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Understanding the EnvironmentalKnowledge, Environmental Attitudes, and Leisure Satisfaction of Visitors Who Took Part in Ecotourism in the Dapeng Bay National Scenic Area

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Abstract: *The main objective of this research was to investigate the relationshipsamong the environmental knowledge, environmental attitudes, and leisure satisfaction of visitors who took part in ecotourism. The participants in this research were visitors who took part in ecotourism in the Dapeng Bay National Scenic Area. They were recruited via purposive sampling and had a questionnaire administered to them. SPSS 18.0 and LISREL 9.1 software were used, respectively, to perform descriptive statistics analysis and confirmatory factor analysis on the data collected, as well as to evaluate the relationships among the constructs of this research. The results showed that (i) there was a significant positive effect of participants' environmental knowledge on their environmental attitudes, and (ii) there was a significant positive effect of participants' environmental attitudes on their leisure satisfaction. The structural model proposed in this research is expected to be beneficial for promoting ecotourism in national scenic areas in Taiwan, in addition to developing the local leisure and tourism industry.*

Keywords: *ecotourism, environmental knowledge, environmental attitudes, leisure satisfaction*

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I. Introduction

Dapeng Bay is the only choked lagoon in Taiwan, and the only cross-sea bridge in Taiwan spans its outlet. Under natural conditions, the residence time of seawater in the lagoon is approximately 30 days. However, large amounts of oyster racks and cages in oyster farms, in addition to wastewater discharged from nearby homes and fish farms, have caused the seawater in the lagoon to deteriorate. Originally, there were plans to set up at least 5 wastewater treatment facilities around the area to treat the wastewater. However, the associated machinery and concrete buildings were replaced by constructed wetlands, an ecological engineering method. This effort has been widely hailed as a key feature of Dapeng Bay National Scenic Area, in addition to providing benefits such as flood mitigation, water purification, and biodiversity enhancement in the area. The Dapeng Bay National Scenic Area Administration has proposed the establishment of 6 constructed wetland areas that will be mainly dominated by gray mangroves.Furthermore, this project will also involve the restoration of spotted mangroves and black mangroves, which have previously existed in the area. Moreover, each wetland is adjacent to different communities that each specialize in the cultivation of different fish species and have thus developed differing fish farming cultures. The Dapeng Bay constructed wetland system's unique soil-plant-microorganism ecology, together with the local fish farming culture, lagoon ecology, and mangrove ecology have collectively created a diverse environment for ecotourism. The six wetlands are the Datan Wetland Park, Pengcun Wetland Park, Linbian Drainage Right Bank Wetland Park, Linbian Drainage Left Bank Wetland Park, Cifong Wetland Park, and Mangrove Wetland Restoration Park (Dapeng Bay National Scenic Area, 2019).

Despite being an island nation rich in lagoons and wetland resources, Taiwan's knowledge regarding ecotourism in wetlands remains shallow. The distribution of wetlands in Taiwan is related to its natural geography. Taiwan is located on the edges of the Eurasian and Philippine Sea plates, resulting in the formation of the Central Mountain Range in its center, as well as large differences in elevation between its plains and plateaus. The temporal distribution of the rainy season and summer typhoons in Taiwan often results in large discharges of sediments from its mountains into its rivers. Moreover, the gradual slope of the continental shelf along the western coast offers natural conditions for the formation of wetlands, such as estuarine deltas, lagoons, swamps, and mudflats (Hsu, 2011).

Ecotourism is a form of tourism that combines tourism and environmental conservation, and is widely promoted around the world. The concept of ecological conservation has gradually been adopted by humans following changes in our life values. Ecotourism is often regarded as a method that involves conserving and

maintaining the natural environment, as well as promoting economic development among the locals. Although researchers differ with regard to specific environmental concepts, the core principles of ecotourism revolve around environmental issues and environmental conservation. According to relevant studies, the aspects of environmental knowledge are environmental sensitivity, knowledge of ecology, knowledge of environmental issues, and strategies for environmental action (Yu &Chen,2012). An individual's environmental attitudes can be expressed through their perspective on the environment, such as their concerns, beliefs, and intentions to act on environmental issues. Therefore, an individual's environmental attitudes are related to their strong concern for the environment, as well as their motivation to actively participate in acts of environmental protection and improvement (Lin & Fang, 2018). The previous discussion reveals that ecotourism has become a popular leisure activity over the years following the increase in environmental protection and awareness among humans, as well as the promotion of ecotourism-related activities. By utilizing the superb ecological resources available, ecotourism is beneficial for the development of the tourism industry in Taiwan. By examining the interactions between an individual's environmental knowledge, environmental attitudes, and leisure satisfaction, we can develop an understanding of the effects of these factors on leisure satisfaction. The Dapeng Bay National Scenic Area is used as an example in this research to investigate the effects of visitors' environmental knowledge, environmental attitudes, and leisure environment on their leisure satisfaction.

