



Article Evaluating Residents' Perceptions of Nature-Based Tourism with a Factor-Cluster Approach

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Abstract: The purpose of the research presented here was to empirically assess resident perceptions of tourism development around the Changbai Mountain Biosphere Reserve (CMBR), a protected area straddling the China and North Korea border. Several theoretical approaches to the assessment of local resident attitudes towards tourism were reviewed and integrated into a novel factor-cluster assessment of residents in Erdaobaihe, the community most adjacent to CMBR. This analysis quantitatively grouped residents based on their perceptions of tourism's economic, social, cultural, and environmental consequences for the town. An exploratory factor analysis of resident perceptual items first revealed six perception domains, and a subsequent cluster analysis then identified four distinct groups of residents based on these perceptions. A descriptive profile of each cluster and the significant differences among clusters are provided. Advancing our theoretical understanding of resident perceptives of tourism development, this cluster-based segmentation approach, demonstrated here, holds much promise for elaborating on the many ways that residents respond to new and long-standing forms of tourism in their communities. These theoretical and methodological contributions will be applicable to scholars as well as tourism practitioners and policy makers.

Keywords: nature-based tourism; protected areas; resident perceptions; tourism planning; destination life cycle

1. Introduction

Protected areas are important nature-based tourism destinations that serve as a primary attraction for the travel industry in many places [1,2]. In China, the national system of protected areas includes nature reserves, forest parks, and scenic areas, all of which are referred to as national parks [3]. Nature reserves are the most popular areas in China for nature-based tourism activities [4]. These reserves enjoy an elevated status because they provide domestic and international visitors with valuable opportunities to experience the country's natural resources and to enhance their ecological and cultural awareness [3]. As of 2017, China had established 2750 nature reserves, and the total area they occupied was about 1,471,670 km² (Hong Kong, Macao, and Taiwan excluded) [5]. Several of these existing national parks are also recognized by UNESCO as Biosphere Reserves. Listed as China's first-batch Biosphere Reserves, Changbaishan Mountain Biosphere Reserve (CMBR), was designated by UNESCO in 1979 and later included in the Man and the Biosphere Program in 1980.

Tourism in China's nature reserves has been a focus of domestic scholarship for over two decades; however, this literature focused little on local community impacts of tourism.



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Copyright: © 2020 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/ licenses/by/4.0/). Given the net benefits that nature-based tourism can provide for both the conservation of natural areas and for local communities [6], tourism analysis requires assessing environmental management of protected areas, as well as local resident perspectives of tourism's outcomes for communities neighboring protected areas. Given a dearth of empirical studies on Chinese residents' perceptions and attitudes towards nature-based tourism activity in nearby reserves, a need persists to better integrate local community perceptions into the management of protected areas in Asian countries, particularly in China where the scale of visitation to many protected areas is particularly high [3]. Furthermore, little of the research in tourism studies, to assess resident attitudes and perceptions, has focused on nature-based tourism destinations.

The purpose of the research presented here was to apply a novel methodological approach to assess resident perceptions of nature-based tourism to the CMBR, a protected area straddling the China and North Korea border. Several theoretical approaches to the assessment of local resident attitudes towards tourism are first reviewed, and these theoretical ideas were then integrated in a survey-based assessment of residents in Erdaobaihe, the community most affected by nature-based tourism to the CMBR. Responses allowed us to quantitatively group residents based on their perceptions of nature-based tourism's economic, social, cultural, and environmental consequences for the town by using a factor-cluster method. The application of tourism theory generated from studies of resident perceptions outside of nature-based tourism contexts, and the novel method-ological approach introduced here for assessing residents' perceptions, will make valuable theoretical and methodological contributions to the broader scholarship tracking the ongoing development of tourism around protected areas and beyond. This analysis also has direct application to the sustainable management of tourism in the communities around CMBR and in other gateway communities around protected areas in China.

2. Literature Review

2.1. Residents' Perceptions of Tourism Impacts

Since tourism development can have both positive and negative consequences at the local level [7,8], resident perceptions and attitudes towards the impacts of tourism development in local communities have attracted the attention of so many tourism researchers that the resulting body of writing cannot be fully reviewed here (see the following for just a few recent examples [9–12]). It has thus long been clear that local resident perceptions influence tourists' experience and satisfaction with their trip, the success of travel programming and policies, and the sustainability of tourist destinations overall [13,14]. If visitation to protected areas is to deliver on the promise of community development, we would expect to find favorable local resident perceptions of tourism's economic, socio-cultural, and environment impacts. As reviewed below, there may be many reasons why local residents do not view visitation to local parks favorably.

2.1.1. Economic Impacts

Regarding economic impacts of tourism development, recent resident attitude research carried out in India demonstrated that residents strongly acknowledge the contributions that tourism makes to local businesses, incomes, and employment [9]. Similarly, many studies have also reported that the positive economic impacts are highly valued by residents, such as generating employment opportunities [15–19], contributing to the improvement of living standards [17,18,20], increasing income [17,18,20–22], creating the local business environment [21,23,24], and improving community infrastructure and public facilities [20,22]. Most studies agreed that the economic impacts of tourism development are predominantly regarded as a positive way [25,26], which is mainly because local residents pay attention to activities related to business and economic development and they see tourism as a necessary economic development tool for local economies [12,15].

Others [27–29] have noted that favorable perceptions often depend on one's level of experience in the tourism industry. Tourism can just as likely be viewed as causing negative

economic effects. Andriotis and Vaughan [16] found that an "economic skeptics" group within a community exhibited lower appreciation of tourism's economic benefits in the Crete context, while other researchers note that residents perceive tourism as offering only low salaries and sub-par jobs [30], detrimental economic impacts of tourism on the local life and cost of living [21,22], raised prices of goods and services [9,20,29,30], and rising housing costs due to inflated real estate markets [9,20,22,31]. Scholars must likewise be prepared to encounter heterogeneous perspectives in communities bordering protected areas.

