“Determinants of tourists’ pro-environmental behavior in coastal tourism sites: A case study from Vietnam”

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ARTICLE INFO	Dam Tri Cuong (2025). Determinants of tourists’ pro-environmental behavior in coastal tourism sites: A case study from Vietnam. *Environmental Economics*, *16*(2), 36-49. doi:10.21511/ee.16(2).2025.04
DOI	http://dx.doi.org/10.21511/ee.16(2).2025.04
RELEASED ON	Tuesday, 27 May 2025
RECEIVED ON	Saturday, 12 April 2025
ACCEPTED ON	Monday, 19 May 2025

JOURNAL	"Environmental Economics"
ISSN PRINT	1998-6041
ISSN ONLINE	1998-605X
PUBLISHER	LLC “Consulting Publishing Company “Business Perspectives”
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
57	2	6

BUSINESS PERSPECTIVES

LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine

www.businessperspectives.org

Dam Tri Cuong (Vietnam)

DETERMINANTS OF TOURISTS' PRO-ENVIRONMENTAL BEHAVIOR IN COASTAL TOURISM SITES: A CASE STUDY FROM VIETNAM

Abstract

Coastal tourism is a growing segment of the global tourist business. Nonetheless, the careless environmental behavior of travelers has precipitated significant problems. Thus, the purpose of this study is to examine the influence of visitors' environmental knowledge and recreational experience on their environmental commitment and attitude, which subsequently impacts their pro-environmental behavior. It uses cognitive-affective-conative theory to deepen the comprehension of the factors affecting tourists' pro-environmental behavior in the realm of coastal tourism in Vietnam. The proposed model was validated by partial least squares analysis with data collected from 303 online individuals with prior experience in coastal tourism in Vietnam, retrieved via Google Forms in April 2024 through convenience sampling. The findings reveal that environmental knowledge positively affected environmental commitment (β = .250, p = .000), environmental attitude (β = .331, p = .001), and travelers' pro-environmental behavior (β = .220, p = .000). Moreover, the recreational experience positively impacted environmental commitment (β = .629, p = .000), environmental attitude (β = .385, p = .000), and travelers' pro-environmental behavior (β = .259, p = .000). The research findings indicated a positive effect of environmental commitment on travelers' pro-environmental behavior (β = .268, p = .000). Finally, visitors' environmental attitudes positively influenced their pro-environmental behavior (β = .155, p = .006).

Keywords coastal tourism, tourists' pro-environmental behavior, environmental knowledge, recreational experience, environmental commitment, environmental attitude

JEL Classification M10, M19, M31

Received on: 12th of April, 2025
Accepted on: 19th of May, 2025
Published on: 27th of May, 2025

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Conflict of interest statement:
Author(s) reported no conflict of interest

INTRODUCTION

Coastal tourism is a crucial economic sector in both industrialized and developing nations with coastlines. It provides an economic stimulus and offers significant potential (Aziz & Niazi, 2023). However, the prevalent practice of extensive coastline tourism has begun inflicting harm on the ecosystem, adversely affecting both its condition and tourists' perceptions (Roca & Villares, 2008). Similarly, the coastal tourist industry faces significant challenges due to guests' negligent environmental conduct. Activities such as flower picking, trash in aquatic and coastal areas, wall painting, and wall scraping have negatively impacted the ecological and aesthetic integrity of the seaside region (Dagustani et al., 2022). Scholars have discovered that travelers who practice pro-environmental conduct can enhance the sustainability of travel sites (Liu et al., 2019; Tang et al., 2022). As a result, it is of the utmost importance to research the influence that tourists' environmental knowledge and recreational experiences have on their environmental commitment and attitude, which in turn impacts their environmentally conscious conduct. By doing so, the existing understanding of the elements that impact the environmentally conscious conduct of visitors in coastal tourism would be substantially improved.

http://dx.doi.org/10.21511/ee.16(2).2025.04

1. LITERATURE REVIEW

Coastal tourism denotes a type of tourism where individuals participate in activities in aquatic settings and along the coast. This type of tourism occurs in designated coastal regions allocated for recreational and leisure activities (Papageorgiou, 2016). Coastal tourism is a vital economic sector in both developed and developing nations that have coasts. Additionally, it has tremendous possibilities and has served as an economic accelerator in countries located along the shore (Aziz & Niazi, 2023). Likewise, coastal tourism is a developing segment within the global tourist business. Coastal beaches attract a vast number of tourists who engage in leisure pursuits, including "surfing, swimming, and camping" (Marzetti et al., 2016). The entertainment aspects of these growing tourist trends, such as the combination of "sea, sun, and sand" and a calm and pleasant environment, are noteworthy in coastal tourism. Not only does seaside tourism provide opportunities for leisure activities, but it also provides significant economic advantages to the visited locations (Sultan et al., 2021). Furthermore, environmental quality and preservation are crucial determinants of success in coastal tourism, as a well-preserved coastal ecosystem offers unobstructed areas and possibilities for tourist and recreational pursuits (Kenchington, 1993). From this perspective, beaches are vital assets that, when adequately safeguarded, may enhance the sector's sustainable growth (Semeoshenkova & Newton, 2015).

