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Multimodal Access to Minor Places in Heritage-Rich Landscapes: GIS Mapping to Define Slow-Tourism Routes from the Stations in the Railway Networks in-between Turin and Milan

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Abstract: The extraordinary richness of the natural and built heritage, widespread in the landscape which surrounds infrastructures, allows searching for new ways to access the places in a more sustainable way, by exploiting multimodal accessibility between train and bike. The current research shows how the territories in-between the cities of Turin and Milan, characterized by a complex historical landscape, could be enhanced in terms of sustainable tourism by exploiting the potential of the existing railway network and the widespread network of local roads, which make many unique places in these territories easily accessible. A GIS method based on a quantitative approach has been defined, to perform the spatial analysis by mapping the most significant nodes in the railway network, in the most attractive heritage areas localized in the surrounding landscape of infrastructures, to trace slow-tourism routes which can be used both by inhabitants and tourists to move across places in a more sustainable way. The research finds the most attractive heritage areas in the surroundings of local railways, and maps slow-tourism routes that connect local railway stations to surrounding heritage, within 15 min of cycling. The GIS-based method can support decision makers in the definition of new territorial development strategies, with the aim of enhancing the livelihood of the inner and fragile areas of the country that are crossed by the railways.

Keywords: GIS; mapping; spatial analysis; natural heritage; built heritage; landscape; sustainable tourism; cycle tourism; multimodality; railway tourism; bike; train

Citation: Rolando, A.; Scandiffio, A. Multimodal Access to Minor Places in Heritage-Rich Landscapes: GIS Mapping to Define Slow-Tourism Routes from the Stations in the Railway Networks in-between Turin and Milan. *Sustainability* **2022**, *14*, 15723. https://doi.org/10.3390/su142315723

Academic Editors: Ramona Quattrini, Ana B. Berrocal Menárguez and Clara Zamorano Martín

Received: 27 September 2022
Accepted: 19 November 2022
Published: 25 November 2022

1. Introduction

Nowadays, travelling by train is recognized as one of the most sustainable modes of transport, less polluting than car and airplane [1,2]. Tourism and transport are strongly interlaced with each other: transport encourages tourism, and tourism promotes transport development [3]. Due to the high environmental impact of tourism on a global scale [4,5], new sustainable forms of tourism have gained space in the tourism sector in the last decades as an opposite form to mass tourism due to changing motivations for travelling toward the environment [6], and to a major environmental-oriented awareness that is pervading our decisions. The shift to low emissions mobility, which is at the center of European policies, is supported by many concrete actions that concern transport efficiency, new digital mobility solutions, multimodality and others [7]. Train travel and bicycle travel are recognized as distinct forms of tourism experience [1]. Over the last few years, the COVID-19 pandemic has contributed to accelerating the outdoor cycling, especially for recreational and sport purposes [8]. In Italy, cycling tourism is a growing phenomenon [9] that is playing a key role as a driver for regional and local development of marginal areas and fragile territories [10–14]. In this framework, new groups of cycling tourists are emerging for their preferences for multimodal accessibility to well-known tourist destinations, and their curiosity to explore those off the most beaten tracks. They are interested in cultural places,

and they are willing to use public transport and bicycle to reach the final destinations [15]. In this perspective, the extraordinary widespread minor built and natural heritage localized in the surrounding local railway networks, themselves a historical infrastructure from the 19th century, could become more attractive destinations for this segment of tourists. Among transport policies, new tailor-made and sustainable transport solutions for tourism development can be designed [15], in order to encourage multimodal accessibility of the territories and enhance post-pandemic tourism [16].

Therefore, the aim of the research is to define a method to map and select the most suitable slow-tourism routes that enable the fruition of cultural and natural heritage, which are localized in the surroundings of local railway stations, by encouraging multimodal accessibility of the inner and marginalized territories.

In this framework, two research questions led the investigation: How do you define the most attractive areas in the surroundings of local railway stations from a heritage point of view? How do you map slow-tourism routes to access minor heritage?

The novelty of the research moves from scientific literature in strategies that take into consideration the reactivation of dismissed or underused railway stations, not only according to mobility parameters (related to population density and the presence of other polarizing economic activities), but also to cultural heritage and landscape assets which can not only improve tourism presence, but also encourage new liveability opportunities in the context of post-pandemic changes and innovations in life and work habits.

In the next sections the research outlines a method that exploits the potential of the Geographic Information System (GIS), to show how local railway stations can work as gates to access the widespread built and natural heritage, and also considers their potential as nodes where the provision of digital services can be most effective due to the already achieved geographic role. The GIS-based method, through a specific workflow that allows gathering, processing and visualizing geospatial data, enables mapping slow-tourism routes within the existing road network. The GIS-based method can support different actors, such as local administrators' and railway companies' strategies involved in the tourism sector, in defining new sustainable travel patterns for the enhancement of territories.

2. Theoretical Background

This section provides insights into three main aspects of the research which are relevant to defining the research domain, and also investigates findings carried out in previous studies. The first one concerns the concept of multimodality related to cycling tourism for promoting new travel patterns. The second one concerns the selection of the most relevant parameters to map slow-tourism routes. The third one concerns the GIS-based applications for slow-tourism routes.

2.1. Multimodality and Cycling Tourism

The combined use of trains and bikes for tourism purposes has a long tradition with regard to onboard bike transportation [1]. The most recent shared-mobility services at the destination, for one or multiple-day trips, have enlarged the range of possibilities for users to experience slow-tourism routes [17,18]. Increasing multimodal accessibility in small and medium railway stations, between train and bike, could create new opportunities in the slow tourism field for regional and local development [15,16,19,20]. In a broader sense, each railway station is a point of interface between landscape and infrastructure. In fact, in one direction, railway stations are the access points to rail services to reach a destination, determining the use of rail mode more than other modes [21], but in the opposite direction, railway stations enable people to access territory and discover it. The integration of cycling and train mobility, in a multimodal perspective, can determine new chances for tourism development, whether the two combined travel modes are perceived by tourists as a whole travel experience or not [17]. It means improving the integration of tourism-based services, both on board trains and at the final destinations. Train travel allows you to

cover longer distances, whilst cycling travel covers shorter distances, characterized by immersive experience through the landscape. Therefore, the combined use of trains and bikes increases the range of tourist destinations from a given location, and also considers a set of unconventional tourist destinations during the train travel, which are reachable by stopping at the station and shifting to bike. In this perspective, medium- and small-sized railway stations, mainly localized in rural areas, are potentially attractive places for cycling tourists to shift from train to bike and explore the surrounding areas [16,19,22,23]. In Italy, the main rail company has started encouraging cycling tourism from railway stations to the surrounding landscape. The national initiative promotes twenty cycling routes that are connected to the railway network, with the aim of promoting new train–bike combined travel experiences [22].

