

Article

The Impact of Socio-Economic Factors on the Development of Rural Tourism: Italian Case Based on a Regional Analysis

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Abstract: Italy's rural areas provide significant tourism opportunities which support local economies and sustainable development. This study examines the impact of socio-economic, technological, natural-ecological, and political-legal factors on rural tourism across Italy's 21 regions. Using statistical data and correlation analysis, five macro factors were evaluated to determine their influence on the prevalence of agritourism as a measure of rural tourism development. The methodology involved a correlation analysis, including the assessment of bivariate relationships between variables, supported by robust statistical tests to ensure reliability. Key findings indicate that technological advancements, particularly in farm digitalization and innovation, are closely associated with rural tourism growth, alongside factors like regional GDP and natural-ecological resources. The study reveals that higher levels of farmer education and rich ecological and cultural assets within regions also positively impact rural tourism. These insights provide valuable guidance for policymakers and stakeholders in formulating strategies that promote rural tourism and regional development, emphasizing digitalization, ecological preservation, and education. This research extends our understanding of the factors driving rural tourism in Italy, offering a basis for targeted interventions that enhance economic resilience and support sustainable tourism in rural areas.

Keywords: rural tourism; cluster analysis; agritourism



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1. Introduction

Rural tourism is a specific branch of tourism that needs exclusive attention. Lopez and Garcia (2006) highlight that rural tourism is one of the fastest-growing sectors, although it only occupies a small part of the tourism market.

According to (RajoviÄ & BulatoviÄ, 2017), rural areas constitute a significant part of the European territory, comprising approximately 52%. In this context, rural tourism emerges as a crucial avenue for the potential growth of these areas, aligning with the broader objectives of sustainable land management and activity promotion (Fagioli et al., 2014). Over the last two decades, several European Union member countries have recognized rural tourism as a strategic approach for the future, capable of fostering the economic and social development of local communities and less privileged regions (Alina, 2015).

Not all tourism in rural areas is necessarily considered rural tourism. Providing an unambiguous definition of rural tourism is a challenging task. Rural tourism, in its essence, refers to tourism activities that take place in the countryside. However, this is a simplistic definition. Rural tourism, as we know it today, dates back to the early 1970s in Western Europe. It offered an alternative to traditional seaside and mountain resorts. This trend

spread to Eastern Europe in the 1990s, offering an escape from urban environments and crowded tourist destinations.

According to (Nikolina & Karin, 2023), the earliest form of rural tourism focused on farm stays. It was seen as diversifying farm income in the context of declining agricultural activity. Known as agritourism or farm tourism, it has since evolved into a multifaceted sector that includes accommodation, food services, attractions, sports, nature-related activities, arts and crafts, museums, libraries, and entertainment.

Indeed, rural tourism is not exclusively linked to the decline of agriculture but also arises in regions where other economic and cultural activities, such as wine production, play a central role. For example, wine tourism has become a prominent segment within rural tourism, offering experiences that combine agricultural heritage with cultural and gastronomic appeals (Van der Ploeg, 2008; Lane & Kastenholz, 2015). This diversification highlights the multifaceted nature of rural tourism and its capacity to evolve beyond traditional agricultural settings.

Within this broader category, agritourism refers specifically to tourism activities that take place on farms, such as staying in rural accommodations, participating in farm-related events, and experiencing agricultural heritage. While agritourism is a significant component of rural tourism, it represents only a subset, focusing primarily on the agricultural aspects. This distinction is essential to avoid conflating the overlapping but distinct concepts of rural tourism and agritourism”.

Many farms have transitioned from agriculture to focus exclusively on tourism, and non-farm entrepreneurs have moved from urban to rural areas, entering the rural tourism sector. In recent decades, the Internet, especially online booking platforms, has expanded the appeal of rural tourism globally, allowing tourists to discover rural accommodations worldwide.

The COVID-19 pandemic has further increased its popularity. Nikolina and Karin (2023) reported that more visitors spent nights in less populated areas in 2021 than in 2019.

Rural tourism extends beyond agricultural activities and includes nature holidays with a particular interest, ecotourism, walking, climbing and horse riding, adventure and sports tourism, health tourism, hunting, educational trips, art and cultural tourism, and, in specific regions, ethnic tourism. Distinct forms of rural tourism have emerged in different geographical areas. For example, farm holidays are important in many rural areas of Germany and Austria, while they are relatively rare in rural regions of the United States and Canada. Given the multifaceted nature of rural tourism and the dynamic rather than static nature of rural areas related to urban factors, developing a universally applicable definition is challenging.

In more detail, rural tourism encompasses a wide range of activities beyond agritourism or farm tourism. While agritourism specifically refers to tourism activities that take place on farms—such as staying in rural accommodations or participating in farm-related events—rural tourism encompasses broader activities that occur in rural settings. These can include cultural and natural tourism, eco-tourism, and outdoor recreational activities, among others (Lane, 1994; Figueiredo, 2013). Clarifying these distinctions is crucial to avoid conflating these overlapping but distinct concepts.

Alisauskas and Jankauskiene (2008) noted that rural tourism creates economic and social benefits for the countryside by offering attractive activities for young people, creating jobs, and expanding the agricultural market. At the same time, it is an effective means of preserving nature and cultural and traditional values. Rural tourism remains one of rural communities’ few viable economic options (Fesenmaier et al., 1995).

However, rural tourism, like other types of tourism, faces challenges due to the green and digital transition, inadequate infrastructure, and a lack of human resources due to the depopulation of marginal areas.