Nevertheless, due to the widespread practice of large coastal tourism, the business has begun to experience damage to the environment, which is negatively impacting both the environmental state and the way tourists perceive it (Roca & Villares, 2008). Moreover, the widespread irresponsible behavior of visitors hinders the sustainable maintenance of coastal environments for tourism (Sultan et al., 2021). Likewise, travelers' careless environmental behavior has raised severe issues for the coastal tourism business. The ecology and aesthetic appeal of the coastal region have been harmed by activities such as plucking flowers, throwing trash into the sea and around the beach, painting and drawing on walls, and wall scraping (Dagustani et al., 2022). Pollution is becoming a danger to the coastal ecology. Coastal environments have been harmed by tourism and leisure activities at coastal sites (Souza-Neto et al., 2023).

The ecology in the coastal region has been managed and regulated via the implementation of rules and legislation set out by the government. On the other hand, according to the majority of instances, the enforcement of laws does not result in beneficial outcomes; rather, it results in poor word-of-mouth regarding tourism destinations. Changing travelers' behaviors is the most important step in creating a sustainable coastal environment. Both governments and academics have established that the only way to achieve the manifestation of environmentally conscious conduct among visitors is to exert influence on the behavior of tourists (Aziz & Niazi, 2023; Panwanitdumrong & Chen, 2021; Wengel et al., 2022). Similarly, travelers may lessen environmental harm and improve the sustainability of tourist sites by adopting pro-environmental behavior. Travelers who practice pro-environmental behavior may help make tourist places more sustainable (Liu et al., 2019; Tang et al., 2022).

The cognitive-affective-conative (CoAC) paradigm serves as the theoretical underpinning, as articulated by Lavidge and Steiner (1961) and Hilgard (1980). The fundamental concept of the CoAC theory posits that a person's affective preference for objects arises from cognitive appraisal, ultimately influencing their attitude and behavioral decisions (Oliver, 1999). The cognitive aspect involves the formation of consciousness, ideas, and opinions about an object (e.g., coastal tourism sites) (Tasci et al., 2022). The affective approach pertains to customers' sentiments and emotions toward the object, which may be either favorable or adverse (Aziz & Niazi, 2023). The conative aspect refers to manifesting a person's intent, articulated via potential or actual behavior, such as intent to buy (Tang et al., 2022).

Due to its efficacy in elucidating views and actions, the CoAC theory has been extensively used in studies concerning customer behavior (Lim & Kim, 2020) and internet users' shared behavior (Hsiao, 2020). Several researchers in the field of tourism have utilized the CoAC theory to explore the loyalty of visitors (Ahn & Back, 2018). Additionally, other researchers have utilized this theory to shed light on the environmentally conscious actions of

tourists (Aziz & Niazi, 2023; Tang et al., 2022). The CoAC theory is crucial in elucidating a person's behavioral process. As a consequence of this, the current paper uses this theoretical framework to investigate the formative processes of visitors' environmentally conscious behavior. Following the CoAC theory, visitors' environmental knowledge and recreation experience (cognitive stage) would activate environmental commitment and environmental attitude (affective stage), subsequently affecting visitors' pro-environmental behavior (conative stage).

The term "pro-environmental behavior" refers to acts that either lessen the negative impact that a person's actions have on the environment or that contribute positively to the environment (Steg & Vlek, 2009). A range of actions may be classified as pro-environmental behavior, such as recycling, trash collection, energy saving, and volunteering for conservation initiatives (Wu et al., 2021). Pro-environmental behavior also denotes actions that are seen to aid or really assist in environmental conservation (Kurisu, 2015). This term is frequently used interchangeably with various other terms in academic literature, such as environmentally responsible behavior, environment-friendly behavior, green consumption, and eco-friendly behavior (Bhatti & Alnasser, 2023). Visitors' pro-environmental behavior denotes a collection of actions undertaken by visitors to safeguard the destination's environment, hence mitigating adverse environmental effects. These behaviors stem from the interaction between people and the environment via tourism-related activities. These interactions are essential for the long-term sustainability of tourism sites and the tourism industry as a whole (Deng et al., 2024). Visitors' pro-environmental behavior generally involves contributions to environmental protection and safeguarding, reduction of adverse effects on natural resources, and responsible conduct during recreational pursuits (Kim et al., 2018). Environmental knowledge is the comprehension of environmental concerns and encompasses a person's awareness of environmental impact, assessment, and shared accountability (Kim et al., 2018). Environmental knowledge is specifically articulated as people's environmental literacy. Environmental knowledge has heightened due to significant worldwide environmental issues, including ecological degradation, pollution, and disturbances caused by tourist operations. It has increased public understanding of ecological challenges and encouraged favorable environmental decisions (Abdullah et al., 2020).