2.2. Slow-Tourism Routes Conception

The second point is about the selection of the most relevant parameters to map attractive slow-tourism routes. It is a central aspect of the tourism offer, because of the capacity of slow-tourism routes to include, in one single linear entity, heterogeneous and smaller entities of the landscape [24]. In urban environments, the searching for pleasant routes has been investigated from several points of view [25,26], and many web applications have been developed in the cities [27–29]. In the field of outdoor cycling tourism, it seems to be a lack of methods to define the best slow route options. In fact, cycle tourism is a recreational and leisure activity, perceived by the visitor as an integral part of an excursion or holiday cycling, ranging from a day or part-day casual outing to a long-distance touring holiday, affected by different motivators [5,30]. Some motivators are directly related to slow-route characteristics. Their concept requires a deep knowledge of the cycling network and landscape features. The first aspect concerns the infrastructure, which allows cyclists to ride across the territory. The cycling network could be made up of dedicated cycle paths or cycle lanes, greenways, or dismissed infrastructure (e.g., railway lines) [31], trails and low/free traffic roads (e.g., quiet country roads). Many road features are decisive in the route choice, also considering users' preferences (slope, road surface such as paved, gravel, off road, but also traffic density, road signals and road width). Among the aforementioned road types, the existing network of low/free traffic roads not designed as cycle paths is emerging as attractive routes for cycling tourism, due to the strong relationship with the countryside and natural landscape [12,16]. The second relevant aspect in the slow route conception is more qualitative, and it refers to the attractiveness of the perceived landscape crossed by the route. Defining landscape attractiveness is a very complex issue [32–34] that depends on the interpretative filter that leads the landscape perception. Several approaches can be used for landscape analysis: morphological/physical, historical, scenic/perceptual, and ecological [35]. The one related to the morphological/physical analysis of the landscape components (e.g., waterways, vegetation, natural and cultural heritage, landmarks, monuments, historical routes, panorama points) seems to be the most effective to be modelled through GIS mapping techniques.

2.3. GIS-Based Methods for Slow Tourism

The third point concerns the potential use of GIS mapping tools for the slow-tourism sector. The great advantage of the GIS-based methods concerns the capacity to collect, manage, process, and model spatial information in a visual form for multipurpose applications [36,37]. To support the decision-making process and to address spatial planning strategies in the slow tourism sector, different kinds of approaches have been developed over the last years by combining GIS-based methods and multicriteria analysis. These kinds of methods allow for exploring the spatial dimension of slow tourism, for instance by defining landscape classes along slow-tourism routes, such as the case of the historical pilgrimage route of Via Francigena [38], or to explore the potential of slow tourism for the enhancement of the widespread disused heritage localized in inner areas [39]. Other research lines are oriented to develop GIS-based methods for the definition of slow-tourism

routes. Some of them are based on landscape resources mapping, by creating customized datasets that are useful to define slow-tourism routes [40], others perform specific workflow for experiencing seasonal scenic conditions of the landscape [41]; other researchers carry out synthetic indices for supporting decision makers, such as the one for measuring the spatial quality of slow-tourism routes [42] or for the identification of the suitability of the disused railway lines to a greenway conversion [43]. As a communication tool to improve the fruition of slow-tourism routes, GIS has been integrated as a web mobile mapping application where users can contribute to the mapping process, becoming producers of geospatial data as volunteer geographers [44] by uploading spatial information on a web platform [45]. By the analysis of research outcomes, it seems to be a lack of GIS-based methods that enables the tracing of slow-tourism routes automatically, from an origin to a destination, by considering several parameters according to the users' preferences. For example, the presence of attractive points of interest like built and natural heritage, scenic landscape, protected natural areas, tourist facilities like bike rental and assistance, accommodation, connectivity to public transport, and morphological features such as slope and road surfaces.

3. Materials and Method

3.1. Study Area: The "Central Park" In-between Turin and Milan

The study area refers to the territories in-between the metropolitan areas of Turin and Milan named *Central Park*, in the north-west of Italy [46]. The study area, approximately 130 × 80 km large, refers to an idea of a new park based on different layered landscapes in-between the main cities, which are accessible by a widespread railway network which innervates these territories (Figure 1).