2.1.2. Sociocultural Impacts

Tourism also has an effect on local sociocultural characteristics including social life, habits, customs, beliefs and values of inhabitants of tourist destination [32]. Researchers working in historic sites in India found that most respondents agree that tourism improves residents' pride in cultural identity and helps preserve cultural values, findings consistent with studies in other cultural contexts [9,18,33–35]. Other studies have noted that tourism positively impacts the services offered by communities [33,36], stimulates more cultural activities and events [18,21,34,36], increases the number of recreational parks and green areas [18,19], and creates more leisure activities opportunities for local people [15,17,20,21,36]. Tourism can also help preserve historic monuments and archeological sites [20,33,34,37].

Nevertheless, numerous studies also illustrate negative sociocultural impacts of tourism development. Studies have noted concerns about large-scale visitation causing traffic congestion and parking problems [9,21,23,24,33,38], as well as saturation of public leisure infrastructure during high seasons [10]. Other studies show tourism development can result in erosion of traditional values [33–35], commercialization of host-community culture [39], and social rivalries related to the distribution of economic benefits [40]. Furthermore, tourism can also be perceived as giving rise to immoral behaviors [33,36], such as serious crime [7,24,33,41,42], theft [43], delinquency and vandalism [41], the availability of illegal drugs [41,43,44], alcohol-related behavioral problems [7,33,41,45], and increased prostitution [46–49]. To the extent that these issues are observed, negative perceptions of tourism to protected areas can be expected.

2.1.3. Environmental Impacts

Scholars have likewise found that local residents can perceive positive and negative environmental impacts in their community [17,20,33,37,48,50–52]. Working in a site of important cultural and religious significance, Liu and Li [9] recently noted that residents in Puri, India, see tourism as preserving natural resources and improving the appearance of their city, consistent with the findings in other contexts [17,20,33,53]. Sharma et al. [54] found that local residents value tourism's benefits for the protection of the physical environment, the conservation of woodlands, and increased environmental awareness programs. Similarly, ecotourism in Costa Rica sensitizes local employees to environmental issues and contributes to increased support for protected areas and conservation [55]. When tourism contributes to pre-existing concerns for local environmental quality, it is much more likely to be supported in local communities.

In other contexts, scholars discovered that resident perceive tourism as having a negative impact on local environments. Researchers have found that local residents express environmental concerns related to overcrowding, pollution, damaged seashores, and disturbed natural landscapes, while other researchers found that perceptions of environmental damage related to waste and pollution [33,39,50,54,56], noise generation [54], agglomeration in public facilities and resources [21,24], congestion and overcrowding [33,37,50], an imbalance in ecological nutrients [54], and loss of local species diversity [55] all lead to negative perceptions of tourism.

2.2. Classifying Residents Based on Impact Perceptions

Since resident perceptions of the impacts of tourism are not likely to be homogenously exhibited across local populations, classifying groups of residents into clusters can provide

insight into the nature and causes of resident reactions to tourism [57]. While this has been a less common approach in the assessment of tourism around protected areas, different quantitative segmentation approaches have focused on local residents' perceptions and attitudes towards other forms of tourism [16,57–59]. Other researchers have clustered on the basis of both opinions of tourism and resident demographics [60]. Weaver and Lawton [61] examined resident perceptions of nature-based tourism on Tamborine Mountain in Australia's Gold Coast, identifying three significantly distinct groups: Supporters, Neutrals, and Opponents.

For the formulation of strategic tourism policies, Brida et al. [62] investigated aspects of host perception in a mountain community in northern Italy with a cluster analysis and multinomial logit model, identifying four homogeneous opinion groups: Environmental Supporters, Development supporters, Protectionists, and Ambivalent. Based on local perceptions of the impacts of new tourism development on two rural communities in Turkey, Sinclair–Maragh et al. [63] utilized a factor-cluster approach and identify four groups of residents: Public service and environment-focused, Community-focused, community–public service-focused, and inconsequential. Using exploratory factor analysis, as well as hierarchical and non-hierarchical cluster analysis, Del Chiappa et al. [64] analyzed residents' perceptions and attitudes towards tourism development and community integration in tourism planning in the context of Costa Smeralda and identified four clusters: Enthusiastics, Moderate Supporters, Critics, and Indifferents. These precedents suggest analogous value would result from similar analyses in communities around protected areas in China.

3. Methods

3.1. Study Site: Erdaobaihe, China

Erdaobaihe is located in Antu County, at the foot of Changbai Mountain Biosphere Reserve (CMBR). Erdaobaihe encompasses an area of 52.42 km², and it is 34km from the CMBR (See Figure 1). The total population is 63,475 people (44,494 resident population), 15% of which are ethnic minorities. Known as the "First Town of Changbai Mountain" and "The Hometown of Beautiful Pine", Erdaobaihe is a tourist resort with a reputation of "sacred mountains, holy waters, strange forests, and immortal fruit." It was rated as one of the world's top 20 tourism towns by the World Top Tourist Town Alliance (T20) Summit in 2016. The CMBR was accepted by the World Biosphere Reserve Network in 1979 [65]. In 1982, it was the first Biosphere Reserve in China to encourage tourism development [66]. With the burgeoning tourism industry, both developers and the provincial government have actively engaged in building roads, bridges, and cable car systems to increase tourist capacity [66]. As a result, CMBR visitation has grown steadily from 29,021 in 1980 [67] to more than 2,500,000 in 2018 [68]. In the past, Erdaobaihe livelihoods depended on crop farming, livestock, and forest products. With the rapid development of tourism, local residents are increasingly employed in hotels, restaurants, local specialty services, and scenic areas.

