Geospatial Attractiveness Evaluation for Tourism Destination Area Analysis

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Abstract. The European Union's cohesion policy, particularly through initiatives like Smart Specialization, seeks to reduce regional disparities by promoting sustainable tourism development that leverages local resources and cultural heritage. As tourism increasingly drives global economic growth, understanding the factors that enhance destination attractiveness is vital for rural inland areas. This paper aims to contribute to the evaluation of spatial dynamics in tourism by developing a comprehensive attractiveness index. A primary challenge in assessing tourism potential lies in synthesizing georeferenced data and relevant indicators into actionable insights. Using the STESY (Specialized Tourism EcoSYstems) domain framework and the structuration assessment proposed by Gatto, Corrado & Scorza (2025), we construct an attractiveness index that captures the multifaceted nature of cultural tourism value chains. Our methodology integrates both quantitative and qualitative metrics to assess the competitiveness of destination areas. The findings help to highlight regional strengths and weaknesses, aiding policymakers in developing targeted strategies for sustainable tourism development. Furthermore, the study underscores the importance of evaluating carrying capacity and enhancing infrastructure to utilize the maximum tourism potential. In conclusion, this paper presents a robust tool for assessing tourism attractiveness in a given territory, offering valuable insights for policymakers and stakeholders aiming to foster balanced regional development and cultural heritage preservation.

Keywords: Tourism competitiveness · Attractiveness index · Sustainable development

1 Introduction

The European Union's cohesion policy (comprising e.g. the Smart Specialization Strategy) aims to reduce regional disparities by promoting sustainable tourism development that enhances local places and resources [1]. As tourism's economic significance became increasingly evident, the tourism industry emerged as a key driver of economic growth for many countries worldwide. Global trends in tourism markets and consumer behavior indicate that advancements in the tourism sector have substantially boosted the demand

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for goods and services along the tourism value chain, thereby generating exogenous income [2]. This boosts revenues for local authorities and hospitality-related businesses, particularly in the accommodation and food-service sectors, in high-tourism areas [3]. Furthermore, identifying the attractiveness factors that most decisively determine the competitive position of in-land rural areas is crucial. Analyzing these factors helps to find regional strengths and weaknesses aiding in the creation of visions and strategies for decision making [2]. One of the key factors behind unsuccessful cultural heritage tourism development plans is the insufficient evaluation of a site's tourism potential, particularly in terms of its attractiveness and carrying capacity [4]. Tourism attractiveness of a destination is often considered to be one of the key determinants of its tourism pull. It reflects feelings, opinions, and perceptions of tourists about the destination's perceived ability to satisfy a journey need [5]. Iatu and Bulai (2011) confirm that an adequate service infrastructure in destination areas, alongside the presence of tourism activities, is a key determinant in driving overall success [6]. Existing studies on tourism destination attractiveness underscore the need for a comprehensive inquiry into evolving metrics, the forces driving these measures, and the development of practical indicators for real-world application. In parallel, a vast array of quantitative and qualitative information—often georeferenced—describes the detailed characteristics of sites of interest. However, synthesizing this multitude of variables into appropriate indicators remains a challenge and is rarely addressed. In particular, tourism georeferencing implies an analytical approach to the territory, typically at the municipal level, to effectively consolidate diverse data into actionable insights [5, 7, 8]. This paper aims to contribute to the investigation of spatial dynamics in tourism by proposing an evaluation of destination area attractiveness across a broad territorial context. The objective is to develop a tool capable of comparing and synthesizing the diverse information related to the cultural tourism value chain, thereby enhancing our understanding of a location's capacity to sustain an adequate tourism demand. In the first section, we define the concept of destination area attractiveness and review the current evaluation tools. In the methodology section, we employ the STESY domain framework and integrate Gatto, Corrado & Scorza [9] assessment of the structuration level of destination areas to construct an attractiveness index. The results section presents the application of this index and examines its implications for development strategies. Finally, the paper discusses the limitations of the current approach, outlines future developments, and explores the policy implications of our research.

