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Exploring Motivators and Deterrents of Cycling Tourism Using Qualitative Social Research Methods and Participative Analytical Hierarchy Process (AHP)

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Abstract: Cycling tourism is an environmentally friendly way to explore a destination. Nowadays, it is becoming more and more popular worldwide, since it permits an in-depth communication both with nature and people. In this context, the aim of this paper is to explore, in detail, mainly the environmental motivators of cycling tourists, and their significance, in Greece, by using qualitative social research (in-depth interviews and focus groups) and participative analytical hierarchical process. The results show that regarding physical environment, the element which attracts cycle tourists the most is the variety of scenic views along their route. Existence of lakes, rivers and beaches were also valued. On the contrary, "Biodiversity" and "Untouched natural landscapes" were ranked low as a description of the quality of the natural environment. However, the rise of cycling tourism depends considerably on the appropriate infrastructure, namely roads with low slopes, appropriate quality of surfaces and cycling infrastructure. Planners, policy-makers, and competent authorities should give emphasis on the critical factors in order to enhance cycling tourism, thus resulting in positive multiplying effects such as environmental protection and economic growth.

Keywords: cycle tourism; qualitative social research; analytical hierarchy process; preferences; Greece

1. Introduction

Cycling tourism is an environmentally friendly way to explore a destination. Cycling and walking depend exclusively on human energy and are almost emission-free. Enhancing modal split of cycling lies at the heart of contemporary policies to reduce greenhouse gases which are liable for climate deregulation.

Bicycle or cycling tourism is becoming a more and more popular tourism activity since it allows an in-depth communication with nature and people. A literature review about tourist attractions conducted by Lew [1] showed that the attractiveness of a place depends often on the opportunities offered (a) to escape from conventional tourism activities, (b) to risk exploring deeper this place, as well as to (c) to enter the "backyard" hidden behind the scene presented to the tourists. This "backyard"

is often less safe for visitors, but the experience gained is authentic. Authenticity is often absent in touristic places and visitors have no opportunity to communicate with ordinary people, to meet real circumstances and real local culture. It seems that tourists have to choose between safety and authenticity and Lew [1] concludes that the attractiveness of a place has closer relation with the second.

Tellingly, cycling offers the opportunity to enter a natural place without disturbing the wildlife through gravel roads which penetrate the heart of an ecosystem. Moreover, it provides the opportunity to redirect from main roads, enter remote villages and meet traditional life and culture [2]. In addition, the rise of cycling modal split in touristic destinations can improve their environment and sustain or even raise the number of their visitors. Rise of cycling in the modal split means higher capacity to move people and goods without the side effects of congestion and environmental degradation.

Therefore, the rise of cycling tourism is or should become a global target and the means to achieve it are of high interest worldwide. In the above context, the aim of this paper is to explore, in detail, the environmental motivators of cycling tourists by using qualitative social research (in-depth interviews and focus groups) and participative analytical hierarchical process. An in-depth interview is a method of data collection used in qualitative social research which tries to deepen the communication between the researcher and the subjects of research, in the same way cycling deepens the communication between the traveler and the surrounding social and physical environment. The process of data collection is extremely slow and is based on long-lasting conversation between researchers and research subjects. This method has been proven to be extremely useful for entering a not common lifestyle and recognizing variables influencing it [3]. Analytical Hierarchal Process allows an easy quantification of qualitative variables [4]. The combination of those two methods is used to develop a participative process to recognize environmental variables enhancing or hindering cycling tourism with the active contribution of cycle tourists, thus obtaining a better understanding about which policies are more capable to foster and attract cycling tourism in Greece.

2. Literature Review: Exploring Factors, Social Research Methods and Multi-Criteria Analysis

2.1. Factors Influencing Cycling Routes

The quality of cycling routes has been thoroughly examined by several scientific papers worldwide. Firstly, regarding the actual safety of cyclists along a given route, we should mention the following: According to Kaplan and Prato [5] high traffic volume increases the number of road accidents significantly. Strauss et al. [6] note that the probability of road crashes is considerably higher in arterial roads. Furthermore, Pulugurtha and Thakur [7] argue that increased speed levels result in higher number of road crashes. Another significant factor affecting actual road safety levels is the proportion of trucks or full-sized buses, which was found to pose great danger for cyclists [5]. Some other research papers indicate that the actual safety level is also affected by on-street parking, slope, and existence of rail tracks [8,9] number of intersections [5], road or information signing and street lights [10] and road width [11]. Finally, (maybe) the most important factor concerning cyclists' actual safety is cycling infrastructures [8,9,12–14]. Robartes and Chen [15] conclude that roads with cycle tracks or exclusive cycle lanes ensure greater safety levels than roads with shared or no cycling infrastructure.

