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Environmental factors, tourism attributes and satisfaction of tourists in CALABARZON: Basis for a bicycle tourism development plan

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Abstract

Bicycle tourism refers to a special interest sector where the bicycle is the main mode of transport for leisure and recreation. Although there is an increasing interest in biking in the Philippines, there is limited research on the topic. The study aimed to propose a bike tourism development plan that may be implemented in Region IV-A (CALABARZON). The researcher evaluated its bicycle tourism attributes; assessed the environmental factors of bike tourism; and evaluated bike tourists' satisfaction, their intention to revisit, and intention to recommend CALABARZON to other bike tourists. A quantitative research technique was used, and the questionnaire was adapted from Disimulacion (2023), Bakogiannis et al. (2020); Han et al. (2017); and Vo-Thanh et al. (2018). Frequency and percentage distribution was used to describe the demographic profile of the respondents in terms of gender, marital status, age, bicycling experience in terms of years, type of bicycle regularly used, main reason for biking, usual companion when biking, and the number of trips taken each year used. The bicycle tourism attributes of CALABARZON in terms of tourist attractions, accessibility, amenities, and complimentary service were evaluated; assessed the environmental factors of bicycle tourism in terms of natural environment, built environment, social environment, and road network characteristics; and determined the bicycle tourists' satisfaction when visiting CALABARZON in terms of satisfaction, intention to revisit, and intention to recommend using mean, standard deviation, and ranking. The T test for unequal variances, Kruskal Wallis test H was used to test for significant difference in responses of bicycle tourism attributes, environmental factors and satisfaction. The significant relationship of bicycle tourism attributes, environmental factors, and satisfaction was tested using Spearman-rho. The influence of bicycle tourism attributes and environmental factors to satisfaction was determined using regression analysis. Results from 415 respondents revealed that they were mostly male, single, between the ages of 26-41; with one to five years of experience; regularly use mountain bikes; interested in their health and fitness; enjoy being with members

of their bike groups; and who take 10 or more biking trips a year. In addition, results showed that CALABARZON has the potential to become a bicycle destination based on its bicycle tourism attributes, environmental factors, and the respondents' satisfaction, intention to revisit, and intention to recommend the region. The researcher proposed a bicycle tourism development plan detailing innovative recommendations.

Keywords: environmental factors, bicycle tourism attributes, satisfaction, tourism development plan, CALABARZON

Environmental factors, tourism attributes and satisfaction of tourists in CALABARZON: Basis for a bicycle tourism development plan

1. Introduction

Bike tourism is a special interest sector that caters to a unique market motivated by health and fitness, adventure, and the love for nature. It appeals to a wide range of tourists interested in culture, gastronomy, and rural destinations. Moreover, experts agreed that health and wellness, soft adventure, and interest in history are fueling the appeal of bike tourism (Aschauer et al, 2019; Salokangas, 2020; Mundet et al, 2022). It was seen as the alternative to walking as well as an economical, affordable, safe, and sustainable form of mobility. In addition, bicycles can traverse both short and long distances as well as maneuver narrow roads and tight spaces. These characteristics empower bikers to efficiently get to their destinations. Fast forward to the post-pandemic era, riding a bicycle provided opportunities for health, fitness, and recreation. It likewise allowed for quick getaways to nearby towns and provinces. These, then resulted to its strong comeback as a leisure activity, not only in the Philippines but also across the globe.

The Four A's refer to attractions, accessibility, amenities, and ancillary services (or complimentary services) that are acknowledged as primary variables in the study of bicycle tourism. On the other hand, the Theory of Planned Behavior investigates the relationship between satisfaction, the tourists' intention to revisit and their intention to recommend. Furthermore, several researchers anchored their bicycle tourism studies on these theories (Vo-Thanh, 2018; Bakogiannis et al, 2020; Ciascai et al, 2022; Gazzola et al, 2018; Goel et al, 2021) to evaluate the potential of bicycle tourism destinations. The relationships among the variables were determined to provide further insights. The relationship between bicycle tourism attributes, environmental factors, and bike tourists' satisfaction, intention to revisit and intention to recommend were evaluated.

The interest in bike tourism, most of the extant literature focuses on top destinations in Europe and North America (Carrick, 2023; Bakogiannis et al, 2020; Goel et al, 2021). Furthermore, there is limited research on bicycle tourism in the Philippines. Most studies focus on urban biking, bike rental, bike-to-work, and bicycle sharing (Camena & Castro, 2019; Castro & Josef, 2020; Alvarez et al, 2020; Quezon City.gov.ph, 2021; Santos, 2024: Taclino, 2021; Olivares, 2023). Thus, the researcher undertook this study to analyze how Region IV-A can tap into the potential of bike tourism. Region IV-A, composed of Cavite, Laguna, Batangas, Rizal, and Quezon collectively referred to as CALABARZON, has become popular for bike tourists. However, despite their increasing presence, the Region is not officially recognized as a bike destination.

