Spatial Distributive Differences in Residents' Perceptions of Tourism Impacts in Support for Sustainable Tourism Development—Lu-Kang Destination Case

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Abstract: Few empirical studies on the effect of tourism impacts on residents' support for tourism development have linked an environmental justice perspective with sustainable tourism. This study aims to explore spatial distributive differences in residents' perceptions of tourism impacts to understand their support for sustainable tourism development. A total of 1057 residents of the Lu-Kang destination in Taiwan were surveyed using an on-site questionnaire. Employing the kernel density method and the local K function for spatial point analysis, the results indicated that spatial clustering of residents' perceptions of both positive and negative tourism impacts occurred in the specific locations. Further, high household income, high education, and more personal benefits from tourism promoted the formation of localized spatial clusters where residents had positive perceptions of tourism impacts which, in turn, led to a high level of support for tourism development. Conversely, low income, low education, and less personal benefits from tourism cultivated the development of spatial clusters with negative perceptions of tourism impacts which, in turn, caused a low level of support for tourism development. The implications for sustainable tourism planning and strategies are discussed.

Keywords: tourism impact; environmental justice; sustainable tourism development; point pattern analysis; geographic information systems

1. Introduction

Several studies have substantially contributed to understanding how the impact of tourism affects the perceptions and attitudes of residents regarding their support for tourism development [1–6]. Perdue et al. (1990), for example, suggested that if residents gained benefits from tourism, which contributes to income and boosts the livelihood of individuals, it would influence their support for a destination's development [4]. McGehee and Andereck (2004) found that rural residents' support for tourism development in a destination varied according to their attitudes regarding the positive and negative impacts of that destination [7]. These and other works advise that perceived tourism impacts have become important for the sustainable tourism development of a destination [8]. This body of literature, however, has not considered environmental justice in its efforts to understand residents' support for sustainable tourism development. More recent work in this area has argued that sustainable tourism development should be linked to social or environmental justice, which includes (distributive) equity, fairness, and justice for disadvantaged local residents [2,9,10], to ensure the effective management of resources for the benefit of future generations.

Further, there is evidence that perceived tourism impacts may be unevenly distributed [11,12]. Wall and Mathieson (2011), for example, note that previous studies have not sufficiently comprehended the spatial distributive disparities in residents' perceptions of tourism impacts [13]. In addition, Deng and Athanasopoulos (2011) and Zhang, Xu, and Zhuang (2011) suggest that little of the work done in tourism and travel studies, or in tourism-relevant areas like environmental justice, uses a spatial analytic perspective [14,15]. Porter and Tarrant (2011) also comment that few studies have used spatial statistics analysis to assess equity in the relationship between the distribution of tourism sites and their impacts and population subgroups [16]. An improved understanding of the spatial clustering of perceived tourism impacts is, therefore, needed to more widely acknowledge where residents gain benefits and endure costs from tourism and support tourism development.

Despite the recognized importance of residents' perceptions of tourism impacts in their support for tourism development, little empirical work in this area has linked the perspective of environmental justice with sustainable tourism. The present study, therefore, examines whether perceived tourism impacts were evenly distributed across a destination and fairly distributed across various socioeconomic levels, defined as an individual's economic and sociological standing (e.g., level of education attained, income) [17]. We also examine residents' support for tourism development based on spatial distributive differences in, and the spatial clustering of, perceptions of positive and negative tourism impacts. The integrated theoretical framework proposed by this study derives from social exchange theory and environmental justice (see Figure 1). Thus, this study makes two unique contributions to the present knowledge base: first, we explicitly consider the spatial clustering effect of residents' perceptions of positive and negative tourism impacts on determining their support for tourism development and, second, we expand sustainable tourism development literature by providing empirical evidence of the relationships between spatial distributive differences in perceptions of tourism impacts and residents' socioeconomics and their support for tourism development. Our findings can assist destination managers in understanding residential location of perceived tourism impacts to better evaluate the sustainability of a destination. The following research questions guided the study:

1. To what extent are residents' perceptions of positive and negative tourism impacts clustered within the specific locations of a destination?
2. To what extent do residents' socioeconomic characteristics (gender, age, income, education, and personal benefits from tourism) predict the spatial clustering of residents' perceptions of positive and negative tourism impacts?
3. To what extent does the spatial clustering of residents' perceptions of positive and negative tourism impacts differ according to their level of support for tourism development?
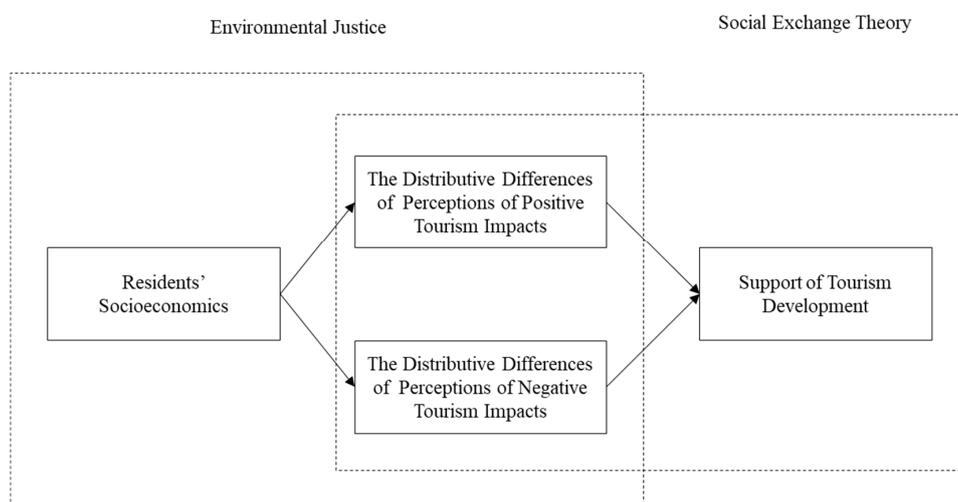
Figure 1. Proposed framework for the study.

