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Tourism in smart villages as an enhancement of rural areas

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Abstract: The purpose of this work is to verify whether Italian smart villages are attractive on a tourist level. This article has the task of analyzing and highlighting the health status of rural villages and checking which and how many of them have evolved toward a sustainable rural village concept, defined in the literature by the name smart village. The study was conducted through the analysis of the projects applied within the two smart villages under study. The two villages analyzed focus on future-oriented development and identify already integrated urban areas as a test bed, capable of attracting the population, workers, and tourists. Both villages have common objectives such as, for example, the transformation from rural villages into smart villages, overcoming the state of depopulation, making them attractive on a tourist level, and pursuing urban development strategies, guaranteeing territorial sustainability. The urban planning process and energy policies are integrated with the Smart Village policies, whose meeting point and strength are represented by the technology applied to the city. The method brings to both experiences multiple points of advantage dictated by the fact that the methodology allows all interested parties of citizens to actively participate in the political life and not only of the city. The successful application of transformation policies in these cities can be used as a future test bed to enable other cities to develop and evolve from classic rural villages to smart villages.

Keywords: *Smart village, Digital, Environment, Sustainability, Tourism.*

JEL Codes: L8, R51, Z32

1. Introduction

The strengthening of internal areas has been at the center of debate and scientific studies for years with the aim of identifying solutions capable of reversing the negative trend of the areas, such as depopulation, the loss of human capital, the loss of identity, and the valorization of resources for local areas (Cois, 2020). In recent decades, the world has been affected by numerous changes, including the growing phenomenon of globalization, the increase in the use of digital devices in daily life and new forms of mobility (Amato, 2019). All this has shifted the focus of economic activity to large urban agglomerations, leaving rural areas behind. But rural areas, if appropriately exploited, could benefit from the social evolution that is affecting large urban centers. These realities, in fact, preserve centuries-old knowledge, ancient traditions, both tangible and intangible assets of important architectural, landscape and natural value. With the environmental crisis of the last decade, there has been a re-evaluation of the potential that small towns, if regenerated, could promote sustainable development; in fact, re-inhabiting internal areas could lead to benefits both in terms of urban co-management and both in terms of air pollution and this would encourage healthier lifestyles. Of considerable interest, therefore, is the European approach to smart villages (D'Adria, 2022).

Rurality, together with the values it historically promotes, can be understood as a decisive strategic lever for local development (Podda, 2016). The testing of models based on previous experiences, such as the Leader model, and the exploitation of ICT technologies could lead to interesting evolutionary prospects for these centers (Lampreu, 2022). The transformation of rural areas and their development have always been the subject of scientific analysis and academic debate. Discussions stem from thinking about more effective rural development policies and the search for new approaches to local development programming (European Court of Auditors, 2022). Emerging challenges include that of efficiently and effectively reducing social and economic disparities between rural areas and large centers. Rural areas in the European Union are home to 137 million people representing 30% of the European population and more than 80% of the Union's territory (European Commission, 2021). According to a study conducted by the European LEADER Association for Rural Development (ELARD), citizens living in rural areas believe that investments made in large urban centers should be the same as in rural settings because balanced development of territories is an important goal as well as the development of digital solutions in the agrifood context (Zhang, 2023). To try to narrow the gap between rural and urban areas, the European Union has deployed a few tools including the establishment of smart villages. The smart village project is aimed at those rural centers that are in decline in both housing and technological aspects. The concept of small smart villages is seen as a solution to ensure the survival of rural municipalities and prepare them for the challenges of the future (Martinez, 2021).

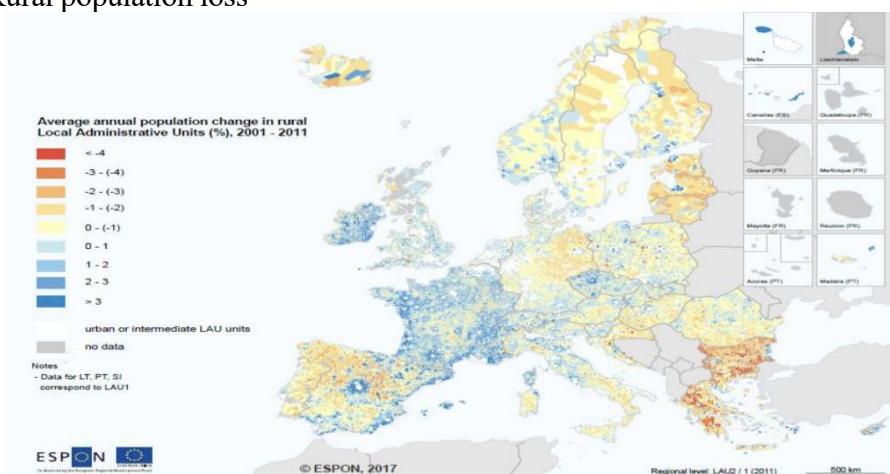
One of the elements that would allow reducing the gap with the urban context is related to the sphere of tourism. The competitiveness of tourist destinations depends on their ability to learn smart logics and thus fostering smart tourism (Ferrero, 2023). Smart tourism, or tourism 4.0, is tourism linked to IoT, big data and artificial intelligence technologies. The smart development of a tourist location is essential to attract visitors (Gomes, 2024). The use of the latest technologies enables the management of tourism offerings by increasing tourist satisfaction. Therefore, it is desirable for tourist destinations to invest resources in technology to improve and personalize the travel experience (Migliaccio, 2022). In recent years, the smart village phenomenon has been the subject of progressive international scientific interest,

both in terms of the meaning of the phenomenon, the various applications of the concept and the funding by different national and international governments (Bokun, 2023). In Italy, however, the phenomenon is still little discussed. This research aims to fill this gap by analyzing the state of Italian smart villages, focusing mainly on the tourism aspect and the investments made to transform them. The main aim of the paper is to investigate the evolution of Italian smart villages starting from an analysis of the literature on the phenomenon and then analysing the case studies of the municipalities of Santa Fiora (Grosseto) and Sellia (Catanzaro) both from the tourism aspect and from the aspect of the investments made to achieve the goal.