Erdaobaihe is a suitable study site for three reasons. First, Chinese nature reserves are the most popular areas in China for ecotourism activities because of their unique natural landscapes and rich flora and fauna [4]. The CMBR epitomizes this popularity, having been elected as one of the national models of ecotourism by the Chinese government. Second, the CMBR has nearly forty years' visitation history, and many tourism activities here hold great economic importance for local governments. Third, the CMBR mainly consists of three scenic areas: North Slope, South Slope, and West Slope. The North Slope is under the jurisdiction of Erdaobaihe, the most important gateway community to the CMBR. This community has the most developed tourism facilities and service functions, and it is also the location of the Supreme Administrative Authority, responsible for the CMBR (Jilin Changbai Mountain Protection Development Management Committee).



Figure 1. Map showing Erdaobaihe Town.

3.2. Research Design

Data gathering was accomplished via a pencil-and-paper survey in Chinese. This survey consisted of 32 statements on the economic, social-cultural, and environmental impacts that tourism has on the local community, with respondents indicating level of agreement using a Likert-style scale ranging from 5 (strongly agree) to 1 (strongly disagree). The statements were uniquely developing, though they drew from previous work [26,69,70]. Modifications were made to correspond to the local content and for language coherency, as indicated in the final versions below. An additional section of the survey gathered data on respondents' demographic profile and social characteristics (e.g., gender, age, education, occupation, monthly income, place of birth, residence time, involvement in tourism, and current tourism-related work). The lead author conducted an initial pilot study with 15 residents, leading to revisions of semantic ambiguities in the initial survey. Surveys were later gathered via a quota sampling strategy, a form of non-randomized stratified sampling that quota sampling "that often approximates the results of probability sampling at less cost and less hassle than strict probability sampling" [71]. Following this approach, confidential surveys were gathered from residents in residential quarters, government departments and institutions, hotels, restaurants, and shops along major commercial streets (Table 1). A total of 400 surveys were completed. After eliminating incomplete and invalid responses, 374 completed usable surveys were retained.

Table 1. Survey sites of survey distribution in Erdaobaihe.

Survey Sites	Names	Number of Surveys
Residential quarters	Lidu garden; Yijingjiayuan; Cuihumingyuan; Dushigongyuan; Baishanjiayuan; Kangjing apartment; Shanshuirenjia; Lihu quarter; Minxinjiayuan; Evergreen garden;	153
Government departments and institutions	Culture, Radio, Television, Press and Publishing Bureau; Bureau of Economic Development and Commerce; Social Insurance Administration	91
Major commercial streets	Baishandajie; Shenhua Road; Lengshan Road;Evergreen Road; Commercial Road	130

3.3. Data Analysis

All the data were analyzed using IBM SPSS (Statistical Product and Service Solutions) Statistics 19. Data analysis occurred in five stages. First, descriptive-statistics were used to get socio-demographic profiles of community residents. Second, an exploratory factor analysis (EFA) was applied to the 32 tourism impact items to identify the fundamental construct from a large set of control variables. As the appropriate choice among estimation methods of factor analysis, principal component analysis (PCA) with varimax rotation was utilized to extract the factors. KMO (Kaiser–Meyer–Olkin Measure of Sampling Adequacy) and Bartlett's Test of Sphericity were used prior to factor analysis. According to common criteria [72], only factors with eigenvalues greater than 1 were kept; and only items with factor loadings and communalities more than 0.5 were retained in the final factor structure. Reliability alphas within each dimension were computed to best fit a factor's internal consistency.

Third, community residents in Erdaobaihe were then quantitatively segmented based on perceptions of impacts of tourism. Ward's hierarchy clustering method was initially used to determine the appropriate number of clusters by an agglomeration schedule on the cluster analysis, followed by the K-means cluster analysis approach [59] to classify the samples based on the identified influence domains. Next, cross tabulations with chi-square analysis were used to explore whether statistically significant differences existed among different resident clusters in terms of categorical variables (e.g., demographics). Finally, differences in perceived tourism impacts associated with each cluster were identified by using discriminant analysis, which evaluated the degree of accuracy in the classification of community resident segments and identified the tourism impacts items that most differentiated the clusters.

4. Results

4.1. Sample Profile

Descriptive statistics and respondent profiles are presented in Table 2. It is worth mentioning that in 2018, the national median per capita disposable income was ¥24,336, though this varied between urban (¥36,413) and rural (¥13,066) residents [73]. Although tourism is not the direct source of income in Erdaobaihe, more than one-third (35.8%) of the sample are currently involved in tourism-related work, including private and state employees. More than half of the respondents (53.5%) are non-native born residents though their length of residence is generally long with almost 56.4% of the sample having lived in the region for more than twenty years.

Socio-Demographics	-Demographics Number (%) Socio-Demographics		Socio-Demographics	Number (%)	
Cender	Male	181 (48.4)		State employees	89 (23.8)
	Female	193 (51.6)		Self-employed	158 (42.2)
Age	18–28 29–39 40–49	72 (19.3) 117 (31.3) 113 (30.2)	Occupation	Tourist area employees Farmer Worker	9 (2.4) 2 (0.5) 22 (5.9)
1160	50-59	51 (13.6)		Others	94 (25.1)
	≥ 60	21 (5.6)		Less than 1000 yuan	22 (5.9)
Education	Junior high school and below High school/Technical secondary school/Technical school	89 (23.8) 130 (34.8)	Mean monthly income/RMB	1001–2000 yuan 2001–3000 yuan More than 3000 yuan	56 (15.0) 97 (25.9) 199 (53.2)
	Junior college/University151 (40.4)Are you currently invGraduate4 (1.1)tourism-related w		Are you currently involved in tourism-related work?	Yes No	134 (35.8) 240 (64.2)
Are you a local resident?	Yes No	174 (46.5) 200 (53.5)		Family-owned hotel/inn operators Restaurant operators	16 (11.9) 34 (25.4)
How long have you lived here?	5 years and below 6–10 years	63 (16.8) 44 (11.8)	What is your current work related to tourism?	Local specialty store operators Protected area/Scenic spot staffs	23 (17.2) 9 (6.7)
	11–20 years	56 (15.0)		Catering, entertainment and other service employees	37 (27.6)
	More than 20 years	211 (56.4)		Others	15 (11.2)