Moreover, although rural tourism is often celebrated for its potential to drive economic development and cultural preservation, its impacts are not universally positive. Studies have documented potential challenges, including environmental degradation, cultural commodification, and increased pressure on local resources (Wilson et al., 2001). Additionally, the benefits of rural tourism may not always be evenly distributed, sometimes exacerbating inequalities within local communities. A critical perspective is therefore essential to fully understand the dynamics and consequences of rural tourism development.

The numerous definitions provided in the literature highlight a diversity of traits and characteristics typical of rural tourism that can then be ascribed to the main drivers that can facilitate its development. Identifying the factors capable of stimulating the growth of widespread rural tourism is, therefore, more necessary than ever to be able to orient the policies underlying rural development. Prior research identifies multiple factors influencing rural tourism development, such as socioeconomic conditions, technological advancements, ecological assets, and political–legal frameworks (Wilson et al., 2001; Barkauskas et al., 2015).

However, while many studies focus on the general factors of rural tourism, limited research specifically examines these influences within Italy's diverse regional context. This gap is particularly relevant given Italy's rich natural and cultural heritage, and it underscores the need for a regionally tailored analysis of the main drivers promoting rural tourism development.

This study addresses this gap by exploring the impact of five macro-categories of economic, socio-cultural, natural–ecological, technological, and political–legal factors on rural tourism development across Italy's 21 regions. The regional perspective was chosen because regions represent the primary administrative units for tourism-related policymaking in Italy. This approach allows for the analysis of structural and socio-economic drivers of rural tourism within a policy-relevant framework, while also highlighting regional disparities. The main objective is to identify and analyze which of these variables is most significantly correlated with agritourism growth, using the amount of agritourism as a proxy for rural tourism development (Barkauskas et al., 2015; Dimitrovski et al., 2012) although it is clear that rural tourism includes a wide range of activities that go beyond agritourism or farm tourism. While the number of agritourism establishments may not capture the full complexity of agritourism development, it provides a valuable structural indicator for understanding regional capacity. This approach aligns with previous research (Barkauskas et al., 2015).

Statistical data from regional sources were subjected to correlation analysis, focusing on 2022 data. The research aims to clarify how these factors influence rural tourism and provide evidence-based insights that could guide policy and strategic development within the sector.

The findings of this study underscore the strong influence of technological factors, particularly farm digitalization and innovation, as well as natural–ecological resources such as biodiversity, cultural landscapes, and regional parks, on rural tourism growth. Additionally, regional GDP and farmers' education levels contribute positively.

These insights contribute to the literature on rural tourism by providing a detailed, region-specific analysis that highlights significant correlations and points to targeted strategies for fostering sustainable tourism.

From a practical standpoint, the study informs public policy by identifying key areas—like digitalization, educational investment, and ecological preservation—that could enhance

economic resilience and sustainability in Italy's rural tourism sector laying the groundwork for more comprehensive investigations in future research. This research is thus valuable for agricultural economists, regional planners, and policymakers focused on leveraging Italy's rural heritage to foster sustainable tourism growth.

2. Literature Review

This study draws on theoretical perspectives that explore the interplay between rural tourism and macro-factors such as socio-economic conditions, ecological resources, and technological advancements. Building on frameworks of sustainable development (Sharp-ley & Roberts, 2004) and institutional capacity (Lane & Kastenholz, 2015), we examine how these factors influence rural tourism development in diverse regional contexts. Sustainable development theories emphasize the need to balance economic growth with environmental and cultural preservation, a critical consideration in rural tourism. Meanwhile, institutional capacity theory highlights the role of governance and policy frameworks in shaping tourism outcomes, particularly in regions with varying regulatory environments.

Rural tourism has been widely studied as a tool for regional development, providing opportunities for economic diversification and cultural preservation (Organizzazione Mondiale del Turismo (UNWTO), 2023). However, its impacts extend beyond financial gains, encompassing social, environmental, and cultural dimensions. Scholars have emphasized the importance of understanding rural tourism through a global lens, analyzing its diverse manifestations and relationships with agriculture across different contexts (Lane, 1994; Sharpley & Roberts, 2004; Nordregio, 2024).

In Europe, rural tourism has been linked to the preservation of agricultural heritage, the promotion of local gastronomy, and the revitalization of declining rural economies. For example, agritourism initiatives in Spain and Portugal have demonstrated how tourism activities can enhance community resilience by fostering sustainable practices and preserving traditional knowledge (Figueiredo, 2013). Similarly, in Germany and Austria, farm stays and wine tourism represent successful integrations of agricultural activities with tourism, highlighting the multifaceted nature of rural tourism (Lane & Kastenholz, 2015).

The relationship between agriculture and tourism is complex and dynamic, varying across regions and cultural contexts. Rural tourism often provides an additional source of income for farmers, but its benefits are not limited to financial gains. For instance, tourism activities can create opportunities for cultural exchange, foster local pride, and encourage the adoption of sustainable agricultural practices (Van der Ploeg, 2008). Furthermore, the integration of tourism into rural areas can support the development of new markets for agricultural products, such as through direct sales to tourists or the promotion of geographically indicated products (Sharpley & Roberts, 2004).

However, it is essential to approach the agriculture–tourism nexus with a critical perspective. While rural tourism can enhance the visibility of agricultural practices and heritage, it may also introduce challenges, such as increased pressure on local resources, the commodification of culture, and potential conflicts between tourism and agricultural priorities (Raschi & Melo Figueiredo, 2013).