2. Literature review and theoretical framework

In recent years the concept of living in smart areas has been linked to the phenomenon of urbanization and to the concept of smart cities. Rural areas are seen as a marginal phenomenon, both as regards the concept of urbanization and as regards the development of ICT components (Evangelista, 2020). In Europe, rural areas (Figure 1) constitute half of the territory and are populated by 93 million people (about 20% of the total population of the European Union).

Figure 1. Rural population loss



Source: Eurostat, ESPON, 2017

These territories are considered rather fragile, as they must face daily challenges related to depopulation, problems related to economic, technological and environmental components, which play a negative role on their development (Bars, 2022). Land management cannot be imagined without the use of modern technologies that create the conditions for meticulous and harmonious territorial development. It must also be considered that the development of existing management systems is obsolete and not effective for the modern technologies and uses that are required for its operation (Savina, 2020), as happens in rural areas. Only in the last decade has there been a rapprochement and interest in rural areas; this growth of interest coincides with the advent of the Smart Village phenomenon (Dassori, 2019). The concept of smart development applied to smart villages has gradually received more attention over the years (Mieczyslaw, 2020). This need stems from the need to slow down environmental, social and economic degradation. The peculiarity of sustainable development is linked to the economic, social and ecological spheres (Zhang, 2020). The concept of smart village identifies with the rural community integrating a municipality or an aggregation of municipalities that employ innovative technologies and practices to improve the quality of

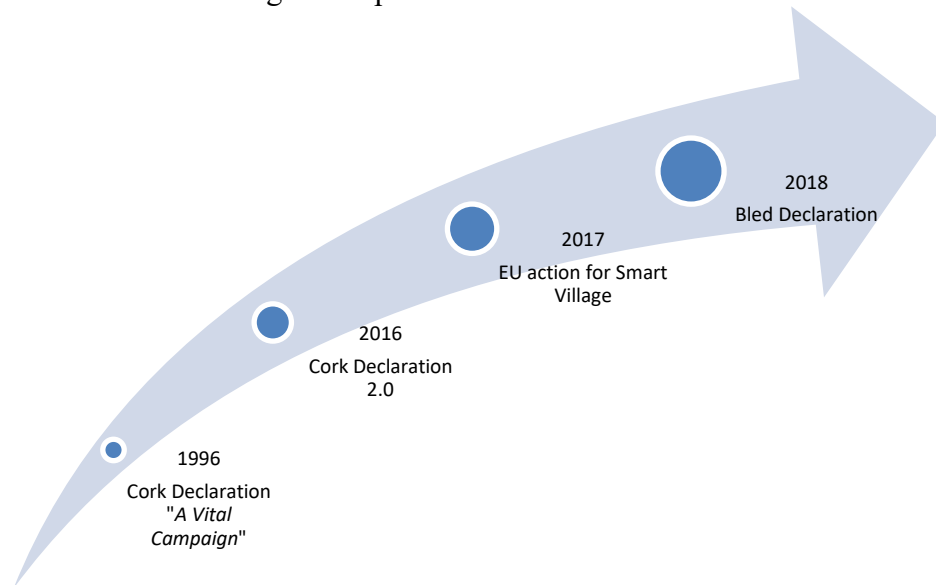
life of its inhabitants and support sustainable development (Carè, 2022). The concept of Smart Villages applies to the principles of Smart Cities outside of "urban territories", it was recently defined by the European Subcommission for Rural Development (Dassori, 2019). The development of the smart city concept in the context of a smaller area and anchored to the concept of technological development has led to the formation of the term smart village. (Herdiana, 2019). The development of smart villages is necessary as a step to strengthen the smart city and its smart implementation (Rachamawati, 2019). The concept of the smart village, therefore, requires the active participation of the community to be able to overcome the preferences of the government and village communities who tend to manage problems conventionally, with little initiative and waiting only for assistance from the central and regional governments (Puteri, 2023). The Smart City and Smart Village dualism can allow us to overcome the traditional phenomena of city development and develop new forms of development suitable for the modern era (Malek, 2019). Although the smart village is not as hot a concept as the smart city, there are various European Community definitions that try to clarify the phenomenon. The European Network for Rural Development (ENRD) defines Smart Villages as "*rural communities that use innovative solutions to increase their resilience, starting from local strengths and opportunities. They are based on a participatory approach to develop a strategy that can improve their economic, social and environmental conditions, taking advantage of the solutions offered by digital technologies. Smart Villages benefit from cooperation and alliance with other communities and actors in urban and rural areas. The initiation and implementation of strategies for Smart Villages can be based on existing initiatives and be financed by various public or private sources*" (European Parliament, 2021). The final report "*Pilot project: smart eco-social villages*" of the European Commission defines smart villages as "*a relatively new concept in EU policies. The emerging concept of smart villages refers to rural areas and communities that build on their existing strengths and resources, as well as developing new opportunities. In smart villages, traditional and new networks and services are enhanced thanks to digital and telecommunications technologies, innovations and better use of knowledge, for the benefit of inhabitants and businesses. Digital technologies and innovations can enable higher quality and standards of living, more public services, better use of resources, less impact on the environment and new opportunities for improved products and processes. The concept of Smart Villages does not propose a single solution, it is characterized based on the needs, potential and strategies of individual territories*" (European Commission, 2019). The objective of smart villages, therefore, is to find practical solutions to transform rural areas into technologically advanced areas. Furthermore, smart villages can strengthen and create cooperation between different community groups but also create collaborative synergies between different rural partners, both in the public and private fields (European Commission, 2018), and can be a potential solution to rural problems (Mishbah, 2018). The origin of the concept of Smart Village in the European Union dates to 1996 starting from the Cork declaration "*A vital countryside*" where the development policy of rural areas focused on the valorization of rural spaces no longer seen in a purely productive guise, but also towards a conception of places for living, business and tourism (Fonte, 2010). The concept of smart village was taken up in the Cork 2.0 European Conference on rural development, called "*A better Life in Rural Areas*", organized by the European Commission in Ireland, where the objectives on how to react to current challenges and opportunities were developed that European rural areas have to face, highlighting the problem of the digital gap between rural and urban spaces, and the need to initiate approaches between the different political actors (European Commission, 2016). The conference addressed the concerns of rural areas, focusing on the youth exodus, paving the way for further orientations on future policies to be adopted, including the concept of Smart Village. The conference concluded that investments in rural areas are of fundamental importance, to encourage identification processes through economic growth and ensure that

