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Exploring Factors Influencing Tourists' Environmentally Responsible Behavior for Snorkeling Tourism, Thailand

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ABSTRACT

Snorkeling is one of the leading causes of marine environmental degradation in coastal destinations around the world, and tourists' irresponsible behavior is a major contributor. The development of environmentally responsible behavior among tourists has thus become critical in preventing and mitigating marine and coastal natural resource problems. Using the extended theory of planned behavior (TPB), this study aims to explore factors influencing tourists' environmentally responsible behavior. The study was conducted from June 1 to December 30, 2022, with 520 participants in Mu Koh Lanta and Hat Chao Mai Marine National Parks, Thailand. Self-administered questionnaires were used to collect the data. The collected data were analyzed by using SEM. The empirical findings show that extended TPB with sociopsychological components (such as environmental concern, environmental attitude, subjective norm, environmentally responsible behavioral intentions) and socioenvironmental factors (environmental knowledge) can explain tourists' environmentally responsible behavior.

1. INTRODUCTION

Nowadays, the popular activity for numerous tourists is coral reef site-seeing, and one of the businesses is likely to expand rapidly. It causes employment and changes economic structure at the domestic and at the national level [1, 2].

Since coral reef are abundance areas with high biodiversity of plant and animal species, the popular activities are snorkeling, scuba diving, and fishing. Although coastal communities and the nation get economic benefits from these activities, these activities possibly threat to coral reefs, marine and coastal natural resources. In other words, snorkeling and scuba diving may result in the deterioration of the ecosystem [1-5].

The possible things which tourists do are to step or to touch corals, to break or to collect corals, sedimentation on corals caused by flippers, to feed fish, to use sunscreen which is harmful to corals, to bring dead corals as souvenirs, to throw rubbish into the sea, and to eat parrotfish. Also, anchor ships in coral reef areas, waves from either diving or tail-sail cause broken corals [3, 5-7], and coral diseases in the dive areas occur due to high tourists [5].

Many previous studies point that snorkeling has less affecting marine ecosystems than scuba diving, so extensive support in marine protection areas around the world promotes snorkeling [8]. As a result, the snorkeling tourism industry has grown rapidly and has become the main tourism activity that takes place in many coastal areas [9]. These results are in agreement with Worachananant et al. [10], which have observed that 64.6% of tourists who visit the Andaman coast, Thailand prefer snorkeling, followed by scuba diving (16.6%), and the other. Tourists choose snorkeling activity because they can do snorkeling without training including inexpensive expense, compared to scuba diving [11]. Therefore, with large number of tourists to do snorkeling, areas should have suitable management; otherwise, activities originated from tourists may lead to environmental deterioration [5, 8].

Many studies related to environment in tourist attractions [12], with many theories clearly indicate that the background is a factor affecting the environmental responsibility behavior [13]. Most studies associated with behavior responsible for tourists focus on the backgrounds of tourists, which are expected to be a factor affecting the environmental behavior [14].

Thailand is famous for it has an abundance of maritime resources and tourist sites, with 2614 kilometers of coastline and 936 islands, attracting around 50 million tourists globally each year [15]. Similar to other marine national parks in Andaman Coast, Southern Thailand, Mu Koh Lanta and Hat Chao Mai are well-known for natural tourism and recreation, particularly snorkeling [16]. Marine National Park's primary goals are to save endangered ecosystems, preserve biodiversity, and also provide as a destination for recreational purpose [5]. The increasing number of tourists who snorkeling in marine national parks can inflict direct and indirect negative impacts on the marine environmental.

Regarding increasing number of tourists who snorkeling together with the lack of research on the environmental responsibility behavioral, this study aims to investigate the environmental responsibility behavioral of snorkeling tourists in Thailand which is most likely the first study to investigate on this aspect in the country.

2. LITERATURE REVIEW

2.1 Theory of planned behavior

Ajzen introduced the theory of planned behavior (TPB) for the first time in 1985. The TPB model evaluates individuals' intents to undertake a certain action in order to determine how important an action is to them and how much effort they are willing to expend to perform a specific behavior. According to this model, behavioral intention, which is influenced by three determinants: attitude, subjective norm, and perceived behavioral control, forms the basis of human behavior [17].