The remainder of the article is structured as follows. We situate the theoretical background by integrating social exchange theory and environmental justice and formulate our research hypotheses. Then, we present the methods and materials, including the subjects, study area, data collection, instruments, and data analysis techniques. Our results consist of (1) confirmation of the validity and reliability of this study's measurement items (i.e., positive tourism impact, negative tourism impact, and support for tourism development), (2) the identification of localized spatial clusters of positive and negative tourism impacts as perceived by residents, (3) the socioeconomic variables used to explain the spatial clustering of residents' perceptions, and (4) the effect of these socioeconomic variables on residents' support for tourism development. After decoding the empirical findings, we discuss the theoretical implications and provide practical tourism planning suggestions for sustainable destination development. We conclude with a brief of the study's contributions to the literature on sustainable tourism development, several limitations, and avenues for future research.

2. Literature Review

This study proposes a theoretical framework that integrates social exchange theory and environmental justice in the context of distributive differences in, and the spatial clustering of, residents' perceptions of tourism impacts to address sustainable tourism development. The key variables in the framework consist of the following: support for tourism development as a (numerical) dependent variable, residents' socioeconomics as (categorical or numerical) independent variables, and the spatial clustering (cluster and remainder) of perceptions of positive and negative tourism impacts as two (categorical) mediating variables addressing the relationship between residents' socioeconomics and their support for tourism development.

2.1. Social Exchange Theory—Spatial Distributive Differences in Perceived Tourism Impacts in Relation to Support for Tourism Development

The majority of studies focused on the relationship between support for tourism development, and residents' perceptions of tourism impacts present social exchange theory as the ideal theoretical foundation [7,18,19]. First developed by Hormans (1958) [20], social exchange theory is "a general sociological theory concerned with understanding the exchange of resources between individuals and groups in an interaction situation" (p. 668). In the tourism context, Ap (1992) suggests that residents may participate in tourism development (an exchange) and then evaluate its expected benefits, not exceeding the costs resulting from that exchange [21]. In fact, it is well understood that not all residents or stakeholders in a tourism community are homogenous [22,23]. Thus, according to social exchange theory, the more residents that benefit from tourism, the more positively they support its development [24]. Yet, inconsistent findings have been reported in tourism literature regarding social exchange theory. Many empirical studies have discovered support for social exchange theory, though some were not certain [20,25].

Previous tourism research has also focused on attitudes toward the potential impacts of tourism development along with the mixed opinions regarding costs and benefits [1,26,27]. The tourism impacts are generally classified as economic, environmental, and social, and these include both the positive and negative aspects of tourism development [21,22,28]. The positive impacts involve creating or increasing job opportunities, environmental appreciation, preserving architectural and historical monuments, etc.; the negative impacts include economic leakage and inflation, crowding, traffic congestion, commercialized/standardized cultural practices, etc. [20,22,29]. Such impacts notwithstanding, Wall and Mathieson (2006) observed that tourism impacts and related perceptions/attitudes vary over time depending on the tourism stakeholders and the destinations [13].

Recent advances in this area indicate that some perceived tourism impacts can be unevenly dispersed across a study area [12,30]. However, few leisure and tourism researchers have employed a spatial analytic perspective, or used the relevant techniques (like point pattern analysis) [31] to explore the spatial distribution of perceived tourism impacts [16]; this is probably because the idea is relatively

new in the field [32,33]. In general, geographic data is spatially dependent because, based on Tobler's (1970) first law of geography, "everything is related to everything else, but near things are more related than distant things (p. 236)" [34]. Therefore, neglecting the potential spatial dependence among geographic data might mislead scholars regarding the significance of the variables in a particular tourism phenomenon [31,35]. Spatial dependence is commonly understood in terms of global and local levels [36]. According to Bailey and Gatrell, the global level of spatial dependence represents an overall development of spatial dissimilarities that occurs if all observations in a study area alter one place to another, due to dissimilarities in the underlying features of the area. On the other hand, the local level of spatial dependence aims at some particular degree of spatial clustering in specific locations, which explains localized interaction among all observations. Distinguished from local spatial dependence, global spatial dependence is unable to indicate where the localized spatial clusters are [37]. Therefore, global and local spatial dependencies should both be included to fully comprehend dissimilarities in the distribution of observations across a study area [35]. Recently, tourism and leisure researchers have utilized this technique to enhance their understanding of the distribution of tourism sites and the estimates of cognitive distance [31], and the spatial pattern of recreational boaters [32].

The relationship between support for tourism development and perceptions/attitudes about tourism impact has been studied more extensively in the literature [5,6,38,39]. The findings generally reveal that respondents with various tourism impact perceptions have different levels of support for tourism development. Perdue et al. (1990), for example, discovered that the residents of 16 communities in rural Colorado that may need tourism development might perceive tourism impact favorably and support additional development [4]. Hsu (1998) found that residents in Iowa who had traveled to riverboats were more likely to support gaming development than those who had not traveled to riverboats [26]. Lee and Back (2003) discovered that residents in Korea who saw the advantages of casino gaming promoted it more enthusiastically in both the pre- and post-development stages than those who saw fewer advantages [40]. Providing insight into perceived tourism impacts in the context of spatial distribution, tourism scholars have proposed that certain perceived impacts are dispersed systematically across areas [11,29]. Unfortunately, few tourism studies further examine such spatial differences in perceptions of tourism impacts in relation to support for tourism development. In the geography and environmental behavior literature, however, Brody, Highfield, and Peck (2005), and Dublin (1992) found that environmental perceptions are spatially dependent, and they concluded that variables explaining such patterns contribute to the development of localized "hot spots" of similar responses [41,42]. Based on the literature, the following hypotheses guided the present study:

Hypothesis 1. *Support for tourism development among respondents with clustered perceptions of positive tourism impacts differs significantly from the rest of the sample.*