they become an attractive place for people both in terms of housing and work. In 2010, the European Union officially adopted the notion of smart applied to the new ten-year growth strategy Europe 2020 stating that Europe should become a smart, sustainable, and inclusive economy. The smart growth strategy supports sustainable development, which is achieved by promoting research, innovation, and knowledge to achieve economic growth (Naldi, 2015). In 2017, however, a further document, drawn up by the European Commission together with the European Parliament, called "*EU action for Smart Villages*" lays the foundations for the evolution of the villages of the future (European Commission, 2017). In the document, in fact, Smart Villages are defined as a tool that would enhance the strengths of local areas with the help of digital technologies, recognizing that each area should be able to use ICT technologies, with the aim of improving the local economy and basic services. To develop the proposed initiatives, the European Union has launched sixteen initiatives for the development of digital policies, research, energy and rural development. In addition to the funds already put in place such as the CAP, rural development policy and cohesion policy, further funds have been presented such as the Innovation Partnership for Agriculture (EIP-AGRI) and the European Development Network rural (ENRD). Two other projects have recently been launched with the aim of improving knowledge of this approach, and they are the SMARTA project which focused on improving and developing mobility within different rural areas (SMARTA, 2021), and the Smart Eco-Social Project Villages which studies the characteristics of the villages identifying opportunities to improve connectivity and propose digital solutions (European Union, 2019). The phenomenon of Smart Villages has continued to evolve over the years, becoming a priority for the European Union. In the Bled declaration in Slovenia in 2018, the European Union affirms the interest of Smart Villages with the aim of promoting digital and social initiative by developing new rural communities throughout the Union (Bogovic, 2018), developing a network that puts in relation and in contact with all the rural areas and associations of Europe with the aim of exchanging information on their respective experiences (Smart Village Network, 2018). During the declaration it was stated that "*the rural digital economy, if developed in an innovative, integrated and inclusive way, has the potential to improve the quality of life of rural citizens and, therefore, contribute to addressing current depopulation and migration of rural areas*"ⁱⁱⁱ. The declaration proposed two solutions to obtain better conditions for the development of rural areas. The proposed solutions concern the synergy between technological results, such as precision agriculture, digital e-learning platforms, e-health, shared economy, circular economy, social innovation and rural tourism. In 2018, the Smart Village Network was established which unites European villages and associations allowing the exchange of information. The first two members of the network are the city of Ptuj in Slovenia and the University of Ljubljana which acts as support for the network. Today the network has grown and includes villages and associations throughout Europe (Smart Villages, 2018). Another important document for the development of smart villages was the rural development policy 2014-2020, which contributes funds to development programs in rural areas (European Commission, 2020). Among the various projects implemented by the EU is the LEADER project, a project already launched in 1991 but recently extended with a further model called CLLD (European Commission, 2021). The objective of the program is to focus on local communities and accelerate solutions that are based on bottom-up local initiatives. One of the recent programs launched by the EU, however, is the PAC 2023-2027. One of the main themes on which the debate relating to the new CAP Programming 2023-2027 is focusing is that relating to the development of smart villages, seen as a strategic tool for strengthening the socio-economic fabric of rural areas (Puttha, 2023). The European Commission has attributed a strategic role to the 2023-2027 CAP for the promotion of Smart Villages, providing support for "*Smart Municipalities*" strategies among the cooperation interventions referred to in art. 77 of Reg. (EU) 2021/2115. To further underline the importance given to

this type of planning approach, the Commission has established a specific result indicator of the CAP Strategic Plans: indicator R.40 "*Intelligent transition of the rural economy*" with which it intends to evaluate the number of "*Smart Municipalities*" strategies supported through PSPs. This type of intervention contributes as a priority to the specific objective "*Promote employment, growth, gender equality, including women's participation in agriculture, social inclusion and local development in rural areas, including the circular bioeconomy and sustainable forestry*" and represents a further tool aimed at promoting aggregate territorial and local approaches (Pianeta Psr, 2020). As mentioned previously, there is no common definition of smart village, but this concept depends on the structures of each individual rural area (Zavratnik, 2018). The focus when talking about smart villages, therefore, are ICT technologies, which can be considered as "*the IoT describes a worldwide network of billions or trillions of objects that can be collected from the world-wide physical environment, propagated via the Internet, and transmitted to end-users. Services are available for users to interact with these smart objects over the Internet, query their states, as well as their associated information, and even control their actions*" (Chen, 2010). The Smart Village phenomenon, therefore, must be seen as an opportunity to improve the quality of life of the population of rural areas, and this can happen through a bottom-up approach, starting from a territorial animation path that involves the local community, and for this purpose technology can help rural communities make this leap in quality, bringing a concrete benefit to the community (Vidmar, 2022). Smart villages are influenced by an even larger phenomenon, smart cities. Smart cities, as well as smart villages, have been at the center of a long debate, as there was no real definition of smart city. The concept of Smart Cities has become increasingly popular in scientific literature and international policies over the last two decades. Cities around the world have begun to look for solutions that enable transport links, mixed land uses and high-quality urban services with long-term positive effects on the economy (Albino, 2015). Giffinger (Giffinger, 2007) defines smart cities as "*A Smart City is a well performing city built on the 'smart' combination of endowments and activities of self-decisive, independent and aware citizens.*". From this definition we can see a certain similarity with the phenomenon of smart villages, as both use technological tools to develop (Kumar, 2016). The spread of Big Data and the ever-increasing evolution of ICT technologies make smart initiatives more feasible in individual centres, both rural and urban (Hashema, 2016). The concept of smartness for cities tends to focus more on big data and the opportunities to transform the way cities function related digital technologies (Lombardi, et al. 2011). The idea of smart villages is not simply an extension of these principles to dispersed areas: it focuses more on local communities taking their future into their own hands, often but not exclusively with the help of digital technologies. It should be considered that research on smart cities is more developed than that of smart villages (Visvizi, 2020). The ICT technologies that are used in smart cities, if well focused on rural areas, could also be used in smart villages, allowing them to have a range of innovative solutions ranging from smart agriculture to smart education (Kaur, 2016). The transition from urban centers to intelligent urban centers, through the use of ICT tools, is not simple and immediate, many urban centers have had many difficulties in transforming themselves into smart cities, and the same fate could befall smart villages, but some researchers think that the transition from rural villages to smart villages could be more immediate than in large centers, as local and regional competition could help identify challenges and possible solutions (Kos, 2018). The impact of technology on rural areas was first studied in October 1984 by Howard Newby, where through a paper entitled 'Rural Communities and New Technologies' he examined the rural impact of the digital revolution, stating that the use of technology would reduce the gap with urban centers. To date, this gap has not yet been bridged, but the use of targeted technologies such as Connected and Autonomous Vehicles (CAVs), Internet of Things (IoT) and smart grids, can overcome the technological problems that plague rural centers (Cowie, 2020). The

evolution of the smart village concept is summarized in figure 2:

