






“Factors affecting sustainable ecotourism in Vietnam: Mediating role of tourist satisfaction and attractive destination”

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FACTORS AFFECTING SUSTAINABLE ECOTOURISM IN VIETNAM: MEDIATING ROLE OF TOURIST SATISFACTION AND ATTRACTIVE DESTINATION

Abstract

The paper aims to identify factors affecting sustainable ecotourism in Vietnam, including the mediating role of tourist satisfaction and attractive destinations. The valid quantitative data were collected from a survey of 515 domestic tourists who have traveled to ecotourism areas in 5 selected areas in Vietnam, including Ca Mau Province, Can Tho City, Ho Chi Minh City, Binh Dinh Province, and Dong Nai Province. To test research hypotheses, data were analyzed using AMOS 24.0 and structural equation modeling (SEM). Research results show that tourist satisfaction strongly affects sustainable ecotourism ($\beta = 0.341$), followed by attractive destinations ($\beta = 0.175$) and environmental awareness ($\beta = 0.147$). In contrast, tourism management policy does not affect sustainable ecotourism. Besides, tourism management policy has the strongest influence on attractive destinations ($\beta = 0.393$), followed by the natural environment ($\beta = 0.129$), culture and society ($\beta = 0.082$), but infrastructure does not affect attractive destinations. Research results also show that the strongest influential determinant of tourist satisfaction is infrastructure ($\beta = 0.448$), followed by culture and society ($\beta = 0.180$), the natural environment ($\beta = 0.150$), and tourism management policy ($\beta = 0.136$).

Keywords

sustainable ecotourism, natural environment, tourism development, regional links, attractive destination

JEL Classification

L83, Q56, R10

INTRODUCTION

Although the tourism industry is actively developing and recovering after the COVID-19 pandemic, the tourism industry in Vietnam still faces many challenges and shortcomings, such as spontaneity and environmental pollution. Vietnam is seriously affected by climate change and faces unsustainable development. It has many hydropower plants, and landslides are increasingly threatening its river systems. Along with those consequences are high tides and prolonged salinity drought, warming temperatures, surface water pollution, land subsidence due to groundwater exploitation, riverbank and coastal erosion due to hydropower and sand mining, etc. Besides, prolonged drought causes high temperatures and a lack of rainfall in the dry season, directly affecting farmers' livelihoods and crops. In addition, the people's awareness in each area across the country is not guaranteed, including the tourist awareness traveling to destinations across the country. This is also the reason for the poor ecosystem, which lacks sustainability (Tien et al., 2021). Therefore, researching factors affecting sustainable ecotourism is necessary in Vietnam.

Some studies have been carried out related to ecotourism development to create livelihoods for local people (McNamara & Prideaux, 2011)

and protect the natural environment (Buckley, 2011), conserving animal species and ecosystems (Buckley et al., 2012). To maintain sustainable ecotourism development, scholars have analyzed the impacts of tourism development on the environment, human life, and pollution levels with many different approaches (Vuong & Rajagopal, 2019; Asker et al., 2010; Hall, 2003). There are different determinants of sustainable ecotourism in different contexts, such as management policy (Nangulu, 2018), tourist satisfaction (Oliver, 1993; Yao et al., 2013; Aliman et al., 2014), and attractive destination (Yao et al., 2013). There are also some determinants of tourist satisfaction and attractive destination, including the natural environment (Suanmali, 2014; Stange & Brown, 2012), infrastructure (Bagri & Kala, 2015; Yuksek et al., 2016), culture and society (Suanmali, 2014), and management policy (Nangulu, 2018). Besides, the effect of environmental awareness is not considered, which may affect sustainable ecotourism. The mediating effects of tourist satisfaction and attractive destinations on tourist satisfaction also require further research.

1. LITERATURE REVIEW

Sustainable tourism is friendly to both nature and the environment. This type of tourism ensures intellectual and social culture protection for sustainable development when preserving the culture, history, heritage, and arts of local communities (Edgell, 2006). Both local people and businesses benefit from sustainable tourism development. Local people can gain income from sustainable tourism development while they can also contribute to maintaining a sustainable environment. Businesses can have more opportunities to provide goods and services at local tourism destinations and invest in the tourism industry for profits. Besides, visitors strive to experience tourism activities with a pure atmosphere and beautiful landscape. Tourism industry wants to increase revenue, the quantity and quality of tourism at destinations, and always aims to attract investment from businesses, but does not want to damage the quality of the natural habitat (Middleton & Hawkins, 1998). When tourists are satisfied with sustainable tourism destinations, they can recognize the importance of tourism resources and try to protect natural resources since they know these resources belong to humanity. Hence, sustainable tourism development must be encouraged effectively without leaving consequences for future generations. Sustainable ecotourism development has been maintained and has existed for a long time to stabilize community activities and social-economic and environmental development (Butler, 1999). The community plays a vital role in sustainable tourism development to protect the environment and ecosystem, reducing human impact on nature (Hall, 2003). Sustainable ecotour-

ism development creates long-term products and stable development for tourist destinations and areas (Machado, 2003).

This paper applies behavioral and triple bottom-line theories to explain environmental awareness, tourist satisfaction, institutional environment, and determinants of ecotourism. Behavioral theory is used to clarify human behavior in their surrounding environment (Angell, 2013). Triple bottom line (TBL) theory explains that there should be concern about the social and environmental impact of businesses instead of only focusing on profit. In the tourism industry, this theory can be applied because it can explain firms and people's concerns about both social and environmental impact when they join the industry (Faux & Dwyer, 2009).

Based on theories and empirical research, this study proposed a research model to identify determinants of sustainable ecotourism in Vietnam. The paper synthesized determinants of sustainable ecotourism through previous studies by Mihalič et al. (2016) and Elshaer et al. (2021). The research model was discussed with 10 experts in the tourism industry in Vietnam, who suggested adding a new variable (environmental awareness) shown in Figure 1.