Like any complex human activity, rural tourism is influenced by several interconnected factors that have been well studied in the literature. Despite extensive research on rural tourism, there is a lack of studies focusing on the interplay of factors affecting rural tourism such as socio-economic, ecological, and technological factors. Most studies either adopt a macro area perspective or focus on individual factors without integrating them into a comprehensive framework. This study addresses this gap by exploring how these factors interact to influence agritourism development across Italy's diverse regions.

According to the (OCSE Organisation for Economic Cooperation and Development, 1994), in total, 14 key factors can be isolated that have been responsible for the development of rural tourism in the last 20 years. These factors include factors closely related to the figure of the tourist and his habits, such as increasing levels of education, growing interest in heritage, green issues, and the authenticity of food, and increased leisure time (both because the average income has increased and because the number of retired people has increased), better health awareness, and the possibility of having better outdoor clothing.

Wilson et al. (2001) point out that, like other economic development strategies, rural tourism requires several components to be successful. Tourism development involves (1) attractions: the natural and artificial features both within and adjacent to a community; (2) promotion: the marketing of a community and its tourist attractions to potential tourists; (3) tourism infrastructure: access to facilities (roads, airports, trains, and buses), water and electricity services, parking, signage, and recreational facilities; (4) services: accommodations, restaurants, and the various retail activities needed to meet the needs of tourists; and (5) hospitality: how tourists are treated by both community residents and employees of tourism businesses and attractions (as also shown by (Gunn, 1988)). However, the authors also highlight a critical omission from the list: the role of tourism entrepreneurs. While the above components and community resources are undoubtedly crucial to tourism development, the active and widespread involvement of rural tourism entrepreneurs is emphasized as being essential. Their engagement ensures a more diverse and solid basis for sustainable tourism development in rural areas.

Thus, Wilson et al. (2001) suggested ten factors that are the most important for successful tourism development in rural areas: a complete tourism package, good community leadership, local government support and participation, sufficient funding for tourism development, strategic planning, coordination, and cooperation between entrepreneurs and regional leadership, coordination and collaboration between rural tourism entrepreneurs, information and technical assistance for tourism development and promotion, good conference and tourism offices and broad community support for tourism. Zdorov (2004) focuses on factors very similar to those that Wilson et al. (2001) already identified: area, population, transportation network, administrative division, climate, natural resources, tourist attractions, economic infrastructure, geographical location, landscapes, current tourist routes, and promising areas for tourism development. Amelung (2006) identifies economic, social, natural, environmental, and cultural factors. In addition to the factors mentioned above, Romikaityte and Kisieliauskas (2012) include the role of legal factors. Labanauskaite (2008) distinguishes external environmental factors that influence the development of tourism into positive (the number of employees, the construction of new tourist facilities, and the formation of new infrastructure) and negative factors that include economic crises, political instability, unemployment, criminogenic situation, financial instability, decline in personal consumption, and an unfavorable ecological situation.

Barbu (2013) states that the main factors determining the development of rural tourism are the level of education, the quality of transport and communications, the financial possibilities of tourists, interest in health care, the role of the sports equipment industry in the development of tourism, the interest of global, national, district, and local administrations, and the development of telecommunications.

In conclusion, the work of (Barkauskas et al., 2015) allows us to frame the diversity of factors indicated by the abundant literature in a relatively limited number of macro-categories that refer to the economic, socio-cultural, natural-ecological, political-legal, and technological sectors. Below, the main factors attributable to each macro-category will be listed with an indication of their possible effect on the development of rural tourism according to what is suggested by the literature.

2.1. Economic Factors

[Botezat \(2003\)](#) states that rural tourism development is highly dependent on turnover growth and notes that rising wages allow people to spend more money on leisure and recreational activities. This factor significantly influences rural tourism. However, drawing attention to growing inflation is essential, which can reduce the population's real income. Rural tourism is also influenced by changes in interest rates, government spending, foreign investment, and unemployment. Research by ([Ramanauskiene et al., 2010](#)) has shown that factors such as GDP, inflation, and unemployment indirectly influence rural tourism development.

2.2. Socio-Cultural Factors

According to ([Barkauskas et al., 2015](#)), the analysis of social factors should include demographic changes in the country and region, the family and community relations prevailing in society, lifestyle characteristics, and aspects of health and education. The personal motivation of tourists also influences the development of rural tourism, such as the desire to learn about customs, traditions, and history and to visit cultural heritage, ethnographic places, and places of attractive heritage and unique nature ([Cavallo et al., 2019](#)). Understanding the motivations and preferences of tourists is crucial for tailoring rural tourism offerings. [Barbieri \(2010\)](#) identifies key motivations for agritourism, such as the desire to connect with rural lifestyles and participate in authentic experiences, which influence the success of rural tourism initiatives.

2.3. Natural–Ecological Factors

The natural–ecological aspect is recognized as a significant factor in the tourism environment. This element includes various components such as climatic conditions, the sustainable use of natural resources, and measures for environmental protection. Factors such as water bodies, waste management, and the richness of biodiversity are crucial for developing rural tourism. [De Freitas \(2003\)](#) highlights the importance of landscape characteristics, geographical location, topography, flora and fauna, and weather and climate conditions. Rural tourism development is susceptible to climatic conditions and the length of the summer season. Climate change and the loss of biodiversity have a significant impact on the development of rural tourism.