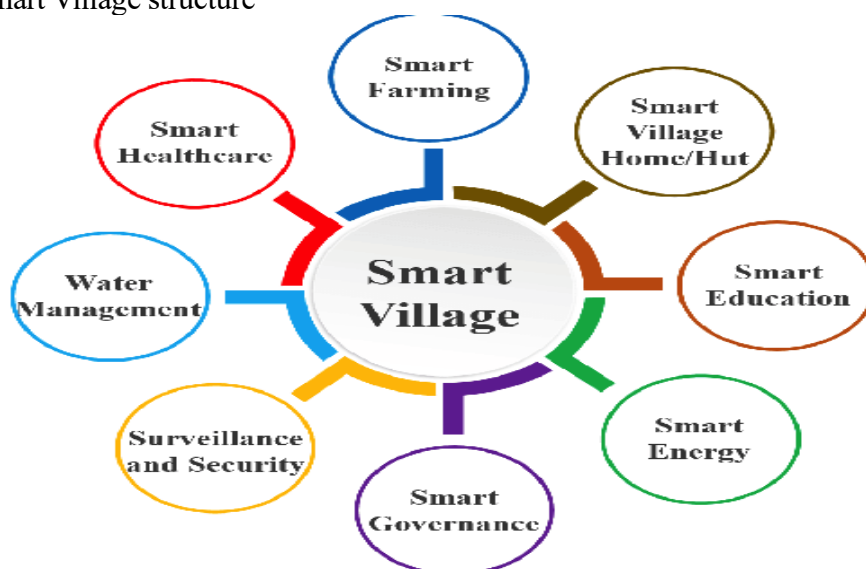
Figure 2. Evolution of smart village concept



Source: Personal Processing

The concept of smart village, therefore, determines a strong link between community, production and consumption methods, culture and the environment in which people live (Atkociuniene, 2019). The concept of smart village seems to include some aspects of rural development that are linked to the use of various forms of digital technology (Jayanthi, 2022). From the analysis of the literature, smart villages have a structure that can be considered a "spider web" (figure 3) where all areas of interest and development can be considered current and innovative elements of the Smart Village concept (Morbiducci, 2023).

Figure 3. Smart Village structure



Source: Smart Village: An IoT Based Digital Transformation (Degata, 2021)

3. Methodology

This work aims to answer the following questions:

- R1: Which Italian municipalities have initiated transformation practices from small rural municipalities to small intelligent municipalities?
- R2: What strategies have been adopted to transform into smart villages?
- R3: Are Italian smart villages attractive for tourism?

The answer to the research questions is developed by analyzing the main bibliography which constitutes the necessary theoretical framework. It critically presents the main scientific contributions regarding rural and inland areas of Italy, as well as sustainable tourism. This is followed by an illustration of the method and materials used. A large paragraph is then dedicated to a detailed analysis of the outlined context, focusing on the geographical and social characteristics of rural and inland areas, and on the main and recent initiatives for their development. The paper analyzes the state of rurality of the Italian territory. The methodology of the paper was to analyze the various national documents used for the study area and on the collection of geolocalized information and data. It was possible to analyze the data on tourism and the geographical distribution of Italian rural municipalities thanks to the help of documents and the database provided by the Istat institutional website. The lines of research used in this work focus on the topic of sustainable tourism. The common thread is dictated by the fact that it leverages the concept of sustainable development, and this is in line with the phenomenon of smart villages. One of the objectives of smart villages is to increase the territorial tourist offer and an integrated use of the same through valuable services for operators and tourists, territorial marketing operations (Bruscino, 2011), digital connection systems between the various tourists, integration with clean mobility services.

The development of smart villages, therefore, can contribute to increasing and developing tourism and improving the village to grow from an economic, cultural, traditional and infrastructural point of view, such as the creation of new modern and technological hotel facilities (Dembovska, 2023). Tourism, therefore, cannot be considered only as a mere factor of economic development but must be seen as an element capable of creating an integrated system that can benefit the entire area concerned (Di Ludovico, 2019). Tourism in rural areas is widely recognized as a driving force in overcoming the decline of local development strategies. To promote the economic recovery of these areas, soft and integrated tourism practices have been put in place and, as a result, community-based, green, small-scale eco and slow tourism models have been promised as, they can contribute to local economic growth by creating links between resources and rural capital (Di Bella, 2019).

Rural tourism involves a large number of factors, and their relationships are complex (Feliziani, 2016). To achieve sustainable control and optimization of rural tourism, it is important to define the internal linkages between the various factors, analytically analyze the effects on sustainability, and propose measures to improve and enhance the sustainability of rural tourism (Jian, 2023). In the process of rural tourism development, attention should not only be paid to individual tourism products but to the sustainability of rural development. Thus, rural tourism can only be sustainable through sustainable rural development that provides financial and technical assistance to rural areas and thus brings development opportunities from a rural tourism perspective (Jian, 2023). Case studies are widely used in tourism research. The application of case study methodology is taken for granted by

mainstream tourism researchers. There is no single research method appropriate for a field as broad as tourism.

The use of alternative methods, from experiments and surveys to narratives, must be considered and used to obtain results in tourism research. Case studies have the advantage of adapting to both quantitative-deductive and holistic-inductive parameters, showing an elasticity not found in other alternative research methods (Beeton, 2005). Moreover, according to other studies, case studies are developed through the control of a triangular combination of techniques, strategies, and theories (Johansson, 2007). The choice of the case study is dictated by the fact that the existing literature still pays little attention to the phenomenon of smart villages in Italy from a tourism perspective. This study contributes to extending the literature on the Italian smart village phenomenon and provides detailed information on the tourism and financial impact of the phenomenon. Subsequently, the "case study" of the municipalities of Santa Fiora (Grosseto) and Sellia (Catanzaro) is presented, which are the first two Italian rural municipalities to have initiated transformation policies into intelligent villages.