Numerous scholars have emphasized the importance of including other social variables in the TPB model, which has been used successfully and comprehensively in several studies to explain various aspects of behavior [18]. It was discovered that the expanded TPB model that included other variables had better predictive ability than the original TPB model [19]. The extended TPB model has strong support and has been successful in explaining many various aspects of environmental behaviors, such as tourists' environmentally responsible behavior [20].

2.2 Environmental knowledge

Environmental knowledge (EK) is information that people have about the environmental situation and natural resources, the impact of consumption and production, including methods to protect the environment, natural resources, and ecosystems [21]. It is so important because people are able to understand the basis of problems and solve environmental problems [22] and encourage people awareness and have a good attitude towards the environment [23].

On the other hand, EK stimulates people to be aware the environment and the intention to solve the occurring problem [21, 22, 24] It is one of the factors influences environmental concern. If someone know more information of environmental problems, he will be more concern with environment [25]. Moreover, EK is positively related to environmental attitude. In contrast to people with lower levels of EK [22, 24, 26], people with higher levels of EK have more cares about the environment.

This study therefore considers EK as a significant predictor of environmental concern as well as environmental attitude, and hypothesizes the following for empirical testing:

H1: Higher levels of environmental knowledge lead to increased levels of environmental concern

H2: Higher levels of environmental knowledge lead to increased levels of environmental attitude

2.3 Environmental concern

Fransson and Ga¨rling [27] define environmental concern (EC) as a value orientation that places a high emphasis on concern for the ecosystem and as a positive attitude toward ecologically relevant conduct. This definition corresponds to Hansla et al. [28], who define EC as an individual's emotional response to environmental issues tends to get stronger when they are concerned about the environment. It describes the attitude toward environmental difficulties, environmental deterioration, and climate change, whether it is favorable or unfavorable. Previous studies have demonstrated the strong and positive link of EC towards attitudes, and subjective norm [29, 30]. People who are aware of the environmental impact of manufactured products are more likely to purchase products that have the least negative impact on natural resources and the environment [31, 32].

This study therefore considers EC as a significant predictor of environmental attitude as well as subjective norm, and hypothesizes the following for empirical testing:

H3: Higher levels of environmental concern lead to increased levels of environmental attitude

H4: Higher levels of environmental concern lead to increased levels of subjective norm

2.4 Environmental attitude

An environmental attitude (EA) can be defined as an individual's attitudes about some components of their environment, which may be viewed as the overall worrying degree of environmental issues [24]. Attitudes are related to one another logically, when one descends the hierarchy, lower-order attitudes become more focused and concrete while higher-order attitudes are more general and abstract [33]. Previous research on environmentally responsible behaviors discovered evidence of positive relationships between attitude and intention [34]. In tourism sector, several studies indicted tourists' general attitudes to participating in the sustainability are more likely to participate in environmental protection [35, 36].

This study therefore considers EA as a significant predictor of environmentally responsible behavioral intentions, and hypothesizes the following for empirical testing:

H5: Higher levels of environmental attitude lead to increased levels of environmentally responsible behavioral intentions

2.5 Subjective norm

Subjective norm (SN) is defined as an individual's sense of moral obligation [37]. These moral requirements could vary depending on the situation, but they almost always have a big impact on how people behave [38]. Previous research has demonstrated the influence of SN on behavioral intentions [39, 40]. Personal SN on environmental is convictions and a duty to conduct in a particular manner with regard to the environment [41]. According to several studies, environmentally responsible behavioral intentions and SN are positively correlated [42, 43].

This study therefore considers SN as a significant predictor of environmentally responsible behavioral intentions, and hypothesizes the following for empirical testing:

H6: Higher levels of subjective norm leads to increased levels of environmentally responsible behavioral intentions

2.6 Environmentally responsible behavioral intentions

Behavioral intention is thought to be the immediate cause of behavior [44]. Past studies showed that the primary predictor of environmentally responsible behavior (ERB) is environmentally responsible behavioral intentions (ERBI) [45, 46]. Previous tourism research demonstrated the strong and positive link of tourists' intentions affect their behavior, if tourists are committed to marine ecotourism, they will take steps to participate in it [47, 48].