2.4. Technological Factors

The technological environment is a crucial aspect that influences the competitiveness and development of a country's tourism industry. Technological factors play an essential role in improving a country's competitiveness by providing timely and adequate information, enabling new possibilities for delivering tourism products, modernizing service systems, ensuring an appropriate level of quality, and implementing other measures based on innovations and adapted technologies. [Hjalager \(2002\)](#) tourism is intrinsically linked to new technologies and organizational and structural innovations. Integrating technology into the tourism sector leads to advances in various aspects, including information dissemination, reservation systems, customer service, and overall operational efficiency.

2.5. Political–Legal Factors

Political stability, clear strategic development goals, the promotion of small and medium-sized enterprises, the promotion of rural tourism implemented by the government, support from the European Union, legislation regulating rural tourism, and environmental protection legislation are all factors that fall under this category and strongly influence the development of rural tourism. The research conducted by ([Movahedi et al., 2020](#))

emphasizes the significant role of institutions in influencing tourism development. The study identifies the positive and significant relationship between reliable institutions and tourism development, indicating that when reliable and supportive institutions attract capital for tourism, they play a crucial role in promoting the growth of rural tourism. This finding aligns with similar conclusions drawn by (Erjaie et al., 1395/2016). Rural tourism development is also encouraged by measures supported by the European Union (Zumpano & Del Prete, 2023). Tourism projects can benefit from multiple EU funds, and the sector is eligible for financial support for the transition to a greener and more digital path under several EU programs. In the Rural Development Programme 2014–2020 and 2023–2027, one of the support directions is foreseen for rural and regional development, according to which one of the supported activities is rural tourism services (Cavallo et al., 2019; Del Prete & Zumpano, 2019; Prosperini, 2019). However, the OCSE Organisation for Economic Cooperation and Development (2010) argues that the development and implementation of specific tourism policies are not sufficient from the point of view of regional development. Instead, attention should be focused on the horizontal and vertical links through which tourism is connected to the surrounding economy (Hyytiä & Kola, 2013).

Previous research has highlighted several factors influencing rural tourism in a positive or negative way. Building on these findings, this study hypothesizes the following:

- Technological factors, such as farm digitalization, will strongly correlate with rural development.
- Socio-cultural factors, including the education levels of farmers, will show moderate correlations.
- Ecological resources, such as biodiversity and protected areas, will positively influence rural tourism growth.

3. Materials and Methods

The article uses the main macro-categories of factors that affect rural tourism development identified by (Barkauskas et al., 2015) and described in the previous paragraph. For each macro-category, the authors have identified one or more variables depending on the availability of statistical data. Data for this study were collected from primary sources. The primary sources included only publicly available datasets from national statistical agencies, such as the National Rural Network, Istat, Eurostat and Ismea, which provided information on agritourism establishments, socio-economic indicators, and ecological resources. All the Italian regions were selected, ensuring a representative sample of Italy's diverse rural landscape. The dataset was carefully cleaned and standardized to address inconsistencies and ensure regional comparability. The data collected are not expressed in a historical series but are mainly referred to as specific years (2021 and 2022) that change depending on the nature of the data. The variables used in this study were carefully selected to align with the research objectives and hypotheses. This study analyzes the drivers of rural tourism development using variables grouped into five categories: political-legal, socio-cultural, technological, economic, and natural-ecological factors.

Table 1 provides an overview of the variables, their definitions, and sources. Political-legal factors include planned expenditure in the 2023–2027 Rural Development Programme for rural tourism interventions, reflecting the commitment of regional policies to agritourism development. Socio-cultural factors encompass characteristics such as the number of farms and agritourism establishments, farmer demographics (age, gender, and education), and farm size (utilized agricultural surface area), capturing regions' human and structural capacity. Technological factors include the number of computerized and innovative farms, which serve as proxies for the digital and technological readiness of the agricultural sector. Economic factors, represented by regional GDP, provide insights into the

broader economic context influencing agritourism. Finally, natural–ecological factors, such as the number and value of geographic indications (GIs), cultural and natural heritage sites, and quality certifications, measure each region’s attractiveness and environmental richness. These variables were selected for their relevance in prior literature and availability across all Italian regions, ensuring consistency and comparability in the analysis. Most variables have a regional or provincial level of detail, as in the case of the two autonomous provinces of Trento and Bolzano. However, keeping the two autonomous provinces separate was impossible for some of the variables used. We aggregated all data variables concerning the two provinces to form the Trentino Alto Adige region.

Table 1. List of selected variables.

Categories	Variable	Description	Source
Political–legal factors	Rural Development Programme 2023–2027	planned expenditure in the 2023–2027 rural development program for rural tourism interventions by region	RRN
Political–legal factors	Rural Development Programme 2023–2027%	share of expenditure planned in the 2023–2027 rural development program in rural tourism interventions by region on the regional total	RRN
Socio-cultural factors	Number of agritourism	n. of agritourism by region in 2022	Istat
Socio-cultural factors	Number of farms	n. of farms by region in 2020	Istat
Socio-cultural factors	UAS	farms by class of utilized agricultural surface area	Istat
Socio-cultural factors	Farmers’ age	farms by age of the farmers per region. Year 2020	Istat
Socio-cultural factors	Farmers’ gender	farms by gender of the farmers and region. Year 2020	Istat
Socio-cultural factors	Farmer’s educational qualification	farmers with higher education qualifications by region	Istat
Technological factors	Number of Computerized farms	computerized farms by region in 2020	Istat
Technological factors	Number of Innovative farms	companies that have introduced at least one innovation in the last three years by region in 2020	Istat
Economic factors	GDP	gross domestic product per region in 2022	Eurostat 2022
Natural-ecological	IG number	number of Geographic Indication products by region in 2022	Ismea mercati
Natural-ecological	IG value	value of Geographic Indication production by region in 2022	Ismea mercati
Natural-ecological	Quality	n. of quality territorial presidia expressed in the number of organic cities, wine cities, oil cities, slow food presidia, wine, oil, and flavors routes by region in 2021	Ismea mercati
Natural-ecological	Culture	n. of territorial landscape quality presidia expressed as orange flags, rural landscapes, FAI sites, and Unesco sites by region in 2021	Ismea mercati
Natural-ecological	Nature	n. of territorial nature reserves or other protected areas, WWF oases, national parks, regional parks, regional reserves, and state reserves by region in 2021	Ismea mercati

