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Rural innovation, territorial enablers and obstacles. Lessons from experiences in Castilla y León (Spain)☆

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ABSTRACT

Rural innovation is a complex concept and an emerging area of interest in innovation theory and rural studies. The goal of the 'Territorios Activos' (Active Regions) project is to identify the factors that enable rural innovation through an examination of various rural innovation initiatives in the Autonomous Community of Castilla y León, Spain. Marked depopulation has left the rural areas in this region with an extremely low density, aging population; the high rates of dependency in such populations and difficulties in the provision of public services to remote areas have led to large intra-regional inequalities. These issues notwithstanding, in some rural areas, so-called rural innovators are engaged in initiatives to enhance rural habitability by providing opportunities to improve local social, economic and environmental conditions.

As part of the 'Territorios Activos' project, 24 interviews were carried out with people who, as individuals or as part of a collective, have initiated rural innovation projects. From these interviews it was possible to identify a range of territorial factors that either enable or hinder rural innovation. In this work we discuss each of the factors identified moving away from a focus on the demographic challenges to the viability of rural areas and towards a consideration of the processes of adaptation and improvement taking place in communities due to rural innovation. In this way we hope to offer some pointers to policy-makers concerning the most efficient ways to boost rural innovation in Castilla y León, Spain.

1. Introduction

A complex theory of rural innovation must transcend the frameworks of business and technological innovation and developing such a theory is an emerging area of international research (Burgos, 2023: 20–24). The move toward a complex understanding of innovation—including both its social and economic dimensions—is now enshrined in the definition of social innovation contained in the Oslo Manual's fourth edition (2018). However, beginning in the 1990's, specific advances in the conceptualisation of rural innovation had already begun to take it beyond economics, business, and technology and to normalise its multi-dimensional nature. Some of the available definitions in this regard, include, for example:

> "to give a new way to solve the problems of rural people" (EOL, 1997)

or

> "the introduction of something new (a novel change) to economic or social life in rural areas, which adds new economic or social value to rural life" (Mahroum et al., 2007: 6).

The present article takes its theoretical framework from the

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definition of rural innovation proposed by Burgos & Bocco. According to these authors, rural innovation is:

> "the set of processes that occur in rural spaces at any scale or intensity which involve the generation, dissemination, and adoption of new ideas, artefacts, procedures, social relations, or institutional arrangements, or that emerge from the reformulation of local, pre-existing knowledge with the aim of providing creative solutions for local economic, social, or environmental problems where these problems may be current, or in the future and which affect, or might potentially affect, rural regions and their interrelated social actors," (Burgos and Bocco, 2020: 227–228).

Understanding rural innovation from this perspective—recognising the diversity of its processes and the multidimensionality of its positive effects—speaks to the complexity of the problems now confronting rural populations. Furthermore, it highlights the adaptive nature of the measures required to address the range of needs and problems currently facing communities, including, for instance, widespread depopulation and the crisis this represents for traditional social models and ways of life (Burgos, 2023).

Rural innovation has, until now, received little attention from innovation researchers at the international level (Yin et al., 2022: 473). Particularly in Spain, the field of economic innovation has matured over the past several decades. Since the late 20th century, primarily driven by Ricardo Méndez and the Grupo de Geografía Económica (Economic Geography Group), the concept of *medio innovador* (innovative milieu) has progressively gained prominence, strongly influenced by the contributions of the French economist Philippe Aydalot and the Groupe de Recherche Européen pour les Milieux Innovateurs - GREMI (Méndez et al., 1999: 144). This concept focuses on the analysis of the complexity of local relationships and the socio-labour and cultural characteristics of certain geographical areas that serve as "seedbeds" of innovative companies (Méndez et al., 1999; Climent López and Méndez Gutiérrez del Valle, 2002), especially SMEs (Alonso and Méndez, 2000). At approximately the same period, the Theory of Worlds of Production, specifically the concept of world of production of innovation, proposed by the economists R. Salais and M. Storper, and very focused on the relationships between the agents participating in the production and consumption chains, found an echo in Spain (Martínez-Minguélez et al., 2023). More recently, influenced by the EU policies, concepts such as Smart Rural and Smart Villages have emerged, emphasizing the role of technological and organizational innovation in fostering rural development and combating depopulation (Palma Pinar and Rosa, 2023) in regions that are currently subject to dynamics changes (Mecha López, 2024). GEOVACUI Project (https://www.ucm.es/geovacui/) explore also the physical, social, and economic issues identified by rural communities as contributors to rural depopulation in Spain and examine which of the numerous initiatives implemented in rural areas have either fostered or weakened the stability of these communities (Martínez-Arnáiz et al., 2020; Mínguez García et al., 2023; Mínguez, 2023).

Furthermore, interest into social innovation in rural areas and into a complex perspective of rural innovation (one that moves beyond Neo-Schumpeterian conceptualisations of innovation that focus mainly on the productive economy, to encompass the broader economic, social, or environmental dimensions of rural life) are recently reflected in a series of seminars organised by the Instituto Universitario de Urbanística (Castrillo Romón et al., 2023a; 2023b) and in studies analysing relational dimensions of rural innovation (Guerrero-Ocampo et al., 2024) or inequalities in its social outcomes (Fanjul et al., 2023).

The complex nature of rural innovation emerges also —although not always explicitly—in other research in the Spanish context concerning social innovation (Vercher et al., 2023); the LEADER programme (Garrido et al., 2004; Chevalier and Vollet, 2019; Mecha LópezRosa, 2021); or analysis concerning business innovation in rural Spain taking either a qualitative or gender-focussed approach (Porto Castro et al., 2015; Baylina Ferré et al., 2018; Segovia Pérez et al., 2022). Similarly, the increasing interest in so-called *rural proofing* in legal fields is evidence of growing awareness of the complexity of innovation in rural contexts (Sanz Larruga and Míguez Macho, 2021).

