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Development of a Mexican Version of the Cycle-Tourist Motivation Instrument (CtMI)

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Abstract: With the growing interest in cycle tourism in Mexico, it is necessary to understand the motives for traveling and cycling. The aim of this study was to develop and validate the bicycle tourism motivation instrument (Cycle-tourist Motivation Instrument (CtMI)) for Mexico. The instrument was applied to 322 cycle tourists who participated, directly or indirectly, in the 2021 Chichimeca route, a cycle tourism event. Atypical data were removed, Cronbach's alpha of the CtMi was 0.920, the Kaiser–Meyer–Olkin (KMO) test gave 0.911 as a result, and Barlett's sphericity test was equal to 0.000; in addition, factor analysis with varimax rotation was performed with factor loadings greater than 0.40, resulting in an instrument with validity and explanatory capacity for the phenomenon of cyclist motivation with 32 items divided into 7 dimensions: health, social, competence domain, exploration, stimulus-seeking, self-presentation and escape, with values equal to and/or higher than those reported in the literature. The CtMI can contribute to future research related to this topic, which will allow us to understand and determine the motivations of the cycle tourist in Mexico. Likewise, this study demonstrates the need for further research to validate the CtMI in other contexts, within Mexico and abroad.

Keywords: bicycling; motivation; scale validation; cycle tourism; Mexico

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1. Introduction

Cycling is one of the fastest growing recreational sport and tourism activities in the world [1]. There are numerous personal and community benefits to cycling: it reduces noise pollution from vehicular transport [2]; it favors educational actions oriented towards the promotion of critical leisure and environmental education [3]; it has social benefits, since there will be a greater number of cycle tourists, and the places they visit will become tourist destinations; it also has mental and physical benefits, thereby improving health [4]; exercising in natural green spaces, such as those traveled through by cyclists, is significantly better than exercising indoors in urban areas [5]; cycling constitutes a healthy lifestyle and even provides an identity [6]; it has numerous environmental benefits. However, it is unknown which of the aforementioned benefits are the most valued by cyclists [7].

While bicycles are mainly used for daily commuting, cycling has become a trend in slow tourism that today accounts for approximately 10% of the vacation market in Europe [8]. With the growth of slow tourism, cycling is likely to receive even more attention from the tourism sector in the future [9]. The integration of cycling, tourism and leisure helps to resolve the growing contraction between transport and tourism demand, and economic development and environmental protection and can therefore contribute to accessing destinations in more sustainable ways [10].

There is a close relationship between cycle tourists and rural tourism [11]; in the ventures and/or communities of this type of tourism, the aim is to improve economic income, so the profile and motivations of the cycle tourist towards this type of tourism

take on special importance, as indicated by the research reported on these topics and summarized in Table 1.

Table 1. Research on the profile and motivations of the cycle tourist.

Characteristics of the Cycle Tourist		Authors
Profile	Gender	[12–17]
	Age	[4,12–17]
	Schooling	[4,13,15,17]
	Income	[4,13,17,18]
	Employment	[17]
Route	Experience	[14,17]
	Who do you go with	[4,13,16,17]
	How many days	[16,18,19]
	What days	[17]
	Distance	[12,13,16,19]
	Time	[4,13,17]
	What do you buy	[17,19]
	How much do you spend	[12,17]
Motivation	Motivation to ride	[4,6,16,17,20–23]

Source: own elaboration.

Most of the studies reported in Table 1 on cycle tourism were based on marketing perspectives, such as travel behavior, regional development and management, so the motivation of cycle tourists can be considered a topic that has been little studied [14].

Much of the literature on motivation in the areas of sport and tourism dates back to work done in the 1930s, where it was suggested that people have a range of needs that function as motivating factors for behavior. While researchers may categorize tourism motivations in different ways, the motivations generally associated with tourism include escape, relaxation and regeneration, education and self-development, relationships and social interaction, and novelty [21].

No phenomenon involving challenges reflects the positive potential of human nature as much as intrinsic motivation, the inherent tendency to seek novelty and to expand and exercise one's own abilities to explore and learn [24]; therefore, understanding the behavioral patterns of tourists over time and formulating corresponding development strategies can enhance their travel experience and satisfaction [21].

The importance of motivation in the travel decision-making process has been reported by Mansfeld [25], which represents the first of six stages that travelers go through before choosing their destination. They then gather information about possible destinations, and evaluate and eliminate some of them. Therefore, it is very important to understand the motivation factor in tourism because this is the beginning of the trip, and cycle tourism is not alien to this process.