Hypothesis 2. *Support for tourism development among respondents with clustered perceptions of negative tourism impacts differs significantly from the rest of the sample.*

2.2. Environmental Justice Linked with Sustainable Tourism—Residents' Socioeconomic Characteristics in Relation to Spatial Distributive Differences in Perceived Tourism Impacts

In this study, the relationship between spatial distributive differences in perceived tourism impacts and residents' socioeconomic characteristics can be understood via the concept of environmental justice linked with sustainable tourism. Although the theoretical connection between sustainable tourism and fairness, equity, and justice for disadvantaged local groups has been implicitly discussed at the destination level [9], several scholars argue that equity, fairness, and justice are fundamental to sustainability discourses, especially the aspects of inter- and intra-generational equity [27,43]. In the context of tourism development (an exchange), a presumption is that individuals attempt to minimize costs and maximize benefits from their relations with other individuals in the tourism industry. Hence, what stakeholders in tourism development acquire and sacrifice suggest the development of

proportionality in the form of the justice principle [44]. In line with Camargo, Lane, and Jamal (2007), stakeholders who are disadvantaged and have endured the negative effects of tourism development are less likely to count on more desirable benefits [2].

For tourism scholars, the distributive equity of residents' perceptions of tourism impacts has been investigated and is considered an example of the important consequences of environmental justice [16]. Distributive equity has been viewed as the unprejudiced placement of advantageous or undesirable environmental resources within communities regardless of the residents' socioeconomic characteristics [45]. Broadly, environmental justice holds that no one should bear biased treatment associated with positive or negative environmental consequences, regardless of socioeconomics or ethnicity [10]. Therefore, based on Davies (1968), these studies indicate that the distributive equity of environmental impacts is connected with environmental justice because "the most appropriate distribution between areas must be to each area according to the needs of the population of that area" (p. 6) [38]. In the present study, the distributive equity of perceived tourism impacts within environmental justice aimed toward positive and negative tourism impacts that were equitably perceived by various socioeconomic residents in the community.

Although tourism scholars suggest that residents' socioeconomic characteristics influence their perceptions of tourism impacts [1,17,39], the fair consideration aspect of tourism impact perception, and its spatial dispersal across residents with various backgrounds, has been emphasized in the recent literature [9,10]. Investigating the spatial distribution of environmental impacts in the context of environmental justice, the majority of empirical studies have focused on who is disproportionally impeded by favorable and unfriendly environmental outcomes. Tarrant and Cordell (1999), for example, found that low-income, nonwhite individuals lived in communities close to locally unwanted lands (e.g., landfills, unhealthy trash) [46]. Sharma and Dyer (2009) reported notable differences in tourism impact perceptions based on income, ethnic background, and occupation rather than age, gender, or level of education [12]. In the field of leisure, Deng, Walker, and Strager (2008) also found that household income may not explain environmental (in) justice [47]. The education variable may be another significant influencing factor in evaluating environmental (in)justice. For example, Stodolska, Shinew, Acevedo, and Izenstark (2011) found that less educated respondents were more likely to negatively view their surrounding environment [48]. Other geography studies have noted that parks with greater potential for congestion were more likely to be used for low-income Latinos or African Americans [49]. Based on these varying results, we may conclude that using socioeconomic factors to understand favorable and unfriendly environmental consequences is dependent on the samples and the study area. Based on the literature, we developed the following hypotheses.

Hypothesis 3. *Socioeconomic variables (gender, age, income, education) and personal benefits from tourism are significant predictors of spatial distributive differences (i.e., spatial clusters and the rest) in residents' perceptions of positive tourism impacts.*

Hypothesis 4. *Socioeconomic variables (gender, age, income, education) and personal benefits from tourism are significant predictors of the spatial distributive differences (i.e., spatial clusters and the rest) of residents' perceptions of negative tourism impacts.*

3. Materials and Methods

The sample for this study was comprised of Lu-Kang residents in Taiwan who were 18 years of age and older. The Lu-Kang destination was selected as the study site because it is one of Taiwan's most famous destinations, and it presents a range of tourism dependencies and diverse socioeconomic characteristics among its residents [7]. The town of Lu-Kang has 85,476 residents but is not racially or ethnically diverse (97% are early Han) [50]. Lu-Kang's big attractions include temples and traditional buildings with historical and architectural value, in addition to traditional food. Lu-Kang has several officially designated national heritage sites [51] and attracted 0.5–1.3 million visitors in 2009 [52].

Data collection occurred over a two-month period between June and August 2011. Qualified interviewers with university IDs used a global positioning system (GPS) and a random sample to ask subjects from Lu-Kang households to participate in on-site, self-administered questionnaire surveys and record their residential locations. The interviewers were identically familiarized with the interview method and the data-gathering procedure. Using ArcView software, version 3.3 (Environmental Systems Research Institute, Inc. Redlands, CA, USA.) [53], a digitized survey subject location map was created and stored as a shape file (see Figure 2). Each subject was represented as a point shape file with the household location (x, y coordinate pair), obtained from the GPS, and the variables of socioeconomic characteristics, perceptions of positive and negative tourism impacts, and support for tourism development, which were obtained from the survey. Spatial points were used as the analysis units because comparable works on spatial distribution and environmental justice discovered that this method avoids using census block groups that are determined politically and can be adjusted in the future [35,54].
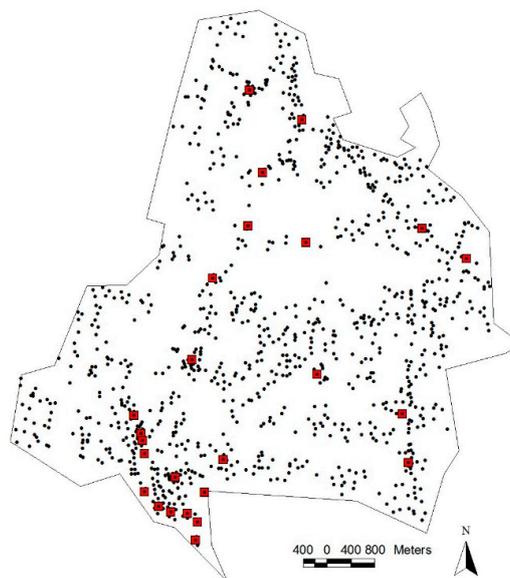
Figure 2. Survey subject locations. Note: Points represent survey subject locations, and square areas indicate the tourism sites.