Furthermore, while there is a broad social consensus in Spain regarding the seriousness and the complexity of the problems caused by low population density in the country's rural areas, channelling these concerns into action to address rural innovation presents very particular problems. In their classic, *¿Lugares que no importan?* (Collantes and Pinilla, 2019; *Peaceful Surrender,* 2011) Collantes and Pinilla conclude that, in Spain, it is necessary to "give more weight to policies genuinely oriented towards rural development". They further insist that productive investment alone is not sufficient pointing to the need to enhance quality of life and to "rely more on local initiatives" (p. 234).

This paper aims to examine rural innovation in a Spanish region, Castilla y León, based on the "Territorios Activos"[4] project. The complex approach to rural innovation (it means, incorporating the various dimensions of quality of life in rural communities) is the framework for this research project focused on "addressing all types of problems and needs, at any scale, in a rural milieu through introducing new products, services, modes of working, and types of social relationships and with the aim of achieving enduring social, environmental, and economic development" (Territorios Activos, 2023). "Territorios Activos" makes a qualitative analysis of several rural innovation initiatives in the Castilla y León region (each of which has very different characteristics) and its objective, among others, is to identify "from below" those elements of the regional context[5] that most influence (for better or worse) the outcomes of these various initiatives.

It should be emphasised that Spain's Castilla y León region is one of the largest in the European Union and it is predominantly rural. While Castilla y León possesses some of Spain's most valuable environmental and landscape features as well as a rich cultural heritage, compared to the rest of the country it has suffered some of the most severe demographic problems. In particular, the region has an extremely low density, ageing population.

'Territorios Activos', however, does not focus on the challenges to the viability of rural areas. Instead, the project aims to change the narrative regarding the study of rural communities to centre less on the demographic problems they face and more on initiatives and processes that provide positive solutions for these communities. The emphasis of 'Territorios Activos', then, is on finding pathways to adaptability, attaining and maintaining viability, and improving the quality of life in rural areas.

Another distinctive trait of the 'Territorios Activos' project is that while it "seeks the 'voices' of the actors whose activities form the basis of the phenomenon studied".[6] Unlike other research projects interested in characterising the people who innovate in rural contexts (Kovács Judit et al., 2017; Nordberg, 2020), 'Territorios Activos' attempts an analysis of the *regional* variables—of all types—that have influenced the progress of these initiatives by examining a set of rural innovation initiatives in Castilla y León and by identifying on them the factors which appear to either enable or present obstacles to rural innovation in the region.

[4] "Territorios activos. Diseño y desarrollo de un Living Lab para la caracterización e impulso sostenible de iniciativas innovadoras en el medio rural de Castilla y León" is a *living lab* designed and developed to both investigate and drive rural innovation in Castilla y León's rural milieux. Funding: *Programa de apoyo a proyectos de investigación cofinanciado por el Fondo Europeo de Desarrollo Regional*, Secretary of Education of the Castilla y León Government, code VA200P20.

[5] Within the framework of the present study, we use "territorial" to refer to a geographic space defined or occupied by specific agents or actors as a result of specific socio-historic processes. In this way, several different "territories" may be overlapped on the same geographic space.

[6] 'Territorios Activos' report for funding application, p. 9.

A regional analysis, such as that presented here, is consistent with the Theory of Rural Innovation (Burgos and Bocco, 2020) and has demonstrated its effectiveness in assessing innovation processes (Müller and Korsgaard, 2017; Naldi et al., 2021). At the same time, many researchers insist on the need for both private initiative as well as institutional support to drive innovation in the rural context (Aarts et al., 2008; Castro-Arce and Vanclay, 2020; Koutsouris and Zarokosta, 2020). However, to be effective this support requires a good understanding of the factors influencing the dynamics of rural innovation—including those of a regional nature. Until now, analyses of the effects of regional variables on the processes of innovation in rural Castilla y León have focused solely on the roles of intermediaries and of public policies (Domínguez Álvarez, 2019; Plaza Gutiérrez and Molina De La Torre, 2019).

In addition, although work concerning other geographic regions has confirmed the relevance of studying the experiences of innovators (Douthwaite and Ashby, 2005; Biggs, 2008; Joppe and Brooker, 2013; Ní Fhlatharta and Farrell, 2017) and the value of qualitative methodologies to reveal the realities and perceptions of those involved in rural innovation processes (Vanclay, 2015; Ilovan and Doroftei, 2017; Strijker et al., 2020), there is little research of this type concerning Castilla y León. Furthermore, that which does exist is centred on only a few specific sectors (Rico González and Gómez García, 2009; Alario Trigueros and Morales Prieto, 2016).

The present article wants to identify a range of territorial factors for the case of Castilla y León which either enable or hinder rural innovation. The choice of Castilla y León as the object responds to the interest of questioning rural innovation from a region facing deep demographic problems in terms of aging and depopulation. The insights of the present work regarding the obstacles to rural innovation in such a disadvantaged context may inform public policy in this region and other similar ones.

2. Method and materials: analysis of a sample of 24 interviews concerning experiences of rural innovation in Castilla y León

The materials presented in this article are derived from a series of open-ended interviews with people who have, either independently or as part of a collective or a company, initiated rural innovation projects.