The findings of the study were used to recommend a bike tourism development plan for CALABARZON. The proposed plan detailed the strategy and action plan, description of the activities, the strategic partners, and success indicators. The researcher studied literature on both established and emerging bike tourism destinations whose attributes, environmental factors, and experiences were similar to the Region, and these were reviewed based on its feasibility and applicability in the context of CALABARZON. The researcher conducted the study to generate empirical evidence to tourists present during the conduct of study. The results of this study can be also used to understand the barriers to cycling and as bases for policy formation. Moreover, the findings also benefit small and medium scale enterprises who can provide bike-related services. Furthermore, the study may be replicated in other regions of the Philippines interested to include biking in their tourism portfolio as a unique and sustainable competitive advantage. Thus, this study would benefit bike tourists, not only in CALABARZON, but also in the rest of the country. The potential of bicycle tourism in CALABARZON, emphasizing its economic, social, and environmental benefits. It aligns with the Philippine National Tourism Development Plan's strategic goals, focusing on improving infrastructure, digitalization, tourist experience, and stakeholder collaboration. Moreso, the research will fill the knowledge gaps regarding the development of sustainable bike tourism in CALABARZON, ultimately leading to better policies, increased cultural awareness, improved health

and well-being, enhanced tourist experiences, and overall socio-economic progress for all stakeholders.

Objectives of the Study - This study aimed to develop a bicycle tourism plan for CALABARZON Region. Specifically, the research described the (1) demographic profile of the respondents in terms of gender, marital status, age, bicycling experience in terms of years, type of bicycle regularly used, main reason for biking, usual companion when biking, and the number of biking trips taken each year; (2) identified the bicycle tourism attributes of CALABARZON in terms of tourist attractions, accessibility, amenities, and complimentary service; (3) determined the environmental factors of bike tourism in terms of natural environment, built environment, social environment, and road network characteristics; (4) assessed the bike tourists' satisfaction when visiting CALABARZON in terms of intention to revisit and intention to recommend; (5) tested the significant difference in responses of bicycle tourism attributes, environmental factors, and satisfaction when grouped according to profile; (6) determined the relationships among bicycle tourism attributes, environmental factors and satisfaction; and (7) proposed a development plan for bike tourism in CALABARZON.

2. METHODS

The researcher used descriptive method. Descriptive correlational analysis is a statistical method that helps researchers to describe and measure the relationship between variables. In the context of a bike tourism destination study in CALABARZON.

The respondents were bicycle tourists traversing the provinces of CALABARZON during the conduct of face-to-face surveys. The estimated sample population of the respondents was calculated using the Raosoft sample size calculator, the parameters were set to five percent (5%) margin of error, 95% confidence level, with a response distribution of 50%. At the time of research, there was no specific data on bike tourist arrivals either in CALABARZON or in in any other region in the Philippines. Thus, the estimated number of bike tourists was based on the January – December 2022 Regional Distribution of Overnight Travelers Report on CALABARZON (as of April 2023) published by the Department of Tourism. Thus, the minimum required respondents were 384, broken down by province: Cavite (43), Laguna (23), Batangas (146), Rizal (100), and Quezon (73). A total of 415 responses was gathered and was used as the basis for the analysis.

This research adapted questionnaires and modified some of the statements to fit the study. It was adapted from bicycle tourism research conducted by Disimulacion (2023), Part I is the demographic profile of the respondents such as: gender, marital status, age, bicycling experience in terms of number of years, type of bicycle regularly used, main reason for biking, usual companion when biking, and number of biking trips taken each year. Part II refers to the bicycle tourism attributes of CALABARZON in terms of tourist attractions, accessibility, amenities, and complimentary services (Han, et al (2017). Part III assess the environmental factors of bicycle tourism relevant to the natural environment, built environment, social environment, and road network characteristics. This was adapted also from research by Bakogiannis et al (2020). Part IV is bike tourist satisfaction when visiting CALABARZON in terms of intention to revisit, and intention to recommend.

The researcher asked permission to the authors to utilize the research instrument to further conduct relevant study in the case of CALABARZON, Philippines. The said instrument underwent face validation, content validation to the experts, pilot test was conducted upon the approval of the panel of examiners. Pilot testing was conducted with 36 respondents, followed by a reliability test using SPSS. The results for the reliability test were as follows: tourist attractions ($\alpha = 0.941$), amenities ($\alpha = 0.932$), complimentary services ($\alpha = 0.976$); natural environment, ($\alpha = 0.840$), built environment ($\alpha = 0.939$), social environment ($\alpha = 0.913$), road network characteristics ($\alpha = 0.957$), satisfaction ($\alpha = 0.962$), desire ($\alpha = 0.946$), and loyalty ($\alpha = 0.957$). The overall results are excellent meaning the scale is reliable.