According to Tang et al. (2022), environmental knowledge refers to an individual's understanding of environmental challenges and their corresponding remedies. Furthermore, lacking a foundation regarding scientific environmental knowledge, it is impossible for an individual to develop a sense of responsibility toward ecological concerns and to engage in environmental commitment actively. Their main point is that being environmentally knowledgeable is linked to committing to the environment. Additionally, Sangkhaduang et al. (2023) evidenced that environmental knowledge is essential because it helps individuals grasp the foundations of issues and handle environmental concerns.

Furthermore, environmental knowledge fosters perspectives and promotes a favorable attitude toward the environment. The correlation between environmental literacy and eco-friendly actions implies that eco-conscious travelers are more likely to participate in environmentally friendly pursuits. Insufficient environmental knowledge might impede individuals' comprehension of environmental mitigation strategies and the adoption of pro-environmental behavior (Ünal et al., 2018).

Holbrook and Hirschman (1982) used experienced perceptions to analyze consumer behavior. Experiences are emotions that individuals encounter throughout their engagement in an event (Poulsson & Kale, 2004). Recreational experience is a method in which a tourist attraction conveys its worth to visitors via the experience (Y. Wang & C. Wang, 2022). Recreational experience in tourism encompasses the emotional consequences following travelers' engagement in recreational activities (Lee & Jan, 2015). It is also how an attraction for travelers conveys its worth via experience (Lee & Sparks, 2007). Recreational experience is to be categorized into elements including satisfaction level, memory integration, preferences, motivation, demand, and intention, noting that the progression of each component is influenced by the environment around it, individual objectives, and attitudes (Y. Wang & C. Wang, 2022). Within the

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realm of nature-based tourism, the recreational experience can enhance the environmental commitment of tourists, which in turn can result in the development of favorable cognitions, feelings, and attitudes (Ballantyne et al., 2011).

Additionally, while tourists are close to the natural environment, they can enhance their environmental attitude and maybe inspire environmentally conscious behavior by participating in leisure activities (Weng et al., 2023). On the other hand, empirical proof by Lee (2011) argued that recreational involvement positively impacts conservation commitment. Similarly, Lee and Jan (2015) demonstrated that individuals' engagement in environmentally conscious behavior, both in general and in relation to specific locations, is increased when they participate in nature-based tourism, thereby positively contributing to sustainable tourism initiatives. Collado et al. (2013) proposed that students' attitudes toward the environment can be improved through direct participation in recreational activities. Likewise, according to Zhang et al. (2023), recreational specialization had a favorable influence on tourists' attitudes toward pro-environment and marine-based conservation behavior intention. Furthermore, Weng et al. (2023) argued that the recreational experience of tourists in the natural environment could increase their environmental attitude and pro-environmental behavior.

Commitment is a psychological connection that includes feelings and thoughts, enabling people to protect, sustain, and nurture connections and alliances (Davis et al., 2011). The notion of interdependence in interactions with others, which includes commitment, can extend to the connection between persons and their environment. In addition, the degree to which a person's requirements are met by a particular organization and the degree to which they are dependent on that entity to fulfill their desires are both indicators of the potential for increasing commitment (He et al., 2018). This argument indicates that the extent of dependence on the connection is a crucial aspect of a person's commitment level. Persons with a heightened degree of commitment to a particular issue are likely to invest more effort in protecting and sustaining that relationship. Therefore, environmental commitment is a connection between a person and the natural environment, characterized by a "psychological attachment to and long-term orientation toward the natural world" (Davis et al., 2009).

Environmental commitment also reflects a person's feeling of responsibility for ecological concerns (Tang et al., 2022). People who commit to protecting the environment are more likely to put their commitments into effect by acting responsibly toward the environment. There is a correlation between high levels of environmental commitment and an increase in the likelihood that individuals would engage in pro-environmental behavior (He et al., 2018). Likewise, visitors who create environmental commitment are more inclined to demonstrate their environmental responsibilities via practical acts. Elevated levels of environmental commitment correlate with a greater likelihood of individuals augmenting their pro-environmental behavior (Tang et al., 2022). In addition, a greater degree of environmental commitment is positively connected with an increased inclination to engage in pro-environmental behavior (Bhatti & Alnasser, 2023; He et al., 2018; Tang et al., 2022).