In selecting the sample of initiatives examined in this work, attention has been paid to ensuring, on one hand, the "voices" that face greater difficulties and have fewer resources to be heard by policymakers, as well as those demonstrating a deeper and more complex commitment in their territorialisation. In this way, the sample excludes both large companies (often located in rural areas primarily in search of extensive commercial space and low-cost land, and having a diversified, big influential capacity) and public-private organisations (as they involve direct participation by public institutions). On the other hand, three types of variables are represented in the sample. First, in relation to the notion of rural innovation as complex, it is of interest to reflect two different dimensions: (i) innovation in processes, organisation, and products (goods or services) and markets (one might say "economic" innovation); and (ii) social innovation. Second, given that this investigation aims to identify territorial variables, the sample must also be representative of the diversity of rural milieux present in Castilla y León. These different environments have been defined according to the Eurostat methodology, revised and adapted to reflect the unique nature of urban systems and transportation networks in the region of interest,[7] and fall into three categories: (i) rural in a functional urban area; (ii) intermediate rural; and (iii) remote rural (Castrillo Romón et al., 2022; Pérez Eguíluz et al., 2021). Third, in order to account for the diverse nature and conditions of innovation actors, we consider three different legal statuses: (i) individuals or self-employed workers (*autónomos*), (ii) small and medium-sized enterprises (including cooperatives) and (iii) associations. As a result, the structural sample comprises 18 "figures" of rural innovation in Castilla y León region (see Fig. 1).

All the selected projects (see Table 1in the annex) took place in rural municipalities within Castilla y León and were chosen on the basis of the following criteria: their positive economic, social, and environmental impact on the immediate rural milieu, and their innovative ways of working, products, services or social networking on a regional scale. Although the structural sample comprises 18 "figures", the operative sample consists of 24 innovative initiatives. This is because, by including supplementary cases from those analysed in the "Territorios Activos" research project, it was possible to capture greater diversity in the discursive flows corresponding to each figure and, thereby enriching the results. The individuals interviewed in relation to the 24 projects were initially contacted by telephone to arrange an appointment. In-person interviews were conducted only with individuals directly involved in each innovation project and took place either on the initiatives premises or in the towns or villages where their activities are carried out. Each interview was made between 2021 and 2023 and started with a short introduction to the present investigation and an explanation of its objectives as well as a summary of the principal topics of the interview. Depending on the availability of interviewees, interviews lasted for between 40 min and 2 h. Interviews were recorded and any points emerging from informal conversation were included in supplementary notes. Together with the interviews, notes were made concerning the nature of the spaces used in each initiative and the towns in which they took place.

The course of each interview was informed by the intention to learn from the experiences of individual innovators and, specifically, to identify the factors that either enabled or hindered their initiatives. Thus, interviewees were first asked to explain how they came up with the idea for their project. Secondly, they were asked about any favourable conditions that helped them develop their project, and following this, they were requested to identify any problems they had encountered and what they would like to see happen in the future. The interviews were semi-structured such that interviewees could introduce topics of their own that they considered relevant; this provided opportunities to explore new ideas and opinions. After each interview, a preliminary analysis was conducted to pinpoint the principal themes; these were then organised on a spreadsheet containing all the themes identified alongside the relevant interview extracts. The interviews were then listened to again and the information obtained was reorganised into a further set of spreadsheets bringing together similar or shared opinions and specific responses as well as the relevant extracts from each interview.

The majority of initiatives in the sample involved small businesses (12 out of 24) and associations (5)[8] without employees although there were also some projects (8) where up to 20 jobs were created. The principal activities of these initiatives are diverse: gastronomy or cosmetic products; cultural or specialist community services; materials recycling; restoration of rural milieux; and supporting rural enterprise. More than half of interviewees (15) were aged under 40 years old and had a university education. Almost all of those interviewed were resident in rural areas (11) or had returned to the countryside after a period of living in a city (8). There was only one case of a project headed by newcomers to the rural milieu. In addition, a few innovators worked from a base in a city (4) (see annexed Table 1).

[7] We adapted Eurostat methodology in terms of conditions and minimum size of urban centres to be considered, and also in terms of time required to reach one of them. Only road infrastructure network was considered, as rural railway network and service are in state of severe decline (see Pérez Eguíluz et al., 2021).

[8] Hereafter, the number of cases represented is indicated in brackets.