Secondly, regarding the perceived safety of cyclists, it is worth mentioning that cyclists feel more secure in cases of cycle tracks and exclusive cycle lanes [16–19]. They also appreciate the adequate quality of road pavement [20], the low speed levels [21] and the absence of trucks or buses [22,23]. On the contrary, they do not feel safe when the number of intersections along a route increases [24], when there is a consistent change in their course such as left turns [16] or in cases of low visibility levels [25].

Next, we focus our interest on preferences and criteria of cyclists for choosing a route, and especially for leisure or recreational purposes (cycling tourism included). Initially, we should note that cyclists, in line with safety issues, prefer routes with limited number of intersections [26]. Furthermore, according to Broach et al. [27] and Zimmermann et al. [28], cyclists usually choose routes with

separated or minimum coexistence with vehicular traffic. Besides these factors, Lee and Huang [29] also highlighted the quality of pavement, and Lamont [30] found that cyclists prefer rural roads, too.

Another notable research was conducted by Ritchie [31], who found that cyclists in New Zealand try to avoid vehicular traffic, particularly trucks or buses. Moreover, according to the same research, cyclists prefer routes with remarkable natural environment such as streams, parks, forests, rivers, lakes, gorges, etc., and they are also in favor of meeting at least one accommodation site each day. Tellingly, two more research papers drew similar conclusions [32,33], arguing the great significance of natural environment along the routes. Simonsen et al. [34] conducted a similar research and found that cyclists prefer routes with natural beauty, calm conditions (i.e., low traffic flow levels), and increased road safety levels. Two later papers that carried out a thorough survey in Taiwan [35,36] identified road safety, low vehicular traffic, landmarks, road signing, refreshment points, sanitation, accommodation, bicycle repair shops, and information centers as considerable factors affecting the selection of a route. It is worth mentioning that the aforementioned factors were found significant in the papers of Lumsdon and Peeters [32] and Downward and Lumsdon [33].

Consequently, based on the literature, we identified that the most affecting factors are the following: (a) Traffic flow, (b) speed, (c) proportion of trucks or full-sized buses, (d) on-street parking, (e) number of intersections, (f) slope, (g) rail tracks, (h) road or information signing and street lights, (i) change in course (e.g., left turns), (j) quality of pavement, (k) cycling infrastructures (cycle tracks, cycle lanes, shared space, off-road), (l) road width, (m) natural environment (water, green spaces, picturesque landscape etc.), (n) accommodation, (o) urban areas and settlements, (p) landmarks, historical sites and monuments, (q) additional services (refreshment points, WCs, bicycle parking sites, bicycle repair shops, cafes, restaurants, etc.).

2.2. Social Research for Defining the Factors

Social research consists mainly of qualitative and quantitative methods [37,38]. Qualitative methods, which deal with non-numerical data [39], are the most appropriate for a thorough identification of the various factors affecting cycling activities for leisure or tourism purposes [34]. Unlike quantitative methods, that can be useful in cases of confirming or generalizing one hypothesis [40] as the qualitative techniques have the potential to give emphasis on communicating with the subject of the research, thus identifying new factors and variables [41]. In general, the goal of the qualitative tradition is a "deep understanding of the particular" [42]. The qualitative methods involve various methods such as logic, ethnography, discourse analysis, case study, in-depth interview, open-ended interview, participant observation, counseling, therapy, grounded theory, biography, comparative method, introspection, casuistry, focus groups, literary criticism, meditation practice, historical research, etc. [43,44].

Two significant methods that require limited sample, thus shaping the proper conditions for a thorough communication with the research subject are: in-depth interviews and focus groups. An in-depth interview can be defined as: "an unstructured personal interview which uses extensive probing to get a single respondent to talk freely and to express detailed beliefs and feelings on a topic" [45]. The main strength of this method is flexibility [46]. A focus group can be defined as "a group of individuals selected and assembled by researchers to discuss and comment upon, from personal experience, the topic that is the subject of the research" [47]. The key point of focus groups is the interaction between the research participants [48].