Source: own elaboration.

The variable chosen to express rural tourism development was the amount of rural agritourism, in line with what was carried out by (Barkauskas et al., 2015). The statistical correlation method was used to research and analyze the impact of the selected factors in supporting rural tourism development. Correlation analysis was applied to quantify the correlation between the amount of rural agritourism and the selected factors concerning the categories introduced in the literature review. The correlation coefficient measures the significance of the statistical dependence between two variables. A correlation analysis was employed to examine the strength and direction of associations between socio-economic, ecological, technological factors, and other factors and the level of agritourism development. This method was chosen for its simplicity and effectiveness in identifying initial patterns and relationships, aligning with the exploratory nature of the research questions. While regression analysis could provide deeper insights into causal relationships, the focus of this study is on understanding associations rather than making predictions. The correlation coefficients were calculated using R Statistical Software (v4.3.3) (R Core Team, 2024). Pearson's product-moment correlation r was calculated between the agritourism variable and each selected variable. Inferences on this correlation coefficient were supported by the assumption of bivariate normality (Denis, 2020). The normality of single variables was assessed through the Shapiro–Wilk test and a Q-Q plot inspection for each variable. MVN R package (Korkmaz et al., 2014) was used to check bivariate normality, verifying concordance between Mardia's, Henze–Zirkler's, and Royston's tests. A visual inspection of the scatter plots and chi-squared plots (Johnson & Wichern, 2013) was used in dubious cases. If the assumption of bivariate normality is debatable, it is recommended to calculate Spearman rank correlation coefficient ρ and Kendall τ coefficient to assess at least the presence of a monotonic correlation, not necessarily a linear one (Korkmaz et al., 2014). The significance of the correlation coefficients was tested, and the relative p -values are reported in the next section. The correlation coefficient can vary from -1 to $+1$. Possible interpretations of the correlation coefficient (Boguslauskas et al., 2009) are summarized in Table 2. The outliers identification is reported in Table 3 and the interpretations of correlation strength are reported in Table 4 only for significant coefficients.

Table 2. Interpretation of the correlation coefficients.

Correlation	Negative	Positive
very weak	$-0.3 \leq r < 0$	$0 < r \leq 0.3$
weak	$-0.5 \leq r < -0.3$	$0.3 < r \leq 0.5$
average	$-0.7 \leq r < -0.5$	$0.5 < r \leq 0.7$
strong	$-0.9 \leq r < -0.7$	$0.7 \leq r < 0.9$
very strong	$-1 \leq r < -0.9$	$0.9 \leq r < 1$

Source: own elaboration.

Table 3. Outlier identification.

Test	Outliers	
Boxplot	Toscana	Trentino Alto Adige
99th percentile	Toscana	Val d'Aosta
$ z > 3.29$	Toscana	
Hampel filter	Toscana	Trentino Alto Adige
Grubbs test	Toscana ($p = 0.000459$)	Trentino Alto Adige ($p = 0.000140$)
Dixon test	Toscana ($p < 2.2 \cdot 10^{-16}$)	Trentino Alto Adige ($p < 2.2 \cdot 10^{-16}$)
Rosner test ($\alpha = 0.05$)	Toscana	Trentino Alto Adige

Source: own elaboration.

Table 4. Correlation coefficients between the selected variable and the number of rural agritourism.