This study therefore considers ERBI as a significant predictor of ERB, and hypothesizes the following for empirical testing:

H7: Higher levels of environmentally responsible behavioral intentions lead to increased levels of environmentally responsible behavior

According to the literature review discussed above, the conceptual model of the study was designed in relation to the defined hypotheses as shown in Figure 1.

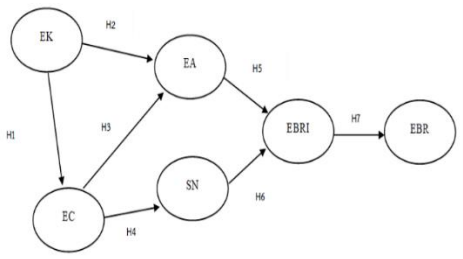

Figure 1. Conceptual model and hypotheses

3. METHODOLOGY

3.1 Location

The study was conducted in Mu Koh Lanta Marine National Park, Krabi Province, and, Hat Chao Mai Marine National Park, Trang Province, Thailand.

3.2 Instrument

The survey used in this study was split into two main sections. In the first part, the purpose of the inquiry was to gather respondents' fundamental sociodemographic details, including gender, age, status, education, occupation, and monthly income (Bath). The second part aimed to measure research construct items, which required respondents to respond on five-point Likert scales (1 = strongly disagree to 5 = strongly agree). There was a total of 28 measurement items, all items for the nine constructs were adapted from previous research findings on ERB.

EK nine items were adapted from Ong and Musa [12], and Ha et al. [49]. EC five items were adapted from Liu et al. [14], and Ibnou-Laaroussi et al. [50]. EA three items, SN three items were adapted from Panwanitdumrong and Chen [20], and Wang et al. [51]. ERBI four items, and ERB four items were adapted from Liu et al. [14], and Wang et al. [51].

3.3 Data collection

The questionnaires were distributed Thai tourists at the study area. A pilot test survey was conducted with 30 respondents. A total of 30 valid samples were tested for the internal consistency of each construct's elements. The Cronbach's alpha coefficients of all constructs ranged from 0.742 to 0.805 and were above 0.7, indicating that the items used to measure the six constructs were reliable [52].

The formal study ran from June 1 to December 30, 2022. On-site data was collected using a convenience sampling method. At the study site, 550 questionnaires were distributed. 520 questionnaires were returned, with 30 being rejected due to missing items.

3.4 Data analysis

For descriptive and inferential statistical analysis, SPSS 22.0 and Amos version 24.0 were used, respectively. The number, percentage, means, and standard deviations of descriptive statistics were calculated, two steps were taken to test the hypothesis using inferential statistics: (1) Confirmatory factor analysis (CFA) was employed in the measurement model to validate the reliability and validity of each construct's measurement scale. (2) The SEM was analyzed to test the model's coherence with empirical data and to identify the causative elements influencing tourists' environmentally responsible behavior.

According to Hair et al. [53], Kline [54], a good model fit representing the value of a normed chi-square ($\chi 2$/df) should be less than 3, whereas the goodness of fit index (GFI), adjusted goodness of fit index (AGFI), and comparative fit index (CFI), should be higher than 0.90, and the root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR) should be less than 0.05. The reliability of the instrument was also determined using Cronbach's alpha, composite reliability (CR), and average variance extraction (AVE) in accordance with Fornell and Larcker [55].

4. RESULTS

4.1 Demographic profile

Tourists' demographic profile was analyzed and presented in Table 1. 57.1% of respondents were female. 56.3% aged between 18 to 25. 51.9% of them were graduated from secondary school or vocational. Approximately 70% were single. With respect to career, about 27.9% were self-employed. 57.9 % of respondent earned 15,000 Bath or less.

Table 1. Demographic profile

Demographic	Category	Percentages
Gender	Male	42.9
	Female	57.1
Age	18-25	56.3
	26-35	23.5
	36-45	13.5
	46 and older	6.7
Education	Primary school	43.2
	Secondary school/Vocational	51.9
	Bachelor's degree or higher	4.8
Marital status	Single	71.0
	Married	24.6
	Other	4.4
Career	Self-employed	27.9
	Company employee	20.4
	Government employee	17.3
	Student/No income	23.3
	Other	5.4
Income (Bath)	15,000 or less	57.9
	15,001-30,000	31.7
	30,001-45,000	7.3
	45,001 or more	3.0

4.2 Measurement model

A confirmatory factor analysis (CFA) using the maximum likelihood estimation method was carried out to ensure that the measurement model construct comprising all latent variables could be measured based on the observed variable.