Different motivations classify tourists and segment the tourism market, helping tourism destinations to provide better services and to have satisfied tourists [24]; however, most of the previous studies on cycle tourism were based on marketing perspectives, such as regional development, travel behavior and administrative management issues, so the study of the motivation of cycle tourists can be considered an understudied topic in academia, with studies focusing more on travel experiences and ignoring the spatiotemporal behavior of travelers [14,25–27].

Studies related to the area of tourism have been increasing in recent years in Mexico, with topics as diverse as the effects of COVID-19 [28]; the effects on the informal economy [29]; tourism of the elderly [30]; the link between tourism, pollution and health [31]; and the factors that affect its demand [32]. Unfortunately there are problems and challenges in determining the tourist demand in Mexico [33], since the tourism statistics that are officially disseminated in Mexico do not have the objectivity or veracity that characterizes knowledge, mainly due to a series of errors, omissions, inconsistencies and even method-

ological manipulations revealed by the information capture and processing mechanisms. There are also no statistics on the number of cyclists circulating in the country, the economic impact they leave, their profile and/or the motivations they have for riding a bicycle.

Tourism in Mexico is the third most demanded economic activity. This industry contributes 8.7% of the national gross domestic product [29], generates 14.7 billion dollars and activates a value chain of 65 billion dollars. Mexico is seventh worldwide in terms of international arrivals, receiving 45 million international tourists and USD 24,563 million [34].

In Mexico, it is necessary to carry out numerous investigations into the interest in cycle tourism with the aim of understanding the reasons for traveling and riding a bicycle [35]. To do this, it is first necessary to perform a reliability and a statistical validity test on the questionnaire to be applied. This will identify if there is homogeneity in the items, that is, that they all measure the same thing and that there is a large internal consistency. It can then be assumed that if the answers are related, it is because the items express or are indicators of the same trait, which will explain how well the data collected cover the real areas of research and the validity of the inferences and conclusions drawn from the results of the questionnaire. These results can then serve as a reference for future research into the motivation of cyclists in Mexico [36–39].

In Mexico, there are several cycle tourism routes, such as the Mayab Route, the Coffee Route, the Tequila Route, but the Chichimeca Route, is the oldest (2004), longest (more than 4500 km) and most popular, attracting more than 500 direct and indirect participants. This route crosses the country from north to south, with the aim that participants get to know the natural, cultural and historical wealth of the nation in a period of two to three months, using the bicycle as a means of transportation [40].

This study designed and evaluated the reliability and validity of the Cycle-tourist Motivation Instrument (CtMI) in Mexico.

2. Materials and Methods

This research was carried out with 322 bicycle tourists who participated, directly or indirectly, in the 18th Chichimeca Route in Mexico, touring the country for 57 days, from 1 June to 28 August 2021, from the southern border with Guatemala to the northern border with the United States of America at Ciudad Juárez, Chihuahua. For this study, participants who were over 18 years old, who owned at least one bicycle and who were Mexican were considered.

The original questionnaire consisted of 84 items, of which 8 were dichotomous, 10 were polytomous, 6 were open-ended to assess motivation, and 60 were Likert-type, with 5 response options, ranging from totally disagree to totally agree. The Likert scale items were obtained from the works of Ritchie [16], Brown, O'Connor and Barkatsas [41] and Cheah et al. [42], with the dimensions or factors and number of items reported in Table 2. The criterion for obtaining the items was the use of those that best fit the concept of cycle tourism and/or the particular conditions of the Mexican cycle tourist, eliminating items related to bicycle rail transport since there are no passenger trains in Mexico.

Table 2. Research on the profile and motivations of cycle tourists.

Dimension	Number of Items	Authors
Health	11	[41,42]
Social	8	[41,42]
Competence domain	7	[16]
Exploration	8	[16]
Stimulus-seeking	8	[16]
Self-presentation	3	[41,42]
Escape	4	[16]
Peer support	2	[41,42]
Transportation and facilities	1	[41,42]
Personification	3	[41,42]
Loneliness	5	[16]

Source: own elaboration.

The questionnaire consists of three parts: presentation, items and motivational phrases using Mexican regional terminology. It was then verified by three experts, and a pilot study was carried out with 5 Mexican cyclists to apply it to the participants of the 2021 Chichimeca Route using Google Forms.