Tourist satisfaction is based on the difference between expectations before and after the travel process. Tourist satisfaction comes from the post-travel perception of the product and service quality that visitors expect from experiencing tourism services (Reisinger & Turner, 2003). Satisfaction can make tourists revisit ecotourism destinations with their relatives or friends. As a result, tourist satisfaction can contribute to the overall ecotourism performance and development (Le, 2024). Once ecotour-

ism develops sustainably, residents can have more opportunities for tourism business and employment. There are several determinants of tourist satisfaction, including travel services, local heritage sites, local people, adventure, culture, nature, journey, beverages and food, price, safety, communication, experience, and accessibility (Voona & Lee, 2009).

The notion of attractive tourism destinations differs in different localities and countries. An attractive destination is one where there are many products, with different types of tourism and support services to satisfy tourist experiences. An active destination can create a good impression for tourists who are willing to return to that destination (Yao et al., 2013). Thus, sustainable ecotourism development is guaranteed at the destination. Tourists with environmental awareness tend to take action for the solution of environmental problems. Environmental awareness can be defined as people's responsibility to ensure a healthy, clean, and safe environment for the present and future generations (Zheng, 2010). People's concern about environmental problems expresses environmental awareness, and they are eager to think of solutions for a sustainable environment (Ariffin et al., 2016). Hence, environmental awareness can result in sustainable environmental development and promote sustainable ecotourism.

Tourism management policy is a country's legal system, an effective mechanism to monitor, manage, inspect, and expand the tourism industry in a specific direction (Dao et al., 2014). Localities tend to create good conditions to promote sustainable ecotourism through establishing good management policies in tourism (Bramwell, 2011). Effective policies not only promote locally sustainable ecotourism but also attract international investments in ecotourism (Crouch & Ritchie, 1999). Good tourism policies can ensure sustainable development in ecotourism destinations with good service and infrastructure to become attractive destinations and increase tourist satisfaction.

The natural environment can create tourist satisfaction and an attractive destination for tourists. According to Lin et al. (2007), the natural environment includes the natural landscape, environment, atmosphere, and weather at tourism destinations. The natural environment cannot be replaced and must be protected to promote sustainable ecotour-

ism. Attractive destinations include pristine natural environments, resources, and other attractions as the main components of tourist destinations (Vengesai et al., 2009).

Infrastructure is critical in promoting sustainable tourism industry development. Infrastructure includes basic utilities, including electricity, roads, schools, and stations serving tourism (Lin et al., 2007). In addition, there are other entities such as accommodation establishments, food services, shops, pubs, agents, and conference offices (Gupta & Bhawe, 2007). Infrastructure is considered the critical factor affecting tourist satisfaction because it includes basic utilities, and tourists can experience those necessities when they first come to ecotourism destinations, along with the natural environment and landscape (Crouch & Ritchie, 1999).

Culture and society include faith systems, customs, cuisine, and handicrafts in one area or country. Each region has completely complicated and different cultural and social characteristics. Tourists can realize social values and distinct cultures at places they visit, and culture and society can also help increase the level of tourist satisfaction (Crouch & Ritchie, 1999).

After synthesizing theories and empirical research, several gaps can be drawn. Firstly, most empirical studies have focused on qualitative research methods and descriptive statistics to evaluate the current situation and propose development directions for sustainable ecotourism, but those studies have had no specific research model. Second, most of these research works have not considered the mediating factors that impact sustainable ecotourism. Finally, environmental awareness has been proposed by experts in this study but has not yet been measured, so this is also considered a new contribution.

The main research objective of this paper is to examine how tourism satisfaction, management policy, attractive destinations, and environmental awareness impact sustainable ecotourism and investigate the role of tourist satisfaction and attractive destinations in moderating the relationship between determinants and sustainable ecotourism. Additionally, this paper examines how environmental awareness impacts sustainable ecotourism.

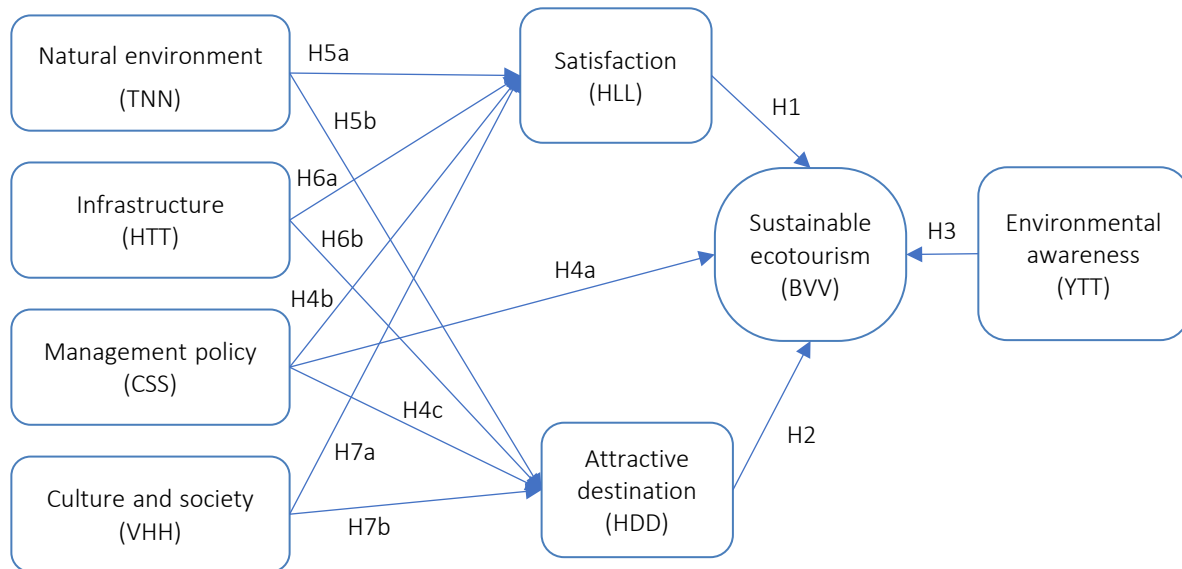


Figure 1. Proposed research framework

Figure 1 represents the proposed research framework based on relevant literature and related theories as mentioned above. Hypotheses are proposed as follows:

- H1: Tourist satisfaction positively influences sustainable ecotourism development in Vietnam.*
- H2: Attractive destinations positively influence sustainable ecotourism development in Vietnam.*
- H3: Environmental awareness positively influences sustainable ecotourism development in Vietnam.*
- H4a: Tourism management policy has a direct impact on sustainable ecotourism development in Vietnam.*
- H4b: Tourism policy positively influences tourist satisfaction.*
- H4c: Tourism policy positively influences the attractive destination.*
- H5a: The natural environment positively influences tourist satisfaction.*
- H5b: The natural environment has a direct impact on attractive destinations.*
- H6a: Technical infrastructure positively influences tourist satisfaction.*
- H6b: Technical infrastructure has a direct impact on attractive destinations.*
- H7a: Culture and society positively influence tourist satisfaction.*
- H7b: Culture and society have a direct impact on tourist attractions.*

2. METHOD

Due to the limited time of research, the survey data were collected in 5 provinces, including Ca Mau Province, Can Tho City, Ho Chi Minh City, Binh Dinh Province, and Dong Nai Province, with survey time from December 2022 to September 2023. Survey participants included 550 domestic tourists who came to ecotourism areas in those provinces.

After proposing the research hypotheses and the model, the study applied the qualitative research method by discussing with 10 experts knowledgeable about sustainable ecotourism to identify the research model and ensure the model could reflect the real context in Vietnam. Those experts are officers working at the Departments of Culture, Sports and Tourism in Ca Mau province, the Department

of Culture, Sports and Tourism in Can Tho city, and the Department of Tourism in Ho Chi Minh City. They have experience in ecotourism development because their work relates to this issue.

First, a group of 10 experts was interviewed for about 45 minutes to clarify determinants and items of variables until there were no new findings. Second, the expert voting was conducted based on experience in identifying relevant components. The consensus voting results needed to reach at least 70% of the total number of expert opinions to meet the requirements. According to Lind et al. (2019), the formula for sample size in the case of an unknown population size is

$$n = z^2 \cdot \frac{p \cdot (1 - p)}{e^2} \tag{1}$$

With a significant level of 5% and an allowable error of 5%, and $p = 0.5$, the minimum sample size should be 385. Therefore, 550 respondents were asked to fill in questionnaires that were suitable for data analysis. As a result, 515 valid samples remained after the survey. The measurement scales were developed based on previous empirical studies and adjusted to suit the environmental research conditions in Vietnam, including discussion with experts. This study used

- five items to calculate the natural environment from Suanmali (2014), Stange and Brown (2012), and Suherlan and Hidayah (2021);
- six items to calculate the infrastructure from Bagri and Kala (2015), Yuksek et al. (2016), Sukiman et al. (2017), and Suherlan and Hidayah (2021);
- four items to calculate the culture and society from Suanmali (2014);
- five items to calculate the management policy from Nangulu (2018) and Stange and Brown (2012);
- four items to calculate the attractive destination from Yao et al. (2013);
- four items to calculate tourist satisfaction from Oliver (1993), Yao et al. (2013), and Aliman et al. (2014);

- four items to calculate the environmental awareness suggested by the authors and experts; and
- five items to calculate the sustainable ecotourism from Elshaer et al. (2021) and Nangulu (2018).

In the study, 37 scales were coded (Appendix A), and SPSS 20.0 and AMOS 24.0 were applied to analyze the survey data. Respondents have replied to each question using a five-point Likert scale, with 1 standing for “strongly disagree” and 5 standing for “strongly agree.”

Table 1 represents the demographic summary of 515 respondents. Statistical results show that tourists aged 41-50 account for 31.1%. This is a very mature age to understand sustainable ecotourism; tourists aged 31-40 reach the highest rate of 49.9%. Male and female tourists are nearly equivalent (47.6% and 52.4%), meaning that both male and female tourists are interested in choosing ecotourism for traveling.

Table 1. Demographic summary of respondents

Description	Frequency	Valid Percent
Age	18-30	12.8
	31-40	49.9
	41-50	31.1
	> 50	6.2
Gender	Male	47.4
	Female	52.6
Job position	Staff	47.0
	Manager	27.8
	Business owner	17.5
	Other	7.8
Intention to return	No	2.5
	Yes	97.5
Ecotourism areas	Ca Mau	28.2
	Can Tho City	24.9
	Ho Chi Minh City	23.7
	Binh Dinh	11.5
	Dong Nai	11.8

Table 1 also shows that a majority of respondents hold staff positions (242 people with 47.4%), followed by respondents in management positions (143 people with 27.8%). The business owner position also accounts for 17.5%, and respondents

with other positions account for only 7.8%. This result means that tourists with staff and management positions tend to choose ecotourism destinations after stressful work because they would like to experience natural landscapes and a pure atmosphere after work. When being asked about the intention to return to ecotourism destinations, most of them intend to return to those destinations (97.5% compared with 2.5% answering “no return”). Most of the respondents have visited eco-

tourism destinations in Ca Mau province (28.2%), Can Tho City (24.9%), Ho Chi Minh City (23.7%), followed by Binh Dinh province (11.5%), and Dong Nai province (11.8%).

