

Residents' Perceived Marine Tourism Impacts and Support Development Attitude - Case Study of Jibei Island

Abstract

This study analyzes a small island residents' impact on development of marine tourism perception and support attitude to new island tourism development and investigates tourism dependence on residents' impact perception and attitude toward support its moderating effect. This study took residents living on Jibei Island in Taiwan's Penghu Islands archipelago as the subjects, using the convenience sampling method of questionnaires, and collected a total of 279 valid questionnaires. After statistical analysis, this study has the following findings. 1. Residents perceived the impact of marine tourism in this order: traffic congestion, marine pollution, coastal landscape damage, destruction of coral reefs, and increased employment opportunities. 2. The factors of "negative impact to living conditions", "negative impact to marine environment", "improved infrastructure", and "positive economic impact" significantly influence residents' support attitude towards tourism development. 3. Tourism industry dependency has a moderate effect on residents' marine tourism impact perceptions and support attitude toward new island tourism development. The results of this study not only provide reference to island countries in the development of marine tourism, but also offer specific directions and recommendations for future research.

Key words: marine tourism, environmental impact, tourism dependency, support attitude,
Jibei Island

23 1. Introduction

24 Island tourism is one of the fastest-growing tourist industries in recent years. It is not
 25 only many people's favorite thing to do, but for some small island-based countries, tourism is
 26 also their main source of income (Nunkoo, Gursoy, & Juwaheer, 2010; Zubair, Bowen, &
 27 Elwin, 2011). Island tourism includes coastal tourism and marine tourism. Hall (2001)
 28 pointed out that the concept of coastal tourism covers the full range of tourism, leisure, and
 29 entertainment-oriented activities that take place in the coastal zone and the offshore coastal
 30 waters. They include accommodations, restaurants, food industry, and second homes, and
 31 infrastructure such as retail businesses, marinas, and activity suppliers, as well as tourism
 32 activities such as recreational boating, beaches that attract marine-based ecotourism, cruises,
 33 swimming, recreational fishing, snorkeling, and diving (Miller & Auyong, 1991; Miller,
 34 1993). Island marine tourism development brings about both positive and negative impacts to
 35 the economy, social culture, and environment (Ap & Crompton, 1998; Brougham & Butler,
 36 1981; Mathieson & wall, 1982; Upchurch, & Teivane, 2000).

37 Although an island's natural and marine ecological resources are very rich, which bring
 38 about the development of various marine tourism activities, they are also relatively fragile
 39 due to the influence of tourism, are easily damaged, and typically cannot recover in the short
 40 term (Needham & Szuster, 2011). Although past studies have found that the development of
 41 marine tourism has a negative impact on the environment and the ecological system, under
 42 the positive economic impact, the majority of residents generally hold a positive attitude
 43 towards tourism development. Residents economically dependent upon tourists support
 44 present development and new tourism development, even though there are negative impacts
 45 (Haralambopoulos & Pizam, 1996; Nunkoo & Ramkissoon, 2007). Previous studies also
 46 show that the development of local residents on travel attitude not by those feelings of

interest to determine, but by various moderator variables by the impact (Lankford & Howard, 1994); moreover, the degree of economic dependence on tourism is an important influential variable. However, few studies have confirmed that residents' attitude towards both tourism development and the development of new tourist attractions is affected by the moderator of "dependence on tourism economic". Under tourism development's economical and environmental impacts, this paper mainly analyzes island residents' support attitude for new island marine tourism development and confirms the "economic dependence on tourism" moderator on this support attitude.

2. Literature Review

2.1 Social Exchange Theory

Most studies that examine resident attitudes utilize the Social Exchange Theory (SET) as their theoretical framework (e.g. Ap, 1990, 1992; Gursoy, Jurowski, & Uysal, 2002; Gursoy & Rutherford, 2004; Jurowski, Uysal, & Williams, 1997; Lindberg & Johnson, 1997; Nunkoo & Ramkissoon, 2009, 2010; Perdue, Long, & Allen, 1990; Tideswell & Faulkner, 1997; Wang & Pfister, 2008). SET as a general theory of sociology, targets the interaction and exchange of resources between individuals and groups (Ap, 1992). The exchange of one's consciousness is different, whereby when individuals perceive an exchange to have positive results, they will assess the exchange in different ways, whereas when it is perceived to be negative, they will give up the exchange (Gursoy, Jurowski & Uysal, 2002). The tourism industry theory assumes that personal attitude takes place in the face of social exchange, whereby there is subsequent development of supporting industries; the tourism industry thus brings about community and influence. The exchange is the tourism industry within the community, in which residents develop and promote tourism and provide services based on

the needs of tourists. Some people benefit from it, while others may perceive negative impacts.