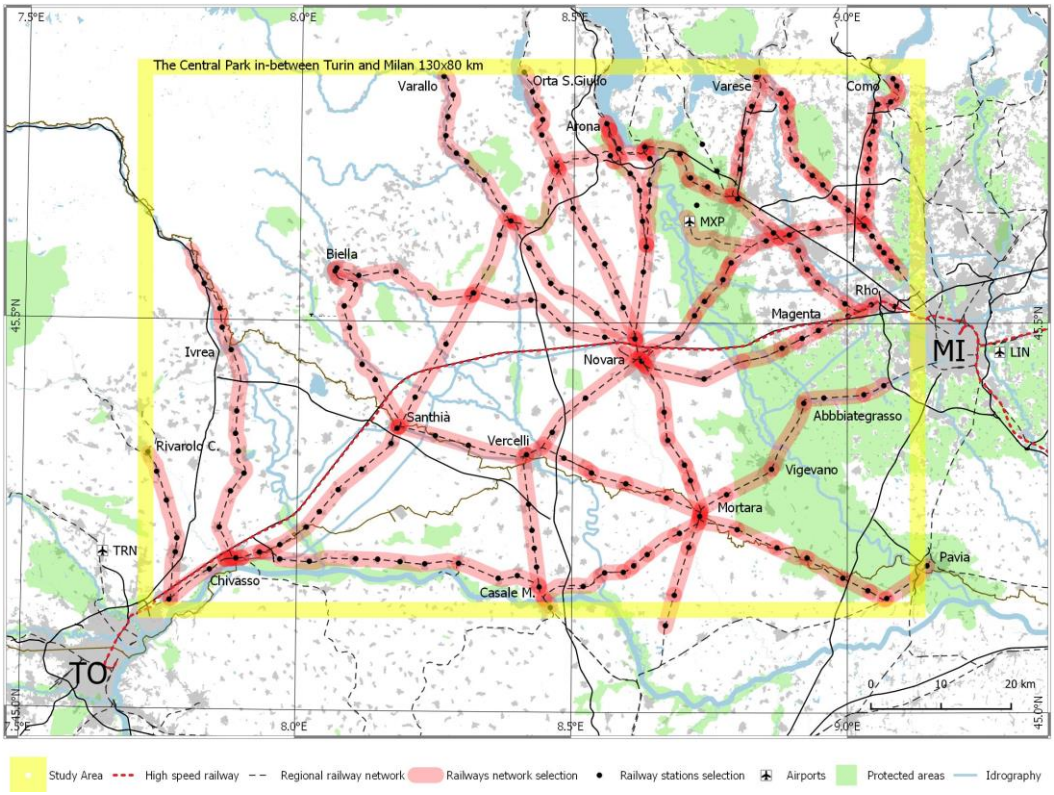

Figure 1. Map of the *Central Park* in-between Turin and Milan, which highlights the regional railway network and the railway stations to access minor places across the territory (small villages, built cultural heritage and natural protected areas).

The idea of the *Central Park* is much more related to the real use of places which are reachable by infrastructures, than to the administrative logic of boundaries. It aims at referring to a supraregional park, which gives the opportunity to enjoy the extraordinary richness of natural, built and cultural heritage, widespread over this landscape, thanks to the high-level accessibility ensured by existing infrastructure (railways and highway), and by ICTs through digital nodes [47]. The area is characterized by a flat agricultural landscape crossed by many rivers descending from the Alps, which supply water for cultivation. The agricultural landscape, also shaped over the centuries thanks to the reclamation works of the Cistercian monks, is spotted with medium and small urban settlements in an extraordinarily widespread historical built heritage, and a system of parks along the rivers and unique protected areas like those of the morainic landscape around Ivrea, the Baragge, and the remains of the planitial forest emerging from the rice fields which are distinctive in the area. Particularly, the research focuses on the high potential of the local railway network, which has innervated this territory since the mid-19th century [48,49], as a means to promote multimodal accessibility of these territories for cycling tourism purposes.

3.2. Materials

The datasets used in the current research belong to the two regional web portals of Piedmont and Lombardy, and to the Italian Ministry of Agricultural and Forestry Policies. For each region, two different kinds of datasets, freely available through the web, have been selected for the scope of the research: the one named built cultural heritage and the one which concerns natural protected areas. The built cultural heritage dataset available at a regional scale in Piedmont collects architectural, urban and archaeological heritage. It gathers places widespread throughout the whole region, mapped with the precision of the scale of 1:25,000, but it does not include the ones mapped by single provinces with a higher level of detail. The Piedmont dataset has been set according to the following categories: religious, military and civil works (at regional scale, the Piedmont points density is 20.636 points/25.387 km^2 = 0.81 points/km^2). In the Piedmont region, the natural protected areas dataset collects national parks, natural parks, natural reserves, special reserves and natural safeguard areas. In the Lombardy region, the built cultural heritage dataset collects several typologies of heritage. The dataset covers the whole region with a high level of detail (at regional scale, the Lombardy points density is 24.981 points/23.844 km^2 = 1.05 points/km^2). The one of natural protected areas gathers national and regional parks. The natural protected areas dataset of the two regions has been enriched by the sites of community importance (SCI), where SCI don't overlap with the protected areas one. The monumental trees dataset was released by the Italian Ministry of Agricultural and Forestry Policies in 2018, and it gathers the location of trees, recognized by the law for their high natural, landscaping, historical and cultural value [50]. The spatial definition of the areas which surround railway stations has been set through the Open Route Service (ORS) tool [51]. This enables the drawing of isochrones and, at the same time, the mapping of slow-tourism routes, by exploiting the API services in Open Street Map. The ORS API service has been integrated within the QGIS plug-in, and it enables many application fields; the isochrones allow to define the space according to the travel mode and to the average speed. The ORS tool enables the route computing with different travel modes and with a wide range of routing options (foot walking, foot hiking, regular cycling, road cycling, safe cycling, mountain cycling, electric cycling, driving a car, wheelchair) that allow the drawing up of routes according to different user profiles. In the current research the cycling regular mode has been set up with the aim to simulate slow-tourism routes. The ORS enables the automatic route definition by a points layer, according to the travel preferences of shortest or fastest route.

3.3. Method

This section is about the method, which concerns the GIS workflow that led to the definition of slow-tourism routes to access places localized in the surrounding railway stations. The method consists of a sequence of steps, supported by thematic maps, which have been identified within a process of analysis and synthesis. The method exploits the potential of the GIS in terms of gathering, managing and analyzing, in a spatial way, georeferenced information in a broad territorial context, even considering Open Street Map (OSM) as data source [52]. The main stages are summarized in the GIS workflow (Figure 2).

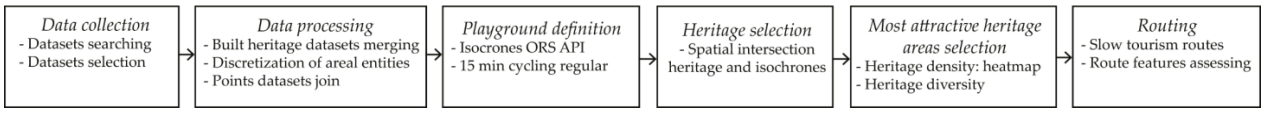

Figure 2. GIS workflow.

3.3.1. Data Collection

The spatial analysis of the study area starts from the data collection of the free available datasets that are related to the purpose of the research. Beyond the mapping of the regional railway network and railways stations, the main active phase of data collection has been focused on gathering the available regional datasets of built cultural heritage and natural protected areas [53,54]. The data collection phase concerns the analysis of features and standards of the available datasets, and their selection with care to the applicability to the research. The data collection also takes into consideration of the level of precision of datasets and the systems of reference.

3.3.2. Data Processing

The second phase is about data processing. This stage concerns the geo-processing of the selected datasets to get a uniform and comprehensive points dataset. Built cultural heritage of the two regions and national monumental trees are in the form of punctual datasets. Natural protected areas are in the form of areal datasets. To merge all selected datasets, some geo-processing operations related to the discretization of areal entities have been performed. In more detail, areal entities have been discretized according to a hexagonal grid with each cell of 1 km^2. This operation enables to transform areal entities into a uniform points dataset, with points distant 1 km from each other. This stage ends with the making of one points dataset named heritage dataset, obtained by merging points datasets of built heritage, natural protected areas and monumental trees, which belong to both regions (Figure 3a).