Attitude is defined as the extent of a person's favorable or adverse appraisal of a specific behavior (Sultan et al., 2021). In the setting of tourism, environmental attitudes denote an individual's positive or negative disposition toward specific environmental issues (Sultan et al., 2021). Environmental attitudes are also described as a psychological inclination shown via a person's assessment of a particular item or issue related to the environment (Weng et al., 2023). According to Weng et al. (2023), when environmental attitude is robust, an increased number of activities may be anticipated to bolster pro-environmental behavior. Several previous investigations have shown that positive environmental attitudes may significantly enhance pro-environmental behavior (Sangkhaduang et al., 2023; Y. Wang & C. Wang, 2022; Weng et al., 2023).

Over the last ten years, much research has been undertaken to examine the fundamental mechanism of pro-environmental behavior from different viewpoints (e.g., Aziz & Niazi, 2023; Confente & Scarpi, 2021; Jiang et al., 2022; Li et al., 2021; Panwanitdumrong & Chen, 2021; Tang et al., 2022). Yet, current research seldom examines the interac-

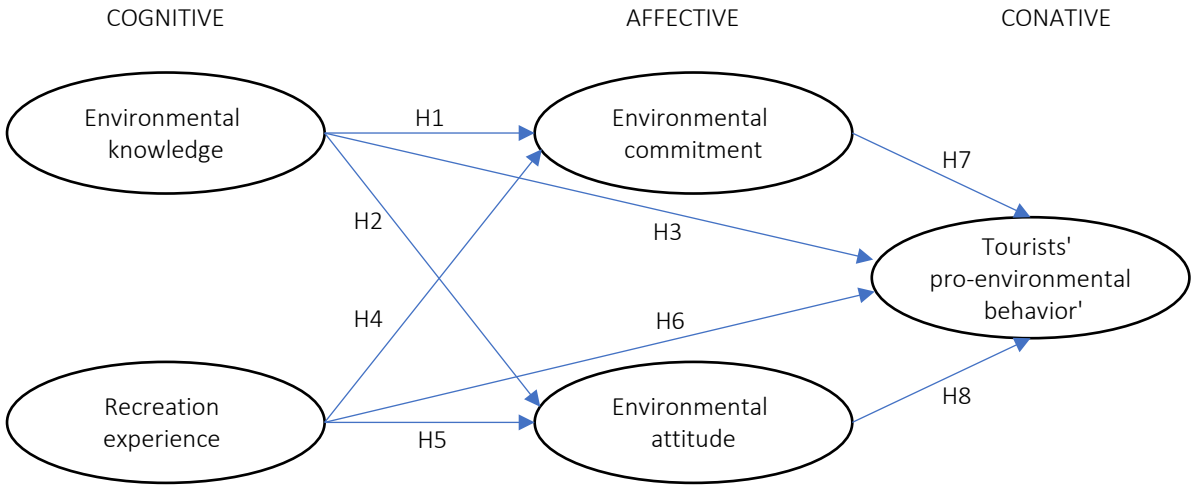

Figure 1. Research model

tion between tourists' environmental knowledge and recreation experience in shaping pro-environmental behavior. Hence, to attain the objective of sustainable tourism, it is crucial to comprehend the combined influence of tourists' environmental knowledge and recreation experience in forecasting pro-environmental behavior.

Moreover, cognitive and affective elements significantly influence visitors' pro-environmental behavior (Baird et al., 2022). According to the CoAC framework, cognitive elements such as tourists' environmental knowledge and recreation experience influence a tourist's attitude and emotions, which then drive their pro-environmental behavior (Lavidge & Steiner, 1961). Therefore, the CoAC theory offers a helpful basis for conceptually elucidating the impact of environmental knowledge and recreation experience on tourists' pro-environmental behavior. Nevertheless, the crucial concepts have been disregarded.

Hence, this paper aims to establish a connection between environmental knowledge and recreation experience and tourists' pro-environmental behavior, using the CoAC theory, to enhance the existing understanding of the determinants that impact tourists' pro-environmental behavior in Vietnam's coastal tourism. Specifically, the purpose of this study is to examine how visitors' environmental knowledge and recreation experience affect their environmental commitment and attitude, which in turn affects their pro-environmental behavior (Figure 1).

Thus, following an examination of the current literature, the hypotheses are articulated in the following way:

H1: Tourists' environmental knowledge has a favorable influence on environmental commitment.

H2: Tourists' environmental knowledge has a favorable influence on environmental attitudes.

H3: Tourists' environmental knowledge has a favorable influence on tourists' pro-environmental behavior.

H4: Tourists' recreational experience has a favorable influence on environmental commitment.

H5: Tourists' recreational experience has a favorable influence on environmental attitudes.

H6: Tourists' recreational experience has a favorable influence on tourists' pro-environmental behavior.

H7: Tourists' environmental commitment has a favorable influence on tourists' pro-environmental behavior.