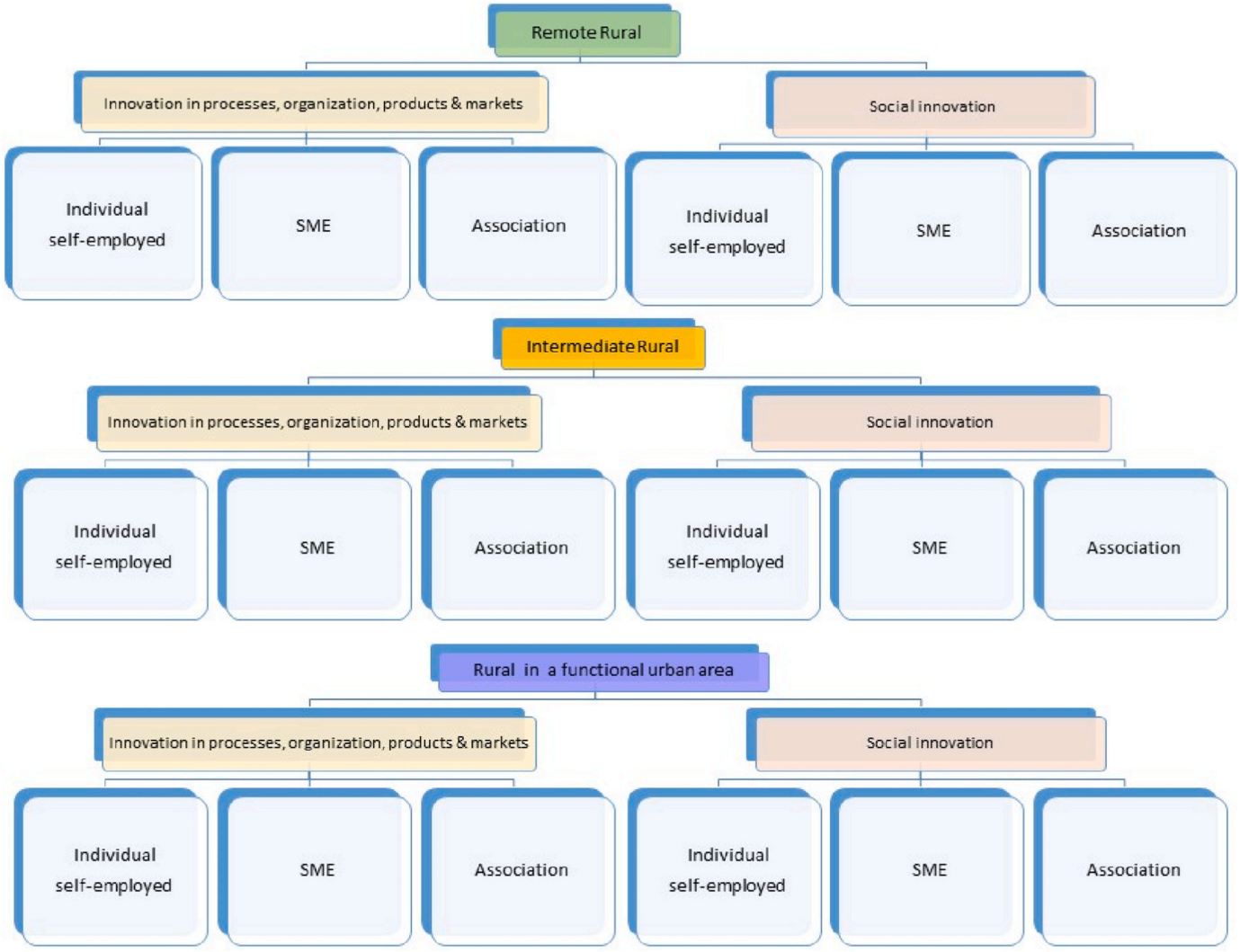

Fig. 1. Structural sample formed by 18 figures.
(Source: the authors)

3. Results

Results are presented according to the topics that emerged from interviews where these are divided into two categories: enablers of or obstacles to rural innovation. Each of these two categories then contains two sub-categories: enabling factors related to a personal connections in the region and local enabling factors; obstacles within the rural milieu and external obstacles. While the present investigation is primarily interested in regional variables, because interviews began with innovators retelling the story of how they came up with the idea for their initiative, it became clear that many enabling factors derived from innovators' personal connections and resources in their region of operation. For this reason, this kind of variable has been incorporated into the analysis alongside other factors characteristic of the region itself such as support from regional governments or other local organisations, or the geographical scale of the initiative. The obstacles cited in the interviews were all regional in nature although they included issues as diverse as the lack of public services to the inadequacies of government subsidies and other financial help.

Finally, in terms of the structure of the text, each of the variables or factors identified are linked to a number of particular initiatives which is indicated in brackets. In addition, in every case, there are also some illustrating extracts from some of the interviews completed. To guarantee the anonymity of participants and to protect their personal data, participants are referred to using a numerical code. This code can be found in Table 1 (see annex) along with some basic details about the innovator in question and their project.

3.1. Enabling factors related to personal connections and resources in the region

Personal links to the territory. Participants cited a range of personal motivations for starting their rural innovation projects. Among the most frequently mentioned were those with a regional dimension such as maintaining contact with family and a sense of community. For other innovators (3) the wealth of resources in the rural landscape was the driver to initiate projects related to caring for the environment. Still others talked of their interest in developing a project focussed on rural life or were primarily motivated by wanting to foster more rural enterprise. The desire to escape urban life was mentioned in many instances. After having lived in cities and having had the opportunity to compare the lifestyle with that in their rural milieux, many interviewees said that they preferred the proximity of work to home, the peace, and the closeness to nature:

> We had the privilege to be born and to live in a village and when we go to the city we can compare. So, as you can compare you say no,

no, I want to return to the life I had, although you lose some things, I'm not bothered, there are compensations. (Participant 11)

property ownership. The property market in Castilla y León's rural regions suffers from stagnation and this applies as much to housing as to business premises and land sales. This situation is partly due to a high level of distrust between landlords and tenants but also because of the large number of second homes and tourist rentals in the region (Alario Trigueros and Morales Prieto, 2012; Lalana Soto et al., 2021). The majority of participants (11) did not have to confront this particular problem because they had inherited property or, thanks to their families, already owned a home, business premises or land to use as the base for their initiative. In other cases (8), participants mentioned that the premises used for their project had been provided by a town council or another public body. Some interviewees (6) recognised the problem of property availability and, above all, cited the issue of outsiders hoping to start a new life in the countryside:

There aren't any homes available (for sale) or land where you can build a house (…) and it's the same with renting: there are many empty houses but lots of people are against the idea of renting it out. (Participant 8)

Having pre-existing business interests or a second business in the same region. The majority of interviewees recognised that their innovation project had been enabled because it complemented one of their principal business activities (6) or that it could be taken forward on the foundations of an existing initiative (5). Nevertheless, there were some innovators (8) who started from nothing and who noted several difficulties in the initial phases of their project: having to work long hours without pay, relying on family support, and the time taken before seeing any positive outcomes or profits.

Local knowledge. Interviewees commented that knowledge of local needs was key to developing a relevant idea. In the majority of cases, an enabling factor in this regard was that innovators either lived in the local area, or in the rural milieu where their initiative was based (11), or they had family connections in the area (6) or maintained direct or indirect contact with local residents (2). However, some participants (8) used a pilot or viability study to test their ideas and gain the relevant local knowledge.

Education outside the rural milieu. According to interviewees, having previous training or education that had taken them away from their rural milieu for some time had been key to finding solutions to the existing problems and emerging challenges of that setting. Among these innovators, several (11) referred to the importance of their further or higher educational experiences and to finding the opportunity to use the learning they acquired away from the rural milieu within that same area:

I always maintain that a person has to leave their village. They have to leave, make their life, make contacts, everything, and then come back with all that luggage to be able to contribute things that otherwise they would have been able to, if they hadn't left their home village. (Participant 13)

Beyond the geographical location of their education, other innovators (3) commented on how they had sought out specific training that would be useful within the rural milieu in which they wanted to innovate. These innovators mentioned attending training courses (3) on business and marketing organised by local action groups, centres for rural development, or other associations; or how they had gained particular knowledge through consultation with experts or other innovators (9). It is interesting to note that many innovators in this corpus had also shared their knowledge to stimulate other projects and rural innovation collaborations (8).