Generally, in-depth interviews, and focus groups provide more quality on the results [49,50]. The friendlier atmosphere that is developed make the respondents feel free to answer the questions, and the relationship built between them and the researcher frees their view on the subject. The researcher may cover all of the aspects of their interest, guiding the conversation towards the research's questions without altering the way the respondents view the subject, receiving, in the end, the most accurate results [51]. In order to ensure a friendly environment of the interviews, a technique for conducting the in-depth interviews is the "snowball method" [52]. This method has, as its fundamental element, that the first respondent recommends the next one, and so forth.

Furthermore, results deriving from focus groups or individual in-depth interviews can ensure the validity of the results [53]. Hence, they are preferred to other similar methods such as online questionnaires or printed questionnaires sent to residents that involve the risk of reduced validity due to:

- Different interpretation of the questions between the respondent and the researcher;
- Guidance of answers and responses by the researcher;
- Lack of honesty by the respondent;
- Difficulty in understanding the question;
- Absence of self-awareness, i.e., the inability to interpret the incentives of the respondents;
- The researcher cannot evaluate the accuracy of the answers provided [54].

2.3. Multi-Criteria Analysis—Analytical Hierarchy Process (AHP)

Multi-criteria methodologies have emerged as a discipline of Operational Research (OR) and their main objective is to support decision-making; particularly, in complex situations [55]. Decision- making is a challenge that includes uncertainty referring to the impacts of the various choices [56]. Multi-criteria analysis (MCA) is a tool that integrates multiple aspects of a problem in the decision process [57,58]. It is used in a variety of cases, including classification, ranking and evaluation of different alternatives or scenarios [59]. The key components of a multi-criteria analysis are the following: (a) the alternatives, (b) the criteria and (c) the weights regarding these criteria [60]. Tellingly, the scores achieved do not necessarily need to be conveyed in monetary terms; on the contrary, they can be simply expressed in physical units or in qualitative terms. It should be mentioned that multi-criteria analysis is increasingly used for decision-making, mainly due to the particular complexity of the issues emerging as well as the deficiency of other relevant tools such as Cost-Benefit Analysis (CBA) or Cost-Effectiveness Analysis (CEA) in taking into account all the impacts of strategies or policies [61]. Especially, in cases of complicated decision problems where policy-makers ought to deal with multiple, different or even conflicting criteria, multi-criteria techniques constitute the most appropriate method [62].

One of the most popular and effective methods belonging to the "multi-criteria techniques group" is Analytical Hierarchy Process (AHP) [63–65], which was first developed by Tomas Saaty in the 1970s [66] and has been under several modifications and improvements since then [67,68].

Analytical Hierarchy Process is a systematic procedure that represents the various elements of a problem in hierarchical form [69] and involves three basic steps: (a) decomposition, or the construction of the hierarchy; (b) comparative judgments, or defining and executing data collection to obtain pairwise comparative data on elements of the hierarchical structure; and (c) synthesis of priorities, or construction of an overall priority rating [70]. It is commonly used in a wide range of practical applications in a variety of decision-making processes, especially in cases of complex problems [71–73]. More specifically, AHP was adopted by a notable number of research papers from different scientific disciplines worldwide [36,74–80].

The main assets of this method, which favored its selection instead of other similar methods, are the following: Firstly, it is crucial that AHP is sound, readily understood, easily implemented, and capable of producing results that agree with expectations [72,81]. Furthermore, it organizes tangible and intangible factors in a systematic way [82]. In general, the simplicity and the flexibility of the method greatly enhanced its attractiveness, thus contributing significantly to its widespread use [83].

One more advantage of the method, is that AHP incorporates both qualitative and quantitative aspects of decision-making [4,84,85] and therefore, it constitutes an efficient tool for controlling the consistency of the evaluation criteria and the alternatives proposed [79]. Additionally, this comprehensive view reduces potential hindrances in the decision-making process [68]. Finally, AHP is useful for examining the relationships among the components of a problem [86,87], since it converts individual preferences into ratio-scale weights that are combined into linear additive weights for the associated alternatives [71].

3. Methods and Application

This research adopts a qualitative approach, in order to define, and rank the factors affecting cyclists' route choices. It is part of the TOPOS research program, aiming to enhance cycling tourism by developing (a) a cycle-friendly certification system for the tourism sector and (b) a cycling tourism website to promote certified businesses. The outcome of the research will be used to develop an algorithm to rate the quality of cycle routes around places.