H8: Tourists' environmental attitude has a favorable influence on tourists' pro-environmental behavior.

http://dx.doi.org/10.21511/ee.16(2).2025.04

2. METHODOLOGY

This study utilizes a quantitative online survey questionnaire to investigate the proposed hypotheses. All measurement concepts were mostly based on prior research, with certain items slightly adjusted to suit the context of Vietnamese clientele experienced in coastal tourism. The present study used the Likert scale to measure participants' levels of agreement, with 1 representing extreme disapproval and 5 denoting perfect agreement. Details about measurements are presented in Appendix A.

This study utilized convenience sampling due to the lack of a sample frame and knowledge regarding the overall population number. The sampling approach was selected because it has a number of benefits, including the fact that it is affordable, straightforward, and the individuals who participated are freely available (Etikan et al., 2016). The internet-based survey was published in April 2024 using Google Forms, aimed at clients with prior expertise in seaside tourism in Vietnam. Subsequently, these customers completed the form and disseminated it across their networks via Zalo and numerous social media platforms. This inquiry employs an internet-based survey as a data collection method, favored for its increasing prevalence, ease of use, adaptability, and efficiency (Andrade, 2020).

On the other hand, participants in the study were kept anonymous, and their names cannot be found. There is also no risk of harm or data breach, so official permission is unnecessary. Also, participants were informed about the research aim, how their information would be used, and that they could opt out at any time.

For the PLS-SEM assessment, Hair et al. (2021) state that a minimum of 200 samples are required for the analysis. Within the scope of this investigation, 303 people were found suitable for examination. Table 1 shows an overview of the characteristics of the sample.

Table 1. Sample's features

Characteristics	Features	Frequency	%
Gender	Male	142	46.9
	Female	161	53.1
Age	18-25	149	49.2
	26-40	127	41.9
	> 40	27	8.9
Income (million VND/monthly)	< 8	51	16.8
	8 ≤ 20	138	45.5
	20-35	76	25.1
	> 35	38	12.5
Education	High school	9	3.0
	College	71	23.4
	University	198	65.3
	Postgraduate	25	8.3

Table 1 indicates that 142 male participants comprised 46.9% of the total responses, while 161 female participants accounted for 53.1%. Respondents between the ages of 18 and 25 made up 49.2%, those between the ages of 26 and 40 made up 41.9%, and those over 40 years old made up 8.9% of the population. In terms of monthly income levels indicated in millions of Vietnamese dong, there are four different groups: respondents gaining less than eight (16.8%), respondents gaining from eight to less than 20 (45.5%), respondents gaining from 20 to 35 (25.1%), and respondents earning more than 35 (12.5%). The education levels of the respondents may be summarized as follows: high school (3%), college (23.4%), university (65.3%), and postgraduate (8.3%).

The collected data were analyzed using SmartPLS and partial least squares structural equation modeling (PLS-SEM).

3. RESULTS

Podsakoff et al. (2003) warned that common method bias (CMB) might skew research results when data were collected using self-report surveys. Therefore, in order to ensure that CMB did not significantly compromise the accuracy of the current findings, statistical techniques, including Kock's (2015) collinearity test and Harman's single factor test, were used. Harman's test indicated that one component accounted for 44.13% of the total variance, well below the anticipated 50%. In addition, according to Table 2, the VIF values for each construct are less than 3.3, resulting from a thorough collinearity test. According to Kock (2015), the existence of multicollinearity does not constrain the proposed model.

Table 2. Collinearity test (VIF)

Variables	EnA	EnC	EnK	ReE	TProEB
EnA	–	–	–	–	1.791
EnC	–	–	–	–	3.113
EnK	1.901	1.901	–	–	2.242
ReE	1.901	1.901	–	–	3.252
TProEB	–	–	–	–	–

Note: EnK – Environmental knowledge; ReE – Recreation experience; EnC – Environmental commitment; EnA – Environmental attitude; TProEB – Tourists' pro-environmental behavior.

Reliability is utilized to assess the consistency and dependability of the measures thoroughly. The range of Cronbach's alpha, which can be seen in Table 3, extends from 0.794 to 0.861. To a similar extent, the composite reliability (CR) index had a range from 0.801 to 0.863; these values are higher than the permissible threshold of 0.7. Based on the findings, the data exhibited a high level of reliability (Hair et al., 2021). Gefen et al. (2011) assert that measurement validity is evaluated via convergent and discriminant validity. Both of these components are examined in detail. The correctness of the items is evaluated using convergent validity, which involves examining each item's loadings as well as the average variance extracted (AVE). The AVE values for the constructs are shown in Table 3, which ranged from 0.591 to 0.688. In addition, the loadings were higher than 0.70, with values ranging from 0.723 to 0.860. In light of these results, the data have strong convergent validity (Chin, 1998).