3.2. Local enabling factors

The availability of endogenous resources. Analysis of the interviews shows that the use of endogenous resources was a significant factor in establishing links with a given rural milieu and contributed to the success of projects. In this way, some projects focussed on using environmental resources to develop agricultural, artisanal, or ecological products (7), while others used built resources such as their homes, business premises, and disused or ruined urban developments (1). Similarly, Castilla y León's rich cultural heritage and landscape were mentioned by several interviewees (3) as drivers behind their innovation initiatives. Furthermore, some innovators (7) had been able to integrate certain intangible resources into their projects, for instance, personal relationships, or the trust and willingness to cooperate among rural communities. Other interviewees (4) based their projects on cultural resources associated with local identity, for instance, community history, traditions, and wisdom.

The spirit of our company is to recover old recipes from the time before the avalanche of chemical additives and preservatives in the industrial world (…) There are fewer artisans doing this as time goes on. (Participant 21)

Support *from public administrations or different bodies in the development of projects.* This factor was important for some interviewees (7) as a means to tackle questions of bureaucracy, permits, and public subsidies. Interviewees confirm having received support from local action groups (LAGs), from the 'Asociación de Jóvenes Ganaderos' (Young Farmers' Association) or the 'Asociación Entretantos' (a non-governmental organization) as well as from public administrations. Other interviewees (6) commented that various town councils had helped them find business premises to work from, although the situation is far from uniform across municipalities: several interviewees (10) complained of a lack of support and difficulties in overcoming initial bureaucratic hurdles on their own.

Geographical scale of initiatives. A further factor enabling the development of innovation projects was the geographical scale of these initiatives. On one hand, covering a large area allowed innovators to ensure the profitability of projects even in regions with low population density while, on the other, it enabled them to satisfy the needs of a larger proportion of the target rural community. This was the case whether projects concerned cultural activities (5), specialist services such as the food delivery, communications, or optometry (3), property searching or business collaborations (3). Some of those interviewed also mentioned establishing external connections with surrounding regions, organising talks or concerts in nearby cities or in other rural areas (2) or selling products on external markets (6).

Informal outreach activities. Finally, interviewees revealed that "word-of-mouth", that is, informal communication in the rural milieu was another important enabling factor (8). Several interviewees were of the opinion that trying to bring new ideas into a rural community always carries some risk (3) and finding users and clients requires a sustained outreach effort. Social relationships in rural communities are more tight-knit than in urban areas and, in this context, informal conversations about new products, services or ways of working make a decisive contribution to spreading information about innovation projects. This does not mean, however, that innovators did not also use other communication channels such as social media (5). Furthermore, innovators would often visit trade fairs or travel to towns and villages within their rural milieu of interest to disseminate information and promote their products and services:

I've always gone village to village, association to association, town council to town council. I've travelled thousands of kilometres to leave information. Then I may have very little take up, but that little take up has been enough for people to get to know me by word-of-mouth in this town or that one, more so than using a website, more than the internet. (Participant 9)

3.3. Local obstacles

The low density of rural innovation initiatives. One obstacle interviewees highlighted was the difficulty of establishing contact networks to cooperate with other individuals or rural innovation bodies. Here, the distances involved constitute a barrier to communication between innovators and this issue is exacerbated by a lack, and the poor quality, of transport and communication infrastructure in rural areas. Interviewees identified the lack of appetite for innovation and related this to the low density of innovators and an insufficient flow of information to obtain feedback on ideas or for skills development. Furthermore, pronounced regional differences in terms of geography, infrastructure, and legislative frameworks also seems to adversely affect the efficiency of communications networks as a means to provide mutual support for rural innovators.

Some interviewees commented that this set of factors led to feelings of isolation:

> One of the things about the countryside is that you don't see other projects like yours. You don't know what other people are doing, what's normal, what's possible. So, well, that's where we got in contact with people (…) We joined the 'Asociación de Moda Sostenible de España' (Spanish Association for Sustainable Fashion). (Participant 6)

In fact, to counter this isolation, interviewees emphasised the benefits of leaving their own area to exchange ideas:

> I think it's important to meet people (…) at the end of the day associations fees are nothing compared to the knowledge you gain from your peers. You have to learn (…), get out and do the research (…). You get out and talk with farmers in various places and, if they're in other provinces all the better. We are always asking ourselves questions and there are things you can copy. It's very useful, getting to know other farmers. (Participant 13)

The undervaluation of rural milieux. Some interviewees (5) highlighted how the undervaluation of rural milieux in Castilla y León often creates problems by disincentivising development and curtailing innovation initiatives. They noted that there is little understanding of or value given to innovation initiatives as much within rural communities as outside (5) and they pointed to a lack of proactivity among rural inhabitants as well as little appreciation for the rural milieux themselves. According to some interviewees these attitudes seemed to come from a scepticism about the future, especially among young people (3). One participant noted how frequently they had heard the following sentiments:

> Get out of town if you want opportunities because you won't find any here. (participant 11)

Inadequate access to digital technologies. Another obstacle confronting the innovators interviewed (4) was the absence of mobile phone coverage and the lack of internet connectivity in rural towns and villages. These conditions make it impossible to organise tele-working, online meetings, or the use of GPS as a tool in livestock management (5). Added to this, innovators commented that the digital divide continues to hamper the ongoing development of their initiatives especially with regards to information and communications technology, especially among older people (2).