The methodological framework is composed of two main pillars. The first one includes the social research, carried out via in-depth interviews and focus groups, aiming at identifying the factors (primarily revealed by the extensive literature review), and the second pillar concerns the calculation of the evaluation index via the multi-criteria method AHP. These two pillars have a hierarchical relationship with each other, with the social research preceding the AHP.

3.1. Qualitative Research

Firstly, regarding the social research, we should mention the following: Literature review provided a considerable view of the factors affecting the quality of cycling routes. They include:

(a) Natural elements (water, green spaces, picturesque landscape etc.);
(b) Places of interest (landmarks, historical sites, traditional settlements and monuments);
(c) Road network characteristics (traffic flow, speed, proportion of trucks or full-sized buses, slope, road width, signing, quality of pavement, cycling infrastructure);
(d) Accommodation and services.

However, the limited number of studies that focus on cycling tourism and the absence of relevant research in Greece signified the necessity of carrying out a social research in order to confirm the aforementioned factors or integrate more in this current paper. The qualitative method of social research has been selected, which is an appropriate form of research to identify these factors.

The aim of this pillar is to identify all the factors that would be useful for a cycling tourist, in order to be included in the evaluation of the external environment of an enterprise. The long duration of the conversation, besides increasing the credibility, also provided time for cyclists to think about all the parameters influencing route choice.

The sample of the research was composed by experienced cyclists from Greece and abroad, organizers/guides for cycling tours, and cyclists from Greece and abroad doing short-term cycling tours. These groups were considered as the most appropriate to identify the factors that influence the quality of cycling routes for recreation/tourism. Precisely, a sample consisting of 22 people between 36 and 65 years old (6 women and 16 men) were interviewed. The participants either had a profession relevant to cycle tourism (cycle tour operator, cycle-friendly hotel owner) or they were active in cycling clubs which organized bike tours. The interviews took place between February and April 2019. Each interview lasted between 20 and 60 minutes.

In the interviews, as expected, natural elements along the route were remarked as facilitators of cycle routes' quality: the water element (seas, lakes, streams and springs), canyons, mountains, i.e., particular landscapes, ecologically important places (rare species of flora and fauna). We now present some quotes from the interviews, concerning the aforementioned natural elements or other external environment features.

Regarding the landscape, it was apparent through the interviews that the cyclists place an important value on the variety of scenic views.

> *Cyclist D: "Variety, beauty of the route: to be able to see things that are a feast for the eyes, not monotonous, boring stuff. You want to fill your mind with images when cycling. A route with landscape variety becomes especially appreciated, along with interchangeable bends, terrain variations, full of vegetation, a view to the sea, such routes are desired by everyone".*

Others emphasized the importance of the cyclists' having a view of a landscape that has been untouched by human interference. It offers images and sounds that the cyclists have forgotten in the urban context.

> *Cyclist E: "Natural beauty is a prerequisite: As cyclists have time to gaze here and there, they want to see something beautiful; if there are no plants, maybe there should be a village, but in any case, they do not want to encounter an urban environment".*

> *Cyclist S: "I think yes, the wilder the nature, the better! It's different . . . I don't know if you have ever been in Antonis Tritsis' park. It is different; it is not the same in your mind as Parnitha Mountain, which is nature by itself! This is apparent; it is artificial over there, my friend. It had some trees, some people added roads, and even though both of them are parks consisted of forests, one of them has been existing for a million years, and the other is something which belongs to a city. Automatically, what touches my soul more is the idea of passing from a natural environment that has been as such since the beginning of time; it excites me, it stimulates all my senses. It is just like Niarchos' Cultural Center, to give you an example: They created a park. It's beautiful, but it would be different if it was there from the beginning; it is different now that you are aware that it is something made by humans! That's how I see it".*

The independent cyclist–explorer does not cease to be a tourist who is particularly interested in learning where the places of interest are. During the interviews, several such characteristics that would be of interest for cyclists were described.

Apart from the conventional tourist cultural destinations (archaeological sites, museums), cyclists take advantage of the freedom offered by the cycling mobility and travel to routes not yet developed in terms of tourism while searching for authentic traces of traditional communities, and would definitely appreciate the encounter with such folkloric elements that are still vital. Thus, they place great importance on the communication with the locals in the traditional villages they visit.