Based on SET, people assess the exchange through the costs and benefits of the results. By personally thinking about the benefits from the exchange, they will make a positive evaluation on it, but if the feeling does not match the costs, then they are likely to have a negative evaluation. Therefore, residents benefitting from tourism development will recognize that tourism is positive and not negative.

Many studies in the tourism impact literature also confirmed SET's practicality (Ap, 1992; Gursoy, Jurowski & Uysal, 2002; Jurowski, uysal, & Williams, 1997; Lindberg & Johnson, 1997; McGehee & Andereck, 2004). Even though SET's starting point is based on an exchange of interests, many studies have confirmed that when people feel that tourism brings a positive impact greater than a negative impact, they will very much support tourism development in their local area (Gursoy & Rutherford, 2004; McGehee & Andereck, 2004; Wang & Pfister, 2008). The perspective of SET helps to determine how residents will respond to the future development of the whole tourism industry (Andriotis & Vaughan, 2003). According to the basic theory of SET, this study also assumes that even if an island's residents feel a negative impact from tourism environment as well as a positive economic impact, they will be both satisfied with the current development and also support the future development of new tourist attractions in other islands.

2.2 Tourism Impact

Tourism impact can be divided into three areas: economic impact, social and cultural impact, and environmental impact (Ap & Crompton, 1998; Brougham & Butler, 1981; Mathieson & Wall, 1982; Upchurch, & Teivane, 2000). In the development of marine tourism, the most obvious impact is on the real environment and the destruction of marine ecology (Wiener, Needhamb, & Wilkinson, 2009). Gartner (1996) pointed out that tourism

development has both positive and negative impacts upon the physical environment, and the positive impacts include: natural environmental protection, historic buildings or natural protected areas, and improving the overall appearance; the negative impacts include: traffic congestion, congestion, noise level, and garbage pollution increase. France (1997) noted physical environmental impacts, and the positive aspects include: the protection of natural areas, wild animals, and ecological environment, and maintaining the maintenance of old buildings; while the negative impacts include: increase in transportation energy costs, aesthetic losses, noise, air pollution, water pollution, increase of animal foraging habits due to garbage, improper cutting of trees, collecting plants, tourists trampling on coastal sand dunes, the destruction of coral reefs, landscape changes, and seasonal effects from population density and structure.

On the environmental impact, Yoon, Gursoy, and Chen (2001) found the following: traffic congestion, noise and pollution, construction of hotels and other tourist facilities that have destroyed the natural environment, unpleasantly overcrowded beaches, hiking trails, parks, and other outdoor places in the community, while tourism provides more parks and other recreational facilities for local residents. After an environmental impact study in island tourism development, Baysan (2001) found that the negative impacts of tourism include: sea pollution, littering, too much building construction, destruction of vegetation, noise, overcrowding, inadequate quality and quantity of water, traffic congestion, and the use of motorboats in the offshore waters. Related research studies' results showed that tourist destination residents think that tourism development can promote economic development, increase employment opportunities, and raise local tax revenue. From the aspect of negative impacts, residents think that tourism development or the community causes some serious problems, including more garbage, traffic congestion, congestion, and a worsening community crime rate (Andereck, Valentine, Knopf, & Vogt, 2005). However, tourism

development does not necessarily have a negative impact on the environment, but also has a positive impact on the presence, including an increase in more leisure/recreation facilities and job opportunities (Liu et al., 1987; Liu & Var, 1986; Perdue et al., 1990), environment/wildlife protection and improvement (Liu & Var, 1986), improving the host area's appearance (Perdue et al., 1990), and the preservation of historic buildings (Liu et al., 1987).

Aside from the positive economic impacts of island tourism (Seetanah, 2011), such as increases in people's incomes, a large number of marine recreational activities negatively affect wild animals' habitats (Velando & Munilla, 2011) and destroy submarine coral reef environments (Needham, 2010) due to sea pollution (Islam & Tanaka, 2004) and crowded beaches and sand erosion, which also caused the coastline to retreat (Garcia & Servera, 2003). The above literature has presented that tourism development has both positive economic impacts on an island and negative impacts on the environment.