Inadequate public transport. The majority of interviewees said they have a good quality of life because they live in relatively large villages which have public transport services (8). Others living in centres without services said they have their own vehicle for their day-to-day transport needs (4) while recognising public transport is a problem (3). Often, bus services are very limited (1–3 times a week) and don't provide the necessary access to other public services which tend to be located primarily in larger towns or in district administrative centres. Furthermore, interviewees complained that bus timetables—where these exist—are not well adapted to the needs of working people or those who want to pursue studies outside of their home village (1). Participants also noted that as communities dwindle, public transport decreases. This not only reduces the quality of life in rural communities but also makes it increasingly difficult for rural innovators to attract business from the cities or other regions (2).

Inadequate medical services. Although some interviewees indicated that, compared to the health services available in cities, those in rural areas have the advantage of being faster and more personalised (3). Services were often criticised, however, for their limited accessibility and for being poorly adapted to the needs of local residents. According to interviewees, doctors visit rural villages only a few times a week, meanwhile, health centres located in larger rural towns are inaccessible due to deficiencies in the public transport system. One innovator mentioned encountering a lack of reliable ongoing treatment in their home village and how this problem had obliged them to suspend their project and move to the city:

> To live in a village, you need to have an iron constitution. With certain health problems it's simply not viable to live here with a doctor who visits once a week. I needed daily medication. (Participant 13).

3.4. External obstacles

A lack of financial help for rural innovation from public administrations. Almost half of interviewees (11) indicated various difficulties in obtaining public subsidies for the self-employed or for small businesses and associations. Interviewees highlighted that many public subsidies involve large amounts and that not only are such amounts generally unnecessary for small initiatives but they also come with numerous obligations. In their place, innovators felt it would be better to develop a range of financial schemes better adjusted to the sizes of their business, for instance, micro-credit. Similarly, innovators emphasised how the delays in accessing public subsidies often hinder the efficiency and speed of rural innovation (5). This is how one interviewee expressed it:

> You have to invest large amounts. Subsidies are not well thought out to stimulate you to do things, because you have to wait for the money and you don't know whether it will be given to you or not. (Participant 6)

Another commented:

> (…) you are obligated to take out a mortgage, to commit several years without knowing if it's going to work out for you or not, and besides, it's an investment of millions and that's not necessary. So, the whole bit about subsidies and so on, in the end you should forget about it. (Participant 8)

Interviewees also pointed to a problem with the unavailability of public funds to help with projects beyond their initial start-up phase (2). They feel it was quite easy to start a project but it becomes difficult to keep things going because of the need for sustained support beyond a project's initial phase:

> It can take several years to recover your investments. Although there are various grants to start up an enterprise the most difficult thing is to keep it going. (participant 13)

Interviewees working on innovation projects in culture or heritage conservation stated that there are no public subsidies available to them (4). These innovators have instead had to rely on partner contributions, a factor that has tended to impair the development and stability of their activities.

However, some interviewees were of the opinion that while there are a great many sources of public funding, they are difficult to find. This was especially so for older innovators or those less experienced in digital communications (3).

Finally, with respect to public funding for innovation, another obstacle mentioned was the lack of differentiated taxation and tax allowances specifically for rural innovators (3). Some interviewees gave various examples to show how these sorts of solutions might be useful, above all, for enabling them to invest more in their initiatives. They feel that such concessions are necessary and indeed, fair, considering the problems they have faced due to the isolation and low population density of rural areas: the low demand for services; high costs of transporting products; and limited human resources. As one interviewee said:

> It isn't fair that we pay the same self-employment quota that you would pay in a capital city when a twentieth of the number of people pass by your door compared to the number who'd go by in the city. (Participant 6)

Excessive administration and bureaucracy. Several interviewees highlighted bureaucratic problems, in particular in relation to regional administration (6). To start a business numerous permits are required from different local government departments; this generally involves long waiting times which has negative repercussions on the progress of rural innovation. One interviewee said that administrative procedures should be simplified:

> (…) It has taken a long time to get our business up and running because of a series of lengthy administrative processes. We should streamline processes not put barriers in the way. Sometimes just because of this, look, we could achieve so much but in the end they grind you down. (Participant 7)

Interviewees also commented on various problems specific to the agricultural-food sector. Here there are persistent uncertainties concerning how to close the circle of ecological production (1) and in terms of the legal regulations on artisanal food products (1). This impedes the development of genuinely ecological products and results in inadequate protection for artisanal food producers in a market dominated by big business.

Finally, interviewees noted that among the difficulties they encountered in starting their initiatives was that their new products or services did not fit within the provisions of current legislation (3). This issue causes project delays, additional paperwork, and being subject to inspections that were inappropriate in the context of their particular enterprise leading to further problems:

> When you start growing something new you don't fit anywhere and so nobody helps you (…). To start with, the local government rejected my application for ecological certification because it wasn't on the current list (…). When we requested a special contract to apply for the PAC (CAP: Common Agricultural Policy) they told me: 'they don't certify blackberries'. The computer system enabled it, but only after a long wait and lots of wasted money sending me rejection letters (…). (Participant 14).

The lack of institutional support *for collaboration among innovators and other relevant actors.* Although some innovators have joined forces with other businesses or bodies to complement their services or products (4), private sector collaborations remain uncommon. Interviewees highlighted a lack of institutional support to help establish contact networks among innovators and other professionals. For example, one innovator, who produces plant-based cosmetics, commented on the absence of spaces providing opportunities for entrepreneurs to meet with universities or other academic institutes:

> You have to go there, you don't know anyone, you don't really know what they're going to ask you (…). If there were a space for networking where you could have the opportunity to meet with these people in a, let's say, less formal way, and talk about the ideas you are still playing with, it might result in more collaboration. (Participant 7)

Difficulties of attracting outside investment. According to some rural innovators, an important factor in developing or enriching their initiatives (as well as raising awareness of their chosen rural milieu) was the involvement of individuals or organisations from outside their immediate local region in the form of, for example, businesses (2), employees (3), new residents (1), or visitors (5). Unfortunately, this kind of outside involvement is often curtailed by the difficulties of attracting exogenous resources. This is due to a range of reasons such as the absence of economic incentives, the lack of interest in rural areas, and a scarcity of spaces for interaction with actors from urban centres (4).