The CFA results demonstrated that the model had a good fit, with $\chi 2$/df = 2.06, GFI = 0.92, AGFI =0.90, CFI = 0.94, SRMR

= 0.03, and RMSEA = 0.04, all of which are within the recommended range. As a result, the items served as indicators for each latent variable, and the measurement model accurately represented the data.

Table 2 shows means, standard deviations, reliability, and convergent validity of six variables: EK, EC, EA, SN, ERBI, and ERB including its associated items. The meaning of each associated item was displayed in Table 5 (see appendix). According to Table 2, the reliability and validity of the six variables were confirmed. The reliability of all variables was checked with Cronbach's alpha coefficient (ranging from 0.742 to 0.805) and composite construct reliability (CR) (ranging from 0.751 to 0.901), higher than the recommended criterion of 0.7 [53, 55]. Therefore, all variables were reliable. In addition, the variable validity was tested through convergent validity and discriminant validity with standardized factor loading and average variance extracted (AVE). For the former, the standardized factor loading for each latent variable was positive from 0.602 to 0.891 and significant ($p < 0.01$). Most of loading values were above the criterion of 0.5 [50]. The AVE values of all latent variables were higher than the suggested threshold of 0.5 [53, 55], ranging from 0.505 to 0.516.

4.3 Structural equation modelling

In order to assess the extended TPB model's consistency with the empirical data based on fit indices and to test the causal linkages between the theoretical variables, the structural equation model was examined. The fit statistics of the model in this paper is as follows: $\chi 2/df = 1.982$, GFI = 0.925, AGFI = 0.901, CFI = 0.949, SRMR = 0.028, RMSEA = 0.043. These results indicate that the goodness-of-fit statistics of the modelling are positive.

Table 2. Means, standard deviations, reliability, and convergent validity

Variable	Items	Mean	S.D.	Cronbach's Alpha	Factor Loading	C.R.	AVE
EK	EK1	4.04	0.815	0.779	0.891	0.901	0.506
	EK2	4.35	0.844		0.651		
	EK3	4.25	0.781		0.649		
	EK4	4.24	0.799		0.742		
	EK5	4.31	0.821		0.674		
	EK6	4.15	0.866		0.814		
	EK7	4.37	0.761		0.665		
	EK8	4.31	0.916		0.656		
	EK9	4.14	1.04		0.617		
	Total	4.23	0.51				
EC	EC1	4.32	0.962	0.761	0.748	0.836	0.505
	EC2	4.22	0.868		0.681		
	EC3	4.28	0.834		0.722		
	EC4	4.22	0.898		0.691		
	EC5	4.40	0.826		0.712		
	Total	4.28	0.628				
EA	EA1	4.33	0.820	0.761	0.602	0.752	0.507
	EA2	4.29	0.870		0.842		
	EA3	4.27	0.898		0.678		
	Total	4.29	0.677				
SN	SN1	4.18	0.913	0.742	0.668	0.751	0.506
	SN2	4.16	0.882		0.830		
	SN3	4.13	0.993		0.620		
	Total	4.15	0.755				
ERBI	ERBI1	4.25	0.949	0.796	0.615	0.808	0.516
	ERBI2	4.36	0.810		0.697		
	ERBI3	4.31	0.864		0.758		
	ERBI4	4.37	0.870		0.792		
	Total	4.32	0.688				
ERB	ERB1	4.25	0.892	0.805	0.632	0.808	0.514
	ERB2	4.28	0.856		0.787		
	ERB3	4.38	0.833		0.707		
	ERB4	4.37	0.863		0.734		
	Total	4.31	0.684				

Table 3. Standardized path coefficients and hypothesis testing results

Hypothesis: Path	Standard Path Coefficient	Standard Error	t-Value	Test Results
H1: EK→EC	0.879**	2.284	2.494	Supported
H2: EK→EA	0.283	0.942	1.691	Unsupported
H3: EC→EA	0.674***	0.116	5.063	Supported
H4: EC→SN	0.852***	0.070	12.695	Supported
H5: EA→ EBRI	0.871***	0.110	8.771	Supported
H6: SN→ EBRI	0.127	0.072	1.617	Unsupported
H7: EBRI → EBR	0.913***	0.072	13.175	Supported