2.3 Residents' Support Attitude for Tourism Development

In the process of tourism development, because there will be a positive and negative influence, so living in the tourist areas, whether they support tourism is very important, because the residents for tourism development support attitude (Landford & Howard, 1994), whether in the development of the local tourism industry, or for the government make tourism policy it is an important reference (Gursoy & Rutherford, 2004), and influence the sustainable development of the community is the most important factor (Allen, Hafer, Long & Perdue, 1993; Andereck, Valentine, Knopf & Vogt, 2005). Residents participate in tourism to the degree of the extent that they are actually involved in the tourism industry. This will affect their judgments on the impact of tourism, but they are inclined to support the positive

interests of tourism development if they are higher than the negative interests (Tideswell & Faulkner, 1997).

Haralambopoulos and Pizam (1996) researched the tourism impact attitude of residents of the Greek island of Samos. Their results showed that tourism has brought about high prices, drug abuse, damage, fights, sexual harassment, and crimes of negative social impact. At the time of tourism development the residents were satisfied and also in favor of expanding tourism development, mainly because tourism brought considerable economic benefits. They also found that the economy is dependent on tourism residents, their toward tourism development not only hold positive attitude, but also than non dependence. Nunkoo and Ramkissoon (2007) studied Mauritius residents' perception of tourism development bringing social and cultural impacts. The results showed that respondents were generally supportive of the development of the tourism industry and also held a positive attitude toward tourism development. The main reason is that local livelihoods are mostly dependent on tourism. However, they also found that tourism has a negative impact, but when the positive benefits outweigh the negative, the local community residents also support tourism development relatively more. The related tourism impact research found to be dependent on the residents of tourism, for their lives will emphasize tourism development brings positive impact is higher than the negative impact (Andereck et al. 2005; Ko & Stewart, 2002; Lankford & Howard, 1994; Liu & Var, 1986; McGehee & Andereck, 2004). For residents and people in tourism business services, Andriotis (2005) found that both groups expressed a high degree of positivity toward tourism and tourism development, even as tourism brought negative impacts to the local environment and society.

3. Methodology

3.1 Overview of Research Area

Penghu is located between China and Taiwan in the Taiwan Strait (Fig. 1), is composed of 90 islands, and is the only island county in Taiwan. Its administrative area includes Magong City, Siyu, Baisha, Husi, Wangan, and Cimei Townships in the prefecture as well as the National Scenic Area and Marine National Park. Jibei Island (village) belongs to Baisha Township and is 3.1km² in area, with a coastline of 13km; it is the largest island on the North Sea and one of the most popular tourist attractions in Taiwan. Sand Beach Beak is located at the south end of the island, with a white sand beach extending 1500m, which is a marine deposit landform - “Sand Spit” - formed by corals and shells that were moved there by the sea; it is a spectacular sight when looking down from the air, a truly world-class natural landscape. Jibei is a paradise for marine activities and provides various types of recreational activities, including banana boating, dragged buoys, two-man speedboats, jet skis, under-the-sea sightseeing boats, paragliding, and snorkeling (Penghu National Scenic Area Administration, 2015).



Fig 1. Jibei Island (Google map search, 2015)

3.2 Sample Design and Data Collection

The subjects of this study are household registrants in Jibei who are over 18 years old and who answered a questionnaire in August 2014. The method of investigation is the researcher from the beginning of the port. Each household as a unit was first asked if they wished to accept the survey; researchers then sent questionnaires to them, waiting for the next day to receive back the questionnaire. If the residents do not want to accept the survey, then the researchers go to the next door, asking those residents their willingness to help complete the investigation. According to Baisha Township Household Registration Office (2015) statistics for August and Jibei Island's (village) population of 1,562 people, more than half did not live on the island. According to the information provided by local residents, most of the people on the island depend on tourism for a living, followed by working for fisheries. According to the above data and survey situation, this study only sampled residents over 18 years old and distributed 320 questionnaires; 279 responses were received, indicating a response rate of around 82.05%.

3.3 Questionnaire Design

This study divided the questionnaire three parts; the first part is "residents' perceived environmental impact scale", with a total of 27 items. The scale mainly refers to Baysan (2001), while the study refers to Yoon, Gursoy, and Chen (2001) for tourism's impact on marine research and refers to Andereck, Valentine, Knopf, and Vogt (2005) for tourism impact on the destination questionnaires. The main survey respondents provided their opinions concerning the positive and negative environmental impacts of tourism development on the marine environment and living environment. The second part is "residents' island marine tourism development support attitude scale", with a total of six questions in this section and items' content for supporting island tourism development: because it can attract