Administrative policies are uniformed by the realities of rural settings. Some interviewees indicated that there is a very poor understanding of the needs of different rural milieux (3). The solutions offered by government are rigid and too undifferentiated and thus, investment is often directed at initiatives and developments that are not needed. Interviewees feel that if local people were consulted directly, this might result in more effective investment that would improve conditions in rural areas. As one innovator commented:

> It's important that people from the city and people in the villages listen to one another, get to know each other's strengths, each other's needs, and from there they would come to a better understanding of one another's realities. (Participant 11)

4. Discussion

This analysis of a corpus of 24 rural innovation initiatives in Castilla y León reveals a high level of awareness among innovators of the contribution their endeavours make to improving the liveability of rural regions. Indeed, innovators demonstrate how they have enhanced the economic, social, and environmental fabric of the rural milieux in which their initiatives are based relying on the endogenous resources and the social capital available in these localities. Nevertheless, in geographical terms, the most striking results are associated with the fact that while these innovators have taken many diverse approaches to their local regions, they share many common opinions concerning the territorial factors that either enable or present obstacles to rural innovation initiatives. Increased understanding of these factors could help improve public policies regarding the promotion of rural innovation and, in this way, further enhance quality of life in rural areas.

Analysis of the corpus of cases shows that, thanks to their perseverance, determination, and training (generally obtained outside the rural context), innovators have been able to overcome the disadvantages of their rural milieux including isolation, a lack of resources, and administrative hurdles. Their success, in many instances, has also been contingent on a variety of lucky coincidences such as the availability of specific regional resources, or property, among others. Even so, some projects have stagnated or advanced very slowly due to a lack of financial support and lengthy administrative processes. It is worth noting, in this respect, that the corpus of successful cases used in this work introduces a bias in terms of obscuring understanding of the role of these factors in failed rural innovation initiatives.

This analysis also highlights the problems of administrative management involved in starting and developing rural innovation projects. Local governments in rural areas do not appear to have sufficient capabilities to support rural innovation while regional administrations have little direct interaction with rural areas. In fact, the rural innovators interviewed for this work seem largely independent from the public sector and demonstrate significant capacity to establish their own communications networks with other individuals, businesses, and associations. This has allowed them to remain up to date with important information and to search out collaboration opportunities.

Although the majority of innovators interviewed for this study have managed to solve their problems of access to public services within the rural context, this work underlines the deficiency of access more generally and how this constitutes an issue that not only lowers quality of life for rural communities but also hinders rural innovation. However,

the obstacle presented by poor public services in rural areas has, in some instances, provided the catalyst to innovation: without waiting for government intervention, several innovators have focussed on the provision of necessary community services or the protection of rural environments.

5. Conclusions

Despite the limited nature of the sample analysed, its alignment with the structural sampling approach based on three types of relevant variables, and its confinement to a precise administrative territory – the autonomous community of Castilla y León – improves the reliability of its results from the perspective of developing an applied approach to the promotion of rural innovation. In addition, results have also been obtained whose validity may have a more general nature, most especially, the relevance and scope of the analysis of territorial factors in their relationship with rural innovation as theorized by Burgos and Bocco (2020).

This research has also demonstrated the validity of the qualitative analysis techniques employed by the "Territorios Activos" project to identify territorial factors that facilitate or hinder rural innovation (Burgos and Bocco, 2020) in regions such as Castilla y León, where rural milieu is characterized by aging populations and low-density.

Applying these techniques, the present study contributes new knowledge addressing concerns raised by experts who claim that, in Spain, local initiatives should be prioritized to sustain necessary intensification of rural development policies, encompassing not only productive basis but also on social, cultural, environmental basis, in order to enhance the overall quality of rural life.

The territorial factors identified and discussed in this article as facilitators or obstacles could offer valuable insights for policymakers aiming to improve public actions to promote rural innovation from a complex perspective (Burgos and Bocco, 2020) and consequently the habitability of rural areas, particularly within Castilla y León.

Although it is recognised that, in the current context, certain challenges such as geographical isolation and scarcity of financial resources may fall beyond the direct control of public authorities, several recommended actions can be outlined to improve public policies aimed at promoting rural innovation: (i) consistently mitigating or eliminating administrative barriers by systematically applying rural proofing measures; (ii) strengthening measures to ensure the availability, affordability and adequation of (often existing) real estate resources such as housing and premises necessary for local development in rural areas; and (iii) improving the quality and accessibility of public services in rural areas (health, education, and culture), especially in remote and intermediate rural areas.

Finally, those results gleaned point the way forward for further research. For instance, the analysis presented has demonstrated the existence of networks of contacts among innovators resulting in extensive cooperation; however, a more in-depth analysis is required to reveal the unique characteristics and factors defining these relationships. Further research might also consider the ways in which public services might be better organised in Castilla y León's rural areas in order to boost rural innovation in its widest, complex sense. Additional studies would be also interesting to compare the perspectives of newly resident innovators to those of innovators who are either local or returning residents, to understand the emergent social challenges underlying rural innovation in the region.

CRediT authorship contribution statement

Elvira Khairullina: Writing – review & editing, Writing – original draft, Validation, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Víctor Pérez-Eguíluz:** Writing – review & editing, Writing – original draft, Validation, Software, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **José Luis Lalana Soto:** Writing – review & editing, Validation, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **David Navarro Martínez:** Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **María A. Castrillo Romón:** Writing – review & editing, Writing – original draft, Validation, Supervision, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.

Author agreement statement

We the undersigned declare that this manuscript is original, has not been published before and is not currently being considered for publication elsewhere.

We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed.

We understand that the Corresponding Author is the sole contact for the Editorial process. She is responsible for communicating with the other authors about progress, submissions of revisions and final approval of proofs.