The conduct of the research was based on the ethical principles for the collection of data from bike tourists in CALABARZON. These principles are as follows: voluntary participation and the right to withdraw from the research, informed consent; protection of anonymity and confidentiality, avoidance of using deceptive practice;

and minimize the risk of harm to participants. Moreover, the researcher followed the "bike protocols" such as the following: seek the team leader to ask his/her permission to distribute the surveys; approach the bike tourists only when they are resting; and allow the bike tourists to leave if they need to. All information were treated as confidential and will be used for academic purposes only.

The following statistical tools were utilized. Frequency and percentage distribution was used to describe the demographic profile of the respondents in terms of gender, marital status, age, bicycling experience in terms of years, type of bicycle regularly used, main reason for biking, usual companion when biking, and the number of trips taken each year used. The bicycle tourism attributes of CALABARZON The T test for unequal variances, Kruskal Wallis test H was used to test for significant difference in responses of bicycle tourism attributes, environmental factors and satisfaction. The significant relationship of bicycle tourism attributes, environmental factors, and satisfaction was tested using Spearman-rho. The influence of bicycle tourism attributes and environmental factors to satisfaction was determined using regression analysis.

3. Results and discussion

Table 1

Profile Distribution of the Respondents

Profile	Frequency (*f*)	Percentage (%)
Gender		
Male	350	84.3
Female	64	15.4
Prefer not to say	1	0.2
Marital Status		
Single	267	64.3
Married	115	27.7
Prefer not to say	33	8.0
Age		
18 – 25 years	157	37.8
26 – 41 years old	170	41.0
42 – 57 years old	65	15.7
58 and above	23	5.5
Bicycling experience in terms of the number of years		
Less than one year	242	58.3
1-5 years	123	29.6
6-10 years	31	7.5
More than 10 years	19	4.6
Type of bicycle regularly used		
Mountain bike	207	49.9
Road bike	132	31.8
Folding bike	15	3.6
Gravel bike	36	8.7
E-bike	14	3.4
Others	11	2.7
Main Reason for biking		
Leisure	114	27.5
Competitive sports	86	20.7
Bike to work	35	8.4
Health and fitness	180	43.4
Usual companion when biking		
Family and/or relatives	57	13.7
Co-workers/Co-employees	11	2.7
Bike group members	235	56.6
Bike solo	108	26.0
Others	4	1.0
Number of biking trips taken each year		
At least once a year	63	15.2
2 - 5 times a year	95	22.9
6 - 9 times a year	39	9.4
10 times a year or more	209	50.4

Table 1 provides a demographic overview of the survey respondents, revealing that the majority were male (84.3%), a disparity potentially linked to the varied terrain of CALABARZON posing challenges for female cyclists and a noted lack of confidence and access to women-specific bicycles (Batemana et al, 2021); a small percentage (2%) preferred not to state their gender, with some indicating they identified outside the binary. Most respondents were single (64.3%), likely due to greater leisure time for extended biking trips (Hsieh, et al., 2021; Bang et al, 2019). The predominant age group was 26-41 years (41.0%), who often bike for exercise and relaxation while a smaller segment (5.5%) were seniors who reported health benefits from cycling (Stončikaitė, 2021). In terms of experience, most (58.3%) had less than a year of biking, possibly spurred by eased pandemic restrictions (Ramos, 2022; Zippa, Inc., 2024), while a smaller group (4.6%) with over 10 years of experience likely consider it a primary recreation (Aschauer, 2019; Bakogiannis et al, 2020). Mountain bikes were the most common choice (49.9%), likely suited to the region's lack of dedicated infrastructure (Millers, 2023), with a few (2.7%) using other types based on preference (Bicycle Review Guru, 2023). The main motivation for biking was health and fitness (43.4%) (Anderson, 2024), while a smaller portion (8.4%) biked for commuting. A significant majority (56.6%) usually biked with groups, highlighting the social aspect (Batterbury and Manga, 2021), with a small fraction (1.0%) citing other reasons like stress relief (Bike Radar, 2024). Finally, most respondents (50.4%) took 10 or more biking trips annually, suggesting an experienced group navigating CALABARZON's varied terrain (Aschauer et al, 2021).