II. Literature Review

(1) Environmental knowledge

Environmental knowledge consists of aspects such as knowledge of ecology, knowledge of environmental issues, and knowledge of environmental action strategies, which are topics covered in environmental education (Jho, Chen, & Lin, 2013). According to (Hungerford & Volk,1990), environmental knowledge is based on (i) knowledge of the natural environment, including the study of ecology and its aspects such as the structure and function of ecological systems, the movement of materials and energy within these systems, and the effects of human impacts; (ii) knowledge of environmental issues, such as natural resources and the consequences of overexploitation of such resources; and (iii) knowledge of and skills in using environmental action strategies, including types of environmental actions, suitable solutions for environmental issues, and environmental action skills. These aspects are in agreement with those of (Marcinkowski, 1988). According to (Chen, 2004), the aspects of environmental knowledge include knowledge of ecology (such as ecological systems, food chains, ecological conservation, evolution, biodiversity, environment, rainforests, organisms, and the exploitation of biological resources); knowledge of environmental science (such as air pollution, water pollution, noise pollution, waste treatment, the prevention of environmental pollution, and the effective use and management of energy, resources, and agriculture); and knowledge of environmental issues (such as the Greenhouse Effect, ozone depletion, the El Niño phenomenon, wastes, and environmental pollution).

(2) Environmental attitudes

Widegren (1998) defined environmental attitudes as an individual's characteristics acquired over time, in which the individual expresses continuous concern for environmental issues, and culminating in taking actions for environmental protection. Thus, an individual's environmental attitudes include their environmental values and environmental beliefs. Environmental attitudes also refer to environmental sensitivity, environmental beliefs, and environmental ethics, which are incorporated in environmental education (Jho*et al*. 2013). According to (Yu*et al*. 2012), an individual's environmental attitudes are the combined beliefs in certain environmental issues, the global environment, or humans or objects directly related to the environment. These combined beliefs involve the overall assessment of an individual's support and preferencesregarding environmental-related topics. Environmental attitudes consist of an individual's attitudesregarding the five following topics: environmental issues, ecological conservation, resource issues, environmental sustainability, and environmental skills. According to (Ji&Yeh, 2015), an individual's environmental attitudes refer to their perceived degree of belief (concerning issues such as positive or negative aspects) with respect to the natural environment. These attitudes are consistent and persistent, as they are an individual's psychological response (such as support and preferences) towards the environment or aspects related to the environment. An individual's environmental attitudes often reflect their feelings or behaviors toward the environment, and can be attained through the process of socialization. Lai (2005) referredto environmental attitudes as an individual's values regarding the environment, such as self-perceived environmental responsibility and the level of concern with respect to environmental issues. When an individual possesses correct environmental attitudes, they develop a strong sensitivity and concern for the environment, thus becoming active in taking actions for environmental protection or even devising a concept of co-existence and co-prosperity between humans and the environment. A study by (Lang*et al.* 2011) measured environmental attitudes on a scale that covers three topics: the balance of

nature, the limits of growth, and the overexploitation of nature.Meanwhile,Wangand Chen (2018) measured the environmental attitudes of participants who took part in ecological education using a scale which consists of environmental ethics, environmental education, and sustainable development.

(3) Leisure satisfaction

Beardand Ragheb(1980) defined leisure satisfaction as the positive feedback or satisfaction perceived by an individual after engaging in leisure activities. The satisfaction of an individual's basic needs results in their leisure satisfaction. (Dorfman, 1979) referred to leisure satisfaction as the objective feedback received by individuals after engaging in leisure activities and experiences, and stated that it is affected by various objective and subjective factors occurring throughout the process. According to (Yeh*et al*. 2017), an individual attains leisure satisfaction when they are satisfied with their leisure activities. The authors of that study devised a leisure satisfaction scale based on the participants' physical and mental feelings, the facilities provided, and the management services provided. Liao and Hsieh (2015) expressed the view that leisure satisfaction consists of an individual's expectations before taking part in leisure activities, as well as the feeling of contentment achieved after completing such activities. The authors of that study measured leisure satisfaction based on psychological, social, physiological, and environmental aspects. A study by Yang*et al*. (2016) on the variation between trail walkers' perceived satisfaction and sense of well-being classified leisure satisfaction into four aspects, namely perceived social, psychological, relaxation, and educational satisfaction.