Table 3. Validity of measurements

Constructs	α	CR	AVE	Loadings
Environmental knowledge (EnK)	0.794	0.801	0.618	0.822
				0.792
				0.727
				0.800
Recreation experience (ReE)	0.861	0.863	0.591	0.750
				0.752
				0.777
				0.799
				0.773
				0.760
Environmental commitment (EnC)	0.807	0.807	0.634	0.751
				0.828
				0.823
				0.780
Environmental attitude (EnA)	0.849	0.856	0.688	0.830
				0.820
				0.807
				0.859
Tourists' pro-environmental behavior (TProEB)	0.819	0.828	0.649	0.860
				0.801
				0.833
				0.723

The factors emphasized in bold in Table 4 represent the outcome of cross-loading pertaining to the same factor. The elevated levels of each indicator within its component, compared to those of unrelated indicators, provide strong proof of validity with discrimination (Hair et al., 2021).

Table 4. Cross-loadings

Variables	EnA	EnC	EnK	ReE	TProEB
EnA1	0.830	0.459	0.439	0.453	0.476
EnA2	0.820	0.495	0.474	0.469	0.446
EnA3	0.807	0.457	0.468	0.515	0.497
EnA4	0.859	0.533	0.578	0.579	0.566
EnC1	0.470	0.751	0.546	0.654	0.538
EnC2	0.557	0.828	0.602	0.647	0.563
EnC3	0.407	0.823	0.503	0.618	0.576
EnC4	0.435	0.780	0.520	0.629	0.604
EnK1	0.478	0.543	0.822	0.559	0.574
EnK2	0.397	0.625	0.792	0.644	0.608
EnK3	0.422	0.463	0.727	0.412	0.389
EnK4	0.574	0.504	0.800	0.527	0.524
ReE1	0.477	0.632	0.550	0.750	0.544
ReE2	0.399	0.611	0.518	0.752	0.559
ReE3	0.393	0.612	0.498	0.777	0.562
ReE4	0.488	0.647	0.517	0.799	0.541
ReE5	0.627	0.609	0.601	0.773	0.610
ReE6	0.411	0.576	0.476	0.760	0.494
TProEB1	0.595	0.624	0.626	0.645	0.860
TProEB2	0.566	0.576	0.572	0.540	0.801
TProEB3	0.379	0.558	0.535	0.577	0.833
TProEB4	0.373	0.549	0.419	0.555	0.723

Note: EnK – Environmental knowledge; ReE – Recreation experience; EnC – Environmental commitment; EnA – Environmental attitude; TProEB – Tourists' pro-environmental behavior.

Upon examination of the data presented in Table 5 and Figure 2, it becomes evident that environmental knowledge has a positive influence on environmental commitment (β = .250, p = .000), environmental attitude (β = .331, p = .001), and travelers' pro-environmental conduct (β = .220, p = .000), thereby confirming the hypotheses *H1*, *H2*, and *H3*. Similarly, it was shown that recreational experience had a significantly positive impact on environmental commitment (β = .629, p = .000), environmental attitude (β = .385, p = .000), and travelers' pro-environmental conduct (β = .259, p = .000), thus contributing to the validation of hypotheses *H4*, *H5*, and *H6*. The findings also demonstrated a positive influence of environmental commitment on the environmentally conscious actions of visitors (β = .268, p = .000), providing support for hypothesis *H7*. In the same vein, the

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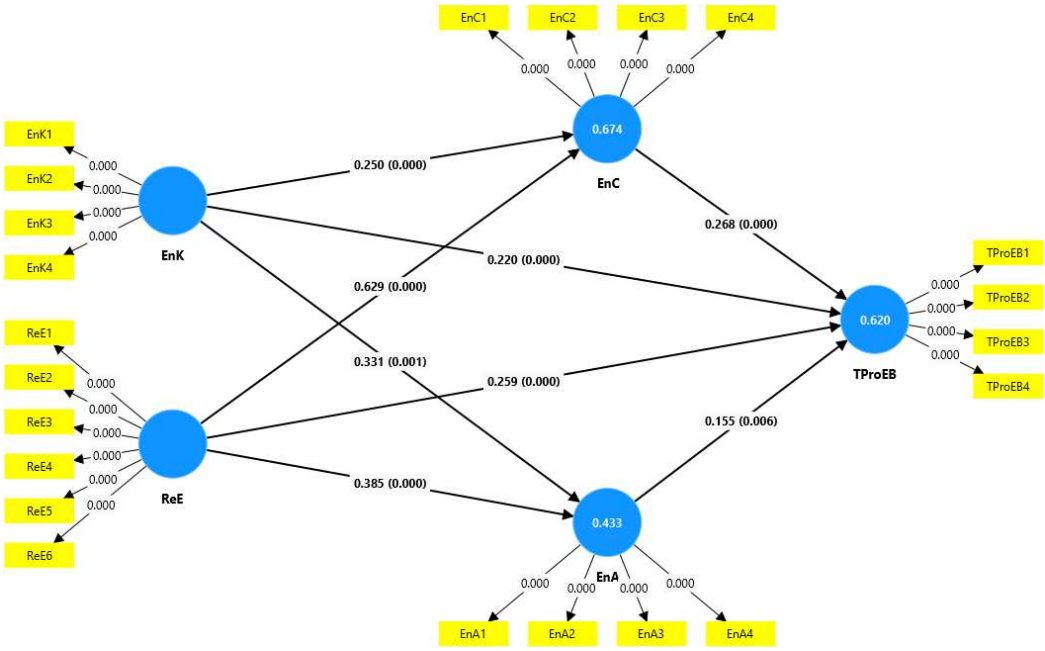