Table 2

Summary Table of Bicycle Tourism Attributes in CALABARZON

VARIABLES	Mean	Rank	Interpretation
Tourist Attractions	4.39	1	Agree
Accessibility	3.83	2	Agree
Amenities	3.80	3	Agree
Complimentary Services	3.74	4	Agree
OVERALL MEAN	3.94	0.64	Agree

Legend: 1.0 to 1.49 (Strongly Disagree), 1.5 to 2.49 (Disagree), 2.5 to 3.0 (Moderately Agree), 3.5 to 4.49 (Agree), 4.5 to 5.00 (Strongly Agree

Table 2 shows the summary table of bicycle tourism attributes in CALABARZON in terms of tourist attractions, accessibility, amenities, and complimentary services with a composite mean of 3.94 and a verbal interpretation of agree. Respondents ranked tourist attractions (4.39) and accessibility (3.83) as the top indicators. CALABARZON is undeniably panoramic and rich in culture and history, whichever province that bike tourists visit. CALABARZON is home to the Mount Banahaw, Mount Makiling, Mount Batulao, and Taal Volcano. It also boasts of lakes, dive spots, farmlands, waterfalls, and beaches. Moreover, there are cultural, historical and religious structures. Authors confirmed tourist attractions are the main drivers of bike tourism across the world (Salokangas, 2020; Bakogiannis et al, 2020). On the other hand, respondents ranked complimentary services (3.74) as the lowest indicator. The researcher observed that there are signages, signboards, and police visibility in certain areas, but confirmed there were limited complimentary services throughout the Region.

Table 3

Summary Table of the Environmental Factors of Bicycle Tourism in CALABARZON

VARIABLES	Mean	Rank	Interpretation
Natural Environment	4.05	1	Agree
Built Environment	3.86	3	Agree
Social Environment	4.04	2	Agree
Road Network Characteristics	3.83	4	Agree
OVERALL MEAN	3.95	0.63	Agree

Legend: 1.0 to 1.49 (Strongly Disagree), 1.5 to 2.49 (Disagree), 2.5 to 3.0 (Moderately Agree), 3.5 to 4.49 (Agree), 4.5 to 5.00 (Strongly Agree)

Table 3 shows the summary of environmental factors of bicycle tourism in CALABARZON in terms of the natural environment, built environment, social environment, and road network characteristics with a composite mean of 3.95 with verbal interpretation of agree. Respondents ranked natural environment (4.05) and social

environment (4.05) as the top indicators with a verbal interpretation of agree. There is no doubt that CALABARZON is blessed with sweeping landscapes, lakes, and forests that motivate bike tourists to visit. The Region showcases panoramic views of its rural beauty. In addition, the ambiance is both peaceful and relaxing. The natural environment is highly rated by bike tourists. (Aschauer, 2021; Ciascai et al, 2022; Salokangas, 2020). Moreover, bike tourism offers "psychotherapeutic healing due to the natural environment where it occurs" (Bhalla et al, 2021, p. 770). Thus, the natural environment is considered as the main motivator for bike tourists. Respondents ranked the built environment (3.86) and road network characteristics (3.83) as the lowest indicators. The researcher received several complaints about the infrastructure in CALABARZON. The bike tourists mentioned the following: unsafe roads; inappropriate modal share with other vehicles, pedestrians, and commuters; sharp turns; and uneven road surfaces. They are hoping for the implementation of stricter road sharing guidelines. Several authors agreed that good quality roads, signposting, road infrastructure, connectivity, natural and man-made attractions, climate, and bike services drive the demand for bike tourism (Han, 2017).

Table 4

Summary table of Bicycle Tourists' Satisfaction

VARIABLES	Mean	Std. Dev.	Rank	Interpretation
Satisfaction	4.23	0.73	3	Agree
Intention to revisit	4.41	0.55	1	Agree
Intention to recommend	4.40	0.52	2	Agree
OVERALL MEAN	4.34	0.47		Agree

Legend: 1.0 to 1.49 (Strongly Disagree), 1.5 to 2.49 (Disagree), 2.5 to 3.0 (Moderately Agree), 3.5 to 4.49 (Agree), 4.5 to 5.00 (Strongly Agree

Table 4 presents the summary of bike tourists' satisfaction on visiting CALABARZON in terms of satisfaction, intention to revisit, and intention to recommend with a composite mean of 4.34 with verbal interpretation of agree. The respondents ranked intention to revisit (4.41) as the top indicator. When asked about their plans to revisit, some of the respondents said that they consider CALABARZON as their favorite destination. They would traverse the provinces during their free time. They also stated that they continue to level up their skills in maneuvering the slopes and sharp curves. CALABARZON has 122 municipalities, 20 cities, and 4,019 barangays with a total population of 16,195,042, as of the 2020 Census which represents 14.85% of the total population of the Philippines (PhilAtlas, 2023). Each of these localities offer different attractions, local cuisine, festivals, and terrain that bike tourists find interesting. According to Mladosich et al (2022), bikers and rural tourism have an intrinsic relationship. Wide open spaces offer the freedom to enjoy the beauty, tranquility, and culture of remote areas as contrasted with urban communities.