3.3.3. Playground Definition

The third phase corresponds to the playground definition. It allows defining the area under investigation, which corresponds to the surrounding landscape of the local railway network. This space has been defined by considering the railway stations localized along the local rail network, as gates to access points of interest (built and natural heritage hotspots) through slow-tourism routes. The areas, which are reachable from the railway stations, have been selected by modelling 15 min cycling-regular isochrones from the stations, by using the ORS plugin. The isochrones from the station allow defining slow routes approximately ranging between 30 km and 60 km long, depending on the density of points of interest. The merging of the isochrones of each railway station enables the definition of the playground, to be considered for the following steps.

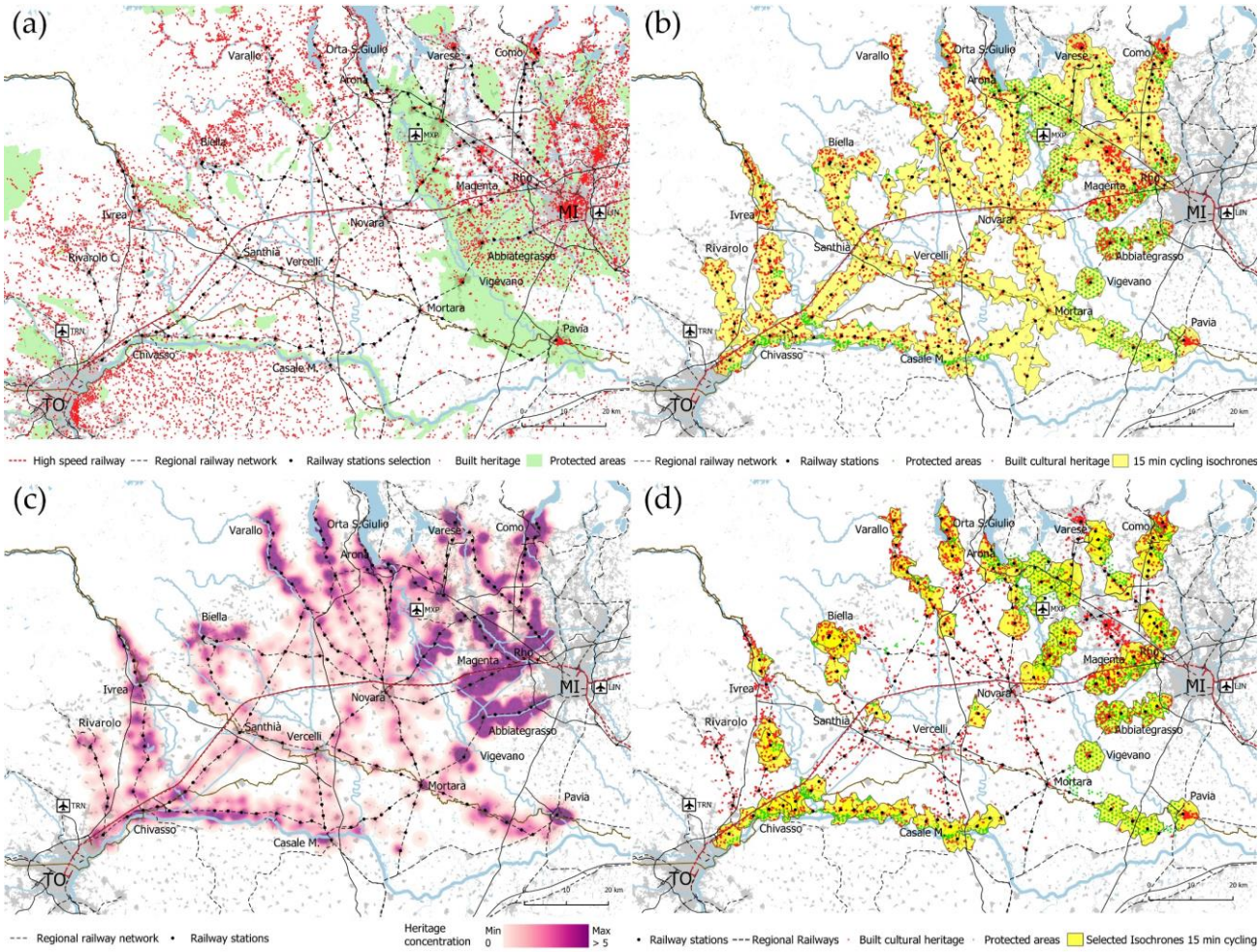

Figure 3. (**a**) Spatial distribution of scattered built cultural heritage and protected areas across the territories in-between Turin and Milan. (**b**) Map of merged isochrones (15 min cycling regular) from regional railway stations, with evidence of the selected built and natural heritage. (**c**) Heatmap of built and natural heritage, which shows the densest areas within 15 min cycling isochrones (dark violet corresponds to the threshold ≥ 5 heritage within 2 km radius). (**d**) Selection of the most attractive heritage areas within 15 min isochrone, on the base of highest concentration of built cultural heritage and to the presence of natural protected areas.

3.3.4. Heritage Selection

The fourth step enables heritage selection from a spatial point of view. A spatial intersection between the isochrones and the heritage dataset enables mapping all the built and natural heritage hotspots within the isochrones, reachable within 15 min of cycling from railway stations (Figure 3b).

3.3.5. Most Attractive Heritage Areas Selection

The landscape attractiveness has been computed according to two main criteria: heritage density and heritage diversity. Both criteria have been applied to the heritage spatial distribution within the isochrones; the first one is a quantitative criterion that concerns the built and natural heritage concentration. The heatmap has been performed in order to define the densest areas in terms of spatial distribution. The kernel density estimation has been carried out by setting the radius for each heritage spot to 2 km. The heatmap shows the maximum and the minimum levels of heritage concentration across the territories (Figure 3c). A threshold value of five heritage spots has been applied to each isochrone to select the densest areas. The second criterion concerns heritage diversity. In

this case, it has been set as a spatial intersection which enables the selection of the isochrone which contains both built and natural heritage spots (Figure 3d). This criterion has allowed planning of a cycling route which potentially is more attractive because it connects different typologies of heritage.