more tourists and increase job opportunities for local residents and income, I am very satisfied with the current tourism development situation, which can let tourists have a better understanding of Penghu customs, properly utilize Penghu tourism resources, support the development of uninhabited islands to become new tourist areas, and attract more enterprises to invest in Penghu. The study refers to Gursoy, Jurowski, and Uysal (2002) and Gursoy and Rutherford (2004) for residents' attitude toward tourism development and to Lankford and Howard (1994) for tourism's impact attitude development scale. In terms of scoring the two scales use a Likert five-point rating to give different scores, including very satisfied (5 points), satisfactory (4 points), ordinary (3 points), not satisfied (2 points), and very dissatisfied (1 point). The last part of the demographic variables includes gender, marital status, age, education level, occupation, monthly income, self depends on tourism, and household depends on tourism.

3.4 Data Analysis

The data analysis was conducted in two steps. First, exploratory factor analyses using the principal component method with Varimax rotation were conducted on tourism impact to examine the dimensionalities and psychometric properties. On that basis, the relationships of tourism impact and support attitude were empirically tested using analysis of the partial least squares (PLS) estimation technique in the second step. There are three major steps to the analysis procedure of the PLS method: basically building up the research model, modify it, and finishing it. In addition, using the PLS analysis, composite reliability (CR) and the average variance extracted (AVE) can respectively evaluate the reliability and validity of the structure model; a generally accepted standard is CR being large than 0.7 and AVE being larger than 0.5 (Fornell & Larcker, 1981). Furthermore, the explanation ability of the model

structure is in the R^2 values, and standardized path coefficients represent the direct effect (Chin, 1998; Hair, Black, Babin, & Anderson, 2010).

3. Empirical Results

3.1 Respondent Profile

From the valid collected questionnaires, in terms of gender, 162 females (58.1%) are the greatest in number. In terms of marital status, 141 were married (50.5%). In terms of age, ninety 31-40 year-old (32.3%) people made up the highest age group. In terms of educational level, the most were 114 (40.9%) people who had a college education. In terms of occupation terms, 117 (41.9%) people worked in the service industry. In terms of personal monthly income, the income level with the most amount of people was NT\$20,001-40,000 (US\$640-1280) at 69 (24.7%). Seventy-two subjects (25.8%) were economically dependent on tourism, while another 42 people (15.1%) had their family's economic sources dependent on tourism.

3.2 Analysis of Residents' Tourism Impact Perception

The analysis results show that residents perceived the impact of tourism in the following order: traffic congestion ($M=4.28$), marine pollution ($M=4.26$), coastal landscape damage ($M=4.04$), destruction of coral reefs ($M=4.03$), and increased employment opportunities ($M=4$). At the bottom, residents' perceived impact of a rise in the crime is the lowest ($M=2.97$).

261 Table 1: Residents' Tourism Impact Perception

Impact items	Mean	SD
Traffic congestion during peak season	4.28	.87
Marine pollution	4.26	.88
Coastal landscape damage	4.04	.93
Increased destruction of coral reefs by yachts	4.03	.84
Increased employment opportunities	4	.72
Damage to marine ecology	3.96	.89
Residents to avoid pollution of the marine environment concept	3.95	.74
Establish the concept of ecological conservation for residents	3.94	.77
Conflict between tourists and residents	3.89	.71
Environmental mess	3.82	.69
Increased local tax revenue	3.79	.67
Improved household income	3.75	.71
Beaches more messy	3.72	.93
Infrastructure increased and improved	3.69	.75
Effect on fishing	3.68	.75
Increased garbage	3.67	.72
Avoid the blight over fishery resources	3.66	.79
Increase the effectiveness of recreation facilities	3.65	.73
Environment and marine conservation	3.65	.79
Increase in noise	3.62	.83
Loss of traditional fishing	3.61	.81
Air pollution	3.57	.77

Tourists' intertidal activities destroying coral reefs	3.56	.74
Water facilities (marina, waterways, dikes) becoming clean and safe	3.55	.81
Increase in local residents' recreation activities	3.26	.92
External transport more convenient	3.20	.96
Rise in the crime rate	2.97	.87

262

263 3.3 Factor Analysis

264 Employing the principal component factor analysis, five factors with an Eigenvalue
 265 greater than one have explanator power that hit 65.56%. However, three items (effect on
 266 fishing, external transport more convenient, and good public order) with factor loading less
 267 than .4 were removed from the scale. The varimax-rotated factor pattern implies that the first
 268 factor concerns “negative impact on living conditions” (7 items). The second factor relates to
 269 “negative impact on marine environment” (6 items, $\alpha=.93$). The third factor consists of
 270 “improved infrastructure” (4 items). The fourth factor relates to “positive impact on marine
 271 environment” (4 items). The fifth factor relates to “positive economic impact” (3 items).
 272 Table 2 shows the results of the factor analysis for tourism impact.