3. RESULTS

After analyzing the demographic summary, this paper includes a reliability test, exploratory factor analysis (EFA), confirmatory factor analysis

Table 2. Reliability test

Code	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Coefficient of Cronbach's Alpha
TN1	14.80	9.118	0.720	0.866	0.888
TN2	14.79	8.582	0.751	0.859	
TN3	14.82	8.742	0.719	0.866	
TN4	14.81	8.780	0.723	0.865	
TN5	14.81	8.966	0.731	0.864	
HT1	18.76	8.987	0.688	0.878	0.892
HT2	18.76	9.640	0.705	0.874	
HT3	18.74	9.396	0.745	0.868	
HT4	18.77	9.180	0.745	0.867	
HT5	18.74	10.030	0.640	0.883	
HT6	18.76	9.255	0.756	0.866	0.941
VH1	11.36	4.940	0.914	0.905	
VH2	11.38	4.936	0.909	0.906	
VH3	11.39	5.270	0.860	0.923	
VH4	11.44	5.029	0.767	0.955	
CS1	15.97	6.896	0.899	0.948	0.960
CS2	15.99	6.945	0.876	0.952	
CS3	16.01	6.868	0.880	0.951	
CS4	15.99	7.021	0.880	0.951	
CS5	15.97	6.937	0.897	0.948	
HD1	11.73	3.209	0.766	0.868	0.896
HD2	11.74	3.164	0.894	0.820	
HD3	11.78	3.710	0.586	0.930	
HD4	11.72	3.179	0.852	0.835	
HL1	11.33	4.181	0.947	0.915	0.950
HL2	11.34	4.469	0.890	0.933	
HL3	11.24	4.317	0.791	0.964	
HL4	11.32	4.128	0.906	0.927	
YT1	11.45	5.738	0.835	0.937	0.944
YT2	11.52	5.219	0.898	0.917	
YT3	11.44	5.722	0.847	0.934	
YT4	11.50	5.208	0.892	0.919	
BV1	15.28	5.291	0.646	0.815	0.845
BV2	15.19	5.228	0.724	0.794	
BV3	15.24	5.391	0.630	0.819	
BV4	15.31	5.348	0.651	0.813	
BV5	15.29	5.475	0.609	0.824	

Note: TNN = natural environment; HTT = infrastructure; CSS = management policy; VHH = culture and society; HLL = satisfaction; BVV = sustainable ecotourism; YTT = Environmental awareness; HDD = attractive destination.

(CFA), structural equation modeling (SEM), and significant tests for SEM.

The acceptable coefficient of Cronbach's Alpha must be at least 0.7 (Nunnally, 1978). A research scale should reach a Cronbach's Alpha of 0.7 or higher to ensure unidimensionality and reliability. However, a Cronbach's Alpha coefficient of 0.6 is acceptable in a preliminary exploratory study.

Results from the reliability test for items from Table 2 show that all variables satisfy the condition of Cronbach's Alpha to be greater than 0.7. So, the study can proceed to test CFA with all variables. The paper performed an EFA test for the independent and dependent variables. For the first time, the subtraction between two factor loadings of item HD3 is less than 0.3. Hence, HD3 is eliminated from the entire model. Table 3 represents the second time of the EFA test.

Table 3. KMO and Bartlett's test result

KMO Measure of Sampling Adequacy.		0.927
Bartlett's Test of Sphericity	Approx. Chi-Square	1.709x10 ⁴
	Df	630
	sig.	0.000

The KMO value must be greater than 0.5 for EFA analysis, and Bartlett's test must have a significance level of sig < 0.05 to ensure there is a correlation between variables (Hair et al., 2010). Besides, the total variance explained must be greater than 50%, and the Eigenvalue coefficient is greater than 1.0 for EFA analysis (Hair et al., 2010). Based on Table 3, the KMO is greater than 0.5 to meet EFA requirements.