The data collected on the two municipalities are the result of a careful analysis of information found from institutional sites and analysis documents found by the National Rural Network program. As regards the municipality of Santa Fiora, the tourism impact was analyzed, while for the municipality of Sellia the investments made to transform the village from rural to intelligent were analyzed. Finally, the conclusions, implications for science and operational practice are analyzed, as are the limits of the research and possible future developments.

4. Initiatives already existing in Europe

The European Union is an exemplary intelligent model (Visvizi, 2020) that constantly invests in innovation and development, bringing with it a series of both economic and social advantages, in fact, quality of life has always been the key force of the process decision-making of the European Union. Smart villages fall within the concept of innovation and development on which the European Union is based, the strategies aimed at enhancing small towns and rural areas are multiple and can be divided according to different purposes: tourism, social, productive, cultural and artistic (Nesticò, 2019).

There are numerous European examples of smart villages, the most active nation is Finland, which uses digital tools to enhance basic services such as health, education and mobility (European Network for Rural Development, 2020). Another country very active in smart villages is Germany, where in the areas of Eisenberg, Gollheim and Betzdorf-Gebhardshain, it carries out numerous initiatives aimed mainly at the use of the Living Lab approach (European Network for Rural Development, 2020). Slovenia, through the Smart Village Tomorrow project, aims to safeguard the quality of life in rural areas by investing in social innovation, digitalization, sustainable mobility and circular economy (European Network for Rural Development, 2020). Another interesting project is the EUSALP Smart Villages (European Commission, 2021) which concerns the Alpine villages of Germany, France, Italy, Liechtenstein, Austria, Switzerland and Slovenia, with the aim of strengthening local infrastructures and services linked to the use of broadband and development of tourism (D'Andria, 2022). Also in Romania, in the Maramures region, initiatives for the development of smart villages have been carried out. The strategy adopted had the objective of increasing tourism, as the Maramures region presents several points to generate its development in tourism terms (Mateoc-Sirb, 2022). There are seven villages in the region, and both have focused on enhancing local infrastructure and traditions. In the villages, in fact, from 2015 to 2021 the hotel structures increased from 42 to 122 units, recording an increase of 188.09%. This growth was based on the growing interest of

tourists in general, and foreign tourists in particular, in the opening of this area to foreign tourists, through a promotion campaign supported by both traditional and modern means, but also on the possibility of supporting these businesses from different financing programs (Ciolac, 2022).

5. The Smart Village in Italy: The Santa Fiora and Sellia cases

Italy is one of the 27 nations that are part of the European Union and with its 302,068 km² it is the 10th European nation by surface area and the 72nd in the world, and has, as of 31 December 2023, 58,997,201 inhabitants, classifying itself as the 25th nation in the world and 6th in Europe by number of inhabitants. From an administrative point of view, Italy has 7,901 municipalities of which 70.1% have less than 5,000 inhabitants, while 29.8% have a population between 5,000 and 250,000 inhabitants, where 68.3% of the Italian population resides (table 1). At a geographical level, Italy has a hilly surface of 41.6% and a mountainous surface of 35.2%. Almost half of the population, 38.7%, lives in the hills, while 12.1% lives in the mountains, while 55.9% of the population lives in urban areas.

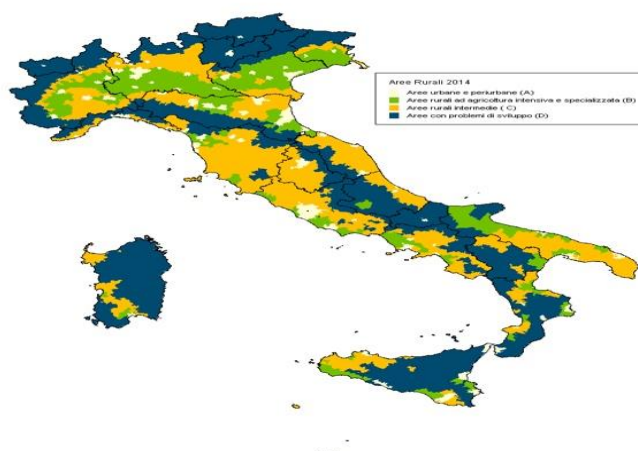
Table 1. Municipalities by geographical distribution

Years	2019	2020	2021	2022	2023
<i>Nord-Ovest</i>	2,996	2,995	2,995	2,995	2,992
<i>Nord-Est</i>	1,397	1,388	1,390	1,390	1,390
<i>Centro</i>	971	970	968	968	968
<i>Sud</i>	1,783	1,783	1,783	1,783	1,783
<i>Isole</i>	767	767	768	768	768
TOTAL	7,914	7,903	7,904	7,904	7,901

Source: ISTAT

As regards territorial distribution (Figure 4), as can be seen from Table 1, the North-West is the most populated territory in the nation, followed by the South, the North-East, the Center, and the Islands. At a regional level, the regions with the highest number of municipalities are Lombardy (1,506) and Piedmont (1,181), followed by Veneto (563) and Campania (550).

Figure 4. Area Rural in Italy



Source: reterurale.it

Starting from 2011 the degree of urbanization according to the European classification of Municipalities is divided into three levels: City; Small Towns, and Rural Areas. In Italy, 63.8% of the territory is represented by rural areas in which 17% of the population lives, while small cities represent 33% of the municipalities and 47.8% of the population resides there, and the cities represent 3.2% and 35.2% of the population resides there. From this, it is easy to deduce that the Italian territory is mainly occupied by rural areas. As can be seen from Table 2, the regions with the highest rate of rural surface area (around 80%) are Valle D'Aosta, Trentino Alto Adige, and Molise. Other regions that register shares of predominantly rural territory are Abruzzo, Piedmont, Basilicata, Friuli Venezia Giulia, Sardinia, Calabria, Tuscany, Liguria, Campania and Marche (Istat, 2023).