> *Cyclist M: "Of course, there are villages that have many specific features, that is, you know that people are still attached—I don't know how to say this—for instance the mills, their mills still exist, or they use gloves and drag water out of the wells, and they are used to it . . . ".*

Regarding road characteristics, experienced cyclists who perform independent cycling trips are not as interested in the slopes encountered in a route as the cyclists who circulate in cities. They consider mountain climbing and the constant movement on a sloped road as a physical challenge and are pleased when they manage to ascend to upward slopes. However, not all cycling tourists belong in such a category. There are cyclists who want flat surfaces when they use their bike in the countryside, just like in the urban environment.

Cyclists circulate with a "vehicle" which does not shatter environmental balance and permits the contact with nature through the senses; thus, they desire this special means of communication with the natural environment and want to enjoy it to the fullest, away from any nuisance caused by motorized traffic. The absence of cars, apart from the genuine enjoyment of the environment it offers, boosts the cyclists' safety. In order to be safe, cyclists do not desire to circulate in roads with high volume of freight transport (trucks), in high-speed roads, or narrow roads in which cyclists seem like barriers and have their safety threatened; thus, the importance of motor traffic intensity for cycling mobility was underlined.

> *Cyclist R: "The only thing we consider is to not pass through main roads, e.g., the Old National Road that goes from Corinthos to Kiato, but if it is necessary for such a route to be included, then so be it. This is not as much for safety, but for quietness, so as to not hear the cars passing by. For example, when traveling from Delphi, there is a very beautiful road, with very beautiful vegetation and view, but the traffic over there is quite heavy: I'm not saying it is not safe, but there is too much noise from the cars passing by with high speed, that's why we avoid this route".*

One more road network feature in which the cyclists are interested is the quality of the road surface. The results derived from other studies [31] were confirmed: there are several cyclists that prefer gravel roads with decent road conditions. The importance of road surface quality is not limited to gravel roads, but is equally significant in the asphalt ones.

Another interesting conclusion drawn by social research, which matches with some of the findings of the literature review [35], is that there are cyclists–explorers that are not interested in cycle-specific infrastructure. For some of them, the existence of even the simplest form of cycle route signing is enough, as it demonstrates the circulation of cyclists to the other drivers.

In addition, during the interviews, the cyclists explained the importance of public transport in cycling tourism: cyclists often use trains and buses in order to arrive in the countryside. Thus, they have the opportunity to begin cycling directly in nature. Traveling by car to the destination they desire to explore is not convenient for them, as it becomes an important burden; they lose the freedom of exploration, as they have to return to their starting point in order to pick up their car.

A criterion discussed in the interviews is the need of getting supplies along the route. Thus, it is important for a cyclist to be aware of the places where they can get the supplies and the equipment they need. Furthermore, cyclists specifically appreciate signing along the route informing them about cycle routes or a place of interest and its distance about a dead-end road.

Ultimately, another factor referred to in the interviews regarding route choices, was the weather conditions. Cyclists are afraid of the storms, as they are unprotected and their lives are in danger; moreover, they avoid winds that oppose their direction, as they have to spend copious amounts of energy in order to overcome them. Dynamic information about places with such weather conditions can aid them in changing their route course.

> *Cyclist S: "I will not pass between two mountains, as I know that the winds over there are very strong, so I will prefer to climb on the back of the mountain, as I am aware that I will be protected from the winds".*

3.2. Multi-Criteria Analysis—Calculating the Evaluation Index

Next step of the methodology applied was the multi-criteria analysis, and the calculation of the evaluation index: The pillar concerning the evaluation of the quality of cycle routes around places consists of five (5) clearly defined steps, in order to be comprehensive and applicable. The steps are the following:

1. Definition of factors
2. Definition of parameters
3. Scaling of each parameter
4. Weighting each parameter
5. Calculation of the evaluation index

Next, we describe each of the steps of this pillar.

3.2.1. Definition of Factors (Step I)

In order to explore the cycle friendliness of enterprises and routes, four factors were selected: (a) natural environment, (b) built environment, (c) social environment and (d) road network characteristics. These factors deal holistically with cyclists' needs, obstacles and preferences.

Natural environment: Cyclists are in touch with the natural environment and as a result, they are affected more in relation with other users of the road network. A pleasant environment is more attractive for cyclists and has a positive effect in their psychology.

Built Environment: The services/amenities provided in a specific region are important for cyclists as they prefer to have a wide range of options in short distances. The existence of an important pole of attractions also play an important role for them.