III. Research methods

(1) Research objectives

The Dapeng Bay National Scenic Area was cited as an example in this research based on its pro-active efforts in promoting ecotourism. The objectives of this research were: (i) to understand the differences among the visitors' socio-demographic characteristics, environmental knowledge, environmental attitudes, and leisure satisfaction ; (ii) to validate and understand the causal relationsamong the visitors' environmental knowledge, environmental attitudes, and leisure satisfaction by means of structural equation modeling; and (iii) to establish a structural model that provides beneficial information for promoting ecotourism in the Dapeng Bay National Scenic Area, in addition to benefiting the tourism sector.

(2) Research Hypotheses

Based on the objectives and theoretical derivations, this study proposed the following research framework (Figure 1) and hypotheses:

(i) Environmental knowledge significantly affects Environmental attitudes.

(ii) Environmental attitudessignificantly affects Leisuresatisfaction.

Figure 1. Research framework

(3) Research participants

The participants in this research consisted of Dapeng Bay National Scenic Area visitors recruited by means of convenience sampling. Between 2019/01/01 and 2019/03/31, 316 out of 500 questionnaires distributed were responded to. After removing 15 invalid questionnaires, the number of valid questionnaires was 301, indicating a response rate of 60.2%.

(4) Research tools

(i) Environmental knowledge scale

There were three aspects in this scale, namely knowledge of the natural environment (EK1), knowledge of environmental issues (EK2), and knowledge and skills regarding environmental action strategies (EK3). These aspects were based on studiesHungerford and Volk (1990), Marcinkowski (1988), Chen (2004), Yu *et al*. (2012), and Jho*et al*. (2013). There were 9 questions, and responses were measured on a 7-point Likert scale.

(ii) Environmental attitudes scale

There were three aspects in this scale, namely environmental ethics (EA1), environmental education (EA2), and sustainable development (EA3). These aspects were based on studiesWidegren (1998), Lai (2005),

Yu *et al*. (2012), Jho*et al.* (2013), Ji and Yeh (2015), and Lin and Fang (2018). There were 9 questions, and responses were measured on a 7-point Likert scale.

(iii) Leisure satisfaction scale

There were four aspects in this scale, namely perceived social satisfaction (LS1), perceived psychological satisfaction (LS2), perceived relaxation satisfaction (LS3), and perceived educational satisfaction (LS4). These aspects were based on studiesDorfman (1979), Beard and Ragheb (1980), Liao and Hsieh (2015), Yang *et al*. (2016), and Yeh*et al*. (2017). There were 12 questions, and responses were measured on a 7-point Likert scale.

IV. Results and analysis

(1) Analysis of participants' basic profiles

In this research, the investigated socio-demographic characteristics of the participants consisted of their gender, age, employment status, education level, income, and place of residence. There were 152 male and 149 female participants, of whom 59.14% (178 participants) were aged between 41-50 years. 63.5% of them (191 participants) held a college degree, and 193 participants were public servants or students. The most common income range was from NTD 30,001 to 40,000. Most of the participants were from Pingtung County.

(2) Analysis of aspects

(i) Analysis of current environmental knowledge of visitors who took part in ecotourism in the Dapeng Bay National Scenic AreaFrom highest to lowest, the mean scores of the visitors' environmental knowledge were as follows: Knowledge of the natural environment (0.80) > knowledge of environmental issues (0.75) > knowledge and skills regarding environmental action strategies (0.70). In general, it is easier for people to comprehend phenomena of the natural environment, such as sunlight, air, land, soil, water, and forests, than it is for them to have knowledge of environmental issues or knowledge and skills regarding environmental action strategies.

(ii) Analysis of current environmental attitudes of visitors who took part in ecotourism in the Dapeng Bay National Scenic Area From highest to lowest, the mean scores of the visitors' environmental attitudes were as follows: environmental ethics (0.92) > environmental education (0.88) > sustainable development (0.86). Participants must have correct environmental attitudes and values in order to foster ideal environmental behavior, and to achieve sustainable development through environmental education.