The survey instrument was a self-administered questionnaire consisting of four sections. Prior to the formal survey, a pretest was implemented to a convenience sample of 300 Lu-Kang residents to discover with certainty whether our scale items were expressive and internally coherent. The first section had two items that measured residents' perceived personal benefits from tourism, which included contributions to the economy and downtown revitalization. Individuals were asked to respond to each item using a five-point Likert-type agreement scale. The second section had 23 items, again using five-point Likert-type scales, focusing on residents' opinions about the impacts of tourism. Twelve of these items assessed positive tourism impacts and 11 assessed negative impacts. The third section had eight items (5-point Likert-type agreement scale) that measured opinions about support for tourism development. The items in the first, second, and third sections were adapted from validated instruments used by McGehee and Andereck (2004) and Perdue et al. (1990) [4,7]. The fourth and final section gathered socioeconomic information (gender, age, education, income). Since the questionnaire was written in traditional Mandarin Chinese and the scales were adapted from literature written in English, translation and back-translation were implemented to guarantee the face validity of the measurement scales.

We analyzed the data in four major phases. First, confirmatory factor analysis was conducted to examine the validity and reliability of the items measuring perceived positive tourism impacts, perceived negative tourism impacts, and support for tourism development. Second, we applied a point

pattern statistical approach to examine the spatial distribution of residents' perceptions of positive and negative tourism impacts, linked with support for tourism development and socioeconomic characteristics. Our spatial point pattern analysis addressed distributive equity in questioning whether certain residents perceived disproportionate positive or negative tourism impacts. The spatial clustering of point locations representing positive and negative perceptions of tourism impacts was identified through point pattern analysis techniques that combined intensity distribution and local K function. The idea of intensity distribution is that the pattern has a density at any location, and the density is estimated by counting the number of points in a region and revealing the first-order properties of a spatial point process and variation through space to assess spatial dependence between points [36]. The first-order properties of a spatial point process describe how the mean number of points per unit area (the intensity) varies through space [35]. We used a kernel density estimation (KDE) method to detect whether the patterns of positive and negative perceptions of tourism impacts in Lu-Kang were globally clustered. This kernel density estimate at point p is calculated from

$$\hat{\lambda}_p = \frac{no.[S \in C(p, r)]}{\pi r^2},\tag{1}$$

where $C(p, r)$ is a circle of radius r centered at the location of interest p [35]. This intensity distribution shows where clusters are occurring; however, the local K function further reveals whether there is statistical significance in the apparent clusters.

Third, we employed a local K function—a second-order (variance of distances) function—to identify and map the statistically significant responses (where $p \leq 0.05$) related to positive and negative perceptions of tourism impacts. The local K function examines points working with a given point i as one of its members and is described by

$$L_i(d) = \sqrt{\frac{A \sum\limits_{j=1}^{N} k(i, j)}{\pi(N - 1)}}\tag{2}$$

where the expected value of Li (d) is d, d is the distance, A is the study area, N is the number of points, and $\sum\limits_{j=1}^{N} k(i, j)$ is the number of points within distance d of point I [55]. This technique can test the null hypothesis of complete spatial randomness (CSR) for a mapped spatial point pattern. According to Getis, the confidence envelope (between minimum and maximum expected Li (d) is generated by performing a specified number of calculation simulations, and then tested for the statistical significance of CSR [54]. If the observed Li (d) falls outside the confidence envelope, the CSR hypothesis can be rejected at the appropriate significance level. Namely, an observed Li (d) below the envelope indicates that the points are dispersed about point i for distance d; conversely, an observed Li (d) above the envelope indicates that the points are clustered about point i for distance d. The identification of the spatial points is used for further analyses in the fourth phase.

Lastly, we conducted two binary logistic regression analyses to identify socioeconomic variables that would explain the spatial clustering of positive and negative perceptions of tourism impacts. We performed two-sample independent t-tests, between these clustered perceptions and the rest of the sample, to distinguish the differences in residents' support for tourism development.

4. Results

There were 1200 survey subjects, and 1057 usable surveys were utilized for data analysis. Roughly 52.9% of the respondents were male, and their ages ranged from 18 to 71, with 78.1% between 31 and 65. The majority (56.7%) were married. The amount of schooling completed and the median household income were 11.81 years and NT$97,100 (US$1.00 = NT$29.90 as of October 2011), respectively (see Figure 3). The socioeconomic profile of the respondents was consistent with the profile of Lu-Kang residents [49].