273

274 Table 2: Exploratory factor analysis of tourism impact

Factor/item	Factor loading	Variance explained (%)	Cumulative explained (%)
TI1: Negative impact on living conditions (NILC)		15.13	15.13
Increased garbage	.731		
Environmental mess	.695		
Increase in noise	.681		

Conflicts between tourists and residents	.649		
Air pollution	.595		
Traffic congestion during peak season	.588		
Loss of traditional fishing	.571		
TI2: Negative impact on marine environment (NIME)		14.95	30.08
Damage to marine ecology	.879		
Marine pollution	.774		
Increased destruction of coral reefs by yachts	.741		
Tourists' intertidal activities destroying coral reefs	.723		
Beaches more messy	.658		
Coastal landscape damage	.477		
TI3: Infrastructure improved (II)		12.86	42.93
Water facilities (marina, waterways, dikes) are clean and safe	.828		
Increased effectiveness of recreation facilities	.737		
Increase in local residents' recreation activities	.726		
Infrastructure increased and improved	.571		
TI4: Positive impact on marine environment (PIME)		12.51	55.44
Avoiding a blight on fishery resources	.693		
Establishing the concept of ecological conservation for residents	.642		
Residents avoid pollution of the marine environment	.614		
Environment and marine conservation	.547		
TI5: Positive economic impact (PEI)		10.12	65.56

Increased employment opportunities	.837
Improved household income	.800
Increased local tax revenue	.586

275

276 3.4 Analysis of Partial Least Squares

277 This study used the PLS Warp 5 software to test the structural model, and the results of
 278 the analysis are shown in Figure 1 and Table 3 and 4. In discriminant validity, as Fornell and
 279 Larcker (1981) suggested, the AVE of construct should exceed other correlation coefficients
 280 of the construct. Table 3 shows the matrix of correlation coefficients for all constructs in this
 281 research. Diagonal elements are the square roots of average variance extracted for the
 282 constructs. The correlation coefficients between any two constructs are smaller than the
 283 square root of the average variance extracted for the constructs. Constructs in the
 284 measurement model of this research indeed are different from one another, indicating that all
 285 constructs in this research carry sufficient discriminant validity.

286

287 Table 3
 288 Discriminant validity

Latent variables	NILC	NIME	II	PIME	PEI	TDSA
NILC	.721					
NIME	.316	.756				
II	.500	.067	.792			
PIME	.654	.559	.280	.769		
PEI	.438	.190	.397	.366	.819	

TDSA	.637	.134	.457	.388	.498	.830
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Note: The value on the diagonal is the square roots of average variances extraction (AVE).

TDSA (Tourism development support attitude)

Convergent validity used the three standards recommended by Bagozzi and Yi (1988) to assess the measuring model: (1) all indicator factor loadings should exceed 0.5 (Hair et al., 1998); (2) CR should be above 0.7; and (3) the average variance extracted, AVE, of every construct should exceed 0.5 (Fornell & Larcker, 1981). As Table 4 shows, the indicator factor loading of every item in the measuring model of this study exceeded 0.7. Composite reliability of constructs ranged from 0.85 to 0.93. AVE ranged from 0.52 to 0.69, therefore meeting all conditions for convergent validity.

Table 4: Construct reliability and Validity

Latent variables	Composite reliability (CR)	Cronbach's alpha	Average variances extracted (AVE)
NILC	.88	.84	.52
NIME	.89	.84	.57
II	.87	.79	.63
PIME	.85	.76	.59
PEI	.86	.75	.67
(TDSA)	.93	.91	.69

In Figure 2 the line represents the value of the path coefficient that is standardized regression coefficient (β). In the direct influence relationship, the factors of “negative impact on living conditions” ($\beta_1=.57$, $p<.05$), “negative impact on marine environment” ($\beta_2=.12$, $p<.05$), “infrastructure improved” ($\beta_3=-.13$, $p<.05$), and “positive economic impact”

($\beta_5 = -.12$, $p < .05$) have a significant influence on the residents' attitude towards tourism development, but for "positive impact on marine environment" ($\beta_4 = -.04$, $p > .05$) there is no significant influence. and $R^2 = .74$. The R^2 value represents the predictive ability of the research model, from Figure 2, the "negative impact on living conditions", "negative impact on marine environment", "infrastructure improved", "positive impact on marine environment" can explain residents' attitude towards tourism environment 74%.