Note: EnK – Environmental knowledge; ReE – Recreation experience; EnC – Environmental commitment; EnA – Environmental attitude; TProEB – Tourists' pro-environmental behavior.

Figure 2. PLS results

Table 5. Testing of hypotheses

Hypothesis		Path coefficient	t-value	p-value	Decisions
H1	EnK → EnC	0.250	4.048	0.000	Confirmed
H2	EnK → EnA	0.331	3.303	0.001	Confirmed
H3	EnK → TProEB	0.220	3.757	0.000	Confirmed
H4	ReE → EnC	0.629	10.167	0.000	Confirmed
H5	ReE → EnA	0.385	4.247	0.000	Confirmed
H6	ReE → TProEB	0.259	3.503	0.000	Confirmed
H7	EnC → TProEB	0.268	3.720	0.000	Confirmed
H8	EnA → TProEB	0.155	2.755	0.006	Confirmed

Note: EnK – Environmental knowledge; ReE – Recreation experience; EnC – Environmental commitment; EnA – Environmental attitude; TProEB – Tourists' pro-environmental behavior.

statistical analysis revealed that visitors' environmental attitudes had a positive influence on their pro-environmental conduct (β = .155, p = .006), thus confirming assistance with hypothesis *H8*.

4. DISCUSSION

The results validated the beneficial effect of travelers' environmental knowledge on their environmental commitment within the field of coastal tourism. The findings are consistent with prior research (Tang et al., 2022). Moreover, there are beneficial effects of travelers' environmental knowledge on travelers' environmental attitudes. The findings are aligned with Zheng et al. (2018). The greater the degree of environmental knowledge among travelers, the more it affects how they view the relationship between people and the environment, how responsible they feel for environmental problems, how actively they participate in environmental commitment, and how they find solutions for them while also cultivating a positive perception of environmental attitude. However, these data also contradict the findings by Sangkhaduang et al. (2023), who posited that visitors' environmental knowledge did not influence tourists' environmental attitudes. The difference may be explained by the fact that Sangkhaduang et al. (2023) focused on snorkeling tourism among visitors in Thailand,

whereas the current paper examined coastal tourism among tourists in Vietnam; hence, the findings of this study need additional investigation to elucidate this matter. Likewise, according to the findings, environmental knowledge has a favorable influence on the tourists' pro-environmental behavior in the framework of coastal tourism. The findings support those of Ünal et al. (2018). The study's findings indicate that those with a greater comprehension of environmental issues are more likely to engage in environmental protection and partake in sustainable activities when involved in coastal tourism.

The findings confirmed the positive impact of travelers' recreation experience on travelers' environmental commitment within the field of coastal tourism. The results are consistent with prior research involving nature-based tourism (Lee, 2011; Lee & Jan, 2015). Likewise, the study found the positive impact of travelers' recreation experience on travelers' environmental attitude in the context of coastal tourism. The findings are aligned with earlier studies (Lee & Jan, 2015; Y. Wang & C. Wang, 2022). Moreover, there is an advantageous impact of travelers' recreational experiences on travelers' pro-environmental behavior within the realm of coastal tourism. The results correspond with Lee and Jan (2015) and Y. Wang and C. Wang, 2022). The more tourists engage in recreational experiences, the more they are in direct touch with the natural environment, the more they increase their environmental commitment and environmental attitude, and the more they boost pro-environmental conduct.

The findings suggest that travelers' environmental commitment positively influences their pro-environmental conduct. The findings align with Bhatti and Alnasser (2023), He et al. (2018), and Sahabuddin et al. (2021). Likewise, travelers' environmental attitude favorably affects tourists' pro-environmental behavior. The findings align with prior studies (Čapienė et al., 2022; Weng et al., 2023). When it comes to the relationship between an individual and their surroundings, environmental commitment and attitude represent a positive attachment to the environment, representing a person or team's psychological identity and association with the natural setting (Tang et al., 2022). Environmental commitment and environmental attitude emphasize people's environmental responsibility and necessitate the prioritization of ecological considerations above tourism advantages to attain this goal. A commitment and attitude toward environmental preservation, as well as the adoption of environmentally conscious conduct, would have a positive impact on the environmentally conscious behavior of visitors throughout all tourism activities. These results are opposite to those of Zhou et al. (2024), who argued that attitudes toward ecotourism do not directly impact the environmentally conscious actions of visitors. The discrepancies can be elucidated as Zhou et al. (2024) assessed ecotourism attitudes through the lenses of interest, pleasure, significance, and value, suggesting that favorable attitudes toward tourism do not necessarily translate into pro-environmental behavior. Conversely, this study evaluated environmental attitudes in terms of preservation awareness, the merit of conservation, the necessity of safeguarding, and the benefits of protecting the coastal environment. Consequently, tourists' environmental attitude exerts a significant impact on tourists' pro-environmental behavior.