(**a**) Personal benefits from tourism　　　　　　　　(**b**) Gender

(**c**) Age　　　　　　　　　　　　　(**d**) Yearly household income
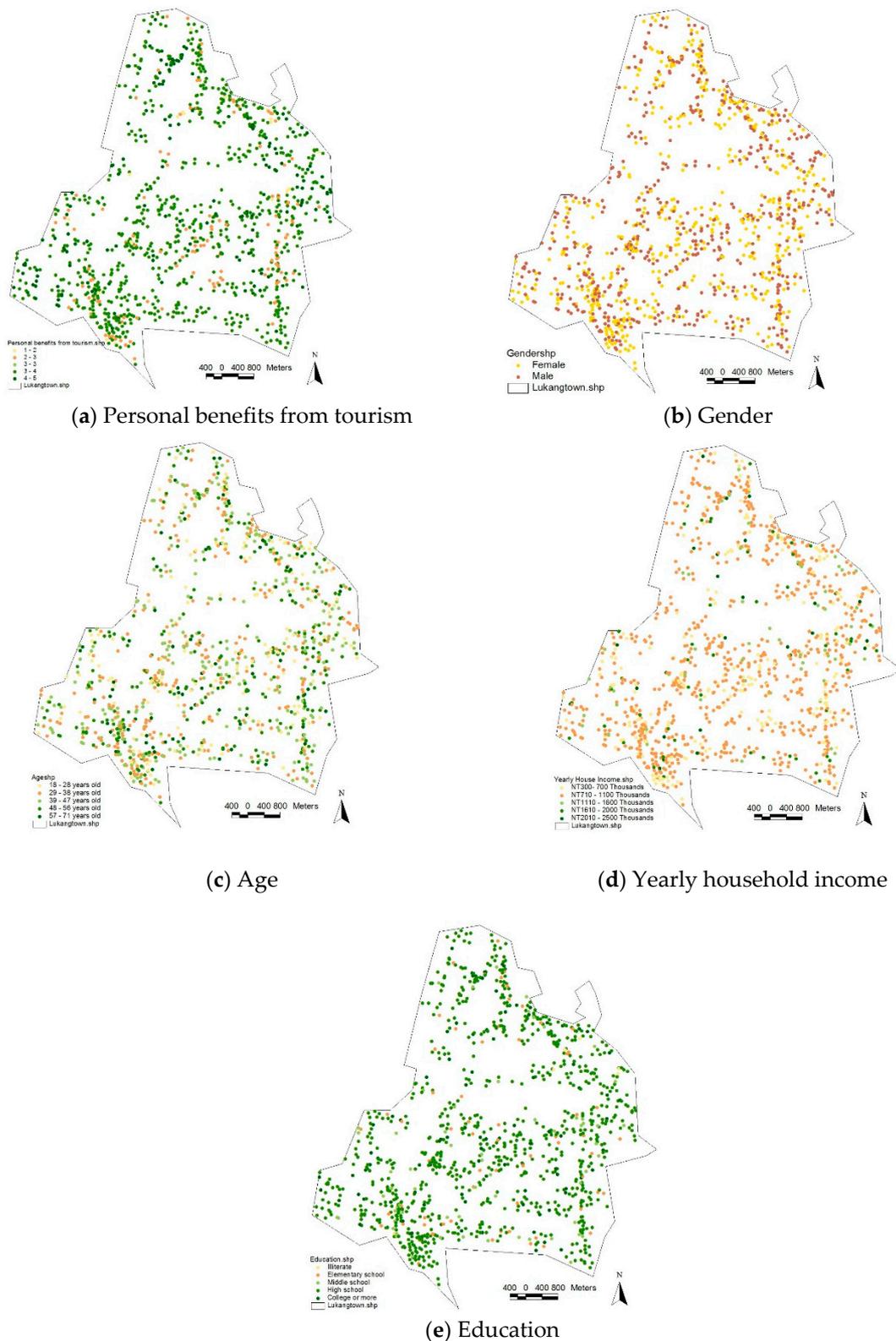
(**e**) Education

Figure 3. The choropleth maps of personal benefits from tourism, gender, age, yearly household income, and education.

Confirmatory factor analysis was implemented to evaluate the measurement items for each latent construct (i.e., perceived positive tourism impact, perceived negative tourism impact, and support for tourism development). The diagnosis of the satisfactoriness of the measurement model contemplated

the goodness-of-fit indices and the validity and reliability of the constructs. First, the goodness-of-fit indices showed that the measurement models for perceived positive tourism impact (12 indicators) (χ^2 = 257.16, *df* = 53, *p* < 0.001, NNFI (Non Normed Fit Index)= 0.94, CFI (Comparative Fit Index) = 0.94, RMSEA (Root Mean Square Error of Approximation) = 0.06, GFI (Goodness of Fit Index) = 0.96, SRMR (Standardized Root Mean Square Residual)= 0.07), perceived negative tourism impact (11 indicators) (χ^2 = 209.72, *df* = 43, *p* < 0.001, NNFI = 0.97, CFI = 0.97, RMSEA = 0.06, GFI = 0.96, SRMR = 0.07), and support for tourism development (8 indicators) (χ^2 = 84.14, *df* = 19, *p* < 0.001, NNFI = 0.98, CFI = 0.98, RMSEA = 0.06, GFI = 0.98, SRMR = 0.07) adequately fit the data. Second, the *t*-values for all indicators surpassed the discriminating level of 1.96 (*p* < 0.05) and the factor loadings were greater than 0.40 [56], providing evidence of convergent validity, and the reliability of all latent constructs surpassed the advised level of 0.70 (see Table 1) [57]. Lastly, the results of a variance extracted test revealed that the discriminant validity of the three latent constructs was ensured [58].

Table 1. Means, factor loadings, and reliabilities for positive tourism impacts, negative tourism impacts, and support for tourism development.