On the other hand, respondents ranked satisfaction (4.23) as the lowest. Although most of the respondents intend to revisit CALABARZON, this may not mean that are satisfied with their trips. The intention to go back may be a result of the need to try other bike routes, see attractions they missed, and/or return to the Region with another group of friends or family members. Researchers agreed that repeat visitors tend to stay longer at a destination, participate more intensively in consumptive activities, are more satisfied, and spread positive word of mouth, whilst requiring much lower marketing costs than first-time visitors (Zhang et al., 2018; Bang et al, 2019). According to experts, "repeat visitors tend to stay longer at a destination, participate in consumptive activities, are more satisfied, and spread positive word of mouth" (Zhang et al., 2018). Stakeholders must be aware that satisfaction with a travel experience is the prime mover of revisit intention (Rejon-Gaurdia et al, 2023; Li et al, 2018) thus, the need to continuously create itineraries, provide road safety, as well as monitor the needs of bike tourists to ensure that bike tourists revisit the destination.

Table 5

Difference of Responses on Bicycle Tourism Attributes of CALABARZON when grouped according to Profile

	t/H-test	p-value	Interpretation
Gender			
Tourist Attractions	0.833	0.407	Not Significant
Accessibility	3.148	0.002	Significant

Amenities	0.300	0.765	Not Significant
Complimentary Services	3.447	0.001	Significant
OVERALL MEAN	2.278	0.025	Significant
Marital Status			
Tourist Attractions	23.169	0.000	Significant
Accessibility	10.483	0.005	Significant
Amenities	13.850	0.001	Significant
Complimentary Services	3.628	0.163	Not Significant
OVERALL MEAN	9.108	0.011	Significant
Age			
Tourist Attractions	40.587	0.000	Significant
Accessibility	18.552	0.000	Significant
Amenities	36.374	0.000	Significant
Complimentary Services	32.429	0.000	Significant
OVERALL MEAN	33.030	0.000	Significant
Bicycling experience in terms of the number of years			
Tourist Attractions	16.530	0.000	Significant
Accessibility	18.989	0.000	Significant
Amenities	5.46	0.065	Not Significant
Complimentary Services	19.990	0.000	Significant
OVERALL MEAN	17.933	0.000	Significant
Type of bicycle regularly used			
Tourist Attractions	12.013	0.017	Significant
Accessibility	11.203	0.024	Significant
Amenities	3.080	0.545	Not Significant
Complimentary Services	5.436	0.245	Not Significant
OVERALL MEAN	7.102	0.131	Not Significant
Main Reason for biking			
Tourist Attractions	12.044	0.007	Significant
Accessibility	11.619	0.009	Significant
Amenities	18.051	0.000	Significant
Complimentary Services	49.253	0.000	Significant
OVERALL MEAN	20.346	0.000	Significant
Usual companion when biking			
Tourist Attractions	40.984	0.000	Significant
Accessibility	41.466	0.000	Significant
Amenities	42.120	0.000	Significant
Complimentary Services	45.872	0.000	Significant
OVERALL MEAN	51.330	0.000	Significant
Number of biking trips taken each year			
Tourist Attractions	34.993	0.000	Significant
Accessibility	8.853	0.031	Significant
Amenities	5.871	0.118	Not Significant
Complimentary Services	33.955	0.000	Significant
OVERALL MEAN	16.987	0.001	Significant

Table 5 presents significant differences in the evaluation of bicycle tourism attributes in CALABARZON when respondents are grouped by their profiles. Regarding gender, males showed a statistically higher evaluation of accessibility (p=0.002) and complimentary services (p=0.001), suggesting a greater familiarity with road and trail networks, while stakeholders should recognize the specific needs of non-male tourists for services (Han et al, 2017; Bakogiannis et al, 2020). By marital status, single respondents had a significantly higher evaluation of tourist attractions (p=0.000), accessibility (p=0.005), and amenities (p=0.001), possibly due to their flexibility in enjoying escapist activities like bike tourism (Sonnentag et al, 2017; Yan et al, 2023).