Table 4. EFA test

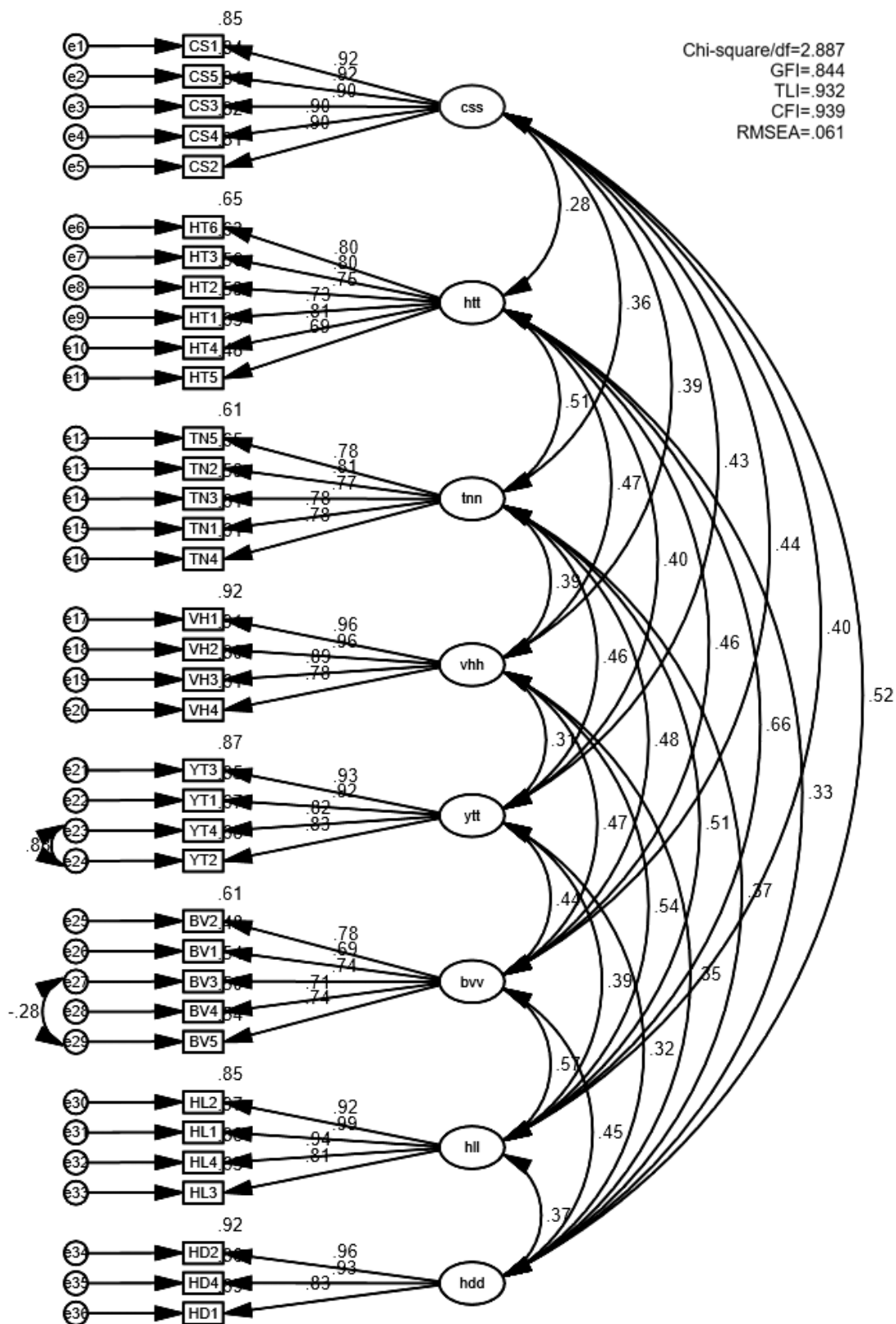
Codes	Factor							
	1	2	3	4	5	6	7	8
CS1	0.884	-	-	-	-	-	-	-
CS5	0.881	-	-	-	-	-	-	-
CS3	0.870	-	-	-	-	-	-	-
CS4	0.856	-	-	-	-	-	-	-
CS2	0.847	-	-	-	-	-	-	-
HT6	-	0.793	-	-	-	-	-	-
HT3	-	0.781	-	-	-	-	-	-
HT2	-	0.771	-	-	-	-	-	-
HT1	-	0.767	-	-	-	-	-	-
HT4	-	0.708	-	-	-	-	-	-
HT5	-	0.645	-	-	-	-	-	-
TN5	-	-	0.798	-	-	-	-	-

Codes	Factor							
	1	2	3	4	5	6	7	8
TN2	-	-	0.796	-	-	-	-	-
TN3	-	-	0.765	-	-	-	-	-
TN1	-	-	0.737	-	-	-	-	-
TN4	-	-	0.735	-	-	-	-	-
VH1	-	-	-	0.873	-	-	-	-
VH2	-	-	-	0.867	-	-	-	-
VH3	-	-	-	0.840	-	-	-	-
VH4	-	-	-	0.821	-	-	-	-
YT2	-	-	-	-	0.864	-	-	-
YT4	-	-	-	-	0.862	-	-	-
YT3	-	-	-	-	0.859	-	-	-
YT1	-	-	-	-	0.840	-	-	-
BV2	-	-	-	-	-	0.793	-	-
BV1	-	-	-	-	-	0.728	-	-
BV3	-	-	-	-	-	0.723	-	-
BV4	-	-	-	-	-	0.700	-	-
BV5	-	-	-	-	-	0.598	-	-
HL2	-	-	-	-	-	-	0.822	-
HL1	-	-	-	-	-	-	0.794	-
HL4	-	-	-	-	-	-	0.774	-
HL3	-	-	-	-	-	-	0.666	-
HD2	-	-	-	-	-	-	-	0.866
HD4	-	-	-	-	-	-	-	0.864
HD1	-	-	-	-	-	-	-	0.826

Note: TNN = natural environment; HTT = infrastructure; CSS = management policy; VHH = culture and society; HLL = satisfaction; BVV = sustainable ecotourism; YTT = Environmental awareness; HDD = attractive destination.

According to Hair et al. (2010), model fit criteria in SEM include CMIN/df (Chi-square/df), CFI, GFI, and RMSA. CMIN/df should be less than or equal to 2.0 to be good, but this index can be acceptable if it is less than or equal to 5.0. CFI should be at least 0.9 to be good, but this index can be acceptable at least 0.8. GFI should be at least 0.9 to be good, but this index can be acceptable at least 0.95. RMSA should be less than or equal to 0.08 to be good. Due to the limitation of sample size, GFI could not achieve at least 0.9, and the study could accept this index with at least 0.8 (Baumgartner & Homburg, 1996; Doll et al., 1994).

The CFA results show that the weights of all the observed variables meet the allowed standards and are statistically significant ($P = 0.000$). Hence, the observed variables used to measure the eight components have convergent validity. Figure 2 shows that Chi-square/df is 2.887 (less than 5.0), other criteria meet the requirements with TLI is 0.932 (> 0.9), CFI = 0.939 (> 0.9), GFI = 0.844 (> 0.8), and RMSEA is 0.061 (< 0.08).



Note: TNN = natural environment; HTT = infrastructure; CSS = management policy; VHH = culture and society; HLL = satisfaction; BVV = sustainable ecotourism; YTT = Environmental awareness; HDD = attractive destination.