3.3.6. Routing

Routing is the process of finding a route within the existing road network, between the regional railway stations and heritage hotspots. The routing stage has been performed by the ORS plugin, which exploits the OSM road graph, by setting the cycling regular travel mode and the shortest route options. Before launching the plugin, the spatial operation of snapping the heritage hotspots to the closest point on the road network has been performed by GIS. This operation is a fundamental step to ensure the placing of heritage hotspots along the existing road network, potentially reachable by the slow tourism route.

4. Results

This section concerns the main outcomes of the research, which show how slow-travel routes can be automatically drawn through the GIS workflow by considering the railway stations as starting points to explore the heritage hotspots scattered across the territory. The results are presented by showing the application of the GIS-based method to four real territorial contexts, selected on the basis of their spatial configuration. The railway stations, selected across the study area are Trino Vercellese (province of Vercelli), Rovasenda (Province of Vercelli), Milan Malpensa airport (Province of Varese) and Borgogranco d'Ivrea (Province of Turin) (Figures 4 and 5).

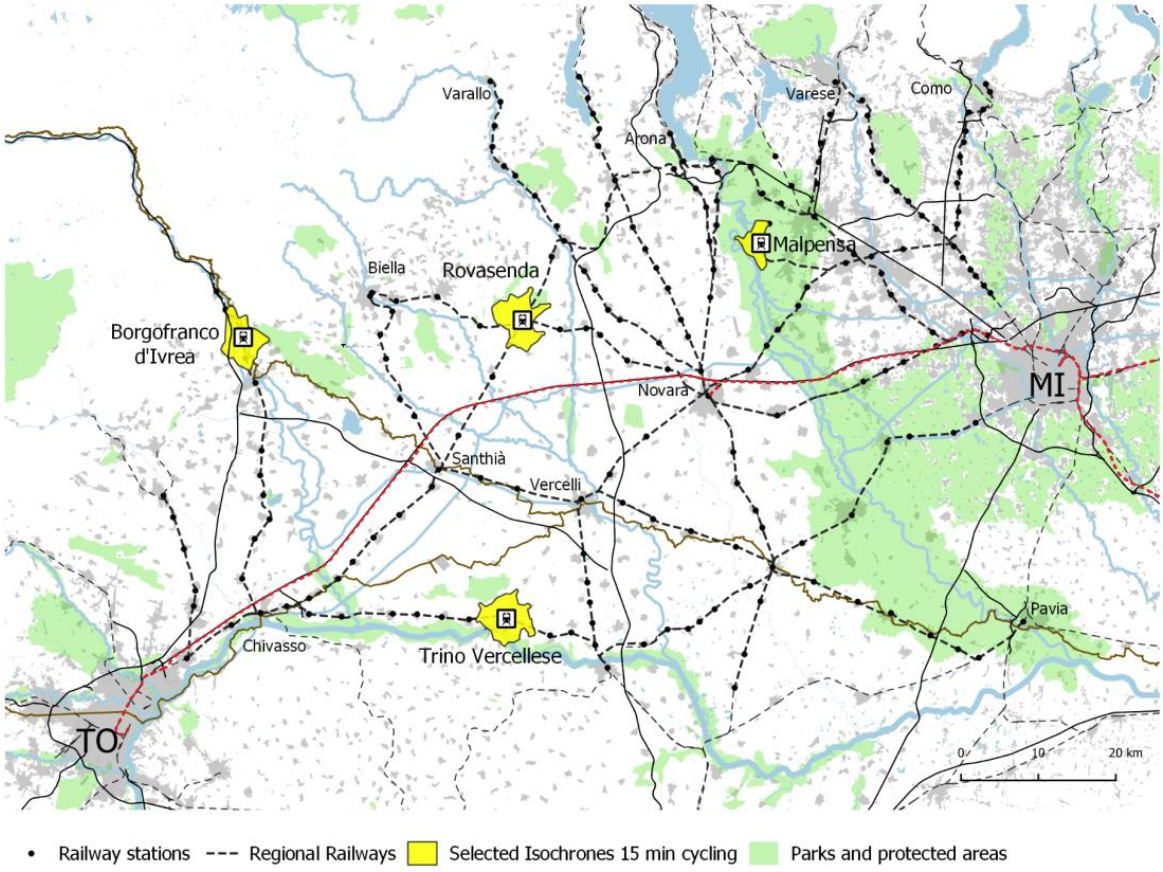

Figure 4. Map of the selected areas in-between Turin and Milan, which were used to test the effectiveness of the GIS-based method.