Table 2. Socio-demographic profile of	f survey sample	(N = 374).
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4.2. EFA of Community Residents' Perception of Nature-based tourism Impacts

The exploratory factor analysis showed that the KMO measure of sampling adequacy was 0.899, a significant Bartlett's Test of Sphericity results with Chi-Square = 6018.715 (df = 496), and p = 0.000, which indicated that the covariance matrix as suitable for conducting factor analysis. According to the criteria of [72], three perception items related to impacts of tourism were deleted from the analysis after running the procedure four times (Most of the money goes to outsiders, The pattern of family relations among local residents is changing and intimacy is declining, and Destroys the peaceful atmosphere of local life). Finally, PCA with varimax rotation of the 29 perception items generated six factors with eigenvalues greater than 1, explaining 65.0% of the total variance (see Table 3). The reliability coefficients (Cronbach's alpha) were higher than or close to the recommended standard of 0.70 [74]. Each factor was appointed a name in terms of the nature of the associated impact items in the group.

Table 3. Factor analysis of residents' perception of the impacts of tourism in Erdaobaihe.

Perception Domains	Loadings	Comm.	IMS	ОМ	Eig.	VE	RC
Factor 1: C	Community Pr	osperity					
Improves relations among local residents	0.810	0.680	3.93				
Improves the environmental awareness of local residents	0.787	0.678	4.27				
Significantly improves the cultural quality of local residents	0.760	0.630	4.12				
Enhances the pride of the local population	0.747	0.684	4.20				
Improves the civility of local residents	0.734	0.612	4.25				
Promotes the opening up of local people's ideas	0.732	0.664	4.19	4 217	8 793	30 320	0.928
Increases availability of recreation facilities/opportunities	0.682	0.645	4.24	1.217	0.7 70	00.020	0.720
Improves the area's appearance and sanitary condition	0.674	0.649	4.39				
Promotes cultural exchange and learning between local residents and tourists	0.651	0.622	4.17				
Preserves cultural identity of host population	0.634	0.661	4.18				
Enhances the local visibility and local image	0.593	0.625	4.36				
Enhances the environmental consciousness of the government	0.563	0.570	4.30				
Factor 2: C	ammunity Dia	h a					
Factor 2: Co	0.789	0.678	3.08				
The establishment of hotels and other tourist facilities has	0.769	0.078	5.00				
damaged the local natural environment	0.777	0.645	2.88	2 952	4 000	13 792	0.809
Moral standards in the area are declining because of the influence				2.702	4.000	10.772	0.007
of tourists with different cultural backgrounds	0.769	0.682	2.42				
The competition for tourists is creating tension among local							
residents	0.639	0.561	2.73				
Increases traffic congestion	0.591	0.550	3.65				
	B. Fconomic Be	nefit					
Contributes to income and standard of living	0 771	0.674	4 12				
Promotes local economic development	0.726	0.703	4.26				
Increases employment opportunities	0.725	0.641	4.24	4.198	2.294	7.909	0.826
Attracts more foreign investment	0.672	0.619	4.17				
F (4 5		1117				
Factor Increases price of goods and cost of living		_OST	4.00				
Increases price of goods and cost of fiving	0.692	0.017	4.09	2 006	1 620	E (01	0.782
A garavates the gap between the rich and the near	0.633	0.735	4.14	3.906	1.630	5.621	0.782
Aggravates the gap between the fich and the poor	0.027	0.009	5.49				
Factor 5:	Government l	Benefit	1.07				
Increases local government revenue	0.677	0.636	4.06	4.230	1.117	3.852	0.634
Improves public utilities infrastructure	0.676	0.651	4.40	1.200	1.117	0.002	0.001
Factor 6: C	ther Negative	Impacts					
Local traditional culture is seriously impacted	0.683	0.623	2.60				
The decline of public security environment brings a sense of				2.859	1.029	3.549	0.585
insecurity to local residents and increases lawbreaking and	0.644	0.666	2.47				
discipline violations							
Benefits only a few people	0.581	0.594	3.50				

Comm. = Communalities; IMS = Item means; OM = Overall mean; Eig. = Eigenvalue; VE = Variance explained; RC = Reliability.

The first factor, "Community Prosperity," included several items related to perception of tourism impacts, focusing on the positive outcomes related to local society, culture, and environment. With an eigenvalue of 8.79, this factor explained 30.3% of the total variance. Factor 2, "Community Disharmony," included five items that related to negative outcomes of tourism in the community, including environmental pollution, congestion, tensions, morals, and destruction of natural habitat. This factor had an eigenvalue of 4.00 and

explained 13.8% of the total variance. The third factor, "Economic Benefit," is characterized by four items focusing on the development of local economy. This factor resulted in an eigenvalue of 2.29 and explained 7.9% of the total variance. Like the first factor, the third component displayed the higher mean score (4.20), and a reliability alpha of 0.83. The fourth factor, "Economic Cost," was derived from three items focusing on income gap and high cost of living. It yielded an eigenvalue of 1.63 and explained 5.6% of the total variance. The 5th factor, "Government Benefit," yielded the highest mean score (4.23) of all and had a reliability coefficient of 0.63. This factor oriented toward public infrastructure and government revenue, both greatly beneficial to quality of life of local residents. This yielded an eigenvalue of 1.12 and explained 3.9% of the total variance. The last factor, "Other Negative Impacts," derived from three less cohesive items reflecting different negative perceptions of tourism's influence on regional culture, security and crime, and leakage of benefits. This factor had an eigenvalue of 1.03 and accounted for approximately 3.5% of the variance in the data.

4.3. Cluster Profiles

Cluster analysis identified distinct groups of respondents based on their perception to the six factors delineated above. In the cluster algorithm, the Ward method is frequently used to produce stable and interpretable results and to maximize within-cluster homogeneity [75,76]. Based on this, and examinations of the dendrograms and agglomeration coefficients, a four-cluster solution was applied in a follow-up K-means cluster analysis. According to [75], the K-means clustering method was undertaken because of its less susceptible results to outliers in the data, the distance measure used, and the inclusion of irrelevant or inappropriate variables.