Scale Items	Mean	SFL	AVE	CR
Tourism impacts				
Positive tourism impacts	**3.97**			**0.85**
Tourism provides incentives for restoration of historic buildings	4.18	0.83 ***	0.78	
Tourism helps preserve the cultural identity of my community	3.94	0.67 ***	0.68	
Tourism improves understanding/image of my community and culture	3.87	0.61 ***	0.84	
Tourism provides cultural exchange and education	3.91	0.65 ***	0.70	
Tourism encourages a variety of cultural activities by local residents	3.99	0.59 ***	0.87	
The quality of public services in my community has improved due to tourism	3.71	0.49 ***	0.78	
The tourism industry provides worthwhile job opportunities for community residents	4.26	0.51 ***	0.75	
Increasing the number of tourists to a community improves the local economy	4.36	0.54 ***	0.62	
Shopping opportunities are better in communities as a result of tourism	3.66	0.40 ***	0.82	
Tourism increases a community's tax revenue	4.19	0.56 ***	0.68	
Tourism development improves the appearance of an area	3.82	0.43 ***	0.66	
Because of tourism, communities develop more parks and recreational areas that local residents can use	3.70	0.41 ***	0.73	
Negative tourism impacts	**3.84**			**0.94**
Tourism results in more vandalism in a community	3.84	0.76 ***	0.70	
In recent years, my community has become overcrowded because of tourists	4.15	0.75 ***	0.83	
Tourism results in more litter in an area	4.09	0.79 ***	0.87	
Tourism development increases the traffic problems of an area	4.16	0.76 ***	0.87	
Tourists negatively affect a community's way of life	3.77	0.79 ***	0.83	
An increase in tourists in my community will lead to friction between local residents and tourists	3.62	0.75 ***	0.85	
Local people are being exploited by tourism	3.59	0.77 ***	0.83	
Tourism causes change in traditional culture	3.69	0.79 ***	0.84	
Tourism results in an increase in the cost of living	3.82	0.80 ***	0.84	
Tourism development increases the amount of crime in an area	3.63	0.76 ***	0.83	
Tourists are a burden on a community's services	3.88	0.68 ***	0.81	
Support for tourism development	**4.01**			**0.94**
I support tourism having a vital role in this community	4.22	0.83 ***	0.75	
The tourism industry will continue to (or could) play a major economic role in this community	4.38	0.84 ***	0.89	
I am happy and proud to see tourists coming to see what my community has to offer	3.94	0.82 ***	0.86	
I favor building new tourism facilities which will attract more tourists	3.86	0.78 ***	0.76	
Tourism can be one of the most important industries for a community	3.93	0.81 ***	0.87	
Additional tourism would help this community grow in the right direction	3.89	0.78 ***	0.88	
The tourism organization of my community's government should do more to promote tourism	3.95	0.79 ***	0.81	
Tourism holds great promise for my community's future	3.91	0.82 ***	0.82	

Note: Individuals were asked to indicate their level of agreement on a 5-point Likert-type scale ranging from 1 = strongly disagree to 5 = strongly agree. SFL: standardized factor loading; AVE: average variance extracted; CR: composite reliability. *** *p* < 0.001.

The density calculation in ArcView 3.3 was conducted using a point-based search radius of 600 m, and it produced a continuous surface layer. An initial examination of the point locations of positive and negative perceived tourism impacts in Lu-Kang showed multiple clusters, with the two largest clusters located at the major tourism sites (e.g., Longshan Temple, Old Street area) (see Figure 4). These results suggest that positive and negative perceptions of tourism impacts in the study area were not dispersed randomly but, instead, were spatially correlated somewhere within its area. Once we established the presence of a global trend of respondent perceptions, we used a local K function to identify locally clustered perceptions. An analysis of 99 permutations for the significance confidence envelope of local K function values for all respondents provides further insight into why positive and negative perceptions of impacts across the study area tended to cluster. The results showed a total of 475 points representing positive perceptions of tourism impacts and 488 points representing negative perceptions of tourism impacts, located at the major tourism sites; their Li (d) values were above the confidence envelope, indicating that the null hypothesis for a CSR distribution of both positive ($p < 0.005$) and negative ($p < 0.005$) tourism impacts was rejected ($p < 0.005$). Therefore, we can conclude that there was a significant localized spatial clustering of the respondents' positive and negative perceptions of tourism impacts.

(**a**) Positive tourism impacts　　　　　(**b**) Negative tourism impacts
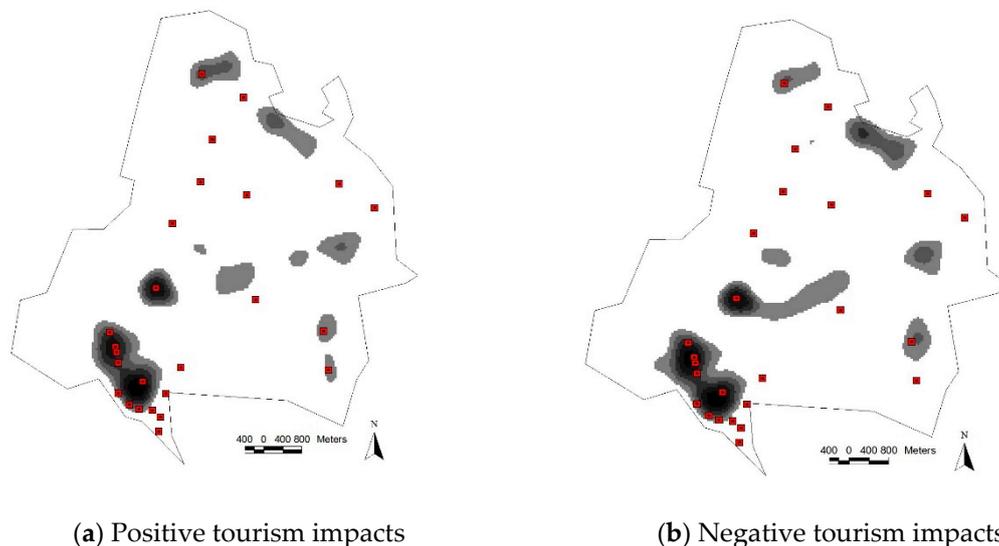
Figure 4. Geographic density of tourism impacts. Note: The dark-colored areas indicate dense tourism impacts depending on the mean of the tourism impact items; the square areas indicate the tourism sites.