Social Environment: The cultural events and the existence of traditional activities in a region affect the decision of a cyclist to visit a region.

Road network characteristics: The structure-condition and efficiency of the road network is crucial for the cyclists. Roads are important in terms of safety and energy consumption.

All these factors refer to the cycle friendliness of the routes.

3.2.2. Definition of Parameters (Step II)

The factors that influence cycling in an area were defined in detail by classifying their parameters. The parameters used are based on the results of the social research conducted for the needs of the research program. The relation between the factors and the parameters is as follows:

a. Natural Environment:

   (i) Variety of scenic views
   (ii) Existence of lakes, rivers and beaches
   (iii) Prevailing winds
   (iv) Existence of Fountains
   (v) Untouched natural landscapes
   (vi) Biodiversity/Natura 2000

b. Built Environment:

   (i) Commerce, entertainment and supply points
   (ii) Traditional settlements
   (iii) Historical routes, monuments and sites
   (iv) Archaeological sites and museums
   (v) Urban green spaces
   (vi) Industrial spaces (negative influence)

c. Social Environment:

   (i) Cultural Events: Cycling tourists prefer places where cultural events take place during all seasons of the year.
   (ii) Traditional Activities and Agrotourism: Areas where traditional and agrotourism activities are organized are preferred by cycling tourists.

d. Road Network Characteristics:

   (i) Slope > 6%: It is one of the main parameters affecting the energy consumption of a cyclist.
   (ii) Smoothness of the surface: It describes the quality of the surface. Roads without puddles or off-road streets without mud are preferred by cyclists.
   (iii) Cycling paths/lanes: It describes the existence of segregated cycling paths or lanes, or the ability for coexistence of cars and bikes.
   (iv) Traffic density/Speed: It describes the pressure and discomfort that a cyclist feels due to traffic and speed. The calculation is based on road category.
   (v) Road width: Wider roads enhance the co-existence of cars and cyclists.
   (vi) Traffic and information signing: It is very important for cyclists to have access to information about cycling routes, nearby settlements etc.
   (vii) Modal share: It describes the share of freight transport with respect to cars.
   (viii) Public Transport: It describes the service area of public transport stations (only those which allow the transport of bikes).

3.2.3. Scaling of Each Parameter (Step III)

All parameters of the external environment were scaled from 1–10 in order to be comparable. The level of each parameter is shown in the Table 1.

Table 1. Level of each parameter.

Level	Variety of Scenic Views	Existence of Lakes, Rivers, and Beaches	Prevailing Winds (km/h)	Existence of Fountains	Unalterable Natural Landscapes	Biodiversity/Natura 2000
0	0% coverage of the study area	0% coverage of the study area	> 30	0% coverage of the study area	0% coverage of the study area	0% coverage of the study area
1	< 15% coverage of the study area	< 10% coverage of the study area	27–30	< 10% coverage of the study area	< 10% coverage of the study area	< 10% coverage of the study area
2	< 22.5% coverage of the study area	< 20% coverage of the study area	24–26.99	< 20% coverage of the study area	< 20% coverage of the study area	< 15% coverage of the study area
3	< 30% coverage of the study area	< 30% coverage of the study area	21–23.99	< 30% coverage of the study area	< 30% coverage of the study area	< 20% coverage of the study area
4	< 37.5% coverage of the study area	< 40% coverage of the study area	18–20.99	< 40% coverage of the study area	< 40% coverage of the study area	< 25% coverage of the study area
5	< 45% coverage of the study area	< 50% coverage of the study area	15–17.99	< 50% coverage of the study area	< 50% coverage of the study area	< 30% coverage of the study area
6	< 52.5% coverage of the study area	< 60% coverage of the study area	12–14.99	< 60% coverage of the study area	< 60% coverage of the study area	< 35% coverage of the study area
7	< 60% coverage of the study area	< 70% coverage of the study area	9–11.99	< 70% coverage of the study area	< 70% coverage of the study area	< 40% coverage of the study area
8	< 67.5% coverage of the study area	< 80% coverage of the study area	6–8.99	< 80% coverage of the study area	< 80% coverage of the study area	< 45% coverage of the study area
9	< 75% coverage of the study area	< 90% coverage of the study area	3–5.99	< 90% coverage of the study area	< 90% coverage of the study area	< 50% coverage of the study area
10	>= 75% coverage of the study area	>= 90% coverage of the study area	< 3	>= 90% coverage of the study area	>= 90% coverage of the study area	>= 50% coverage of the study area

Accordingly, the same methodology was followed for the other three factors.