The means of each factor for the members of each cluster were calculated. The resulting ANOVA tests showed that all six factors contributed to differences among the four clusters (p < 0.01) (Table 4). In addition, the Scheffe Post Hoc tests examined differences between clusters in terms of all six perception factors. Based on the importance of perception factors to each group, Cluster I, II, III, and IV were labeled Somewhat Irritated, Enthusiastic Supporters, Cautious Romantics, and In-Betweeners, respectively. A Cross-tabulation analysis further identified profiles of each cluster, and a chi-square statistic determined if there were any significant differences among the four cluster groups (Tables 5 and 6). Results indicated that four clusters were significantly different based on the age, residence time, and current tourism-related work (p < 0.05). However, statistically significant differences did not exist for those whose occupations were family-owned hotel or inn operators, restaurant operators, protected area or scenic spot staff, catering, entertainment and other service employees, and others, respectively (Table 6). Insight into these outcomes became evident as we look at each of the four groups in more detail.

Porcention Domains	Resident Cluster				0 11 14	E toot	Sig. Loval
Terception Domains	I (n = 81)	II (n = 149)	III (n = 103)	IV (n = 41)	Overall Mean	r-test	Sig. Level
Factor 1: Community Prosperity	3.85 ^a	4.47 ^b	4.20 ^a	4.11 ^b	4.22	23.823	0.000
Factor 2: Community Disharmony	3.34 ^a	2.39 ^b	3.43 ^a	3.02 ^{ab}	2.95	25.296	0.000
Factor 3: Economic Benefit	4.07 ^a	4.47 ^a	4.35 ^a	3.10 ^b	4.20	95.519	0.000
Factor 4: Economic Cost	4.15 ^a	3.32 ^b	4.43 ^a	4.21 ^a	3.91	36.603	0.000
Factor 5: Government Benefit	3.64 ^a	4.40 ^b	4.60 ^c	3.85 ^b	4.23	63.756	0.000
Factor 6: Other Negative Impacts	2.84 ^a	2.46 ^a	3.40 ^b	2.98 ^a	2.86	17.709	0.000

Table 4. Analysis of resident clusters by perception domains.

Means were derived from a five-point scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree); A Scheffe Post Hoc test revealed that a statistically significant difference exists among the four clusters (Significant at 0.01 level); Items with different superscripts indicate significant differences.

			0 1 1				
	Characteristics	Cluster				T_{0} (100%)	Charles Charles
		I (n = 81)	II (n = 149)	III (n = 103)	IV (n = 41)	10tal (100 %)	Statistics
Gender	Male (181)	33(40.7)	73(49.0)	56(54.4)	19(46.3)	181(48.4)	$X^2 = 3.463$ p = 0.326
	Female (193)	48(59.3)	76(51.0)	47(45.6)	22(53.7)	193(51.6)	ĆV = 0.096
	18–28 (72)	19(23.5)	27(18.1)	25(24.3)	1(2.4)	72(19.3)	2
Age *	29–39 (117) 40–49 (113) 50–59 (51)	20(24.7) 7(8.6)	38(25.5) 56(37.6) 19(12.8)	38(36.9) 23(22.3) 14(13.6)	10(24.4) 14(34.1) 11(26.8)	117(31.3) 113(30.2) 51(13.6)	$X^2 = 29.967$ p = 0.003 CV = 0.163
	$\geq 60 (21)$	4(4.9)	9(6.0)	3(2.9)	5(12.2)	21(5.6)	CV = 0.165
	Junior high school and below (89)	21(25.9)	30(20.1)	22(21.4)	16(39.0)	89(23.8)	$X^2 = 13.295$ p = 0.150 CV = 0.109
Education	High school/Technical secondary school/Technical school (130)	27(33.3)	56(37.6)	37(35.9)	10(24.4)	130(34.8)	
	Junior college/University (151) Graduate (4)	33(40.7) 0(0.0)	59(39.6) 4(2.7)	44(42.7) 0(0.0)	15(36.6) 0(0.0)	151(40.4) 4(1.1)	
	State employees (89) Self-employed (158)	10(12.3) 35(43.2)	46(30.9) 55(36.9)	25(24.3) 47(45.6)	8(19.5) 21(51.2)	89(23.8) 158(42.2)	× ² 22 51
Occupation	Tourist area employees (9) Farmer (2)	3(3.7) 0(0.0)	3(2.0) 1(0.7)	2(1.9) 1(1.0)	1(2.4) 0(0.0)	9(2.4) 2(0.5)	$x^2 = 22.71$ p = 0.090
	Worker (22) Others (94)	8(9.9) 25(30.9)	3(2.0) 41(27.5)	9(8.7) 19(18.4)	2(4.9) 9(22.0)	22(5.9) 94(25.1)	CV = 0.142
Mean monthly	Less than 1000 yuan (22) 1001–2000 yuan (56)	5(6.2) 19(23.5)	8(5.4) 16(10.7)	6(5.8) 17(16.5)	3(7.3) 4(9.8)	22(5.9) 56(15.0)	$X^2 = 10.05$ n = 0.346
income / RMB	2001–3000 yuan (97) More than 3000 yuan (199)	23(28.4) 34(42.0)	40(26.8) 85(57.0)	23(22.3) 57(55.3)	11(26.8) 23(56.1)	97(25.9) 199(53.2)	CV = 0.095

 Table 5. Demographic profile of clusters.

CV = Cramer's value; * p < 0.05.