The data obtained were analyzed with SPSS version 20 software. The analyses performed were as follows: detection of atypical data with the Mahalanobis distance procedure and that of the typical score variables; descriptive analysis of the data and statistical validation of the instrument with the overall Cronbach's alpha and with dimensions; the Kaiser–Meyer–Olkin (KMO) test; Bartlett's sphericity test; and factor analysis with varimax rotation, with a significance level of 0.05 and with 250 interactions for convergence, and an extraction index of 0.4 [16,41,42].

3. Results

The following results were obtained in this study.

3.1. Atypical Data

Atypical data [43] were caused by individuals who presented a value or a combination of values in the observed variables that clearly differentiated them from the rest and could cause a significant distortion in the results. It was therefore necessary to detect them, study their influence and analyze their causes in order to decide whether they should be retained or excluded from the analysis. Table 3 shows the analysis of atypical data using SPSS 20 software; the Mahalanobis distance procedure and that of the typical score variables were used. It is worth mentioning that for a threshold value of 0.01 for the Mahalanobis distance procedure and a value greater than 2.5 for the atypical data, there was only a difference of two people, number 9 and number 34, which Mahalanobis did not consider. Therefore, it was decided to take the data from the atypical data value procedure for this research, which can be seen in Table 3.

Table 3. Atypical data by the atypical data value procedure.

Atypical Data	Number of Respondent	Atypical Value	Observations
Years of cycling	52	2.75	25 years of cycling
	59	3.84	35 years of cycling
Number of bicycles	8	3.46	Has 5 bicycles
Number of mountain bikes	32	2.78	Has 3 mountain bikes
	34	2.78	Has 3 mountain bikes
Number of road bikes	53	3.77	He has 2 road bikes and uses them the most
Age of bicycle	53	3.51	Has a 15-year-old bicycle
Cost of bicycle	6	2.86	Has a MXN 70,000 bicycle
	16	3.56	Has a Trek-brand bicycle
	33	4.90	Has a Trek-brand bicycle
Spending on each outing	9	3.09	Spends MXN 300 on each outing Spends
	28	3.09	MXN300 on each outing

Note: Monetary values (MXN) are in Mexican pesos; source: own elaboration.

These data were removed from the study to avoid their influence in the case of the mean being used; therefore, in the descriptive data analysis, the median was used, and in the case of factor analysis, these values were removed from the analysis [44].

3.2. Descriptive Results

Table 4 presents the descriptive analyses of the research, with the results related to the profile of the cycle tourist, which include socio-demographic variables, variables related to the bicycle and variables related to the cycling route.

Table 4. Socio-demographic results.

Concept	Frequency	Percentage
Gender		
Male	45	76.3
Female	14	23.7
Age (years)		
18–20	2	3.4
21–30	14	23.7
31–40	19	32.2
41–50	16	27.1
51–60	6	10.1
More than 61	2	3.4
Last level of education		
No education	0	0
Primary	0	0
Secondary	1	1.6
High school	11	18.6
Bachelor's degree	32	54.2
Specialty	4	6.8
Master's degree	7	11.9
Doctorate	4	6.9
Employment		
Unemployed	0	0
Public sector	20	33.9
Private sector	23	39.0
Self-employed	13	3.4
Student	2	22.1
Retired	1	1.6

Source: own elaboration.

As can be seen in Table 4, three-quarters of the respondents were men. The average age was 38.5 years, with 83% being between 20 and 50 years old; most have a high school education and almost 40% work in the private sector as an employee or owner of a company.

Table 5 shows that 70% of the respondents have been involved in cycle tourism for 2 to 10 years. Most have one to two bicycles, at least one of which is a mountain bike. The most commonly used wheel size was 29. Most respondents have a bicycle that is less than one year old, and 37% of those surveyed have bicycles that cost them between MXN 11,000 and MXN 20,000.

Table 5. Results on the bicycles used by cycle tourists.