Categories	Variable	Correlation ₁	p-Value ²	Interpretation	Correlation Without Outliers ¹	p-Value ²	Interpretation
Political–legal factors	Rural Development Programme 2023–2027	$\rho = 0.388$ $\tau = 0.274$	0.091 0.098	weak weak	$r = 0.382$	0.12	
	Rural Development Programme 2023–2027%	$\rho = 0.206$ $\tau = 0.137$	0.38 0.42		$r = 0.117$	0.64	
Socio-cultural factors	Number of farms	$\rho = 0.356$ $\tau = 0.232$	0.12 0.17		$r = 0.267$	0.29	
	UAS	$\rho = 0.430$ $\tau = 0.274$	0.060 0.098	weak very weak	$r = 0.522$	0.026 *	average
	Farmers age	$\rho = 0.332$ $\tau = 0.211$	0.15 0.21		$r = 0.314$	0.20	
	Farmers' gender	$\rho = 0.191$ $\tau = 0.116$	0.42 0.50		$\rho = 0.265$ $\tau = 0.176$	0.29 0.33	
	Farmers' educational qualification	$\rho = 0.402$ $\tau = 0.305$	0.080 0.064	weak weak	$\rho = 0.490$ $\tau = 0.373$	0.041 * 0.032 *	average weak
Technological factors	Number of Computerized farms	$\rho = 0.838$ $\tau = 0.674$	$<2.2 \times 10^{-16}$ *** 7.75×10^{-6} ***	strong average	$r = 0.805$	5.66×10^{-5} ***	strong
	Number of Innovative farms	$\rho = 0.789$ $\tau = 0.611$	4.82×10^{-5} *** 7.32×10^{-5} ***	strong average	$r = 0.777$	0.00015 ***	strong
Economic factors	GDP	$\rho = 0.767$ $\tau = 0.621$	0.00012 *** 5.18×10^{-5} ***	strong average	$\rho = 0.837$ $\tau = 0.712$	1.30×10^{-6} *** 7.19×10^{-6} ***	strong strong
Natural–ecological	Value of Geographic Indication	$\rho = 0.595$ $\tau = 0.442$	0.0066 ** 0.0059 **	average weak	$\rho = 0.651$ $\tau = 0.503$	0.0043 ** 0.0030 **	average average
	Amount of Geographic Indication	$\rho = 0.681$ $\tau = 0.487$	0.00095 ** 0.0028 **	average weak	$r = 0.674$	0.0021 **	average
	Quality	$\rho = 0.508$ $\tau = 0.400$	0.024 * 0.014 *	average weak	$r = 0.454$	0.059	weak
	Culture	$\rho = 0.874$ $\tau = 0.759$	4.80×10^{-7} *** 3.37×10^{-6} ***	strong strong	$r = 0.822$	2.90×10^{-5} ***	strong
	Nature	$\rho = 0.716$ $\tau = 0.571$	0.00038 *** 0.00045 ***	strong average	$\rho = 0.617$ $\tau = 0.493$	0.0064 ** 0.0044 **	average average

Source: own elaboration. ¹ Pearson's r correlation coefficients are reported for data that are normally bivariate distributed. Otherwise, Spearman's ρ and Kendall's τ correlation coefficients are reported. ² Significance of p values: <0.1; * <0.05; ** <0.01; *** <0.001.

As the agritourism variable was not normally distributed, bivariate normality with each of the other variables could not be assumed. To face this case, the presence of outliers was assessed, verifying the concordance between visual identification by boxplot, position out of 1st to 99th percentile range, absolute z-score > 3.29 (equivalent to 0.1% probability for the value to be in a normal distribution), Hampel filter, Grubbs test, Dixon test, and Rosner test included in the outliers R package (Komsta, 2006). The results of the outlier identification are presented in the next section.

4. Results

All the variables used belong to a macro-category of factors associated with rural tourism development. In this way, it was possible to highlight which variable is positively and significantly correlated with the development of rural tourism expressed as the number of agritourism. The identification of outliers is shown in Table 3. The agritourism variable presented two significant anomalous values: Tuscany and Trentino Alto Adige (which aggregates data from Trento and Bolzano).

The results of the correlation analysis between the selected variables and the number of agritourism were calculated, including and excluding the Tuscany and Trentino Alto

Adige regions, as reported in Table 4. The discussion of the results is limited to the cases of statistically significant correlation indices.

Figure 1 provides a visual representation of the spatial patterns of the variables analyzed in the study. The central map displays the spatial distribution of the amount of agritourism across the regions, offering a reference point for comparison. Surrounding this, the corner maps (a), (b), (d), and (e) are variables representative of the categories considered in this study. Map (a) of political–legal factors illustrates an example of a variable (Rural Development Programme 2023–2027%) with no significant correlation. In contrast, the maps of technological factors, economic factors, and natural–ecological factors (b, d, and e, respectively) depict the variables with the strongest significant correlations to the amount of agritourism within their respective categories (innovative farms, GDP, and culture, respectively), as determined by the statistical analysis.