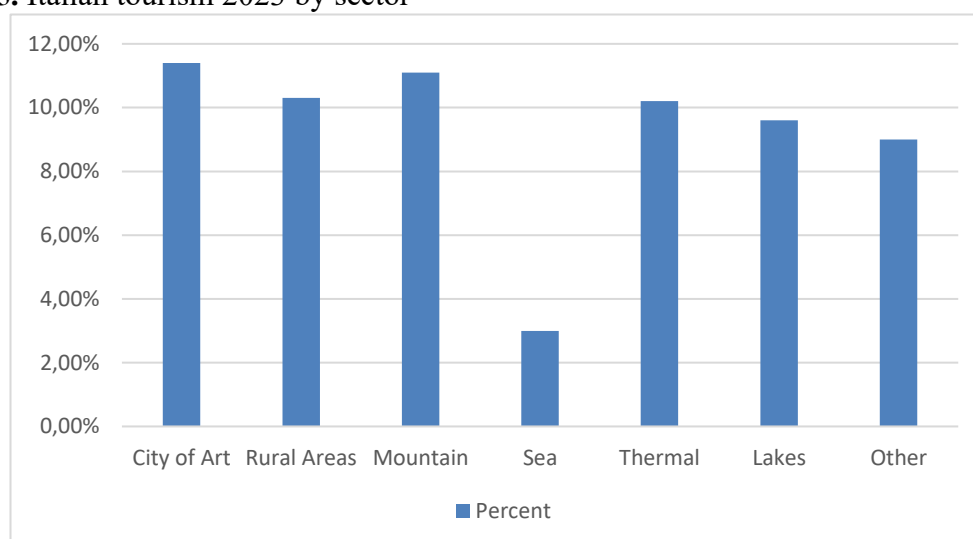
Table 2. Italian regions by rural area

<i>Region</i>	<i>Employment (%)</i>	<i>Region</i>	<i>Employment (%)</i>
Piemonte	76.6	Valle D'Aosta	93.1
Liguria	66.9	Lombardia	54.2
Trentino-Alto Adige	87.7	Veneto	49.0
Friuli-Venezia Giulia	73.5	Emilia-Romagna	57.9
Toscana	67.4	Umbria	56.1
Marche	64.7	Lazio	52.6
Abruzzo	77.6	Molise	89.3
Campania	66.5	Puglia	14.3
Basilicata	74.2	Calabria	72.0
Sicilia	37.2	Sardegna	72.2

Source: ISTAT

From these data, it is easy to understand how Italy plays a favorable role in the development of smart villages. The establishment of smart villages, if well structured, could lead to a series of advantages, not only on a technological level but also on a tourist level, as they could be an attractive center for that type of tourist who loves walking in nature and discovers the architectural and culinary delights of Italian villages (Garau, 2015). Tourism in Italy has always been one of the driving sectors of the national economy (Basile, 2010), and the 2023 data confirms this trend. In 2023, Italy recorded +8% compared to 2022, the sector is driven by foreign tourists who, in 2023 alone, grew by 13.7% compared to the previous year, however, as regards the domestic market there is an increase of 2.8% compared to 2022, which suggests much slower domestic tourism. The areas that recorded significant numbers were the cities of art (11.4%) and the mountains (11.1%). Tourism in rural areas (10.3%) and spa tourism (10.2%) (Drintle, 2023) also grew. Seaside tourism, on the other hand, is the area that has recorded more moderate growth. The data is easily readable from figure 5

Figure 5. Italian tourism 2023 by sector



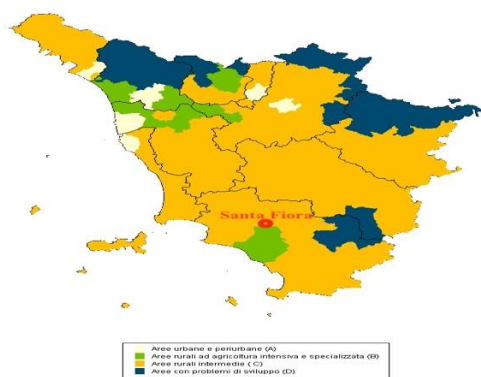
Source: ISTAT

From the data on tourism (table 3), we can see how rural areas represent the third driving segment of Italian tourism. The development of smart villages can further contribute to increasing the rural tourism segment and can contribute to the growth of a creative economy, tradition, and community symbols, the improvement of infrastructure, and the introduction of new technologies (Dembovska, 2023). Italian villages are very important for the history and cultural identity of the nation, some of them are experiencing a period of profound transformation, going from historic villages to intelligent villages in which, using technology, it is possible to digitize the ports with the public administration and transform them into attractive places for tourism. The transformation of rural villages into smart villages is foreseen within the "*Italy 2025 Plan - Strategy for the Technological and digital innovation of the Country*", and while awaiting the start of the plan, some villages have already opted for a rapid digital transformation. The villages that have launched successful projects and which have allowed the town to be transformed into an intelligent village are the municipalities of Santa Fiora in Tuscany and Sellia in Calabria.

Santa Fiora

Santa Fiora (Figure 6) is an Italian municipality of 2,484 inhabitants in the province of Grosseto in the Tuscany region. The municipality of Santa Fiora is part of "The Most Beautiful Villages in Italy", a private association that favors small Italian municipalities that decide to join and that present an important historical and artistic interest.

Figure 6. Municipality of Santa Fiora (Grosseto)