Concept	Frequency	Percentage
Years of cycling		
1	3	5.0
2 to 5	21	35.5
6 to 10	20	34.0
11 to 20	10	17.0
More than 21	5	8.4
Number of bicycles		
1	27	45.8
2	23	39.1
3	5	8.4
4	3	5.0
5	1	1.6

Table 5. *Cont.*

Concept	Frequency	Percentage
Mountain bikes		
0	1	1.6
1	37	62.8
2	19	32.2
3	2	3.4
Age (years)		
1	17	28.8
2	8	13.6
3	8	13.6
4	6	10.2
5	5	8.5
6	3	5.1
7	3	5.1
8	3	5.1
9	1	1.7
10	4	6.8
15	1	1.7
Cost of bicycle		
Less than MXN 5000	13	2.2
From MXN 6000 to MXN 10,000	11	8.6
From MXN 11,000 to MXN 20,000	22	37.2
From MXN 20,000 to MXN 30,000	8	13.6
More than MXN 30,000	5	8.5

Note: Monetary values (MXN) are in Mexican pesos; source: own elaboration.

Table 6 shows that 74% of those surveyed ride with friends, and 45% go out on a bicycle 2 to 3 days a week. Furthermore, 80% leave before 8 am, half of them ride 20 to 40 km per day, and 88% buy something en route.

Table 6. Results related to the route.

Concept	Frequency	Percentage
Who do you go biking with		
Alone	15	25.5
Friends	44	74.5
Relatives	0	0
Strangers	0	0
Days a week you ride		
1	9	15.3
2	13	22.0
3	14	23.7
4	10	17.0
5	8	13.6
6	3	5.0
7	2	3.3
Departure time		
Before 7:00 a.m.	12	20.4
At 7:00	18	30.6
At 8:00	18	30.6
At 9:00	3	5.0
At 10:00	3	5.0
At 11:00	2	3.3
After 12:00 p.m.	3	5.0

Table 6. *Cont.*

Concept	Frequency	Percentage
Ride distance in km		
Less than 10 km	2	3.3
From 11 to 20 km	6	10.2
From 21 to 30 km	18	30.6
From 31 to 40 km	12	20.3
From 41 to 50 km	8	13.5
More than 51 km	13	22.0
Do you buy something on the road		
Yes	52	88.1
No	7	11.8

Source: own elaboration.

3.3. Statistical Validity of the Instrument

To explore the validity of the dimensions of cycle tourist motivation shown in Table 2, factor analysis was used with the purpose of using some factors to describe the relationships between many elements. Whenever the eigenvalue of a factor is greater than 1, it is possible to analyze this factor, and when it is necessary to search for potential factors among many variables, factor analysis uses varimax rotation techniques to explain the factors by the variance contribution rate, which is advantageous in its explanation [42]. Cronbach's alpha value for the CtMI was 0.920 and the Kaiser–Meyer–Olkin value was 0.911, while the significance level of Bartlett's sphericity test was 0.000, which indicates that it is adequate for factor analysis. Table 7 shows the exploratory factor analysis of the CtMI items with the loadings of the principal components, using varimax rotation with factor loadings >0.40.

Table 7. Principal component loadings for the CtMI with varimax rotation.

Item	Factors						
	1	2	3	4	5	6	7
I ride to be physically active	0.879						
I ride to improve my health	0.836						
Cycling is a physical challenge	0.757						
Cycling allows me to be respectful of the environment	0.753						
Cycling allows me to set new goals for my health	0.713						
Cycling allows me to feel refreshed and invigorated	0.664						
I enjoy the feeling of euphoria after I ride	0.535						
I cycle to be with other people who enjoy the same activity		0.823					
I enjoy cycling because I can be with friends and family		0.787					
I ride to interact with local people		0.690					
I like to ride in a group rather than alone		0.672					
I consider cycling to be a social activity		0.646					
Cycling gives me the opportunity to meet new people		0.583					
I enjoy socializing after cycling in a restaurant or bar		0.578					
I ride to find stories and photos for social media		0.448					
Cycling helps me learn what I am capable of			0.730				
With cycling I can prove to myself that I can do it			0.725				
I ride to try something new and different			0.668				
I develop skills and competences with the bike			0.630				
I ride to examine my surroundings in detail				0.783			
I ride my bike to explore the area				0.769			
I use a bike to have a relaxed pace of travel				0.596			
When I ride I like the feeling of discovery				0.542			
I cycle to get away from responsibility					0.778		
I ride to increase my social standing					0.750		
Cycling allows me to experience danger					0.705		
I like the other riders to explicitly consider me as a cyclist						0.842	
I like others to think of me as a cyclist						0.803	
I like others to think of me as athletic						0.627	
I cycle to get away from an overcrowded situation							0.702
Cycling makes me forget about my problems							0.658
I cycle for a change from everyday life							0.605

Note: dimension 1, health; dimension 2, social; dimension 3, competence domain; dimension 4, exploration; dimension 5, stimulus-seeking; dimension 6, self-presentation; and dimension 7, escape. Source: own elaboration.