CONCLUSION

Using the cognitive-affective-conative (CoAC) theory and empirical research, this work aimed to determine the factors that influence visitors' pro-environmental behavior in coastal tourism. This paper sought to assess the effect of tourists' environmental knowledge and recreational experience on their environmental commitment and attitude, and how visitors' environmental knowledge and recreational experience affect their environmental commitment and environmental attitude, which in turn influences their environmentally conscious conduct. The findings revealed that environmental knowledge among visitors had a beneficial impact on environmental commitment, environmental attitude, and pro-environmental conduct of travelers. Like the preceding point, the recreational experience of travelers had a substantial positive influence on their pro-environmental conduct, their attitude toward the

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environment, and their commitment to the environment. Furthermore, the pro-environmental behavior of travelers was significantly and advantageously influenced by the environmental commitment and attitude of visitors.

This analysis was one of the initial endeavors, as it was among the first to integrate the effects of environmental knowledge and recreational experience (cognitive factors) on environmental commitment and environmental attitude (affective factors), subsequently influencing tourists' pro-environmental behavior (conative factor), thereby establishing a comprehensive framework for understanding tourists' pro-environmental behavior in coastal tourism. The findings of this inquiry have significant implications for management. A significant improvement in tourists' pro-environmental conduct has occurred due to the recognition of the significant effect that travelers' environmental knowledge and recreational experience have on their environmental commitment and attitudes. That being the case, coastal tourism authorities are obligated to consider these findings to improve the environmentally conscious behavior of tourists.

It is important to recognize that this study has a few shortcomings. First, more elements might influence the environmentally conscious conduct of coastal visitors. Examples of these characteristics include environmental value, eco-friendly reputation, tourist satisfaction, and societal influence. Future studies may examine how these factors influence the tourists' pro-environmental conduct in coastal tourism for a deeper understanding. Second, this study employed the CoAC theory to elucidate the factors of tourists' pro-environmental behavior in coastal tourism. Additional theories may elucidate the tourists' pro-environmental behavior in coastal tourism, including the value-attitude-behavior and the stimulus-organism-response theory, among others. Subsequent studies may investigate these theories or amalgamate them with the CoAC framework to elucidate the factors of tourists' pro-environmental behavior in coastal tourism.

AUTHOR CONTRIBUTIONS

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ACKNOWLEDGMENT

The author acknowledges the Industrial University of Ho Chi Minh City, which supported this study.

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APPENDIX A.

Table A1. Latent variables and items

Latent variables and items	Reference
Environmental knowledge	
1. I am aware of the environmental challenges that humans are currently encountering, such as air pollution, climate change, etc.	Tang et al. (2022)
2. I am aware of the environmental challenges and hazards that coastal tourism presents	
3. I am aware of the environmental slogans of coastal tourism attractions	
4. I am aware of behaviors that might mitigate environmental harm during coastal tourism activities, such as not littering, bringing personal toiletries, etc.	
Recreation experience	
1. I felt stress-relieved by the coastal tourism	Y. Wang and C. Wang (2022)
2. I felt emotionally stable because of the coastal tourism	
3. I became closer to my friends as a result of the coastal tourism	
4. I was able to communicate well with my friends because of the coastal tourism	
5. I was able to relax because of the coastal tourism	
6. Coastal tourism increased my joy	
Environmental commitment	
1. I commit to always considering the environment's best interests at (name of location)	He et al. (2018)
2. I would want to make a stronger future connection with the environment of (name of location)	
3. The natural environments of (name of location) have a strong emotional connection for me	
4. I anticipate feeling a deep connection to the environment of (name of location) at all times	
Environmental attitude	
1. I believe it makes sense to preserve the coastal environment	Sultan et al. (2021)
2. I believe it is a good idea to preserve the coastal environment	
3. I believe it is vital to preserve the coastal environment	
4. I believe it is advantageous to preserve the coastal environment	
Tourists' pro-environmental behavior	
1. I abide by the tourist rules set out by the scenic spot's management	Sultan et al. (2021), Tang et al. (2022)
2. I keep the scenic spot's infrastructure safe from damage	
3. I properly dispose of the trash I generate while traveling	
4. I will actively urge people to refrain from destroying the environment	