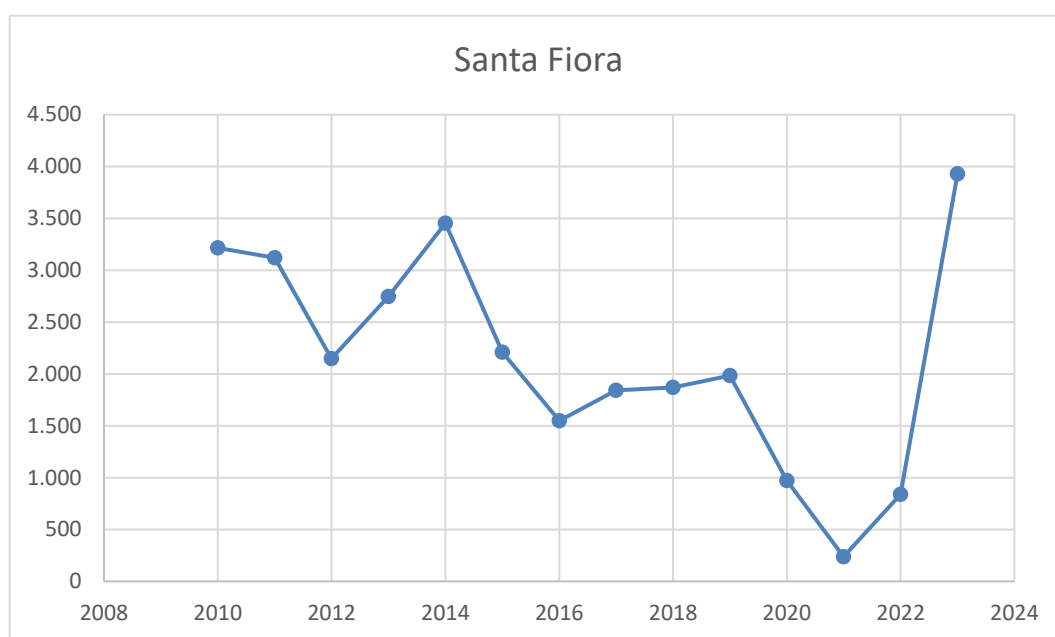


Source: comune.santafiora.gr.it

The municipality of Santa Fiora extends for 63 km² in the Monte Amiata area and is spread over hilly and mountainous areas. Because of its high tourist qualities, the village was recognized with the orange flag of the Italian Touring Club in 2015. In 2020 the Municipal Administration of Santa Fiora launched a project called "Santa Fiora Smart Village" which envisages the relaunch of territorial attractiveness through the development of relocatable activities, an attraction for families and workers. The public works project developed by the Administration is divided into three functional sections, providing, in the first instance, for the revaluation of the former hotel structure "Il Petruccio" in the hamlet of Bagnolo to create an innovative structure that can be used as a hub technological, start-up and coworking incubator. The "Santa Fiora Smart Village" project was approved and nominated for the Borghi Call in March 2022. The project is part of the investments envisaged by the Italian PNRR (National Recovery and Resilience Plan) as regards Mission 1 - Digitalization, innovation, competitiveness and culture, Component 3 - Culture 4.0, Measure 2 "Regeneration of small cultural sites, cultural, religious and rural heritage", Investment 2.1: "Attractiveness of historic villages" financed by the EU under the NextGenerationEU program. The Santa Fiora Smart Village project, still under construction, begins with the regeneration of the former hotel building in the hamlet of Bagnolo. The structure, in addition to being used as a technological hub and incubator for start-ups, will also be used as a useful environment for tourists where they can meet and work. The structure will be equipped with a high-speed internet connection thanks to which tourists will be able to work remotely away from the chaos of the city. At the beginning of 2024, however, the second step of the project is expected which involves the construction from scratch of a hotel structure in line with the surrounding environment. The structure will be on one level to leave visibility to the Pratuccio public park. On the ground floor of the structure, offices, laboratories and a warehouse will be built. The strong point of

the structure is the connection with the city park and the construction of windows that will make the workstations bright and attractive (Comune di Santa Fiora, 2024). Part of the project has already been started and from this, the strong point of "*Santa Fiora Smart Village*" is smart working (Santa Fiora Turismo, 2024). Thanks to the installation of broadband throughout the village, the municipality has allowed public administration workers, employees of private companies, and self-employed workers to benefit from the tranquility of the village and to be able to take advantage of the new technologies installed to be able to work. in tune with the beauties of the village. The first part of the project has already achieved a good number of results the municipality has seen the number of tourists grow exponentially. Based on the data processed and released by the Amiata Tourist Area, the municipality of Santa Fiora from January 2023 to July 2023, compared to the data for the same period of 2022, saw arrivals grow by 196.9% and presences by 141. 9%, data that shows how, using winning strategies, a rural village can become attractive and consequently increase tourist flows even in periods of the year considered low season, thus allowing tourism to be depersonalized and create a market outside the full season (Comune Santa Fiora, 2024). In figure 7 it is possible to see how the tourist flow grew within the Municipality of Santa Fiora from 2008 to 2023.

Figure 7. Tourism in Santa Fiora



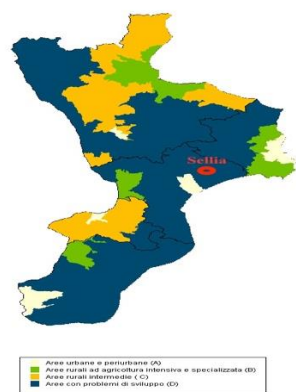
Source: regione.toscana.it

The creation of innovative and useful accommodation and hotel facilities for the needs of tourists, therefore, is allowing for the emergence of operators with whom to share future strategies. The adoption of tourist hospitality allows the hotel sector and private and public housing units to no longer compete but to create an autonomous, independent, and homogeneous hospitality product integrated within the territory.

Sellia

Sellia (Figure 8) is a municipality of 477 inhabitants in the province of Catanzaro in the Calabria region. The municipality is located 560 meters above sea level and stands in a predominantly hilly area.

Figure 8. Municipality of Sellia (Catanzaro)



Source: sellia.asmenet.it

Despite having a small number of inhabitants, Sellia has been subject to a series of transformations in recent years which, by a project inspired by the valorization and promotion of its cultural and environmental beauties, have allowed the medieval village to transform into an intelligent. Furthermore, the village boasts a small record, that of having eight museums in its territory known by the term SMOSS Museum Network, an advantage that allows the village to be very competitive on a tourist level. In recent times the village has been the protagonist of an important transformation, in fact, thanks to a series of investments in the area, projects have been launched that have allowed it to be transformed into a smart village. Among the works that have been carried out within the village and which have transformed it into an intelligent village there are the street furniture works Sellia has three SMART Benches installed within its center. The intelligent solar-charged benches allow the devices of citizens or tourists to be recharged, guaranteeing access to the internet, and knowledge of the main environmental parameters, and allow you to check tire pressure and will be illuminated at night. The strong point of the intelligent benches is the provision of solar panel systems which will allow them to function with zero impact on the municipality's coffers. The village of Sellia has also started the installation of Health Stations which allow the health status of citizens and tourists to be monitored, and finally, an instrument for air monitoring has been installed. A further project is the Sellia Guide App which, based on a series of itineraries, allows tourists to explore the village. The village of Sellia has been more active in tourism, in fact, through LORaWAN technology it is possible to monitor entrances to museum spaces and the availability of parking spaces. Thanks to these projects, the municipality of Sellia has attracted the attention of the national and international media, allowing an increase in tourists and obtaining greater funding. The village of Sellia appears to be the most financed in the country. The funding that allowed Sellia to evolve into a smart village falls within the 2007-2013 PSR funding of 150 thousand euros, which was channeled through the PIARs managed by the Province of Catanzaro (Di Napoli, 2022). Through this funding, the municipality managed to create a free Wi-Fi network open to all citizens, effectively becoming the first smart village in Italy. Further funding gave the start to new projects which allowed Sellia to confirm itself as an intelligent village. Among the various sources are the PNRR Borghi Call which allowed 1.6 million euros to be obtained, the CIS which allocated 1.3 million euros, the Sport and Suburbs Call with 700 thousand euros, Hydrogeological Instability 1.3 million euros, Libraries and historical archives 60 thousand euros and