** $p < 0.05$.
*** $p < 0.01$.

Table 3 and Figure 2 indicate the results of the modelling test. The standardized path coefficients of EK to EC is 0.879, has a significant and positive effect. The findings revealed that EC to EA and SN are 0.674 and 0.852, respectively. Additionally, EA to EBRI is 0.871 and EBRI to EBR is 0.913, each value has highly significant and positive effect. However, EK to EA is 0.283, and SN to EBRI is 0.127, each value shows no significant effect.

As a result, hypotheses 1, 3, 4, 5 and 7 are verified, except 2 and 6 were not supported. The results indicated that the five endogenous variables were useful and significant to determine the core construct of the TPB model.

The predictive explanatory power of the model refers to R-square (R^2), which describes how much the independent variable can explain the variance of the dependent variable. Overall, the proposed model explained 83.3% of the variance in ERB ($R^2 = 0.833$).

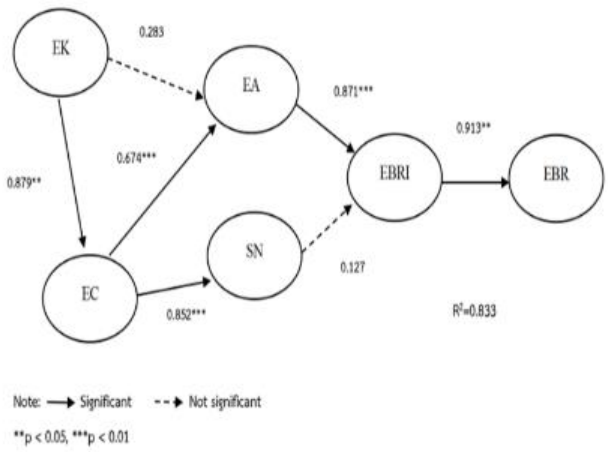

Figure 2. Structural model results

4.4 Indirect impact assessment

Table 4. Indirect impact assessment results

	EC			SN		
	DE	**IE**	**TE**	**DE**	**IE**	**DE**
EK	.879	-	.879	-	.749	.749
EC	-	-	-	.852	-	.852
SN	-	-	-	-	-	-
EA	-	-	-	-	-	-
EBRI	-	-	-	-	-	-
R^2		0.772			0.726	
	EA			**ERBI**		
	IE	**TE**	**DE**	**IE**	**DE**	**IE**
EK	.283	.592	.875	-	.857	.857
EC	.674	-	.674	-	.695	.695
SN	-	-	-	.127	-	.127
EA	-	-	-	.871	-	.871
EBRI	-	-	-	-	-	
R^2		0.869			0.949	
	ERB					
	TE	**DE**	**IE**			
EK	-	.783	.783			
EC	-	.635	.635			
SN	-	.116	.116			
EA	-	.795	.795			
EBRI	.913	-	.913			
R^2		0.833				

The indirect-impact analysis enables additional tests on the mediation effect among the variables in the proposed model. The analysis results were displayed in Table 4. The results signaled that EK has a direct effect on EC (DE= 0.879), has an indirect effect on SN (IE= 0.749), has a direct effect and indirect effect on EA (DE= 0.283) and (IE= 0.592), respectively, has an indirect effect on ERBI (IE= 0.857) and has an indirect effect on ERB (IE= 0.783).

EC has a direct effect on SN (DE= 0. 852) and EA (DE= 0.674), has an indirect effect on has an indirect effect on ERBI (IE= 0.695) and has an indirect effect on ERB (IE= 0.635).

SN has a direct effect on ERBI (DE= 0.127) and has an indirect effect on ERB (IE= 0.116).

EA has a direct effect on ERBI (DE= 0.871) and has an indirect effect on ERB (IE= 0. 795).

ERBI has a direct effect on ERB (DE= 0.913).

5. DISSCUSSION

This study's theoretical accomplishment is the establishment of a framework to explain the formation of tourists' ERB in order to prevent the environmental deterioration. TPB model was expanded to create this framework, which aims to incorporate socio-psychological components (such as EC, EA, SN, ERBI) and socio-environmental factors (EK).