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The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Annex.

Table 1
Summary of the sample of rural innovation projects.

Participant Nº	Type of rural context	Type of innovation	Legal structure	Principal sector	Principal activities	Starting point of the initiative	Number of employees (e)/ participants (p)	Gender of innovator (s) (Man/ Woman/ Both)	Educational level	Years of experience
1	Rural but functionally urban	Organisational	Limited partnership (SME)	Livestock	Production of milk and lamb; assisting other businesses; collaboration with laboratories specialising in genetic lines.	Development of existing business	12 (e)	M	University	7
2	Rural but functionally urban	Product and social	Self-employed	Cultural	Active aging; music therapy sessions; piano lessons.	New	1(e)	W	University	29
3	Remote rural	Social	Association	Cultural/ Outreach	Industrial heritage rescue: carrying out the first phases of conservation and conditioning; making contacts and raising awareness in public administration and wider society.	New	10 (p)	Both	Various levels	11
4	Intermediate rural	Social	On an individual basis	Communication	Maintenance and distribution of an online application providing a rural information service.	New/ Alternative	3 (p)	M	University	2
5	Intermediate rural	Organisational and market	Self-employed	Service	Mobile hearing and optometry service; making and selling glasses and hearing aids; vision therapy.	New	1 (e)	M	University	3
6	Intermediate rural	Market and product	Cooperative (SME)	Service	Creating menus; cooking and distributing meals for home delivery; home help for the elderly.	New	17 (e)	W	Not specified	11
7	Intermediate rural	Market and product	Limited partnership (SME)	Productive	Production and marketing of lavender essential oil; lavender visitor centre.	I Phase: New; II phase: Development of existing business	2 (e)	Both	University	17
8	Intermediate rural	Organisational and product	Self-employed	Productive	Fabrics recycling; design, production and sale of clothing; dressmaking workshops; collaboration with other collectives.	New/ Alternative	2 (e)	W	University	11
9	Intermediate rural	Organisational and social	Association	Cultural	Training in various specialisms and branches of the arts; organising cultural events.	Development of existing business	11(e)	Both	University	19
10	Rural but functionally urban	Social	Association	Social/cultural	Village revitalisation: provision and maintenance of basic services; organising cultural activities.	New	16 (p)	Both	Various levels	8
11	Intermediate rural	Environmental and social	Association (Neighbourhood council)	Social/cultural	Village revitalisation: provision and maintenance of basic services; organising agricultural, social, and cultural activities.	Development of existing business	65 (p)	Both	Various levels	34
12	Rural but functionally urban and remote rural	Organisational and social	Limited partnership (SME)	Innovation management service	Creating and managing co-working spaces; supporting social entrepreneurs (competitions,	Development of existing business	38 (e)	Both	University	12

(*continued on next page*)

Table 1 (*continued*)

Participant N°	Type of rural context	Type of innovation	Legal structure	Principal sector	Principal activities	Starting point of the initiative	Number of employees (e)/ participants (p)	Gender of innovator (s) (Man/ Woman/ Both)	Educational level	Years of experience
					training, consulting, management, obtaining funding)					
13	Remote rural	Market and social	Self-employed	Cultural	Letting co-working spaces; organising cultural workshops and events.	New/ Alternative	1 (e)	W	University	10
14	Rural but functionally urban	Product, organisational, and social	Self-employed	Livestock/ Outreach	Regenerative livestock farming: production and sale of beef; raising awareness about regenerative farming methods.	New	1 (e)	M	University	4
15	Rural but functionally urban	Social	Limited partnership (SME)	Cultural/ Educational	Gathering, compiling, and learning traditional knowledge; organisation of workshops; bringing adults and young people into contact with traditional, rural knowledge.	Development of existing business	1 (e)	M	University	19
16	Rural but functionally urban	Environmental and market	Limited partnership (SME)	Tourism	Accommodation for rural tourism; organising events.	New/ Alternative	15 (e)	W	University	2
17	Intermediate rural	Social	Association (Alliance)	Cooperation	Consulting for rural entrepreneurs: assisting with establishing collaboration between rural and urban businesses.	New/ Alternative	9 (participant businesses)	M	University	2
18	Intermediate rural	Social	Association	Cultural	Organisation of social-cultural activities related to ecology, training, leisure, and sport; working to maintain public services.	New	300 (p)	Both	Various levels	16
19	Intermediate rural	Product and market	Self-employed	Livestock	Raising cattle: production and sale of beef; assistance with sales of food-products of other local producers.	Development of existing business	2	Both	University	3
20	Remote rural	Organisational and social	Association	Livestock	Network of people with specific rural profiles: organisation of annual in-person meetings; round tables; and meetings with experts.	New	150 (p)	W	Various levels	7
21	Remote rural	Process and product	Limited partnership (SME)	Productive	Creating novel, artisanal confectionary and baked goods including vegan and gluten-free products.	New	20 (e)	M	Not specified	26
22	Rural but functionally urban	Process and product	Self-employed	Productive	Production and sale of food stuffs made using pheasant meat; collaboration with educational centres for visitors and students; seminars about innovation/ entrepreneurship.	New	1 (e)	M	University	5
23	Rural but functionally urban	Process and product	Self-employed	Productive	Production and sale of food stuffs made using blackberries.	New	1 (e)	W	University	8
24	Rural but functionally urban, Intermediate	Product, market, and social	Limited partnership (SME)	Service: support and management for home rentals	Providing consultation and a search and management service for newcomers seeking	New	20 (e)	Both	University	6

(*continued on next page*)

Table 1 (*continued*)

Participant N⁰	Type of rural context	Type of innovation	Legal structure	Principal sector	Principal activities	Starting point of the initiative	Number of employees (e)/ participants (p)	Gender of innovator (s) (Man/ Woman/ Both)	Educational level	Years of experience
	rural and remote rural				homes or business premises in rural areas.					

Data availability

Data will be made available on request.

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