To identify the socioeconomic variables that explain the spatial clustering of residents' perceptions, binary logistic regression analysis was employed twice. Two dichotomous variables representing the spatial clustering/remaindering of perceptions were individually used as the dependent variables in the logistic regression model. Using one categorical variable (gender) and four numerical variables (age, income, education, and personal benefits from tourism) as independent variables in the model, the SPSS logistic regression procedure using the enter method returned two final models for both positive and negative perceived tourism impacts with Hosmer–Lemeshow test statistics of 6.26 and 6.16 with 8 df and a p value of 0.618 and 0.601, indicating a decent fit. Among the explanatory variables, personal benefits from tourism (β = 1.759, −1.055, respectively), yearly household income (β = 0.016, −0.009, respectively), and education (β = 0.440, −0.090, respectively) were significant in the logistical regression models for positive and negative perceptions tourism; however, gender and age were not significant (see Tables 2 and 3). Namely, high household income, high education, and more personal benefits from tourism promoted the development of localized clusters in the distributions of positive perceptions of tourism impacts; however, low income, low education, and less personal benefits from tourism cultivated spatial clusters of negative perceptions.

Table 2. Results of logistic regression analysis for respondents in the spatial clustering of positive tourism impacts.

Independent Variables	*β*	SE	Wald	df	Significance	Exp(*β*)
Personal benefits from tourism	1.759	0.148	142.137	1	0.000	5.809
Gender	−0.119	0.147	0.652	1	0.419	0.888
Age	−0.003	0.002	1.455	1	0.228	0.997
Income	0.016	0.007	5.017	1	0.025	1.016
Education	0.440	0.049	81.741	1	0.000	1.552

Table 3. Results of logistic regression analysis for respondents in the spatial clustering of negative tourism impacts.

Independent Variables	*β*	SE	Wald	df	Significance	Exp(*β*)
Personal benefits from tourism	−1.055	0.120	77.495	1	0.000	0.348
Gender	0.029	0.134	0.048	1	0.827	1.030
Age	−0.010	0.006	2.241	1	0.134	0.990
Income	−0.009	0.002	15.491	1	0.000	0.991
Education	−0.090	0.030	8.742	1	0.003	0.914

Additionally, based on a test of means, respondents with locally clustered positive perceptions of tourism impacts tended to have more support for tourism development than the rest of the sample ($p < 0.05$). However, respondents with locally clustered negative perceptions of tourism impacts were inclined to have less support for tourism development than the rest of the sample ($p < 0.05$) (see Table 4).

Table 4. Comparison of the mean values of the locally clustered perceptions of tourism impacts and of the rest of the samples.

Dependent Variable	Positive Tourism Impacts			Negative Tourism Impacts		
	Cluster Mean (*n* = 457)	Remainder Mean (*n* = 600)	*t*-Value	Cluster Mean (*n* = 488)	Remainder Mean (*n* = 569)	*t*-Value
Support for tourism development [a]	4.25	3.69	12.54 ***	3.30	4.47	−33.51 ***

Notes: [a] Individuals were asked to indicate their level of agreement on a 5-point Likert-type scale ranging from 1 = strongly disagree to 5 = strongly agree *** $p < 0.001$.

5. Discussion

This study investigated spatial distributive differences in residents' positive and negative perceptions of tourism impacts, the use of socioeconomic characteristics to explain spatial distributive disparities in the costs and benefits of tourism development, and residents' support for tourism development based on spatial distributive disparities in positive and negative perceptions of tourism impacts. The results suggest that (a) the positive and negative perceptions of tourism impacts tended to be concentrated across the study area and seemed to occur in the specific locations, namely, the major tourism sites; (b) high income, high education, and more personal benefits from tourism promoted localized clusters of positive perceptions of tourism impacts and, conversely, low income, low education, and less personal benefits from tourism cultivated spatial clusters of negative perceptions of tourism impacts; and (c) residents in local clusters of positive perceived tourism impacts had high levels of support for tourism development while residents in local clusters of negative perceived impacts had low levels of support for tourism development. This study was mainly motivated by environmental justice and social exchange theories, which propose knowledge regarding who perceives an (un)equal burden of positive and negative environmental outcomes and who endures

the costs and gains benefits from exchange (tourism development) to support tourism development. Although linking environmental justice with sustainable tourism development has been proposed, this is the first time environmental justice and social exchange theories have been integrated and examined. Further, our findings expand the sustainable tourism literature in a significant manner—while prior research had already recognized that tourism impact is an important factor in support for tourism development [1,6,37], several researchers have observed that future studies on sustainable tourism should evaluate the equitable distribution of advantages and costs derived from tourism development among community residents and their support for tourism development [2,44].

Researchers have noted that few tourism studies—or studies of tourism-related issues such as tourism impacts—have used a spatial analytic perspective [14,15,30], especially in the context of environmental justice [9,16]. Moreover, researchers have pointed out that some perceived tourism impacts may be unequally dispersed [11,12,29]. In the case of the Lu-Kang residents in Taiwan, our results showed that the positive and negative perceptions of tourism impacts seemed to be concentrated across the study area. We further found that residents' positive and negative perceptions of tourism impacts were spatially clustered in special locations. Our findings have some similarities with those of Brody et al. (2005) who found that environmental perceptions are, in fact, spatially dependent across the landscape [40]. Thus, these discoveries suggest that the point pattern analysis used in this study helps acknowledge those locations with greater positive or negative perceptions of tourism impacts so as to point out the spatial disparities present in the perceptions of those impacts. Compared to previous studies on tourism impacts, the current study contributes to the sustainable tourism literature from a spatial perspective by showing that positive and negative perceptions of tourism impacts by diverse socioeconomic residents in a destination cannot be rationally treated as evenly dispersed.