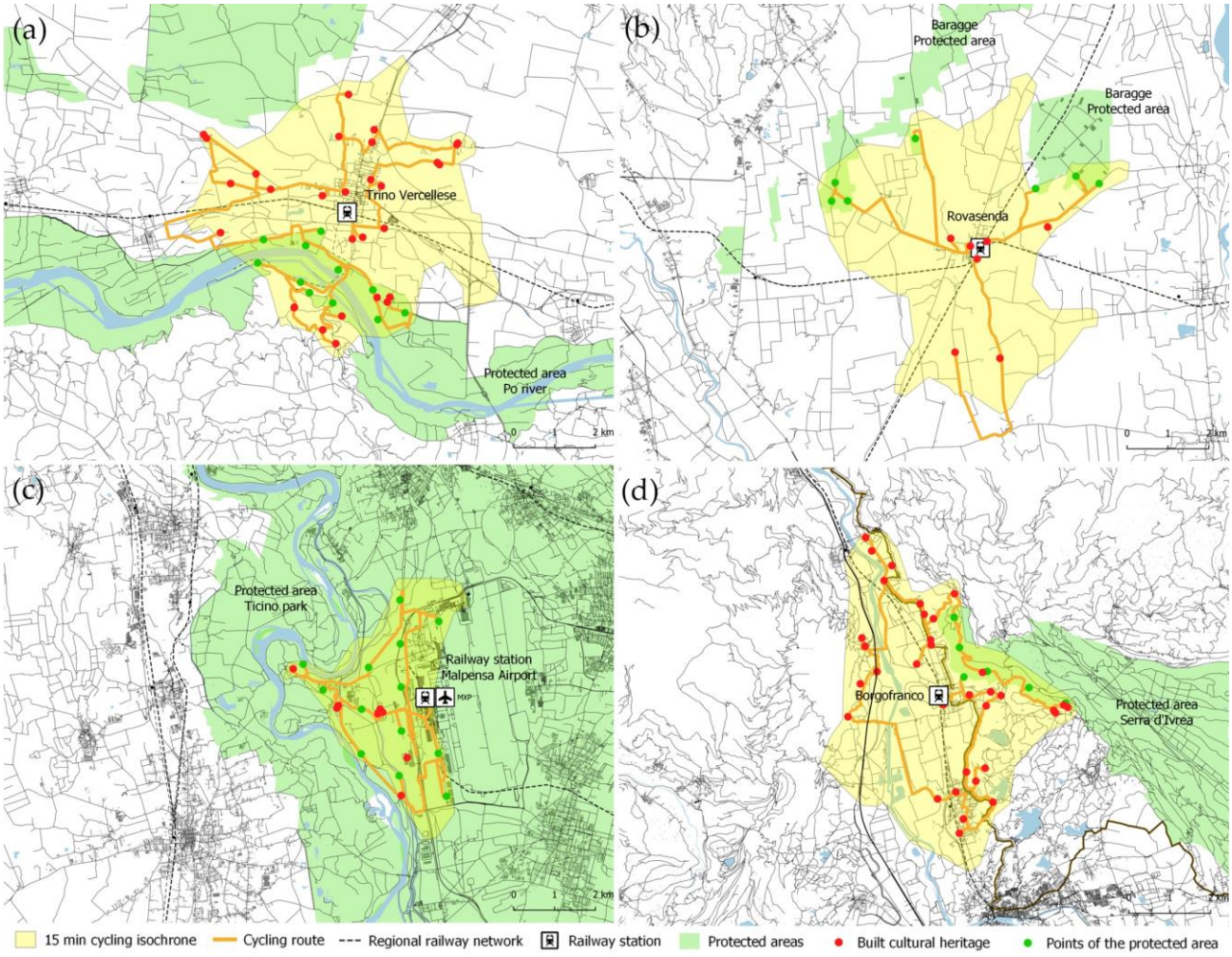

Figure 5. Maps of the four selected railway stations, characterized by different territorial configurations in the study area. (**a**) Trino Vercellese localized on the left bank of the Po river, in-between the hill of Turin with the protected area of Po river and the flat rural paddy-rice landscape of the Po valley. (**b**) Rovasenda, localized in the flat agricultural landscape of paddy-rice fields, close to the protected area named Baragge. (**c**) International Milan Malpensa airport railway station, localized close to the river Ticino Regional park, on the border between Piedmont and Lombardy regions. (**d**) Borgofranco d'Ivrea is localized at the base of the western alps, in the direction of Aosta valley, close to the protected area named Serra d'Ivrea.

4.1. Trino Vercellese

Trino Vercellese railway station is localized in the southern area of the *Central Park*, in-between Chivasso and Casale Monferrato, on the left bank of the Po river, in-between the hill of Turin with the protected area of Po river and the flat rural paddy-rice landscape of the Po valley. The slow route, which starts from the railway station, is 51 km long, connects 40 heritage hotspots, and is divided into 29 built heritage hotspots, 1 regional natural protected area (Po river protected areas, discretized by 11 points) and 13 heritage typologies. The slow route is in the ring form within the 15 min isochrone (Figure 5a).

4.2. Rovasenda

Rovasenda railway station is localized in the northern flat agricultural landscape of paddy-rice fields, between Biella and Novara, characterized by a low density of urban settlements and by the presence of the natural protected areas of Baragge. The railway station is localized along the intersection between the Novara–Biella, east–west connection and the Santhià–Arona, north–south connection, which is nowadays a disused railway line. This case has been selected because of the intersection between two railway lines, and for the potential benefits that the potential reactivation of this line could generate in terms of slow tourism. The slow route covers 34 km and intersects 14 heritage hotspots, divided into 7 built heritage hotspots and 2 regional natural protected areas (Baragge protected areas, discretized by 7 points) and 8 heritage typologies. The slow route is in the radial form, within the 15 min isochrone (Figure 5b).

4.3. Milan Malpensa

The international Milan Malpensa airport is connected to the metropolitan area of Milan by the regional railway connection. The railway station of the airport is localized within the regional protected park of the Ticino river. This case has been selected due to the specificity of this location, being a railway station integrated into an international hub within Ticino park. This area is also characterized by a high density of urban settlements and heritage hotspots which surround the airport. The slow route is 30 km long, connects 21 heritage hotspots, is divided into 8 built heritage hotspots and 1 protected area (Ticino protected areas, discretized by 11 points), and has 9 heritage typologies (Figure 5c).

4.4. Borgofranco d'Ivrea

Borgofranco d'Ivrea railway station has been selected because of its location at the base of the western alps, along the railway line and the highway A5 which connects the Piedmont region to Aosta Valley. Borgofranco d'Ivrea is surrounded by the hilly and varied landscape of the moraines, spotted by small rural settlements, with alpine mountain peaks in the backdrop. The area of Borgofranco is also crossed by the historical pilgrimage path of Via Francigena, which partially overlaps to the designed slow route. In this case, the landscape is characterized by the natural environment of woodlands, spotted by scattered built heritage hotspots. The slow route covers 39 km and intersects 39 heritage hotspots, divided into 33 built heritage hotspots and 1 site of community importance (SCI protected area of Serra d'Ivrea discretized by 6 points) and 14 heritage typologies. The slow route is in the ring form, within the 15 min isochrone (Figure 5d).

The selected route features have been compared in Table 1. The table shows the different features of each route, with care to the number of heritage hotspots and heritage typologies. To better compare the slow route features, four different synthetic indicators have been computed by referring to the route length, as is visible in Table 2. The built heritage indicator shows the average percentage of built heritage along the slow-travel route, according to the number of built heritage hotspots. The naturalness indicator shows how much the slow route crosses natural environments. The heritage richness indicator highlights how rich the slow route is, by considering the total amount of natural and built heritage hotspots. The heritage diversity shows how diverse the slow route is, by considering the number of heritage typologies distributed along the route.

By the analysis of the physical components in Table 1 and processed indicators in Table 2, it appears that the area of Borgofranco d'Ivrea can be considered as the most attractive one because three of the four indicators are the highest ones. The areas of Trino Vercellese and Malpensa airport are a bit less attractive than Borgofranco, but they seem to be more attractive in terms of naturalness due to the wider extension of Ticino park in the area of Malpensa, and Po river park in the area of Trino Vercellese. The area of Rovasenda seems to be less attractive due to the least heritage richness and least heritage diversity (Figure 6).