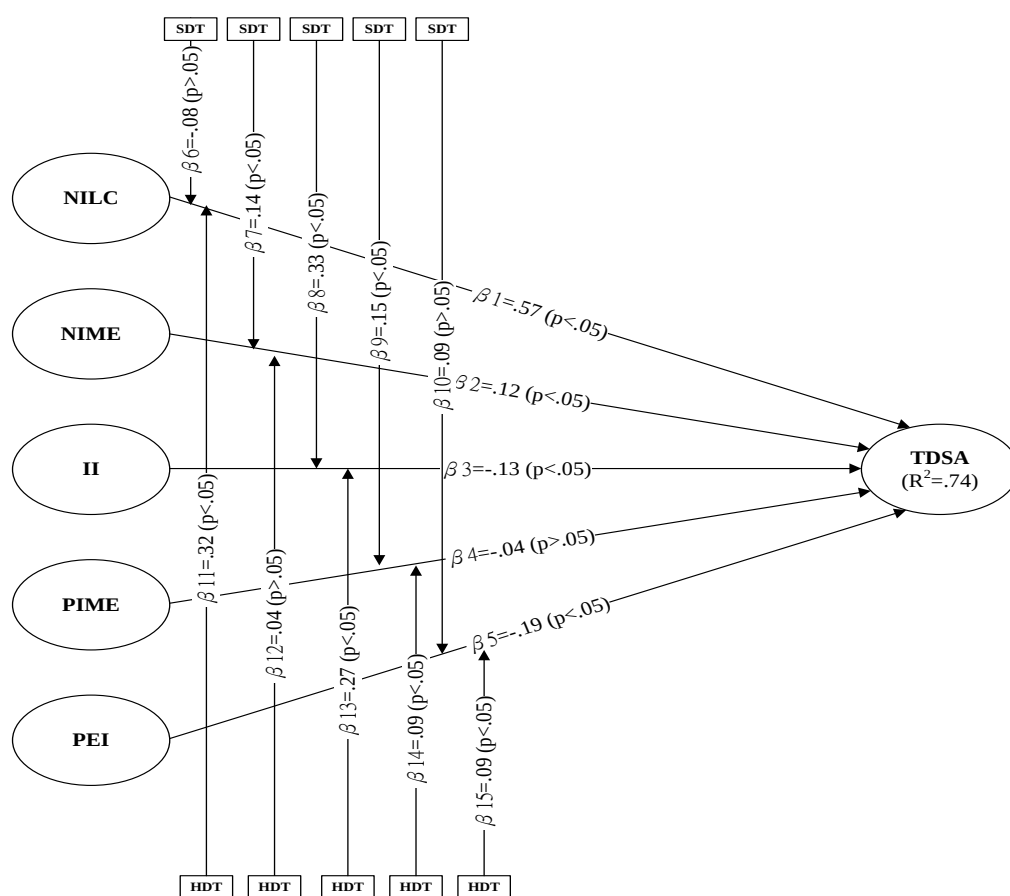


Fig. 2 The estimated structural model.

In the moderating effect, the initial results of the analysis found that for whether respondents are self-dependent on tourism (SDT), the factors of "negative impact on marine environment" ($\beta_7 = -.14$, $p < .05$), "infrastructure improved" ($\beta_8 = .33$, $p < .05$), and "positive impact on marine environment" ($\beta_9 = .15$, $p < .05$) have a moderating effect on the residents'

attitude towards tourism development, but for the factors of “negative impact on living conditions” ($\beta_6=.08$, $p>.05$) and “economic positive impact” ($\beta_{10}=-.09$, $p>.05$) there is no moderating effect. Second, the analysis results show that, for whether households are dependent on tourism (HDT), the factors of “negative impact on living conditions” ($\beta_{11}=.32$, $p<.05$), “infrastructure improved” ($\beta_{13}=-.27$, $p<.05$), “positive impact on marine environment” ($\beta_{14}=.09$, $p<.05$), and “positive economic impact” ($\beta_{14}=.09$, $p<.05$) have a moderating effect on the residents’ attitude towards tourism development, but for “negative impact on marine environment” ($\beta_{12}=-.04$, $p>.05$) there is no moderating effect.