Private Support Fund with 689 thousand euros. These loans have allowed Sellia economic growth through the arrival of new businesses and the creation of new jobs, demographic growth with the increase in residents, families, and more births, and finally, greater social inclusion through digitalization (Zicchinella, 2023). As far as the municipality of Sellia is concerned, there is no tourism data, as there are no hotel facilities in the village. The only data obtained are fruits of interviews given to the national RAI and from interviews given by the former mayor of the small municipality. Analyzing the area of the area, it denotes that near the small town of Sellia, there is the City of Sellia Marina, which being facing the sea, has seen an exponential increase in tourist flows over the past 10 years. Thus, based on the research done on the small town of Sellia and from the statements made by the relevant bodies, it is estimated that tourists who visit the small town of Sellia rely on the City of Sellia Marina, as it has easier accessibility and attractiveness by virtue of its location on the sea. Considering this, it would be desirable for the small municipality of Sellia to equip itself with its own hotel infrastructure so that it can accommodate tourists within its territory and maximize the benefits that a smart village, both in economic and tourism terms, could bring to the community.

6. Conclusions

Considering the literature reviewed, it is concluded that smart village is a concept for the development of small villages which, using technology, enable them to offer various services to the citizenry, such as facilitating access to information, providing free and unlimited wi-fi network, and improving the local economy through increased attractiveness. Since the EU launched the Smart Small Municipalities Action in 2017, the concept of smart villages has evolved and is currently being promoted as a key tool for local development. It is precisely the European initiatives that have contributed to the growing importance of the smart village concept, and many villages in the EU have taken decisions at the local level, such as the ENRD and Smart Rural 214 and 275.

The Smart Rural 21 project itself is based on local experiences and together with 21 smart villages has initiated a series of interventions to evaluate the smart village concept on the ground. Currently, the EU has launched the new Common Agricultural Policy (CAP) 2023-2027, which offers funding opportunities for the creation of smart village development strategies, such as the LEADER strategy. Not all member states, however, encourage small villages through a simple system of preparatory support. Only nations such as Austria, Finland and Poland have made significant progress in PAC strategic plans. As far as Italy is concerned, few villages have evolved into smart villages; among the pilot villages are the two analyzed cases Santa Fiora and Sellia. The villages have focused on different strategies: Sellia employed a strategy more focused on the urban aspects of the village, while Santa Fiora promoted smart working by becoming a smart village working. Both villages obtained funding through the NRP and succeeded in obtaining benefits from a structural perspective.

Based on this, many other villages in Italy are implementing policies and strategies to transform rural villages into smart villages. The process of developing and implementing smart village strategies, therefore, can be supported by one or more appropriate actors to move this process along. The role of communities is vital in the early stages of the project, in that, they mobilize and involve local people.

7. Discussion

This study adds to the rare contributions related to smart village tourism services (Shrestha, 2020),

promoting the development of studies and research on topics that will surely characterize the future that depends on the diffusion of artificial intelligence. It thus certainly contributes to the current and prospective scientific debate considering, also, the future theoretical implications that tourism may have on smart villages. The case study approach also provides a sound theoretical basis for understanding how new technologies can be harnessed for landscape resources. The study has limitations mainly related to the case methodology, which, have limited generalization, as, the strategies employed by two villages differ in both qualitative and quantitative aspects. A further limitation is the difficulty of finding data, in that, they are only available from institutional portal thus not favoring greater dissemination at the national level. For the Municipality of Sellia, in fact, there are no tourism data since there are no hotel facilities in the village and the only data obtained are fruits of interviews given to national television entities. To increase the attractiveness and the number of visitors within its village, it would be desirable for the Municipality of Sellia to have its own hotel infrastructure so that it can accommodate tourists within its territory and maximize the benefits of being a smart village.

Over the years, therefore, it will be important to evaluate the economic sustainability of smart initiatives and assess its popularity among tourists. It will also be important over the years to assess how much the flow of tourists has increased in relation to the increase in smart projects, especially with reference to the municipality of Sellia, since, at present, the municipality is during transformation. Tour operators should increase and take care of data recording on the use of smart equipment to enable useful reports with statistical data on the dynamics of tourist flows.

The success of the initiative will also depend on the sensitivity of local business operators to digital tools of this kind, helping to enrich the information already present, innovating, detailing and updating it with local events, which should also be the main attraction. Careful data management can procure useful information to adapt and improve offerings, enabling long-term economic sustainability. The results of this work could be a useful starting point for future research aimed at assessing the importance of smart villages on the Italian territory and evaluating their tourism impact in terms of arrivals and accommodation creation.

8. Future implications

In Italy at present, in addition to the already mentioned and analyzed Santa Fiora and Sellia, two other areas that are transforming their rural villages into smart villages. The areas involved in the transformation are the Cilento and Matese areas with special reference to the small municipalities of Sepino (Campobasso) and Guardiaregia (Campobasso). Currently, the two areas are during project development and definition, but it is already possible to assess the areas of intervention. The Cilento villages are focusing on the digital transformation of agriculture and sustainable tourism by creating smart tourism pathways, while the Matese areas are launching innovative projects in the medical field by allowing medical personnel to make remote diagnoses. Considering this, it might be interesting in the future to compare national data and see whether the number of smart villages in Italy has increased, whether the two cases analyzed have had improvements, and how they have developed and what results the two areas currently under development have achieved.

Conflict of interest

All authors declare no conflicts of interest in this paper.

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