Table 1. Data comparison of the four selected slow-tourism routes.

Railway Stations	A Inhabitants by Isochrone [n.]	B Cycling Route Length [km]	C Total Heritage [n.]	D Built Heritage [n.]	E Protected Areas [n.]	F Points Discretization of Protected Areas [n.]	G Heritage Typologies [n.]
Trino Vercellese	7401	51	40	29	1	11	13
Rovasenda	957	34	14	7	2	7	8
Malpensa	976	30	21	8	1	13	9
Borgofranco d'Ivrea	8971	39	39	33	1	6	14

Table 2. Slow-tourism route indicators.

Railway Stations	Built Heritage [D/B] [n./km]	Naturalness [F/B] [n./km]	Heritage Richness [C/B] [n./km]	Heritage Diversity [G/B] [n./km]
Trino Vercellese	0.57	0.22	0.78	0.25
Rovasenda	0.21	0.21	0.41	0.24
Malpensa	0.27	0.43	0.70	0.30
Borgofranco d'Ivrea	0.85	0.15	1.00	0.36

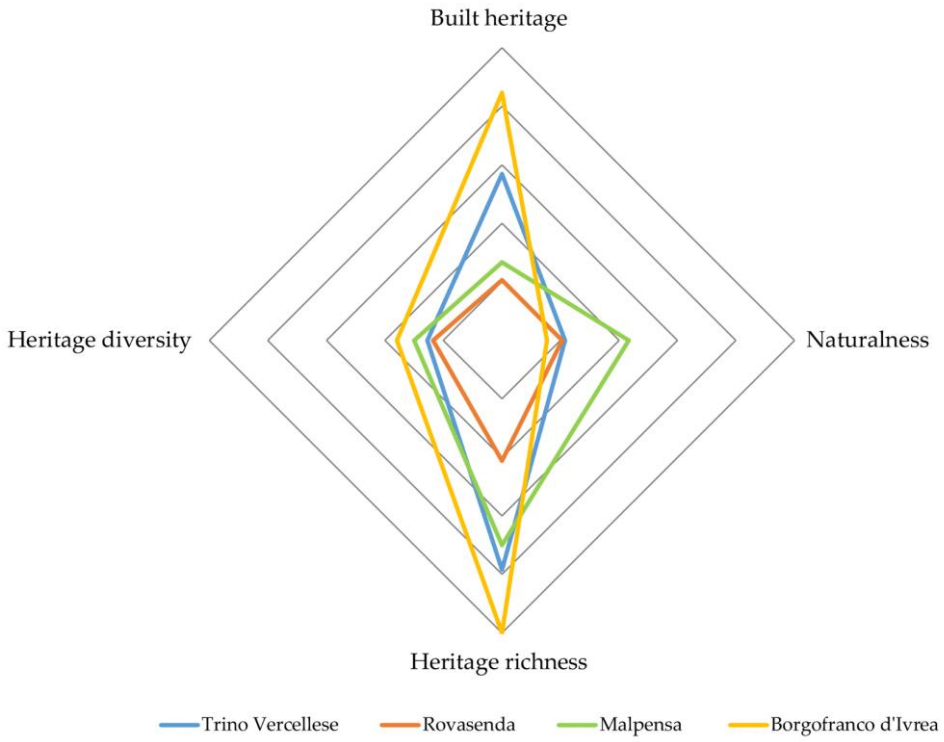

Figure 6. Spider graph of the synthetic slow-tourism route indicators.

5. Discussion

The research points out how the GIS-based method can support decision makers operating in the tourism sector to better exploit existing infrastructure, as in the case of local railways and minor roads, as a sustainable strategy to enhance the inner and marginal areas of the country by promoting slow-tourism routes across the landscape. One of the main potentials of this method concerns its high flexibility and replicability to other territorial contexts. Nevertheless, three main points will be discussed in the next rows: The first one is more theoretical, and it concerns the concept of multimodality between trains and bikes, which can play a key role in sustainable tourism development. The second point is about the potential of the GIS-based method, which in the mapping process, through

the spatial analysis, can reveal hidden features of the landscape by exploiting the great availability of geospatial data, both at the regional and local scale. The third one is about the attractiveness of the areas and the definition of slow-tourism routes.

The first point concerns the multimodal accessibility of inner and marginalized territory. It is a key concept to increase the attractiveness of territories from a sustainable tourism perspective, and particularly to improve the relationships between heritage and railways. The widespread network of regional railway stations placed in the study area could be better exploited if they were inserted into a broad territorial strategy, which encourages the development of cycle tourism infrastructure and cycle tourism services. Cycle tourism routes can support the development of a new unconventional tourist destination offer across inner and marginalized areas. Multimodal accessibility of heritage hotspots can be improved by bike-sharing services in minor and less known railway stations, and by encouraging onboard bike transportation service on train coaches. Additional cycle tourism services [15], both physical and digital, can be oriented to the promotion of slow-tourism routes. Through the GPS-based mobile phone applications, web GIS portal, location-based services related to key slow tourism sectors, such as the ones related to local food and culture, accommodation and bike assistance services, heritage can support the reactivation of abandoned places across the territory and contribute to the revitalization of local economies. The improvement of cycle tourism services can bring benefits both for inhabitants and for tourists, in a sustainable development perspective. For the inhabitants, cycling tourism can determine the enhancement of territorial capital (natural, cultural, and human), the creation of new opportunities for investment and new jobs in different related sectors, and the growth of the local economy, but also, the radical shifts to more sustainable mobility habits in commuting from home to work, or even for recreational purposes in relation to proximity tourism [14].

The second point is about the great potential of GIS in the mapping process, a creative practice which allows unveiling hidden features [55,56] and supports spatial analysis both at regional and local scale. At the regional scale, such as the one of *Central Park* proposed in this research, the GIS-based method can support decision makers in the definition of territorial strategies and selection of the most attractive heritage areas along the railway lines, according to the heritage concentration and heritage diversity criteria. In the study area it has been tested through the presence of both criteria, by setting a threshold of five heritage spots for density, and a mix of built and natural spots for diversity. The naturalness indicator can be improved by considering not only natural protected areas, whose value is commonly recognized, but also considering unbuilt environments and low-density built environments that are compatible with cycling tourism (e.g., countryside, woodlands). In this perspective, other kinds of thresholds can be tested to improve the selection of the densest heritage areas. Nevertheless, the landscape attractiveness can be better modelled spatially, also taking into account other indicators that are relevant for cyclist tourists, such as tourism services, road surfaces, and cycling services [57], in order to perform an overall index. At the local scale, the GIS-based method allows the exploration of site-specific landscape features which are the base of the slow-tourism routes definition.