4. Discussion

Analysis results show that residents perceived a negative impact of marine tourism during the tourist high season when traffic congestion problems were brought to the island. In fact, the above result confirms findings in the literature about local traffic congestion being a major negative tourism environmental impact (Brunt & Courtney, 1999; Lindberg & Johnson, 1997; McCool & Martin, 1994). During the peak season, most tourists on Jibei Island rent scooters and ride around the island, with only a few tour groups using buses. Because scooters need gasoline, they therefore not only affect the local living environment, but also cause air pollution to the environment. In addition, the buses carrying tourists are older vehicles with poor exhaust emissions, and thus they are also sources of air pollution on the island. Of course, many of the tourists to the island come during the summer, and yachts are one of the most important modes of transport. They bring noise and marine pollution, inevitably affecting the lives of local people

Because the tourist island is mainly engaged in marine activities catering to the needs of tourists, there are various activities that need to be powered by boats or vehicles in the ocean, such as banana boats, dragged buoys, two-man speedboats, jet skis, glass-bottom sightseeing

boats, paragliding, etc. These activities also cause ocean pollution and noise. These activities are very common throughout the world and entail the construction of artificial facilities (such as toilets, bathrooms, restaurants, souvenir shops, etc.), which also destroy the natural coastal landscape. One of the biggest sources of coastal pollution is generated by tourists who produce a lot of garbage, use toilets, and discharge waste water following bathing, conforming to findings in relevant articles (Baysan, 2001; Garcia & Servera, 2003; Islam & Tanaka, 2004; Needham, 2010; Yoon, Gursoy, & Chen, 2001). The study also found contamination factors from some of the local tourist industry and service personnel, such as poor living habits like garbage or cigarette butts littering the ground. Moreover, some bed and breakfast (B&B) lodges offer tourists an “intertidal ecological experience” or yacht rides to uninhabited islands, but they also caused the destruction of coral reefs. At night, there are beach bonfires and activities, which also create a lot of garbage and pollution on beaches.

From the above results, it is clear that residents generally perceived tourism development on the island as having a negative impact on the environment, but they still think tourism development also brings a positive economic impact due to more employment opportunities, which supports the most important impact of tourism development (Ap & Crompton, 1998; Brougham & Butler, 1981; Mathieson & Wall, 1982; Seetanah, 2011; Upchurch, & Teivane, 2000). However, the minimal increase in the crime rate has the smallest impact according to residents. Penghu’s crime rate is the lowest in Taiwan, while Jibei Island’s is even lower. Thus, any rise in crime due to excessive drinking, gambling, and even fighting did not register any serious impact on the local residents.

In the structural model of relations, the results of the analysis found that “negative impact of living conditions”, “negative impact on marine environment”, “infrastructure improved”, and “positive economic positive” exhibit a supportive predictive power of 74% for residents. First, the results showed that the factor of “negative impact on living

conditions” is influential for residents’ supportive attitude, while it also shows that tourism development brings forth the negative effects of garbage, environmental mess, noise, conflicts between tourists and residents, air pollution, traffic congestion (Andereck et al, 2005; Baysan, 2001; Islam & Tanaka, 2004; Yoon et al, 2001), and loss of traditional fishing. Nonetheless, the residents still support tourism development. The main reasons for these negative impacts are not very serious, but rather within an acceptable range, and Penghu’s tourism season is only six months long (April to October), thus giving the local marine environment ample time to recuperate.

Second, we found that the factor of “negative impact on marine environment” exhibits an influential supportive attitude for residents; these negative shocks include: damage to marine ecology, marine pollution, yachts increasingly destroying coral reefs, tourists’ intertidal activities destroying coral reefs, beaches becoming messier, and coastal landscape damage. These circumstances and the factor of “negative impact on living conditions” show the same result. Although residents understand that marine tourism will bring about negative ecological impacts, but the impacts are only six months, and so the residents can accept this.

Aside from marine tourism development bringing negative impacts, the study also found that residents had an influential supportive attitude toward “infrastructure improved” and “positive economic impact. Yoon, Gursoy, and Chen (2001) noted that tourism provides more parks and other recreational facilities for local residents. The results of this study are consistent with those related to the impact of tourism, in which tourism development was found to positively improve local public facilities (Liu et al., 1987; Liu & Var, 1986; Perdue et al., 1990). The study also found a positive economic impact for residents from tourism development, including increased employment opportunities, improved household incomes, and higher local tax revenue (Andereck et al., 2005; Seetanah, 2011).