Table 6. Social profile of clusters.							
Characteristics			Clu	$T_{-1-1}(1009/)$			
Characteristics	-	I (n = 81)	II (n = 149)	III (n = 103)	IV (n = 41)	10tal (100 %)	Statistics
Local resident	Yes (174) No (200)	42(51.9) 39(48.1)	67(45.0) 82(55.0)	50(48.5) 53(51.5)	15(36.6) 26(63.4)	174(46.5) 200(53.5)	$X^2 = 2.866$ p = 0.413 CV = 0.088
Residence time *	5 years and below (63) 6–10 years (44) 11–20 years (56) > 20 years (211)	17(21.0) 9(11.1) 9(11.1) 46(56.8)	18(12.1) 18(12.1) 31(20.8) 82(55.0)	25(24.3) 12(11.7) 15(14.6) 51(49.5)	3(7.3) 5(12.2) 1(2.4) 32(78.0)	$63(16.8) \\ 44(11.8) \\ 56(15.0) \\ 211(56.4)$	$X^2 = 21.293$ p = 0.011 CV = 0.138
Involved in tourism-related work	Yes (134) No (240)	31(38.3) 50(61.7)	55(36.9) 94(63.1)	40(38.8) 63(61.2)	8(19.5) 33(80.5)	134(35.8) 240(64.2)	$X^2 = 5.439$ p = 0.142 CV = 0.121
Family-owned hotel/inn operators	Yes (16) No (118)	2(6.5) 29(93.5)	7(13.0) 47(87.0)	6(15.0) 34(85.0)	1(11.1) 8(88.9)	16(11.9) 118(88.1)	$X^2 = 1.304$ p = 0.728 CV = 0.099
Restaurant operators	Yes (34) No (100)	11(35.5) 20(64.5)	12(22.2) 42(77.8)	9(22.5) 31(77.5)	2(22.2) 7(77.8)	34(25.4) 100(74.6)	$X^2 = 2.178$ p = 0.536 CV = 0.127
Local specialty store operators*	Yes (23) No (111)	2(6.5) 29(93.5)	9(16.7) 45(83.3)	7(17.5) 33(82.5)	5(55.6) 4(44.4)	23(17.2) 111(82.8)	$X^2 = 11.844$ p = 0.008 CV = 0.297
Protected area/Scenic spot staffs	Yes (9) No (125)	3(9.7) 28(90.3)	5(9.3) 49(90.7)	1(2.5) 39(97.5)	0(0.0) 9(100.0)	9(6.7) 125(93.3)	$X^2 = 2.774$ p = 0.428 CV = 0.144
Catering, entertainment and other service employees	Yes (37) No (97)	10(32.3) 21(67.7)	16(29.6) 38(70.4)	10(25.0) 30(75.0)	1(11.1) 8(88.9)	37(27.6) 97(72.4)	$X^2 = 1.807$ p = 0.613 CV = 0.116
Others	Yes (15) No (119)	3(9.7) 28(90.3)	7(13.0) 47(87.0)	4(10.0) 36(90.0)	1(11.1) 8(88.9)	15(11.2) 119(88.8)	$X^2 = 0.299$ p = 0.960 CV = 0.047

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CV = Cramer's value; * p < 0.05.

4.3.1. Somewhat Irritated (I)

The first cluster identified represented 21.7% (n = 81) of the sample. This group was so labeled because its mean score for two positive perception domains (F1: 3.85; F5: 3.64) was the lowest among all clusters and far below the overall means (Table 4). This group also considered Economic Benefit (F3: 4.07) lower than the overall mean (4.20). Meanwhile, individuals in this cluster rated Economic Cost (F4: 4.15) and Community Disharmony (F2: 3.34) higher than the overall means. Those in the Somewhat Irritated cluster cared less than other clusters about negative impact of tourism, Other Negative Impacts (F6:2.84). Over one-third of Somewhat Irritated (38.3%) were aged 29–39, while only 8.6% were 50–59, the highest and lowest percentages in these respective age ranges among all clusters (Table 5). Regarding residence time, those in this Somewhat Irritated cluster had the smallest portion in the 6 to 10 year range (11.1%) (Table 6). Concerning current tourism-related work, Somewhat Irritated had the smallest number of individuals (6.5%) who operate local specialty stores.

4.3.2. Enthusiastic Supporters (II)

The second cluster identified comprised 39.8% (n = 149) of the total sample, the biggest group among the four clusters. This group scored significantly higher on Community Prosperity (F1: 4.47) and Economic Benefit factor (F3: 4.47) than the other clusters. Government Benefit (F5: 4.40) was also seen to be important perception factors for these individuals (Table 4). However, Enthusiastic Supporters rated Economic Cost (F4: 3.32) more moderately, and different from other clusters, they are less emphatic in acknowledging that tourism led to Community Disharmony (F2: 2.39) and Other Negative Impacts (F6: 2.46). For Enthusiastic Supporters, the means of all three positive perception domains (F1, F3, and F5) were higher than the overall means, while the means of three negative perception domains (F2, F4, and F6) were lower. As with the previous group, more than one-third of Enthusiastic Supporters (37.6%) were aged 40–49, which was the largest group among the four clusters (Table 5). Over one-fifth of Enthusiastic Supporters (20.8%) have lived locally for 11–20 years (Table 6). The proportions of Enthusiastic Supporters accounted for 16.7% who were operating local specialty stores.

4.3.3. Cautious Romantics (III)

The third cluster segment, dubbed "Cautious Romantics," represented 27.5% (n = 103) of the study sample. This label was applied to represent this segment's contradictory responses to the changes brought about by tourism development. Compared with the other three clusters, this group's mean score for Government Benefit (F5: 4.60) was highest, yet these individuals also rated Community Prosperity (F1: 4.20) and Economic Benefit (F3: 4.35) as moderately high (Table 4). However, they had negative perceptions of discordant atmosphere and increasing living costs in Erdaobaihe. Their means for Economic Cost (F4: 4.43), Community Disharmony (F2: 3.43), and Other Negative Impacts (F6: 3.40) were significantly higher than that of the other three groups and corresponding overall means. Nearly one-fourth of Cautious Romantics (24.3%) are aged 18–28, making this the youngest of the four resident clusters. It also had the smallest portion in the 60+ age brackets (2.9%) (Table 5). In terms of residence time, Cautious Romantics had the largest group of less than six years residence (24.3%), but had the smallest percentage of those residing locally for more than 20 years (49.5%) (Table 6). Compared to Enthusiastic Supporters, almost equal proportions (17.5%) of Cautious Romantics were operating local specialty stores.