Table 8 shows Cronbach's alpha, the variance explained by factors, the eigenvalues and the number of items for the version of the CtMI for Mexico.

Table 8. Cronbach's alpha, variance explained by factors, eigenvalues, and item values.

Concept	Factor (Dimension)						
	1	**2**	**3**	**4**	**5**	**6**	**7**
Cronbach's alpha	0.92	0.85	0.896	0.82	0.72	0.83	0.67
Explained variance (%)	16.958	12.387	9.081	8.575	6.946	6.873	6.122
Eigenvalues	10.978	3.681	2.282	1.664	1.306	1.140	1.030
Number of items	7	8	4	4	3	3	3

Note: dimension 1, health; dimension 2, social; dimension 3, competence domain; dimension 4, exploration; dimension 5, stimulus-seeking; dimension 6, self-presentation; and dimension 7, escape. Source: own elaboration.

Tables 7 and 8 show that there are seven factors that have factor loadings greater than 0.4 and that if we add the explained variance of each one, they account for 66.9% of the variance of the 32 items measured, so their explanatory capacity is very appropriate. Therefore, and based on the literature [16,41,42], 32 items were obtained from the 60 originally proposed. These 32 items are distributed into 7 factors: health, social, competence domain, exploration, stimulus-seeking, self-presentation and escape. The resulting instrument has been named the Cycle-tourist Motivation Instrument (CtMI) for Mexico.

4. Discussion

The objective of the study was to develop and statistically validate the Cycle-tourist Motivation Instrument (CtMI) for Mexico built from information provided by three authors [16,42,43] located in New Zealand, Australia and Malaysia, respectively, from which 60 items included in 11 dimensions were taken.

This questionnaire was applied to 322 cycle tourists who participated, directly or indirectly, in the 2021 Chichimeca Route. Atypical data were removed, and Cronbach's alpha, the KMO test and Bartlett's sphericity test were calculated; in addition, factor analysis with varimax rotation was performed, with factor loadings greater than 0.40. The results obtained for the construction and validity of the version of the CtMI for Mexico indicate that they have validity and a very appropriate explanatory capacity for the motivation phenomena behind cycle tourists, having adequate Cronbach's alpha and KMO values and presenting values equal to or greater than those reported by the aforementioned authors. For example, the KMO observed for Lian et al. [42] is 0.886, and that observed for Brown et al. [41] is 0.896, while for the CtMI, it is 0.911. In the case of Cronbach's alpha, dimension values from 0.799 to 0.880 were reported for the first author, dimension values from 0.63 to 0.88 were reported for the second author, and in the case of the CtMI, dimension values from 0.670 to 0.920 were obtained.

The differences between the instruments used to measure motivation [16,41,42] are mainly due to two elements: the first is the countries where the surveys were applied to validate the instruments, since they are culturally and socially different from Mexico, and the second is the fact that [16] only applied it to cycle tourists, [41] applied it to cyclists in a competition, and [42] applied it to cyclists in general, whereas the CtMI was validated in Mexican cycle tourists. However, the information reported by these authors has been very important for the development and validation of the version of the CtMI for Mexico.

In addition to the validation of the version of the CtMI for Mexico, the results of this study show the profile characteristics of the cycle tourists who participated in the 2021 Chichimeca Route, such as the socio-demographic data, the characteristics related to their bicycle and the characteristics related to the route they follow, which are very important and relevant aspects that allow us to understand the phenomenon of cycle tourism in Mexico.

Finally, despite the positive results of this study in regard to developing the CtMI for Mexico, it should be recognized that there were limitations to this research; for one, only 23.7% of those surveyed were women, which can be considered low, although in other

international studies, this percentage is similar or lower [41,42]. Moreover, this study did not consider other tour events in which Mexican cyclists participate, so it is necessary to conduct more studies in order to further refine the CtMI, which can serve as a basis for future research on the motivation of cycle tourists in Mexico.

5. Conclusions

This study developed and statistically validated a version of the CtMI for Mexico, providing a significant contribution to future research related to this topic. It also furnished profile data of the cycle tourists who participated in the 2021 Chichimeca Route, which will help in determining the characteristics of cycle tourists in Mexico and understanding them. Likewise, this study demonstrates the need for further research to validate the CtMI in other contexts, within Mexico and abroad.

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