Age-based analysis revealed that those between 26-41 years old had a higher evaluation of tourist attractions (p=0.000), accessibility (p=0.000), amenities (p=0.000), and complementary services (p=0.000), aligning with the concept of micro-adventures catering to busy lifestyles (Goodnow, 2018; Woodhouse, 2020). In terms of bicycling experience, respondents with less than one year showed a higher evaluation of tourist attractions (p=0.000), accessibility (p=0.000), and complementary services (p=0.000), highlighting potentially different motivations and needs of newer bike tourists (Aschauer, 2021). Those using mountain bikes had a higher

evaluation of tourist attractions (p=0.000), accessibility (p=0.000), and complementary services (p=0.000), underscoring the symbolic importance of their chosen bicycle (Nurse, 2021). Individuals whose main reason for biking was health and fitness had a higher evaluation of tourist attractions (p=0.007), accessibility (p=0.009), amenities (p=0.000), and complementary services (p=0.000), consistent with the benefits of regular biking (Kwigizile et al, 2019; Lee and Huang, 2014; Salokangas, 2020). Respondents who usually biked with their bike group friends had a higher evaluation of tourist attractions (p=0.000), accessibility (p=0.009), amenities (p=0.000), and complementary services (p=0.000), emphasizing the social dimension of biking (Gazzola et al, 2018). Finally, those who biked ten or more times a year had a higher evaluation of tourist attractions (p=0.000), accessibility (p=0.031), and complementary services (p=0.000), highlighting the importance of these attributes for frequent visitors and the need for collaborative efforts to ensure a sustainable bike destination (Vo-Thanh et al, 2018).

Table 6

Difference of Responses on Environmental Factors of Bicycle Tourism in CALABARZON when grouped according to Profile

Gender	t/H-test	p-value	Interpretation
Natural Environment	-0.603	0.547	Not Significant
Built Environment	1.925	0.057	Not Significant
Social Environment	0.312	0.756	Not Significant
Road Network Characteristics	2.298	0.024	Significant
OVERALL MEAN	1.374	0.172	Not Significant
Marital Status			
Natural Environment	7.227	0.027	Significant
Built Environment	0.776	0.678	Not Significant
Social Environment	1.784	0.410	Not Significant
Road Network Characteristics	1.495	0.473	Not Significant
OVERALL MEAN	2.280	0.320	Not Significant
Age			
Natural Environment	8.618	0.035	Significant
Built Environment	13.610	0.003	Significant
Social Environment	12.844	0.005	Significant
Road Network Characteristics	9.274	0.026	Significant
OVERALL MEAN	12.526	0.006	Significant
Bicycling experience in terms of the number of years			
Natural Environment	14.362	0.001	Significant
Built Environment	19.844	0.000	Significant
Social Environment	1.851	0.396	Not Significant
Road Network Characteristics	10.529	0.005	Significant
OVERALL MEAN	13.095	0.001	Significant
Type of bicycle regularly used			
Natural Environment	6.881	0.142	Not Significant
Built Environment	4.466	0.347	Not Significant
Social Environment	7.337	0.119	Not Significant
Road Network Characteristics	27.766	0.000	Significant
OVERALL MEAN	9.341	0.053	Not Significant
Main Reason for biking			
Natural Environment	9.011	0.029	Significant
Built Environment	25.344	0.000	Significant
Social Environment	14.412	0.002	Significant
Road Network Characteristics	19.283	0.000	Significant
OVERALL MEAN	16.069	0.001	Significant
Usual companion when biking			
Natural Environment	42.187	0.000	Significant
Built Environment	17.371	0.001	Significant
Social Environment	17.205	0.001	Significant
Road Network Characteristics	38.007	0.000	Significant
OVERALL MEAN	28.483	0.000	Significant

Number of biking trips taken each year			
Natural Environment	2.371	0.499	Not Significant
Built Environment	17.971	0.000	Significant
Social Environment	2.575	0.462	Not Significant
Road Network Characteristics	10.493	0.015	Significant
OVERALL MEAN	7.493	0.058	Not Significant