4.3.4. In-Betweeners (IV)

The last cluster, "In-Betweeners," was the smallest, accounting for 11.0% (n = 41) of the total sample. This segment cared more about the economic outcomes. Among six perception domains, this group strongly perceived economic problems (e.g., price of house and living cost, etc.), ranking highest on Economic Cost (F4: 4.21). Meanwhile, this cluster also rated Economic Benefit (F3: 3.10) the lowest, far below the overall mean (Table 4).

Although individuals in this cluster ranked Other Negative Impacts (F6: 2.98) last, it was still rated higher than its overall mean (2.86). The means of the other three factors for Community Prosperity (F1: 4.11), Community Disharmony (F2: 3.02), and Government Benefit (F5: 3.85) were between the ratings of clusters Somewhat Irritated and Enthusiastic Supporters. In-Betweeners had the smallest portion aged 18–28 (2.4%), but had the largest group in the 50+ combined age brackets (39.0%) (Table 5). In-Betweeners possessed the largest percentage of residents aged over 20 (78.0%), but less than one-fifth of these In-Betweeners (19.5%) lived locally more than 10 years. This percentage was the lowest among the clusters (Table 6). Yet more than half of In-Betweeners operated local specialty stores, the highest percentage among the clusters.

4.4. Discriminant Analysis

Based on the results of the cluster analysis, three canonical discriminant functions were calculated on all six perception domains (Tables 7 and 8). A chi-square test determined all three functions were statistically significant. With an eigenvalue of 1.281, 0.912, and 0.740, Function 1, 2, and 3 explained 43.7%, 31.1%, and 25.2% of the variation, respectively. A Wilks' lambda test and a univariate F-test were also employed to determine the significance of each of the six perception domains. The results illustrated that all six perception factors made a statistically significant contribution to the discriminant function. Standardized canonical discriminant function coefficients were used to interpret which predictor variable contributed the most to each function separately. The F-test showed that the factors that differentiated the four clusters the most were Economic Benefit, Government Benefit, and Economic Cost (Table 7). Standard coefficients also revealed that, in Function 1, two factors (Community Disharmony and Economic Cost) differentiated the clusters most. Economic Benefit differentiated the clusters the most in Function 2, and Government Benefit, Community Prosperity, and Other Negative Impacts had the most differentiating power in Function 3. The classification matrices were then used to determine whether the discriminant functions were valid predictors. As illustrated in Table 8, 95.5% of the 374 grouped cases were correctly classified, verifying the discriminant functions achieved a high classification accuracy rate. The results also showed that, Somewhat Irritated (98.8%), Enthusiastic Supporters (95.3%), Cautious Romantics (91.3%), and In-Betweeners (100%) were correctly classified into their respective clusters.

Discriminant Function	Eigenvalue	% of Variance	Canonical Correlation	Wilks' Lambda	Chi-Square	df
1	1.281 ^a	43.7	0.749	0.132	745.722	18
2	0.912 ^a	31.1	0.691	0.301	442.227	10
3	0.740 ^a	25.2	0.652	0.575	203.801	4
Perception Domains	Function 1	Function 2	Function 3	Wilks' lambda	F-test	
Community Prosperity	-0.529	-0.183	0.489 *	0.838	23.823	
Community Disharmony	0.720 *	0.154	-0.175	0.830	25.296	
Economic Benefit	-0.310	0.839 *	-0.437	0.564	95.519	
Economic Cost	0.838 *	-0.069	-0.100	0.771	36.603	
Government Benefit	0.131	0.535	0.781 *	0.659	63.756	
Other Negative Impacts	0.434	0.366	0.351 *	0.874	17.709	

Table 7. Summary of four-group discriminant analysis results.

^a First 3 Canonical discriminant functions were used in the analysis; * means factors discriminating the four clusters in Function 1, 2, and 3; p = 0.000.

		Predict	ed Group Membersl	nip	
Cluster Case	Somewhat Irritated	Enthusiastic Supporters	Cautious Romantics	In-Betweeners	Total
Somewhat Irritated	80 (98.8%)	0 (0.0%)	1 (1.2%)	0 (0.0%)	81 (100%)
Enthusiastic Supporters	4 (2.7%)	142 (95.3%)	3 (2.0%)	0 (0.0%)	149 (100%)
Cautious Romantics	3 (2.9%)	6 (5.8%)	94 (91.3%)	0 (0.0%)	103 (100%)
In-Betweeners	0 (0.0%)	0 (0.0%)	0 (0.0%)	41 (100.0%)	41 (100%)

Table 8. Evaluation of cluster information by classification results.

95.5% of original grouped cases correctly classified.

5. Discussion

5.1. Research Implications

The numbers presented above tell an interesting tale of the perspectives of 374 community residents living in the Erdaobaihe in late August of 2018. The perceptions of these residents were easily quantifiable into six perception domains that explained approximately two thirds of the variance in their responses to statements about tourism impacts. A cluster analysis of the six perception domains then indicated that residents can be distinguished from one another on the basis of four main categories of perspectives, categories that are not explained by level of involvement in the tourism industry. These findings align with certain elements of past research. For instance, the research that has applied a "stage-based" approach to assessing attitudes and perceptions on the basis of the stage of a destination's development or the amount of experience or participation in tourism that a resident has had [27–29,77,78].

These models tend to equate more favorable attitudes towards tourism with less experience in the industry, which in this study corresponds to the Enthusiastic Supporters and Cautious Romantics. The Somewhat Irritated cluster corresponds closely to mid- to later stages of the Doxey, Butler, and Dogan models. The In-betweeners have the least experience with tourism in Erdaobaihe, yet they exhibit longer residence and more local business involvement. Given their lengthy residence time and level of investment in the local community, they are in a position to evaluate tourism impacts, despite not being directly employed by the industry. Their cautious attitudes are thus not surprising and reflect the type of more informed and realistic perspectives of tourism that Hunt and Stronza [29] associate with more exposure to the tourism industry. Such results suggest that, despite much contention along the way, scholars and practitioners continue to find value in the life cycle concept and state-based approaches to assessing resident attitudes towards tourism [9,29,79–83].