This study also shows that the islanders' personal and family livelihoods are dependent on the tourism industry, and thus they are in favor of new tourism development of unmanned islands. The results found that respondents self and/or household depend on tourism or not, toward tourism development support attitude have moderating effect exists, it is clear this factor for the decision whether to support the residents of the development of tourism has great influence. This study's results support past previous studies, presenting that the economy is dependent on tourism residents, their toward tourism development not only hold positive attitude, but also than non dependence (Haralambopoulos & Pizam, 1996), and more support tourism development (Andereck et al. 2005; Ko & Stewart, 2002; Lankford & Howard, 1994; Liu & Var, 1986; McGehee & Andereck, 2004).

The social exchange theory emphasizes that residents believe that they get benefits from tourism development, identifying that tourism bring more positive impacts than negative (AP, 1990, 1992; Perdue, Long & Allen, 1990; Perdue et al., 1999). Even though there is a negative impact on the environment, residents also support tourism development and even support new island development. The results of this study thus also support the social exchange theory (Ap, 1992; Gursoy, Jurowski & Uysal, 2002; Jurowski, Uysal, & Williams, 1997; Lindberg & Johnson, 1997; McGehee & Andereck, 2004).

5. Conclusion and Suggestions

5.1 Conclusion

The study found that for island development and tourism, the main negative impacts on the environment are: congested coastline, marine pollution, landscape damage and destruction, damage to coral reefs, and damage to marine ecology. Although tourism brings negative impacts to the environment, there are still positive impacts, including increased local employment opportunities for residents to avoid pollution of the marine environment and

ecology conservation concept. In the structural model, the results show that the affected residents regarding the present tourism become a tourist area of support attitude in local development and new development of the island, there are "living conditions negative impact", "marine environment negative impact", "infrastructure improved, and the" economic positive impact ", and individual residents or their family economic source is mainly dependent on tourism, regarding their support attitude has moderating effect, also proved this item will significantly affect the residents of the attitude. Finally, for theory application, it is obvious that tourism and tourists for the island cause a serious negative impact to the marine ecological environment. However, under the positive impact to the local economy, residents are willing to look past the negative impacts, thus verifying the social exchange theory point of view.

5.2 Suggestions

According to the findings of this study, after discussion and analysis, the following recommendations are offered.

5.2.1 While tourism can exhibit negative environmental impacts, a good mechanism can minimize their effects. Therefore, Jibei Island's tourism industry should gradually switch to electric scooters and promote bicycle rentals to tourists. The positive result is a reduction in environmental pollution. Because the island is not very large, during the peak season, the use of electric vehicles can help replace diesel engine buses.

5.2.2 Penghu's tourism and leisure industry provides tourists with intertidal zone activities (at low tides, people can enjoy coral reefs), but most tourists are not familiar with how to safekeep the environment. Sometimes the coral reefs are destroyed or even die, thus

negatively affecting the fish ecological system. Therefore, these types of activities should be avoided and replaced by other positive tourist activities.

5.2.3 The negative impact to the marine environment mainly comes from yachts in the tourism industry that travel to uninhabited islands or provide fishing voyages. During these trips, tourists oftentimes carelessly throw away waste or garbage into the waters, negatively affecting the marine environment. Moreover, yachts are unable to dock at uninhabited islands, because there are no piers. Thus, tourists are wading ashore, ruining the intertidal marine ecology. Therefore, the local tourism service industry has to inform tourists to not destroy the coral reefs and not to catch fish and shellfish, in order to maintain the local marine ecological balance.

5.2.4 When engaged in maritime activities, tourists also bring about an increase in sewage (bath and toilet use) and produce a lot of garbage that causes pollution to the coastline. Because it is not easy for offshore islands to deal with wastewater, government departments should employ more waste water recycling equipment. In addition to setting up bulletin boards to inform tourists to not litter, trash bags and trash cans should be placed at appropriate locations to minimize destruction to the environment. In addition, during the peak season the government should increase the number of garbage collection times, so as to prevent garbage from influencing environmental hygiene to a greater degree.

5.2.5 From some of this study's limitations and together with the new findings herein, we offer the following recommendations for future researchers. First, in the design of the questionnaire regarding the negative environmental impact by tourism, some items can be added as they relate to the specific local island(s), especially the local coastal landscape and

man-made facilities. In terms of the research objective, tourists can also be recruited as subjects, in order to understand their cognition toward marine environment conservation and to help government departments plan relevant conservation policies. Researchers have found that the influence of marine pollution, in fact, not only tourists, researchers found some from and tourism services to provide the operators and service personnel, so subsequent researchers also the direction of the analysis a negative impact on the environment.

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