Table 6 presents the difference of responses on environmental factors of bicycle tourism in CALABARZON when grouped according to profile. Table 6 reveals significant differences in the evaluation of environmental factors for bicycle tourism in CALABARZON when respondents are grouped by their profiles. Regarding gender, males showed a statistically higher evaluation of road network characteristics (p=0.024), which aligns with Bimbao & Ou's (2022) finding that infrastructure motivates bicycle travel and Carrol et al.'s (2020) observation that underrepresented groups prioritize protected bike lanes. By marital status, single respondents had a significantly higher evaluation of the natural environment (p=0.027), potentially because they have fewer home-related responsibilities (Sonnentag et al, 2017; Vada et al, 2020). Age-based analysis showed that respondents aged 26-41 years old had a higher evaluation of the natural environment (p=0.035), built environment (p=0.003), social environment (p=0.005), and road network characteristics (p=0.026), which are likely preferred leisure activities for this age group, such as nearby micro-adventures (Gross and Sand, 2019). In terms of bicycling experience, those with less than one year had a higher evaluation of the natural environment (p=0.001), built environment (p=0.000), and road network characteristics (p=0.005), which can aid stakeholders in targeted segmentation (Rejón-Guardia et al, 2017; Aschauer et, 2021). Respondents using mountain bikes had a higher evaluation of road network characteristics (p=0.000), confirming the suitability of this bike type for CALABARZON, where road characteristics influence biking based on skill levels (R´erat and Schmassmann, 2024). Those whose main reason for biking was health and fitness had a higher evaluation of the natural environment (p=0.029), built environment (p=0.000), social environment (p=0.002), and road network characteristics (p=0.000), consistent with Aschauer et al.'s (2019) segmentation based on motivations and interests. Respondents who usually biked with group members had a higher evaluation across all environmental factors: natural (p=0.000), built (p=0.001), social (p=0.001), and road network (p=0.000), supporting Mladosich et al.'s (2022) findings on the social aspects of biking. Finally, those taking 10 or more trips annually had a higher evaluation of the built environment (p=0.000) and road network characteristics (p=0.015), indicating their experienced insights are valuable for stakeholders in a competitive environment (Aschauer et al, 2019).

Table 7

Difference of Responses on Bicycle Tourists' Satisfaction when grouped according to Profile

Gender	T/H-Test	P-Value	Interpretation
Satisfaction	2.614	0.011	Significant
Intention To Revisit	-0.284	0.777	Not Significant
Intention To Recommend	0.706	0.482	Not Significant
OVERALL MEAN	1.603	0.113	Not Significant
Marital Status			
Satisfaction	1.689	0.430	Not Significant
Intention To Revisit	28.129	0.000	Significant
Intention To Recommend	22.987	0.000	Significant
OVERALL MEAN	11.509	0.003	Significant
Age			
Satisfaction	8.419	0.038	Significant
Intention To Revisit	18.372	0.000	Significant
Intention To Recommend	19.219	0.000	Significant
OVERALL MEAN	18.629	0.000	Significant
Bicycling Experience In Terms Of The Number Of Years			
Satisfaction	5.753	0.056	Not Significant
Intention To Revisit	5.396	0.067	Not Significant
Intention To Recommend	3.610	0.164	Not Significant
OVERALL MEAN	1.938	0.380	Not Significant

Type Of Bicycle Regularly Used			
Satisfaction	13.573	0.009	Significant
Intention To Revisit	10.938	0.027	Significant
Intention To Recommend	13.412	0.009	Significant
OVERALL MEAN	7.757	0.101	Not Significant
Main Reason For Biking			
Satisfaction	10.354	0.016	Significant
Intention To Revisit	0.839	0.840	Not Significant
Intention To Recommend	1.582	0.663	Not Significant
OVERALL MEAN	3.684	0.298	Not Significant
Usual Companion When Biking			
Satisfaction	12.241	0.007	Significant
Intention To Revisit	3.205	0.361	Not Significant
Intention To Recommend	4.218	0.239	Not Significant
OVERALL MEAN	6.061	0.109	Not Significant
Number Of Biking Trips Taken Each Year			
Satisfaction	23.852	0.000	Significant
Intention To Revisit	10.058	0.018	Significant
Intention To Recommend	8.006	0.046	Not Significant
OVERALL MEAN	19.211	0.000	Significant

Table 7 shows the difference of responses on bike tourists' satisfaction visiting CALABARZON when grouped according to profile.

Analysis of satisfaction and revisit/recommendation intentions based on respondent profiles revealed several statistically significant differences. Regarding gender, male respondents reported higher satisfaction levels (p=0.011) than other genders, potentially due to the limited availability of women-specific bicycles and a perceived lack of confidence in cycling skills among females. Marital status significantly impacted intention to revisit (p=0.000) and recommend (p=0.000), with single individuals showing higher intentions, possibly due to more flexible schedules and a tendency for single tourists to be more satisfied with attractive destinations (Viet et al 2020). Age also played a significant role, with younger bike tourists expressing higher satisfaction (p=0.038), intention to revisit (p=0.000), and intention to recommend (p=0.00), likely driven by their interest in unique and hedonic experiences (Coudounaris and Sthapit, 2017). Interestingly, bicycling experience (in years) did not significantly affect satisfaction, revisit intention, or recommendation intention, suggesting that CALABARZON can be enjoyed by bikers of varying experience levels, and improvements could further encourage tourism (Chen et al, 2020). However, the type of bicycle used did show significant differences in satisfaction (p=0.009), revisit intention (p=0.027), and recommendation intention (p=0.009), with mountain bike users having a higher evaluation, likely due to the versatility of mountain bikes on diverse terrain (Barber, 2021; Anderson, 2024). The main reason for biking significantly affected satisfaction (p=0.016), with those biking for health and fitness reporting higher satisfaction, aligning with research on the positive impacts of cycling (Anderson, 2023). Biking with a usual companion also significantly impacted satisfaction (p=0.007), with those biking in groups reporting higher satisfaction, highlighting the social dimensions of cycling (Batterbury and Manga, 2021). Finally, the number of biking trips taken annually significantly affected satisfaction (p=0.000) and intention to revisit (p=0.018), with those biking more frequently (ten or more times a year) showing higher satisfaction, suggesting that positive and novel experiences drive revisit intentions (Sharma and Nayak, 2018; Libre et al, 2022).