Empirical evidence provides strong support for the study's findings. The significance of each element influencing tourists' engagement in ERB. These findings are similar with existing studies [14, 20, 47, 50, 51, 56, 57].

From a practical perspective, relevant government agencies should improve the medium of communication on the significance of the ERB to their tourists and establish a mechanism of receiving feedback related to the environmental practices of agencies within their trip. Tourist sites should enhance the sense of control of the ERB, provide tourists with an explanation of snorkeling EK in handouts, multimedia, posters, videos etc. Also, the promotion of environmental responsibility tourism should be done by tour operators, tourist guides, family members, and friends by way of reminders, persuasion, and setting an example for others.

6. CONCLUSION

This research uses extended theory of planned behavior model to illustrate the elements affecting the establishment of tourists' environmentally responsible behavioral at snorkeling areas, coastal of Andaman, Thailand. The results of the structural equation model analysis identified the important role of tourists' EK in strengthening their EC, and their EC to engage in that their beliefs about a given behavior EA and SN, and EA had significant, positive influences on ERBI. Moreover, tourists' ERBI had significant and positive effects on ERB. Further, this study offers practical implications in promoting effective ERB among tourists. Recommended tourism management measures include raising the awareness of tourists by enhancing their EK and EC. This will aid marine ecosystems conservation and such measures should be incorporated into methods for planning and managing sustainable snorkeling tourism in Hat Chao Mai National Park and Lanta Archipelago National Park. Future research could extend the original theory of planned behavior model by

including other factors such as socio-psychological, socio-environmental and demographic.

Similar to all studies, this study has limitations. First, self-administered questionnaires were used to obtain the data, which could have resulted in social desirability bias. On-site and observational investigations should supplement it. Secondly, the results of the study may not be applicable to a wider range of society due to few study areas. Future studies would benefit from broadening study areas to include additional locations.

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APPENDIX

Table 5. Question items of snorkeling tourists' environmental responsible behavior

	Associated Items
EK	
EK1	I am knowledgeable about marine life identification.
EK2	I am knowledgeable about ecological relationships among marine life in the coral reef.
EK3	I am knowledgeable about current threats to the marine environment in the coral reef.
EK4	I am knowledgeable about marine conservation programs at snorkeling site.
EK5	I am knowledgeable about negative impacts that snorkeling can create on marine ecosystems.
EK6	I am knowledgeable about ways to reduce negative impacts on the marine environment.
EK7	I am knowledgeable about usage of snorkeling equipment.
EK8	I am knowledgeable about prohibited activities in the marine national park.
EK9	I am knowledgeable about penalties for violating regulations in the marine national park.
EC	
EC1	I am concerned about the state of the marine environmental.
EC2	I am willing to help protect the marine environmental.
EC3	Major social changes are necessary to protect the marine environmental.
EC4	The condition of the marine environmental affects the quality of my snorkeling tourism experience.
EC5	I am willing to spend some energy in protecting the marine environmental during snorkeling activity.
EA	
EA1	It is beneficial to protect the marine environment of snorkeling site.
EA2	It is pleasant to protect the marine environment of snorkeling site.
EA3	It is wise to protect the marine environment of snorkeling site.
SN	
SN1	People who matter to me think I should take actions to protect the marine environment of snorkeling site.
SN2	People whom I respect hope I could protect the marine environment of snorkeling site.
SN3	People whom I am familiar with would take part in the protection of the marine environment of snorkeling site.
ERBI	
ERBI1	I am willing to observe guidelines for snorkeling notices.
ERBI2	I am willing to protect the coral reef of the snorkeling site from being destroyed.
ERBI3	I am willing to engage in reasonable disposal of the waste produced during my snorkeling trip.
ERBI4	I am willing to support people who want to practice environmental responsibility.
ERB	
ERB1	The beautiful natural scenery of the snorkeling site makes me consciously regulate my environmental behavior.
ERB2	I protect the coral reef of the snorkeling site from being destroyed.
ERB3	I engage in reasonable disposal of the waste produced during my snorkeling trip.
ERB4	I support people who want to practice environmental responsibility.