Beyond the stage models, the two identified clusters of residents (i.e., "Cautious Romantics" and "In-Betweeners") harken to the findings of other researchers [57,58] who, similarly labeled their resident clusters as "Ambivalent Supporters" (i.e., those who were less assertive and indecisive about the impacts of tourism development) and "Realists", (i.e., those who admitted that tourism development have both positive and negative impacts). In addition, the identified group "Enthusiastic Supporters" in this study is similar to previous studies [16,57–60,64], although had different names such as "Advocates," "Lovers," "Enthusiastics," and "Development Supporters", this group definitely refers to those who highly agreed with the positive impacts and strongly supporting tourism development. Meanwhile, the identified group "Somewhat Irritated" in this study is similar to labels of "Haters," "Cynics," and "Opponents" in previous studies [57,58,60,61,64]. As has been suggested elsewhere by Sarr et al. [84], such findings can create community "interventions should capacitate the group that supports tourism to lead initiatives, seduce the reluctant ones, energize those who seek to migrate and negotiate with the external tourist agents to achieve more equitable tourism development in which locals actively participate."

This study also attempted to link clusters to particular variables, which has previously produced mixed findings. Like Sinclair–Maragh, Gursoy, and Vieregge [63], we verified that

there were commonalities across all four clusters in terms of gender, age, education levels, monthly income, and job and occupation when carrying out the cross-tabulation procedure in their study. Unlike Andriotis and Vaughan [16], our findings did not indicate that positive perceptions of tourism are correlated to levels of education, that not supporting this demographic as a means of clustering for tourism-related resident attitudes [14]. Resident views and attitudes toward tourism often make the findings of cluster analysis very sitespecific and hard to generalize. When distinct psychographic segments exist, demographics are often thus of little value in describing segment membership [60]. Instead, our findings seem to support the conclusion of other studies that suggested concentrating more on the personal values of respondents and less on their socio-demographic characteristics.

Sharpley [14] claimed that variable results between studies may be a function of the degree of variation among locations, both in general terms and regarding the nature of tourism that exists there. For this reason, Haley et al. [85] point out that the sampling methodology, sample size, and the use of statistical techniques change greatly from study to study, making comparisons of research findings more difficult. The lack of consistent methods and standardized instruments is very evident in the literature on the measurement of perceptions and attitudes of residents towards tourism, as [56] noted. Yet given the replicability of the clustering approach demonstrated here, and the similar labeling of clusters across numerous studies of resident perspectives, including in the distinct cultural context featured in this study, future work may be able to unify this approach and provide some cross-cultural consolidation of these resident perspectives towards tourism development.

5.2. Relevant Limitations

Several limitations warrant attention here. First, this study used 32 impact statements sourced from the previous literature; however, these statements may not account for all types of impacts that tourism may have in communities. While it may be relatively easy to identify clusters who have extreme views (e.g., "Enthusiastic Supporters" and "Somewhat Irritated"), the complexity of views among many in the community undermines the precision of this simplified segmentation process. The complexity of variations in the instruments used in each study will limit the degree to which direct comparisons can be made [57], therefore, it is necessary to warrant those impact statements covering a larger, randomized sample gathered in Erdaobaihe and other natural areas in China in the future research. The line between pragmatically contextualized and broader generalizability remains very fine.

As this study concentrated on resident perceptions of tourism development around one geographical location (i.e., one of the scenic areas at CMBR), an opportunity remains for further studies of the other scenic areas at CMBR. Examining similar variables in other locations will yield more comprehensive understanding of the variation in perceptions and attitudes towards tourism development. The factor-cluster analysis method would continue to be useful in this broader application. Furthermore, this study used nine social and demographic identifiers variables to describe residents. These variables assessed may not be those most related to attitudes towards tourism development. While this demographic information facilitates quantitative analyses, qualitative techniques focusing more deeply on religious beliefs, personality, prior knowledge of tourism, political persuasion and empowerment, perceived status of overall local economy, and community or place attachment would likely provide additional insights into the findings of the factor-cluster method implemented here.

6. Conclusions

The purpose of this study was to employ a novel methodological approach to identify the differences among groups of residents regarding their perceptions about nature-based tourism impacts in Erdaobaihe resulting from visitation to the nearby CMBR. By utilizing a factor-cluster analyses approach, this study divided the residents into four homogenous groups and then assessed the differences and characteristics of these four clusters using cross-tabulation of their demographic profile. This study makes two important contributions to the existing literature. On the one hand, it extends and tests theoretical premises derived from the large body of writing on residents perceptions of tourism to the study of communities around natural areas to the Chinese context, a rapidly growing domestic and international tourism market. Furthermore, this paper demonstrates the methodological value of implementing the combined factor-cluster technique to advance this body of scholarship on resident perceptions of tourism development. A fruitful path forward may involve integrating this approach with that taken by others employing a factor-cluster analysis approach to study heritage tourism [63], to assess how resident reactions differ across different form of tourism. Those researchers showed that cluster solutions can represent multiple and heterogenous resident groups participation, thus accounting for resident perspectives on a simultaneous combination of issues. Their research produced single issue clusters (e.g., a community-focused group), double issue clusters (e.g., public service and environment-focused group), and triple issue clusters (e.g., community-public service-focused group). In terms of advancing our theoretical understanding of resident perspectives of tourism development, this cluster-based segmentation approach demonstrated here, and getting underway elsewhere, holds much promise for elaborating on the many ways that residents respond to new and long-standing forms of tourism in their communities. These theoretical and methodological contributions will be applicable to scholars as well as tourism practitioners and policy makers.

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