The third point is about the slow-tourism routes definition. The ORS service, integrated with the GIS method, enables control of the route features (shortest or fastest route option) and cycling travel modes (regular, road, safe, mountain, electric), which can be chosen according to the user's preferences. The selected four areas show the applicability of GIS-based method to different territorial configurations, and how synthetic indicators for routing (built heritage, naturalness, heritage richness, heritage diversity) can support users' travel choices.

Limitations of the GIS-based method are related to the lack of weights belonging to heritage hotspots, which could be estimated according to their uniqueness/spread over the territory, or in relation to high-level recognition by a national or international organization which lists places of outstanding beauty (e.g., UNESCO). Secondly, the lack of an overall mapping of relevant elements for cycling tourists, not only oriented to the attraction

points of the landscape, but also related to the tourism services (e.g., accommodation, bike assistance, water fountains) and to morphological features of the road (slope and roads surface characteristics), leads to further developments of the research.

Future development of this work can be addressed to an overall mapping of relevant aspects for cycling tourists [57], even by applying weights to the landscape attractions and tourism services. Questionaries for cycling tourists could be helpful to better understand weights to be applied in spatial analysis. A web dashboard could be developed to map parametric slow-tourism routes according to travelers' preferences, by filtering spatial information (e.g., trace a slow route that intersects at least one church, one museum, three natural protected areas, and five panoramic points, within 15 min from railway stations along unpaved roads). Further applications of the method can be tested in other territorial contexts, characterized by more uniform landscapes and by different built-heritage density and diversity.

6. Conclusions

The research debate on cycle tourism, as stated in a recent literary review, outlines a trend of development of this economic sector in general, and it also suggests that a finer filter of attention should be applied to those touristic experiences that can be defined by more specific adjectives such as slow, green, sustainable, proximity and cultural [14]. Also considering the framework of UN SDGs (n.3, 9 and 11) [58], the research has shown a method to support the definition of new strategies in the field of sustainable tourism, to reduce greenhouse gas emissions and define new environmentally friendly travel patterns. The research contributes to the existing body of literature on cycling tourism, by investigating the research domain of multimodal accessibility, between train and bike, of heritage-rich landscapes, considering the territory between Turin and Milan as a study case. This specific territorial context has been chosen because it shows in a clear way the potential of tourism to improve the tangible and intangible interrelations between dense urban and metropolitan areas and dispersed inner areas, also rich in heritage and cultural assets [47]. It has shown the potential of a GIS-based method to improve spatial relationships between heritage and railways, by defining slow-tourism routes to access minor places. The research demonstrates, by considering real case studies, that local railway stations, if they are localized in a heritage-rich landscape, could also play an active role for cycling tourism by promoting new tourist destinations. The GIS-based method, on the one hand, highlights the potential of minor widespread heritage in the surroundings of railway stations as a possible tourist destination, reachable by shifting between train and bike; on the other hand, it shows how to explore and map slow-tourism routes which enable experiencing the widespread heritage. The method can be inserted in a territorial development strategy to promote unconventional, and possibly even unexpected, tourist destinations, with the aim of reduce overpressures on the best-known places. In such a way, this strategy could contribute to rebalancing tourism flows, which in the most crowded tourist destinations can create negative impacts on the environment in a concentrated way and promote a more balanced use of the places across the territory. New synergies between national, regional and local authorities, train companies, tourist operators, and bicycle associations can inspire concrete sustainable actions for the enhancement of inner and marginalized areas of the countries. The approach and the technicalities outlined in this paper demonstrate the effectiveness of defining new trajectories of touristic development for the territories analyzed, especially if they are well interconnected with the railway network.

In conclusion, it can be assumed that multimodal accessibility is an effective and sustainable mobility solution, not only for tourists but also (and even more) for inhabitants, who can use the same network for their home-to-work travels. A strategy to support this idea should be based on the provision of specific services, and it seems that further research and solutions should be experimented with and realized, particularly to provide solutions useful to both temporary and permanent inhabitants, starting from cultural and health care services. These services (physical, but also digital and phygital) should integrate the

traditional ones like accommodation, and should therefore be implemented and provided, both during the travel time to reach the destination and in the territories and places crossed by slow mobility routes, where the need of specific assistance in terms of general well-being (of body and mind) should be related to and activated by location: prompt, effective and site-specific. Smart services can therefore be available in a diffused way throughout the territories, using buildings that are often dismissed or closed because unattended, such as stations and service areas that can be located along the mobility network, but also those located throughout even more remote areas such as schools, post offices, churches and small historical places of interest. In this respect, it is to underline the crucial role of the cultural aspects of tourism, strongly related to the human capital of the territories, where only the truth, not displaceable capital, is present. The accessibility—direct and indirect in terms of information that can support the knowledge process—contributes to improving the overall spatial and cultural quality of the experience along the routes and the availability of cultural information, especially considering the importance, after the pandemic, of proximity and knowledge tourism. The study case of digital lockers, experimented in Piedmont for the accessibility of small churches (e.g., automatic unlock opening through QR code application) in remote areas, is a model that could be applied also to other kinds of services [59]. Similarly, it can be considered as a suitable example, to be translated into inner and less dense areas, of the Idea Stores in London [60], which constitutes attractive points where cultural, but also health care and social services, are provided in an integrated form. These solutions could positively impact on quality of the territories, where tourism can be a positive catalyst and an agent of overall development, improving at the same time the sense of belonging and pride of inhabitants and the provision of better services, based on the most important ones of mobility, well-being, health care, and culture, so as to create the conditions for a long term (permanent, durable, and in one word, sustainable) better relationship between people and the landscape.

Author Contributions: Conceptualization, A.R. and A.S.; Methodology, A.R. and A.S.; Investigation, A.S.; Data curation, A.S.; Writing—original draft, A.S.; Writing—review & editing, A.R.; Visualization, A.S. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Informed Consent Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

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