2 Defining Attractiveness in Tourism Destination

The authors [10] conceptualize attractiveness by three typologies: revealed attractiveness, perceived attractiveness and real attractiveness. First, revealed attractiveness refers to incoming flows of tourisms into a geographical area [10]. Closely linked to this concept, tourism attractions serve as key drivers of visitation. These attractions are characterized by distinct features that capture tourists' interest and motivate them to choose a specific destination. Essentially, tourism attractions shape and respond to tourist flows, influencing both the scale and direction of tourism development [11]. Second, perceived attractiveness captures how individuals or groups view, assess, and value a particular

region [10]. Aligned with this statement, attractiveness fundamentally represents the perceived ability of a destination to provide individual benefits as the composite of individuals' feelings, perceptions, and evaluations regarding a destination [12, 13]. Finally, real attractiveness encompasses all the factors—such as infrastructure, services, human capital, innovative capacity, institutions, and government—that enhance a region's appeal and contribute to the overall attractiveness of the host area [10]. Researchers have classified the factors contributing to a destination's attractiveness into primary and secondary features [14]. Primary features include attractor activities, which directly draw tourists to a location, while secondary features encompass tourism infrastructure such as accommodation, transportation, tourist services, and facilities, which describe the tourist supply and capacity of local area to support tourist activity [5]. It is important that destinations that are compared by these measures should provide a similar type of tourism product. [15].

2.1 Evaluation of Existing Methods for Destination Attractiveness Index

Several studies have contributed to defining relevant variables, refining assessment methodologies, and selecting data sources to ensure robust and reliable measurements.

A widely recognized model is the Index of Destination Attractiveness (IDA), proposed by Krešić and Prebežac [15] which integrates multiple interrelated measures into a single composite indicator. In their study on Croatian coastal tourism destinations, variables were identified based on expert assessments of key tourism supply elements, while tourists rated their influence on destination choice using a six-point Likert scale, resulting in a dataset of 4,915 questionnaires. Similarly, Iatu and Bulai [6] applied multivariate analysis and correlations to Romanian territorial-administrative units statistic indicators, ensuring data consistency and relevance across regions. A commonly used methodology involves questionnaire-based assessments that capture perceptions of tourists and experts. Previous studies [16, 17] confirm the validity of perception-based evaluations, integrating them with expert opinions to refine perceived attractiveness assessments [5]. The development of tourism indices and the selection of relevant variables to identify and characterize homogeneous tourist areas are inherently interconnected aspects of a single logical process. This process aims to establish a statistical model designed to measure local tourism attractiveness, ensuring a systematic and data-driven evaluation of tourism dynamics.

3 Methodology

To develop the Destination Attractiveness Index, we refer to STESY domain taxonomy [9], a model that identifies tourism geographies based on territorial elements. This approach enables the detection of specialized tourist destinations within a broad territorial area. This methodology to identify the Destination Area (DAj) is based on the cluster detection of points of interest (POIs) based on their spatial proximity. This spatial approach allows to define the boundaries of each DAj. By considering both the spatial arrangement and the distances between POIs, the algorithm ensures that each DAj represents an area with clear boundaries on the basis of relevant tourism assets, facilitating more effective tourism planning and analysis.

The present paper focuses on the Vulture area in Basilicata (Italy) as a case study, where an attractiveness index was developed by analyzing the number of users' reviews related to tourism services. This analysis moves from a broad regional perspective to a low-dimensional representation DAj using Points of Interest (POIs), including specialized attractors (e.g., cultural tourism) and services (e.g., accommodation, restaurants).

3.1 Data

The data used in this context comes from Google API Places, a service that provides detailed information about places, including user-generated content like **reviews and ratings**. The **DAj** were identified using the STESY model, which categorizes tourism assets into groups. These include **attractors (aj)**, such as castles, churches, and museums, and **services (st)**, like restaurants and accommodations. Table 1 presents a sample of data-set organization.

Table 1. Data-set format

POI ID	Type	DAj	Rating	Number of_review
1	Accomodation (Acc)	23	4,4	146

The dataset includes **78 attractors (aj)**, which consist of cultural and historical landmarks such as castles, churches, museums, and archaeological sites. In addition, there are **442 restaurants (R)**, representing the food and beverage establishments that cater tourists. The **accommodation sector (Acc)** is also well represented, with **417 mapped entities**, including hotels, bed & breakfasts, and other lodging facilities. In total, the **tourism-related services (st),** which combine restaurants and accommodations, amount to **859 entities**, emphasizing the crucial role of hospitality in the region's tourism offer.