Table 8

Bike Tourism Development Plan for CALABARZON

Strategy and Action Plan Elements	Description of Activities	Lead Responsible and Strategic Partners	Success Indicators
Bicycle Tourism Attributes Complimentary Services			
To enhance Tourist Safety and Security	Assure tourists that assistance is readily available in case of accidents or medical emergencies.	-Region IV-A tourism office -Local tourism offices	There could have lower reported cases of serious accidents or medical emergencies among cyclists.

Environmental Factors of Bicycle Tourism Road Network Characteristics			
To ensure smooth and safe cycling conditions	Prioritize the maintenance and improvement of road surfaces to minimize the risk of accidents and enhance the overall cycling experience for all types of bicycles, including road bikes, mountain bikes, and recreational bikes.	-Provincial tourism offices -Region IV-A tourism office -Department of Public Works and Highways -Sponsorships from shuttle services	Obtain positive feedback from cyclists regarding the quality and safety of road surfaces. There is increase in the number of cyclists of different skill levels and riding styles visiting CALABARZON.
Bicycle Tourists' Satisfaction Visiting CALABARZON			
To enhance Tourist Satisfaction	Actively solicit and respond to feedback from cyclists regarding their experiences in CALABARZON	-Provincial tourism offices -Region IV-A tourism office -Transport groups based in CALABARZON	There could be increased organic word-of-mouth recommendations from cyclists to their friends, family, and other cycling communities.

4. Conclusions and recommendations

The typical bicycle tourist in CALABARZON, based on the survey, is likely to be a male, single individual between 26 and 41 years old with less than a year of biking experience who regularly uses a mountain bike primarily for health and fitness, often riding with a bike group and taking more than 10 trips annually. These respondents found the tourist attractions to be the most appealing aspect of bicycle tourism in the region, with the natural environment being the most appreciated environmental factor. Notably, they also expressed a positive intention to revisit CALABARZON for bicycle tourism. Statistical analysis revealed significant differences in the assessment of bicycle tourism attributes based on most respondent profiles, except for the type of bicycle used. Similarly, perceptions of environmental factors varied significantly based on age, biking experience, main reason for biking, and usual companion. Furthermore, satisfaction levels with bicycle tourism differed significantly based on marital status, age, and the frequency of biking trips. The study also identified significant relationships between bicycle tourism attributes and environmental factors, between bicycle tourism attributes and satisfaction, and between environmental factors and satisfaction. Ultimately, these findings enabled the researcher to propose a comprehensive bike tourism development plan for the CALABARZON region. This study able to recommend improvement of the CALABARZON as a Bike tourism destination.

To foster bike tourism in CALABARZON, a collaborative approach is crucial, involving local tourism offices, travel operators, and the Department of Tourism in creating specialized tour packages that appeal to diverse demographic segments, including women, LGBTQIA+ individuals, seniors, experienced bikers, commuters, and users of unique bikes like bamboo or electric models, promoting the region both domestically and internationally. Enhancing the biking experience necessitates the development of shaded rest areas along routes, equipped with water stations, clean restrooms, bike parking, and shower facilities, strategically located near attractions and events, potentially staffed by local personnel. Addressing environmental concerns through shelters and community-led maintenance is vital for sustainability. Unique bike routes should incorporate cultural and historical sites like churches and the Angono-Binanongan Petroglyphs, promoted via social media. Standardizing facilities across the region and fostering community participation in safety and sustainability are key to success. Offering new, unique, and tailored services for different segments, including information on suitable bikes and routes, is recommended, initially positioning CALABARZON as a mountain bike destination. Ultimately, realizing CALABARZON's potential requires prioritizing infrastructure, safety, and the creation of new itineraries and events through partnerships between government, the private sector, and academia, while also learning from other established bike tourism destinations. Future research should focus on areas like bike rentals, technology integration, safety mechanisms, sustainable practices, driver awareness, satisfaction measurement, unique event creation, grant acquisition, tourism statistics, and inter-agency collaboration.

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