Studies on environmental justice in sustainable tourism literature have suggested that the distributive equity of tourism sites and their costs and benefits call for reflections of various residents [9,10] and the presence of tourism development [4,6]. As a result, while it is important to acknowledge that positive and negative perceptions of tourism impacts are spatially clustered in special areas, there is a need for further understanding of the relationships between these localized clusters and residents' socioeconomic characteristics and their support for tourism development. The findings reveal that education, income, and personal benefits from tourism—but not age and gender—explain localized clusters of positive and negative perceptions. Namely, respondents in localized clusters with positive perceptions were more likely to be educated, wealthy, and have high personal benefits from tourism than the rest of the sample. Conversely, respondents in localized clusters of negative perceptions were more likely to be less educated, have a lower income, and have low personal benefits from tourism than the rest of the sample. These findings are consistent with the conclusions that residents with higher levels of education [59], income [29], and personal benefits from tourism [7,18] perceived significantly higher positive impacts from tourism development. However, our results do not accord with Andriotis' (2004) finding that senior residents perceived tourism impacts to be more advantageous in contrast with young residents [1]; however, our results do support Liu and Li's (1988) findings that age and gender were not factors in residents' perceptions of tourism [60]. Hence, we propose that the spatial distributive inequity of perceived tourism impacts is triggered by disadvantaged residents within the environmental justice of a tourism destination.

In addition, we found significant differences in positive and negative perceptions of tourism impacts between localized clusters and the rest of the sample regarding support for tourism development. These results echo the discoveries of the previous empirical findings of Teye, Sönmez, and Sirakaya (2002), and Wan (2012), who found that residents' support for tourism could be predicted by positive and negative perceptions of tourism impacts [5,6]. Unlike past studies, however, we show that the relationship between perceptions of tourism impacts and support for tourism development reflects the need to consider the spatial distribution of perceived tourism impacts.

Overall, the study outcomes report that respondents in different locations had different perceptions regarding support for tourism development, which were determined by income, education,

and personal benefits from tourism; however, there were no differences based on age or gender. These findings signify the spirit of both social exchange theory and environmental justice. In accordance with social exchange theory, the costs and benefits of exchange (e.g., tourism development) for the stakeholders are highly recommended in developing sustainable tourism planning and conducting policy so as to uphold the reinforcement of the stakeholders. Moreover, the theory of environmental justice in the spatial equity related to tourism suggests that the costs and benefits of tourism should be equitably distributed among various groups regardless of their socioeconomic features. Correspondingly, residents' perceptions of tourism impacts can offer valuable guidance for developing strategies for sustainable tourism development if the spatial disparities in the perceptions of residents in deprived areas can be amended.

Our results, therefore, have some practical implications for sustainable tourism planning and strategies. First, destination managers should pay attention to the differences in the spatial distribution of positive and negative perceptions of tourism impacts. Davis, Allen, and Cosenza (1988) proposed that ignoring residents' perceptions is not advisable for destination managers involved in developing tourism [38]. Since positive and negative perceptions were found to be clustered across the Lu-Kang, information regarding the influence of tourism development is more likely to be directed toward the (dis)advantaged groups and the rest of the residents individually; thus, reciprocal communication could possibly be developed to ensure that all residents can comment on the priorities for destination development. For example, it is very important to generate information on positive and negative attitudes toward destination development in the future, and to change the perception that local tourism businesses take advantage of local disadvantaged groups. In addition, although local residents seemed to perceive negative tourism impacts, most of them did not oppose tourism development in the small town, indicating that destination management organizations could collaborate with disadvantaged groups to turn these negative perceptions into more favorable ones. For instance, the tourism business could hire them or obtain their feedback on infrastructure improvement, community beautification, traffic dispersion services, etc. Second, strategies for improving the unfairness in the distribution of positive and negative perceptions which, in turn, affect support for tourism development, should be made available to the (dis)advantaged groups. Since sustainable destination development depends on residents with various socioeconomic characteristics, destination managers need to understand the spatial clustering of positive and negative perceptions based on income, education, and personal benefits from tourism. Thus, the production of recent tourism sites in potentially disabled areas, along with an assortment of tourism activities in different areas of Lu-Kang, might possibly be maintained, and the spatial distribution of costs and benefits gained from tourism development would be well balanced among all residents. Moreover, it would be necessary to provide facilities and services (e.g., parking lots, garbage removal services) for local residents, who are influenced by tourism development, to improve and enhance their quality of life. Investments in such physical features of neighborhoods could be made from the public sector to influence economic regeneration and broaden residential appeal.

6. Conclusions

This study integrated environmental justice and social exchange theories into the context of sustainable tourism development and empirically tested the relationships between residents' socioeconomic characteristics, the spatial distributive differences of perceptions of tourism impacts, and support for tourism development. The proposed framework provided a comprehensive understanding of the spatial equity of positive and negative tourism impacts as perceived by (dis)advantaged local groups who evaluated tourism in their community based on the costs and benefits of that tourism. These findings revealed that resident groups with high income, high education, and more personal benefits from tourism tended to positively perceive tourism impacts and had more support for tourism development; however, those with low income, low education, and less personal benefits from tourism tended to negatively perceive impacts and had less support for tourism development.

Moreover, these findings address tourism sustainability discourses from a spatial distributive justice perspective on tourism impacts. Future endeavors to understand the influence of tourism impacts on residents' support for sustainable tourism development should recognize the spatial distribution of tourism impacts and its reflection of residents' socioeconomic characteristics and their support for tourism development.

Since this study provides several introductory observations to the spatial clustering of tourism impacts in Lu-Kang, Taiwan, three limitations should be mentioned. First, the context and scope of this study are confined to Taiwan; therefore, the discoveries and judgments might not precisely apply to other areas. Second, the examination of why grouped perceptions of tourism impacts occur in certain locations is exploratory. Future studies need to examine whether other variables that designate the reinforcement of tourism development show the existence of spatial clustering. For example, Perdue et al. (1990) found that different attitudes toward tourism development were important antecedents for influencing residents' support of tourism [4]. The formation of such a spatial clustering of community attitudes can offer clues to how various residents evaluate tourism development, and then sustainable tourism development policies can be conducted for those who are in certain areas. Finally, a small number of socioeconomic variables, which offer a limited portion of the probability of environmental justice, were tested in this study. Since the study's respondents were not racially or ethnically diverse, further studies should pay particular attention to differences in the distribution of tourism impacts and support for tourism development according to the residents' race or ethnicity.

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