3.2 Constructing the Attractiveness DA Index

For each DAj, two averages are calculated:

- Average Number of Reviews (N): This is the average number of reviews for all the POIs within the DAj Services;
- Average Ratings of Reviews (REV): This is the average rating for all the POIs within the services DAj Services.
- Construction of the two-dimensional index: The two-dimensional index is built by combining the two averages calculated above.
- Each DAj will therefore have an attractiveness value that considers both the average number of reviews and the average rating:

$$\textbf{DAj Index} = f(\textbf{N}, \textbf{REV})$$

3.3 Case Study

The case study focuses on Vulture area (ranging from Monticchio Laghi to Alto Bradano) in Basilicata (Italy), a region characterized by low population density (56.3 inhabitants/km^2) and long-standing infrastructural and economic challenges.

The area hosts a regional park, medieval castles, national museums, UNESCO sites, and archaeological landmarks, yet remains undervalued for tourism. This research offers decision making tools for spatial development strategies that leverage local resources, environmental assets, and cultural heritage to foster sustainable and competitive tourism growth.

4 Results and Discussions

We analyzed 19 DAj specialized in cultural tourism within a low-density (rural) area. The comparison between various DAj through the attractiveness index allows us to differentiate and describe the DAj based on their attractiveness characteristics, distinguished by average number of review and average rating of reviews.

Figure 1 and Fig. 2 displays the correlation between the number of reviews and average review scores. DAj with the highest number of reviews (e.g., 35; 38; 33) tend to have above-average ratings, with scores around 3.88–3.98. This suggests that more visited locations maintain a good perceived quality. Indeed, the DAj 35 contain an attraction belonging to the UNESCO category, and the area is recognized as a popular tourist destination with recent infrastructure development.

Some destinations with a moderate number of reviews (e.g., 24; 15) have relatively high ratings (4.42 and 4.29, respectively), indicating that while they may not be among the most visited, they receive very positive feedback from visitors. DAj 24 and 15 are indeed communities with a high dispersion value and are located outside the tourist circuits promoted by local agencies.

The destination with the highest rating (DAj 24, average rating of 4,42) has only 59.7 reviews on average per element, which could indicate a niche of highly satisfied visitors but lower visibility compared to other areas. Some locations with many reviews (e.g., 11 and 14) show ratings around 3.80, indicating a good level of attractiveness but with action-need for improvement in perceived quality.

The destination with the lowest rating 41 (2.85) also has the lowest number of reviews (27.9), suggesting it may be less attractive in terms of both popularity and visitor experience.

The applied index allows for an evaluation of the DAj. The comparison based on the quality of supplied services identifies the DAj that best meet users´ needs and expectations. Within tourism strategy policies, this method can provide a large-scale overview of the attractiveness of DAj, helping to identify where adaptations or investments might be necessary in a comprehensive view of the study area.

Furthermore, this evaluation framework identifies DAj through the analysis of tourism infrastructure and perceived attractiveness. The findings suggest that the applied approach can effectively support decision-making processes allowing the identification of territorial target where to design a coordinated framework for targeted investment

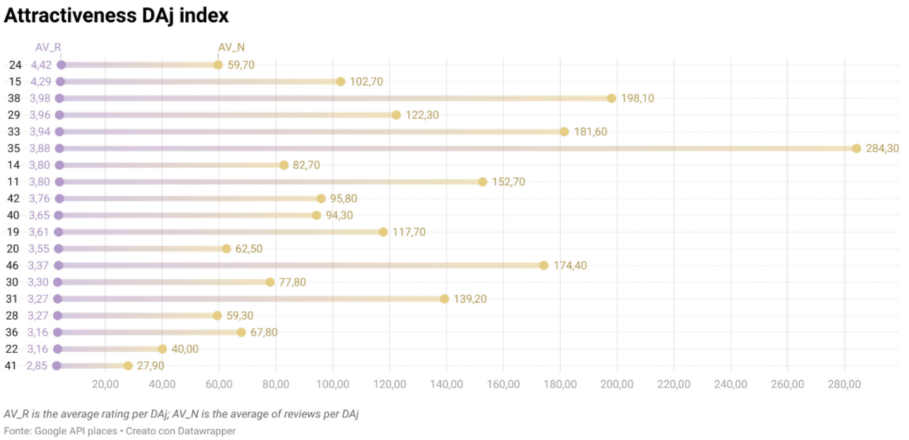

Fig. 1. In the graph, the y-axis represents the average ratings per DAJ, while the x-axis indicates the number of ratings.