Figure 2. Structural model after final calibration in CFA

Table 5. Discriminant validity

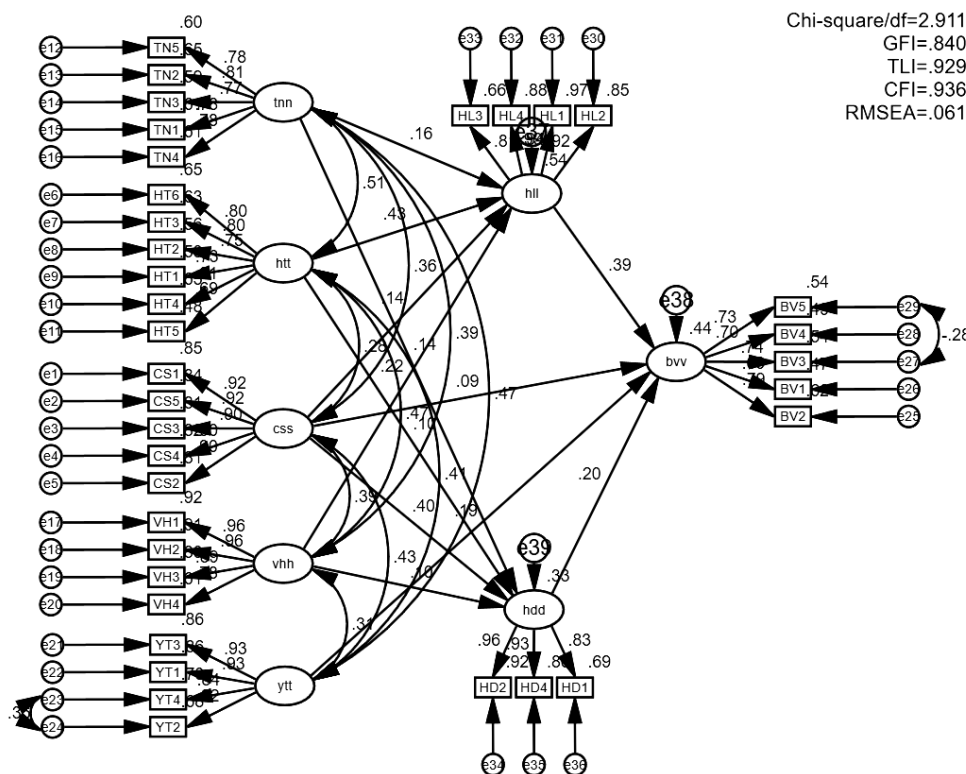
Variables	CR	AVE	MSV	MaxR(H)	CSS	HTT	TNN	VHH	YTT	BVV	HLL	HDD
CSS	0.960	0.827	0.270	0.960	0.909	–	–	–	–	–	–	–
HTT	0.894	0.584	0.430	0.897	0.280	0.764	–	–	–	–	–	–
TNN	0.889	0.615	0.265	0.889	0.364	0.511	0.784	–	–	–	–	–
VHH	0.945	0.811	0.291	0.965	0.387	0.474	0.388	0.901	–	–	–	–
YTT	0.932	0.775	0.221	0.944	0.426	0.405	0.470	0.312	0.881	–	–	–
BVV	0.852	0.536	0.329	0.855	0.436	0.458	0.475	0.469	0.447	0.732	–	–
HLL	0.954	0.841	0.430	0.982	0.404	0.656	0.515	0.539	0.391	0.574	0.917	–
HDD	0.933	0.824	0.270	0.952	0.519	0.325	0.369	0.353	0.325	0.454	0.374	0.908

Note: TNN = natural environment; HTT = infrastructure; CSS = management policy; VHH = culture and society; HLL = satisfaction; BVV = sustainable ecotourism; YTT = Environmental awareness; HDD = attractive destination.

According to Hair et al. (2010), average variance extracted (AVE) and maximum shared variance (MSV) are applied to test convergent validity and discriminant validity. Convergent validity is applied to test whether measures of a latent variable are positively correlated with each other. Table 5 shows that all AVE values are greater than the threshold of 0.5 and all MSV values are less than AVE. Hence, all factors ensure convergent validity and discriminant validity requirements.

SEM analysis results in Figure 3 show that the Chi-square/df = 2.911 (less than 5.0). Other indexes satisfy model fit requirements. Specifically, TLI is 0.929 (> 0.9), CFI is 0.936 (> 0.9), GFI is 0.840 (< 0.9), and RMSEA is 0.061 (< 0.08). The data set can be used for analysis due to statistical significance.

Table 6 shows that 43.7% of the variance in sustainable ecotourism is explained by exogenous variables. Exogenous variables can also explain



Note: TNN = natural environment; HTT = infrastructure; CSS = management policy; VHH = culture and society; HLL = satisfaction; BVV = sustainable ecotourism; YTT = Environmental awareness; HDD = attractive destination.

Figure 3. The final structure model

32.8% of the variance in attractive destinations. Similarly, exogenous variables in the model can explain up to 54.2% of the variance in tourist satisfaction. The *R*-square values are not so high but sufficient enough to measure how exogenous variables affect those dependent variables.

Table 6. R-Square results

Construct	R-square
Attractive destination	0.328
Tourist satisfaction	0.542
Sustainable ecotourism	0.437

Table 7 shows the direct and indirect effects of the SEM results. Most of the significant values are less than 5%, so the study accepts the hypotheses as stated. Specifically, determinants of sustainable ecotourism include tourist satisfaction ($\beta = 0.341$), attractive destination ($\beta = 0.175$), and environmental awareness ($\beta = 0.147$). Hence, *H1*, *H2*, and *H3* are accepted. However, the tourism management policy does not affect sustainable ecotourism because the *p*-value is greater than the significant level of 5%. Hence, *H4a* is rejected.