(iii) Analysis of current leisure satisfaction of visitors who took part in ecotourism in the Dapeng Bay National Scenic Area From highest to lowest, the mean scores of the visitors' leisure satisfaction were as follows: perceived psychological satisfaction (0.94) > perceived relaxation satisfaction (0.90) > perceived educational satisfaction (0.84) > perceived social satisfaction (0.79). Participants must be interested in ecotourism activities in order to boost their self-confidence, relieve stress, and be more relaxed, as well as to have social interactions with other people.

(3) Assessment of model fitting

From the table 1, it can be seen that the chi square/degrees-of-freedom ratio (88/33) and the GFI value were, respectively, 2.67 and 0.93, indicating a good fit. The AGFI and RMSEA values were, respectively, 0.89 and 0.082, indicating an acceptable fit. The absolute fit model used in this research was considered acceptable.

Table 1. Overall model goodness-of-fit evaluation

Evaluation Index		Goodness-of-fit tandard	Result	Comments
Absolute fit	X^2/df	≦3	2.67	Good fit
	GFI	≧0.9	0.93	Good fit
	AGFI	≧0.9	0.89	Acceptable fit
	RMSEA	≦0.08	0.082	Acceptable fit

(4) Path analysis and confirmatory analysis

Figure 2.shows the study testify the result form coefficient finds that (i) There is a significant difference between Environmental knowledge and Environmental attitudes. The result shows that the standard coefficientis 0.28（t＝3.72） and has a significant difference. (ii) The Environmental attitudes has a significant difference to Leisure satisfaction and coefficientis 0.22（t＝3.24）. The two hypothesizes of study are all accepted.

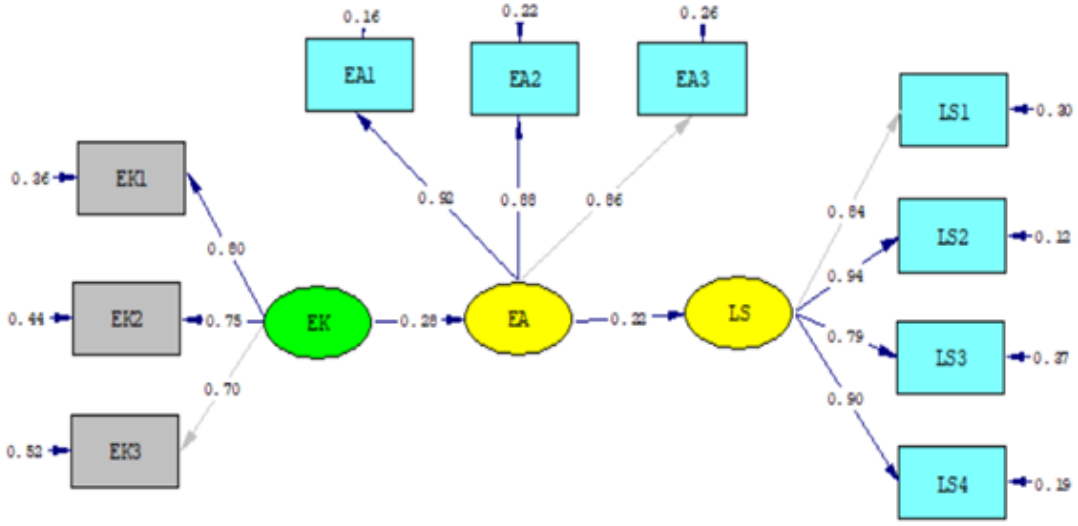

Figure 2. Standardized path diagram of this study

V. Conclusion and recommendations

(1) Conclusion

Based on the analysis above, the model used in this research has achieved a good fit, providing evidence to support the conceptual framework devised in this research. The effects between variables are as follows:

(i) Effect of visitors' environmental knowledge on their environmental attitudes

In this research, the visitors' environmental knowledge had a significant effect on their environmental attitudes, which is in agreement with the results obtained by Yu*et al*. (2012), Jho et al. (2013), and Lam (2014).

(ii) Effect of visitors' environmental attitudes on their leisure satisfaction

In this research, the visitors' environmental attitudes had a significant effect on their leisure satisfaction, which is in agreement with the results obtained by ThadaradChaveanghong (2017) and Tsay(2018).

(2) Recommendations

As ecotourism becomes increasingly popular, it is important to comprehend relevant factors such as visitors' environmental knowledge, environmental attitudes, and leisure satisfaction beforehand, in order to achieve significant benefits of ecotourism for sustainable development. This is also important for the promotion of ecotourism in Taiwan's national scenic areas, as well as for developing the local leisure and tourism industry.

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