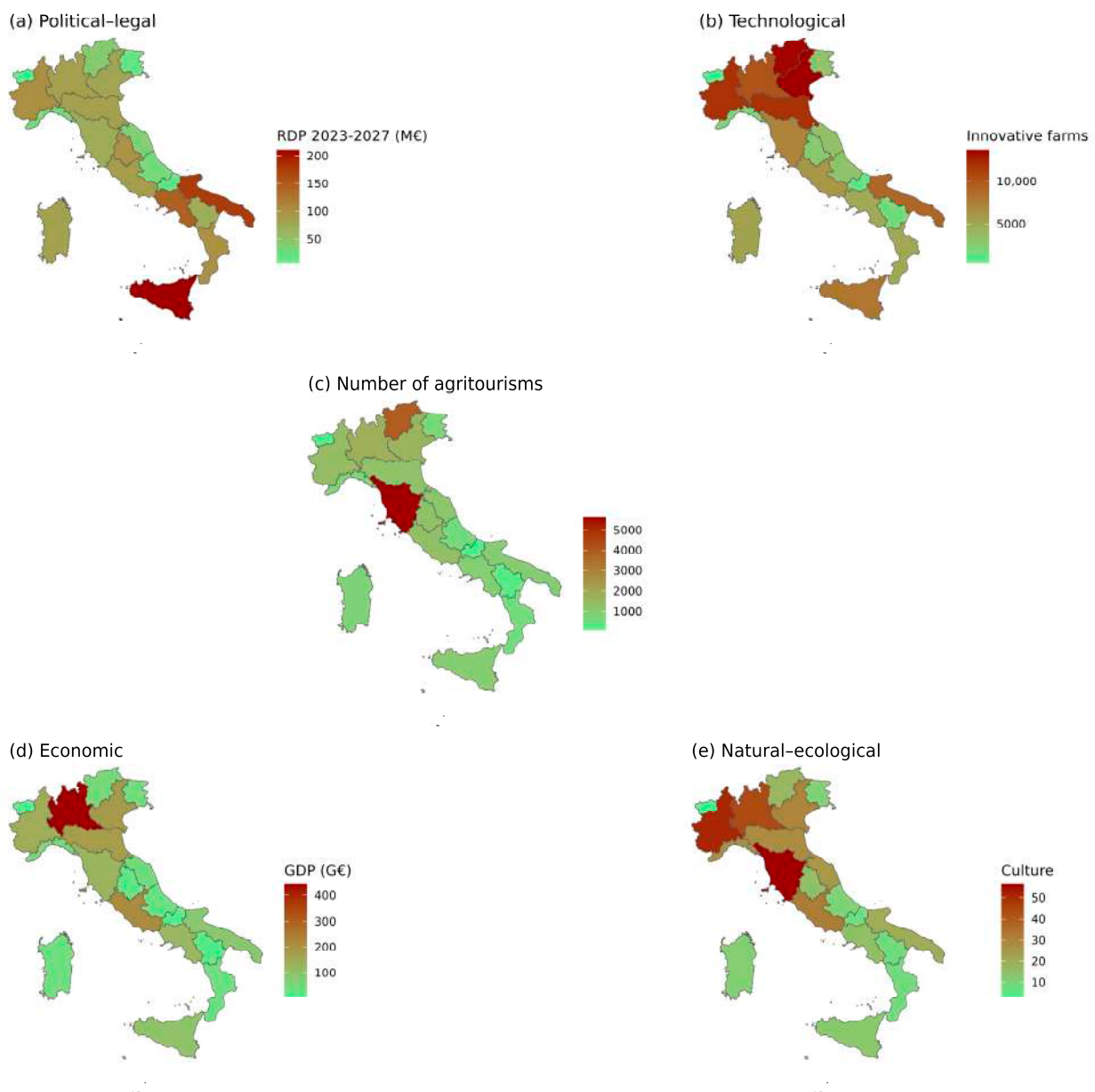


Figure 1. Spatial distribution of variables representative categories analyzed in the study. The central map (c) illustrates the amount of agritourism, while the corner maps (a–e) have the strongest correlations to (c) within their respective categories, except for (a), which shows no significant correlation. Source: own elaboration.

5. Discussion

Our findings align with the theoretical perspective that socio-economic and ecological factors play a more direct role in driving rural tourism, as proposed by sustainable development theories. However, the weaker correlation observed for political–legal factors underscores the context-dependent nature of institutional capacity, suggesting that governance structures require further alignment with local and regional needs to enhance agritourism development.

The findings of this study highlight that technological and natural–ecological factors play a crucial role in developing rural tourism across Italian regions, aligning with previous studies that emphasize the importance of digitalization and ecological assets in enhancing the appeal of rural tourism (Wilson et al., 2001; Barkauskas et al., 2015). The positive correlation between agritourism growth and technological advancements, such as farm digitalization and innovation, confirms the results of (Hjalager, 2002), who argued that new technologies and innovation are fundamental to creating a competitive advantage in rural tourism. This study extends Hjalager’s (2002) findings by demonstrating the regional impact of technological adoption within Italy, providing empirical evidence of digitalization’s critical role in agritourism growth, particularly in regions with a high concentration of technologically advanced farms.

Additionally, the influence of natural–ecological factors, including biodiversity, cultural landscapes, and protected areas, underscores the findings of (RajoviÄ & BulatoviÄ, 2017; Fagioli et al., 2014), who highlighted the value of natural assets in driving rural tourism. However, our results add a new dimension by quantifying the specific impact of ecological variables, such as the presence of geographically indicated products, on agritourism development. This relationship has been suggested but not fully explored in previous studies. These findings emphasize that ecological resources are attractive for tourism and serve as crucial assets for differentiating regions within the competitive landscape of rural tourism.

While categorized as distinct macro-factors, natural–ecological, sociocultural, and political–legal factors often overlap in their influence on rural tourism development. For example, preserving natural parks (a natural–ecological factor) frequently depends on local communities’ sociocultural support and political–legal frameworks regulating land use. This interconnectedness underscores the need for a holistic approach to analyzing the drivers of rural tourism in future research. Lane and Kastenholz (2015) highlight the importance of integrating these aspects to achieve long-term sustainability in rural tourism. Moreover, while community-based tourism is often promoted as a tool for local development, Gascón (2013) argues that its effectiveness can be limited by social and territorial constraints, emphasizing the need for a more context-sensitive approach to rural tourism planning.

Our research also diverges from prior studies in certain areas. For instance, while (Barkauskas et al., 2015) suggest a strong influence of political–legal factors on rural tourism, our findings indicate a weaker correlation between regional development programs and agritourism prevalence. This discrepancy may be due to Italy’s unique regulatory environment, leading to variations in their effectiveness. This divergence suggests that political–legal support may be beneficial, but its impact is context-dependent and may require more targeted policy interventions to achieve uniform results across different regions.