Besides, tourism policy positively influences tourist satisfaction ($\beta = 0.136$), and tourism policy posi-

tively influences the attractive destination ($\beta = 0.393$). Thus, the study accepts *H4b* and *H4c*. Results also show that the natural environment directly impacts tourist satisfaction ($\beta = 0.150$), and the natural environment also positively influences attractive destinations ($\beta = 0.129$). Hence, *H5a* and *H5b* are accepted. Technical infrastructure plays an important role in increasing tourist satisfaction ($\beta = 0.448$) but does not affect attractive destinations with a *p*-value greater than 5%. Hence, *H6a* is accepted, but *H6b* is rejected. *H7a* and *H7a* are also accepted, and this result is similar to the empirical study by Crouch and Ritchie (1999). Culture and society have a direct impact on tourist satisfaction ($\beta = 0.180$) and tourist attraction ($\beta = 0.082$).

Table 8 shows the indirect effects of sustainable ecotourism determinants. All of the indirect effects have statistical significance (1%). Management policy significantly and indirectly affects sustainable ecotourism with full mediation because it does not directly affect sustainable ecotourism (Table 7). All of the other three determinants (culture and society, natural environment, and infrastructure) have a significantly indirect impact on sustainable ecotourism with partial medication because those also directly impact sustainable ecotourism.

Table 7. Direct effects

Code	Dimension of influence	Code	Estimate	S.E.	C.R.	P	Result
hll	←	tnn	0.150	0.040	30.761	***	Supported
hll	←	htt	0.448	0.047	90.468	***	Supported
hll	←	css	0.136	0.035	30.879	***	Supported
hll	←	vhh	0.180	0.032	50.570	***	Supported
hdd	←	tnn	0.129	0.048	20.657	0.008	Supported
hdd	←	htt	0.104	0.054	10.927	0.054	Rejected
hdd	←	css	0.393	0.043	90.120	***	Supported
hdd	←	vhh	0.082	0.039	20.090	0.037	Supported
bvv	←	ytt	0.147	0.034	40.306	***	Supported
bvv	←	css	0.080	0.042	10.913	0.056	Rejected
bvv	←	hll	0.341	0.041	80.424	***	Supported
bvv	←	hdd	0.175	0.041	40.268	***	Supported

Note: ***significant at 1% level, TNN = natural environment; HTT = infrastructure; CSS = management policy; VHH = culture and society; HLL = satisfaction; BVV = sustainable ecotourism; YTT = Environmental awareness; HDD = attractive destination.

Table 8. Indirect effects

Effect	Indirect	
	S.E.	Sig.
Culture and society → Tourist Satisfaction → Sustainable Ecotourism	0.105	0.001
Natural environment → Tourist Satisfaction → Sustainable Ecotourism	0.090	0.001
Infrastructure → Tourist Satisfaction → Sustainable Ecotourism	0.189	0.001
Management policy → Tourist Satisfaction → Sustainable Ecotourism	0.137	0.001

Table 9. Mediating effects

Parameter	Estimate	Lower	Upper	P
Natural environment x Tourist Satisfaction → Sustainable Ecotourism	0.051	0.027	0.083	0.001
Natural environment x Attractive destination → Sustainable Ecotourism	0.022	0.007	0.048	0.009
Infrastructure x Tourist Satisfaction → Sustainable Ecotourism	0.153	0.117	0.196	0.001
Management policy x Tourist Satisfaction → Sustainable Ecotourism	0.046	0.024	0.071	0.001
Management policy x Attractive destination → Sustainable Ecotourism	0.069	0.039	0.111	0.000
Culture and society x Tourist Satisfaction → Sustainable Ecotourism	0.061	0.043	0.088	0.000
Culture and society x Attractive destination → Sustainable Ecotourism	0.014	0.003	0.033	0.031
Total indirect effect	0.417	0.329	0.513	0.001
Total effect	0.564	0.456	0.666	0.001

Based on the analysis results from Table 9, *p*-values in all cases are less than the significance level of 5%. Hence, tourist satisfaction and attractive destinations also have mediating effects in the research model. The mediating effect with the largest estimate belongs to the correlation between infrastructure and tourist satisfaction ($\beta = 0.153$).

4. DISCUSSION

Sustainable ecotourism development plays an important role in both social, economic, and environmental development in a country. Although ecotourism areas in Vietnam have a lot of tourism potential, these destinations still have many limitations in waste treatment, and the ecosystem is vulnerable to the impact of tourism. With the climate change trend and the increasing scarcity of seafood and natural resources, the provincial government urgently needs to develop tourism in a responsible and sustainable direction in Vietnam. The study has identified factors affecting sustainable ecotourism development with a valid data sample of 515 respondents. Some steps for data analysis include descriptive statistics, reliability testing, EFA, CFA analysis, and testing of the linear structural model (SEM).

In particular, the most positively influential determinant of sustainable ecotourism is tourist satisfaction ($\beta = 0.341$), followed by attractive destinations ($\beta = 0.175$) and environmental awareness ($\beta = 0.147$). Those research results are similar to works by Le (2024), Reisinger and Turner (2003), Yao et al. (2013), Lee (2009), and Valle et al. (2006). Tourist satisfaction can foster overall ecotourism performance and development because tourists would like to revisit ecotourism destinations after their real tourism experience. An attractive destination can also ensure tourist satisfaction and develop sustainable ecotourism with various products and services. An attractive destination is a place where nature, beautiful scenery, a clean environment, warm weather, and fresh air exist (Lin et al., 2007). Attractive destination is a critical factor for sustainable ecotourism, which is also supported by Hall (2003) and Asker et al. (2010). An attractive destination is a place that provides services and infrastructure, equipment, and landscape that are different from other localities, simultaneously making tourists return or introduce others to come (Asker et al., 2010). Besides, people tend to be concerned about environmental problems, and they think of solutions for a sustainable environment (Ariffin et al., 2016). Environmental awareness can ensure sustainable environmental development and promote sustainable ecotourism at destinations.