3.2.4. Weighting Each Parameter (Step IV)

The definition of the weight of each parameter was made through Analytic Hierarchy Process (AHP). This current method has been selected due to the nature of the decision to be taken: 1—the problem is hierarchically structured, 2—a consistency check is needed, 3—a specific score of each parameter is needed.

The evaluators were cyclists and the sample consisted of 11 people: 6 women and 5 men. Their age was between 18 and 45 years old. All of them were active cycling tourists. The interviews were made either in person or via Skype. They were not recorded. The evaluators were provided with the verbal scale of AHP and the interviewer noted their answers. At the end of each interview, all evaluators were asked if they agreed with the notes made, in order to validate the results. The interviewer, then, transformed their answers in numerical values as follows: 1 = Equal importance of both elements, 3 = Moderate importance of one element over another, 5 = Strong importance of one element over another, 7 = Very strong importance of one element over another, 9 = Extreme importance of one element over another, 2, 4, 6, 8 = Intermediate values. The evaluators were firstly called to compare the factors. Afterwards, they were given the parameters, divided in four groups, according to the factor they belonged to. As a result, the AHP method can generate the weights concerning both the factors and the parameters. Therefore, we are able to calculate the external environment index (see Step V).

3.2.5. Calculation of the Evaluation Index Using AHP (Step V)

The final step involves the calculation of the external environment index. This index comprised the following factors:

- Natural Environment = x1 | weight = 0.241
- Built Environment = x2 | weight = 0.088
- Social Environment = x3 | weight = 0.152

- Road Network Characteristics = x4 | weight = 0.519

External Environment Index = 0.241x1 + 0.088x2 + 0.152x3 + 0.519x4

It should be mentioned that the index of each factor comprised the following parameters:

(a) Natural Environment:

- Landscape alternations = p1 | weight = 0.337
- Existence of lakes, rivers and beaches = p2 | weight = 0.238
- Prevailing winds = p3 | weight = 0.187
- Existence of fountains = p4 | weight = 0.113
- Untouched natural landscapes = p5 | weight = 0.085
- Biodiversity/Natura 2000 = p6 | weight = 0.04

Natural Environment Index = 0.337p1 + 0.238p2 + 0.187p3 + 0.113p4 + 0.085p5 + 0.04p6

(b) Built Environment:

- Commerce, entertainment and supply points = p7 | weight = 0.461
- Traditional settlements = p8 | weight = 0.199
- Historical routes, monuments and sites = p9 | weight = 0.178
- Archaeological sites and museums = p10 | weight = 0.098
- Urban green spaces = p11 | weight = 0.042
- Lack of industrial spaces = p12 | weight = 0.022

Built Environment Index = 0.461p7 + 0.199p8 + 0.178p9 + 0.098p10 + 0.042p11 + 0.022p12

(c) Social Environment:

- Cultural events = p13 | weight = 0.833
- Traditional activities and Agrotourism = p14 | weight = 0.167

Social Environment Index = 0.833p13 + 0.167p14

(d) Road Network Characteristics:

- Slope = p15 | weight = 0.319
- Smoothness of the surface = p16 | weight = 0.227
- Cycling paths/lanes = p17 | weight = 0.188
- Traffic density/Speed = p18 | weight = 0.099
- Road width = p19 | weight = 0.072
- Traffic and information signals = p20 | weight = 0.045
- Modal share = p21 | weight = 0.028
- Public transport = p22 | weight = 0.022

Road Network Index = 0.319p15 + 0.227p16 + 0.188p17 + 0.099p18 + 0.072p19 + 0.045p20 + 0.028p21 + 0.022p22

4. Discussion and Conclusions

The aim of this paper was to explore environmental motivators of cycling tourists using in- depth interviews and participative analytical hierarchical process. In-depth interviews proved to be very efficient for recognizing, in detail, environmental variables which influence cycling tourism. They were categorized into four main categories: Road network characteristics, Physical Environment, Social Environment and Built Environment. The participative analytical hierarchy process was used to quantify the importance of each variable in each of those four categories and make comparisons

between the four main categories, in other words, to weight each variable in each of those four categories. Experienced cycle tourists participated in the procedure to value each parameter in a participative way.