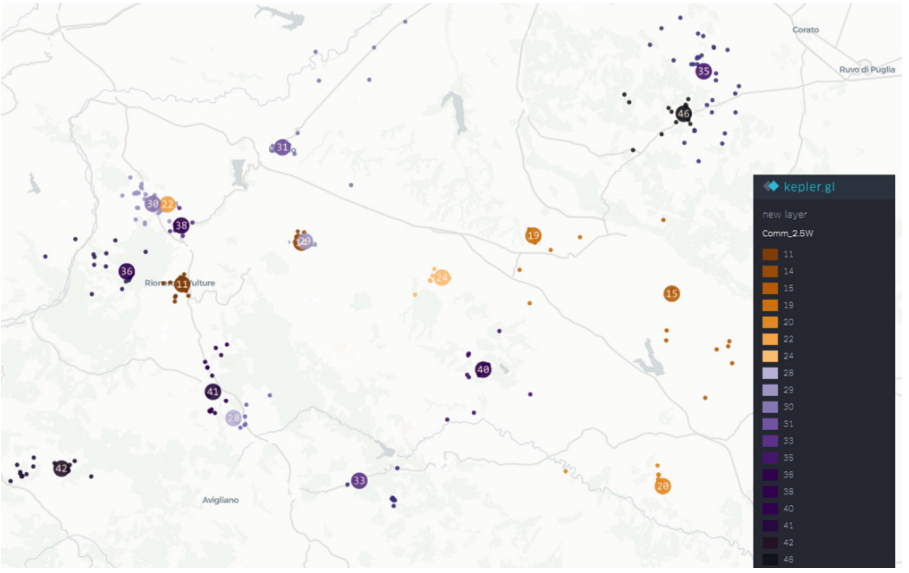

Fig. 2. In the figure, the DAj (represented with a color scale) and the points (services) within the Vulture-Melfese study area are shown.

improving the infrastructure of the tourism value chain. The construction of this index integrates both quantitative and qualitative dimensions into a single indicator, enhancing the tourist's perception as final beneficiaries of the territorial tourism ecosystem offering a high level of granularity that improves conventional tourism statistics.

5 Conclusions

This paper proposes to construct a synthetic index of DAj attractiveness applied in a specific context in order to analyze how Vulture area perform in terms of the tourism infrastructures attraction. The proposed index effectively merges quantitative and qualitative components into a single metric, on the basis of high level of territorial granularity that goes beyond traditional statistical units.

As illustrated in Fig. 2, the proposed methodology enables the identification and assessment of the key components of the tourism system, resulting in the creation of a spatial representation of tourism attractiveness in the case study area. This approach is considered highly transferable in other context, as it proves useful meanings in territorial interpretation potentially applicable across various fields of investigation. The simplicity of its structure, combined with the careful selection and evaluation of elements and spatial relationships enables for the transdisciplinary applicability of the results, upon which different sector-specific assessments can be developed.

Potential applications of this approach may include the evaluation of investment scenarios aimed at stimulating local development in Destination Areas (DAj) through both hard and soft measures.

Policy implications derived from this research refer to the opportunity to target territorial marketing actions on those areas with high rating coefficients but only moderate review volumes, in order to boost their visibility and tourist inflow. Additionally, a deeper analysis of the DAj with the highest number of reviews and consistently good ratings may allow to identify local best practices based on effective organization of the tourism local supply chains easily replicated in the weaker DAs of the study area. Moreover, a further scenario could focus on the establishment of a territorial tourism support network that coordinates local stakeholders to ensure a more equitable allocation of public investment, thereby improving a balanced and sustainable overall efficiency of the territorial tourism ecosystem.

However, several limitations need to be considered in the proposed model. First, the index relies on a single source, Google Places, which may introduce bias since the demographics of its users and their representation of potential tourists are not considered. There is no consideration of who is reviewing the locations—such as their age, gender, nationality, or whether the set of reviewers truly reflects the profile of tourists likely to visit the area. Furthermore, while the tourism sector has seen a rise in fake reviews in recent years, the authenticity of the scores used in this index has not been questioned, presenting a significant limitation.

Future research should address these issues by incorporating a broader range of sources, integrating demographic data of reviewers, and evaluating the credibility of the reviews. Additionally, a more comprehensive assessment of DAs attractiveness could include data on tourist flows and the specific features of individual attractions, to provide a more complete picture of the tourism system. The current model only evaluates one dimension of attractiveness, without addressing the appeal of individual tourist attractions—a gap that should be addressed in future research. The next step will primarily integrate data on tourist flows and attraction-specific features to achieve a more comprehensive assessment of DAs attractiveness.

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