CONCLUSION

This study aims to figure out factors affecting sustainable ecotourism at destinations in a transition economy. Research results are useful for managers in ecotourism management because these results provide determinants of sustainable ecotourism, including tourism resources, environment, landscape, ecosystem, and regional link policies for sustainable ecotourism development. In addition, residents and tourists know what ecotourism is and understand ways to maintain sustainable ecotourism and protect the environment to adapt to climate change.

Tourist satisfaction ($\beta = 0.341$) and attractive destination ($\beta = 0.175$) are the two strongest influential determinants of sustainable ecotourism development. The natural environment, infrastructure, management policy, and culture and society all positively affect tourist satisfaction. Hence, provincial authorities in Vietnam need to improve all four factors to increase tourist satisfaction. Infrastructure has the most influential impact on tourist satisfaction, while most ecotourism destinations do not have good infrastructure conditions, including basic utilities, electricity, roads, schools, and stations that serve tourism in Vietnam. Infrastructure and facilities in ecotourism areas in Vietnam do not meet most of the tourists' needs. Thus, the tourism industry needs to overcome these weaknesses to develop sustainable ecotourism.

There should be solutions for management policy, the natural environment, and culture and society to enhance destination attractiveness. Along with a sufficient legal system, local authorities should also have mechanisms to expand, monitor, and manage sustainable ecotourism development. Tourism is an interdisciplinary specific type of industry that is highly socialized. Therefore, local authorities should develop open policies to attract investment projects and reduce administrative procedures, re-planning destinations, and building specific sustainable product brands for their provinces in Vietnam. Foreign investment in ecotourism can improve infrastructure while maintaining the natural environment and landscapes at destinations.

Despite some practical contributions to promoting sustainable ecotourism in Vietnam, this paper still has some limitations that call for further research. Future research works should focus on sustainable ecotourism in ASEAN countries to promote sustainable ecotourism in a wider area. Besides, there should be more determinants of sustainable ecotourism in reality for further research. Future studies will continue to explore ecotourism development strategies with the participation of stakeholders for sustainable development.

AUTHOR CONTRIBUTIONS

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APPENDIX A

Table A1. Questionnaire: Items for the survey scale

Code	Observable variable	Source
TN1	Vietnam has many ecotourism areas	Suanmali (2014)
TN2	Ecotourism areas in Vietnam have many wild animals and vegetation	
TN3	Vietnam has many primeval areas	Stange and Brown (2012)
TN4	Ecotourism areas in Vietnam have a fresh, natural environment	
TN5	The natural landscape in Vietnam is very beautiful	Suherlan and Hidayah (2021)
HT1	Ecotourism areas in Vietnam fully meet tourist amenities	
HT2	Convenient and easy means of transportation in ecotourism areas in Vietnam	Bagri and Kala (2015), Yukseket al. (2016)
HT3	Ecotourism areas in Vietnam provide all the necessary information	
HT4	Dining spots in ecotourism areas in Vietnam are clean and safe	
HT5	The communication system is modern	Sukiman et al. (2017)
HT6	Ecotourism areas in Vietnam have many diverse shopping products	Suherlan and Hidayah (2021)
VH1	Vietnam has many historical relics	
VH2	Ecotourism areas in Vietnam have many religious sites and temples	
VH3	The architectural style in Vietnam is unique and diverse	Suanmali (2014)
VH4	Vietnam has many festivals	
CS1	Security conditions in Vietnam ecotourism destinations are guaranteed	
CS2	Rules and regulations at destinations in Vietnam are appropriate	
CS3	Vietnam has appropriate codes of conduct for tourists	Nangulu (2018)
CS4	Vietnam has environmental information and education	
CS5	Vietnam has a sign to protect environmental resources	Stange and Brown (2012)
HD1	Ecotourism areas in Vietnam are very unique	
HD2	Ecotourism areas in Vietnam are very charming	
HD3	Ecotourism areas in Vietnam are very meaningful	Yao et al. (2013)
HD4	Ecotourism areas in Vietnam are very attractive	
HLL1	I am satisfied with the ecotourism areas in Vietnam	
HLL2	I am very happy to have visited some ecotourism areas in Vietnam	
HLL3	I will return to this tourist destination in the future	Oliver (1993), Yao et al. (2013), Aliman et al. (2014)
HLL4	I would encourage others to visit ecotourism destinations in Vietnam	
YT1	Vietnamese citizens have sufficient knowledge of environmental protection	
YT2	Vietnamese citizens have environmentally friendly behaviors	Suggested by authors and experts
YT3	People have friendly attitudes toward the environment in Vietnam	
YT4	People are ready to take action for the solution of environmental problems	
BV1	Everyone is guided and participates in learning about environmental conservation regulations at ecotourism destinations in Vietnam	
BV2	I realize that the provincial government in Vietnam is very interested in developing sustainable ecotourism	Elshaer et al. (2021)
BV3	Local authorities strengthen biodiversity conservation activities	
BV4	Polluting waste is treated according to regulations	Nangulu (2018)
BV5	Local authorities, businesses, and people link to develop sustainable tourism	

Note: Questionnaire items (1 = “Strongly Disagree” to 5 = “Strongly Agree”). TNN = natural environment; HTT = infrastructure; CSS = management policy; VHH = culture and society; HLL = satisfaction; BVV = sustainable ecotourism; YTT = Environmental awareness; HDD = attractive destination.