Furthermore, our findings contribute to the socio-economic literature by showing that regional GDP and farmer education levels have a significant but less dominant impact than technological and ecological factors. This aligns with studies like that of (Skuras et al., 2006), which found that economic affluence and educational attainment contribute positively to tourism. However, these factors alone may not drive rural tourism growth

without complementary technological and ecological support. In this way, our study provides a nuanced understanding of the layered influence of socio-economic variables, suggesting that their effect is enhanced when combined with specific technological and ecological developments.

Theoretically, this study advances the literature on rural tourism by providing empirical evidence of how diverse macro-factors interact to influence tourism development within Italy's regional contexts. By integrating sustainable development theory and institutional capacity theory, this research emphasizes the multifaceted drivers of rural tourism, particularly the critical roles of technological advancements and ecological resources. Unlike prior studies that often focus on broader European or national scales, this study highlights the importance of regional disparities and tailored interventions, offering a more granular understanding of rural tourism dynamics. Additionally, the findings contribute to the emerging discourse on the digital transformation of rural tourism, demonstrating how digitalization can serve as a catalyst for sustainable growth. This research thus bridges theoretical gaps by linking socio-economic, technological, and ecological dimensions within a unified analytical framework, paving the way for future explorations into region-specific policy and development strategies. Our findings suggest several directions for policymakers: first, investing in farm digitalization and environmental preservation as foundational pillars for rural tourism; second, considering targeted, region-specific policies that can bridge the gap in political–legal support for rural tourism initiatives. Future research could explore how sustained investment in technology and ecology might influence rural tourism resilience and the evolving role of political support across different regulatory landscapes.

6. Conclusions

This study provides valuable insights into the factors driving rural tourism development across Italy's regions, with clear implications for policymakers, destination marketers, and rural tourism operators. Firstly, the strong positive association between technological advancement, particularly in farm digitalization, and agritourism growth suggests that policymakers should prioritize investments in digital infrastructure for rural areas. By supporting digital literacy and innovation within agricultural enterprises, regional authorities can enhance the competitiveness of rural tourism, making it more appealing to tech-savvy, sustainability-conscious tourists.

Secondly, the critical role of ecological factors implies that policymakers and tourism operators should work collaboratively to protect and promote Italy's natural and cultural heritage. Policies focused on biodiversity conservation, support for geographical indication certifications, and enhancing eco-tourism infrastructure can further capitalize on Italy's ecological assets, distinguishing the country's rural destinations from global competitors. Operators should also integrate eco-friendly practices and emphasize unique regional products to attract tourists interested in sustainable and culturally immersive experiences.

Based on the findings of this study, several actionable recommendations can be proposed to enhance rural tourism development in Italy. Strengthening farm digitalization and encouraging the adoption of smart technologies are essential steps to improve agritourism and rural tourism offerings and operational efficiency. Simultaneously, promoting environmental preservation through programs integrating rural tourism with ecological resource management can leverage Italy's rich natural heritage as a key tourist attraction. Addressing disparities in political–legal support requires the design of region-specific policies tailored to each region's unique needs and characteristics, ensuring equitable and effective outcomes. Finally, implementing mechanisms for continuous evaluation and feedback on the impact of rural tourism policies will allow strategies to be adapted based

on regional performance and stakeholder input, fostering a more sustainable and resilient rural tourism sector.

This study offers a foundational analysis of agritourism development using structural indicators, providing insights into regional disparities and key drivers. While the limitations of the chosen proxy variable and temporal scope are acknowledged, the findings highlight the critical importance of technological advancements and ecological assets. Future research should build upon these results by incorporating more dynamic indicators, such as occupancy rates and seasonal trends, to develop a more nuanced understanding of agritourism development. Policymakers can use these findings as a basis for strategies that balance structural capacity with broader tourism dynamics, fostering sustainable growth in rural tourism.

However, this study is not without limitations. The number of agritourism establishments was chosen as a proxy for agritourism development due to its availability as a standardized and comparable dataset across Italian regions. Additional indicators, such as occupancy rates or establishment dates, could provide a more nuanced picture. The analysis relies on cross-sectional data, which captures a snapshot of agritourism development but does not account for longitudinal changes. The trends observed during this period may only partially reflect long-term patterns. The temporal scope of the study was constrained by data availability. Future studies could extend the temporal scope to include pre-pandemic and later years to capture a more comprehensive understanding of agritourism dynamics. Additionally, while the study includes a comprehensive set of macro-factors, it omits certain variables that may impact rural tourism, such as specific regional marketing strategies or consumer behavioral trends. Future research could address these limitations by employing longitudinal data to assess the evolution of rural tourism drivers over time and incorporating more nuanced variables, such as consumer preference metrics or regional tourism promotion strategies, which may reveal further insights into market demand and destination image. This study adopts a regional-level analysis to examine rural tourism development across Italy. While this approach facilitates the identification of region-specific trends and drivers, it does not provide a detailed nationwide synthesis or province-level assessment. Data limitations at the provincial level and the scope of this study precluded such an analysis. Future research could address this gap by incorporating more granular data to assess rural tourism development at multiple scales.

Expanding the scope to other countries with similar rural tourism profiles would also enhance the generalizability of the findings. However, the current approach offers a valuable contribution by focusing on agritourism's regional distribution and structural aspects, providing a foundation for future studies.

In conclusion, this research underscores the importance of a multifaceted approach to rural tourism development, where digitalization, ecological conservation, and tailored regional policies collectively contribute to sustainable growth. By addressing the current drivers and limitations identified in this study, future research can deepen our understanding of how rural tourism can adapt and thrive within an increasingly digital and ecologically aware global tourism market.

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