The comparison between these four categories showed that the attractiveness of a route is mainly influenced by road network characteristics. Natural environment characteristics had the second highest score, but approximately only half of the weight compared with road network characteristics. Regarding social environment characteristics, we should mention that they had a slightly lower score. Finally, built environment characteristics proved to be less influential as they reached only one-third of the score compared to natural environment characteristics.

These results are in line with the literature. Milakis and Athanasopoulos [88] also used a participative weighting approach. In this method, participants reached a consensus regarding the weights after several rounds of discussions and oral presentations of the evaluation results regarding a metropolitan cycling network. Again, in the urban cycle network context, road characteristics had the most crucial role followed by built environment characteristics and physical environment characteristics. Cyclists travel mainly on the road and traffic characteristics are of crucial importance because it influences quality of cycling regardless of the purpose of cycling (leisure or transport).

The slope of the route is a key characteristic that interests cycle tourists. Again, this finding is in line with the literature of stated preference surveys. Cyclists, regardless of purpose of cycling, state the slope of the road is one of the main deterrents of cycling [89] or state that a flat landscape is the main motivator for cycling [90]. The second score between road network characteristics reached "surface quality". "Existence of cycle infrastructure/ routes" was the third highly rated factor between road network characteristics. Both factors are also mentioned in the stated preference literature [29,89–91].

The relatively low degree of hierarchical evaluation of traffic intensity is impressive, although in interviews, it appeared as a crucial factor, mainly in relation to the enjoyment of the natural environment. One possible explanation for this, is that cyclists valued this factor in the AHP method, mainly having in mind their safety and judging on the basis of their experience. Indeed, in interviews, the traffic intensity factor was more associated with the enjoyment of the natural landscape.

Regarding natural environment parameters, cyclists stated that landscape changes offering a variety of scenic views along their route is the most important variable. At this point, the research contribution is important, as it was possible through in-depth interviews, to describe in greater detail, variables related to the quality of the natural environment along the route. The AHP method was a necessary second step to prioritize their importance. In contrast, other studies examining cycling tourism motivators used the variable "pleasant countryside" [32], "good scenery" [33], "experience natural environment" [31] or "natural beauty of the route" [34]. It is worth mentioning that in those papers, it was not recognized that what is really appreciated from cyclists is the change of scenery, since a beautiful but undifferentiated landscape does not, in fact, offer the cyclist the same pleasure compared to scenic roads offering a wide spectrum of pictures. Variables such as "biodiversity" and "untouched natural landscapes" were ranked low as a description of the quality of the natural environment.

Eventually, the cyclists stated that the existence of bus stops or train stations along their route, traffic modal split and the width of the road are of low importance to them.

In Greece, mountainous areas reach the seashore and many scenic routes combine mountainous wildlife and sea views. The outcome of the research shows that a place with a road network offering a variety of scenic views is a strong attractor of cycle tourists. Greece has the physical environment to attract cycle tourists. Moreover, touristic areas have been developed mainly along the seashore leaving mountainous inland untouched. These settlements have maintained a traditional agricultural lifestyle; they act as live acting museums of local culture. Local culture proved to be also influential towards enhancing cycle tourism. Notwithstanding, the outcome of the research shows that the rise of cycling tourism depends mostly on the appropriate infrastructure, namely roads with low slopes, and appropriate quality of surfaces. Equipped with an attractive physical environment and maintaining local tradition is what fosters touristic activity in Greece. However these factors alone, are not enough

to sustain cycling tourism, on the contrary improvements of road characteristics will definitely increase the attractiveness of Greece as a cycling tourism destination.

Conclusively, policies that are more capable to foster and attract cycling tourism in Greece are those which improve road safety conditions and information along cycle routes. Signposting of safe and accessible cycle routes with good road surface conditions, construction of dedicated cycling infrastructures where cycle routes follow main roads or narrow roads where cyclists feel unsecure, information along the route about places of interests and cycle route maintenance, are policies which can foster cycle tourism based on the outcome of the research. Planners, policy-makers, and competent authorities should give emphasis on those policies, which create a safe road environment, in order to enhance cycling tourism, thus bringing about positive multiplying effects such as environmental protection and economic growth. To conclude, cycling tourism could arise as an efficient tourism activity in Greece, tackling seasonality, and boosting the tourism product of the country because of the rich, physical environment and the strong presence of local tradition.

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