

The factors affecting the development of ecotourism in Can Tho city

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ABSTRACT

This study aims to identify and evaluate the key factors affecting the development of ecotourism in Can Tho City, which is the economic, cultural, and transportation hub of the Mekong Delta region, Vietnam. With its characteristic riverine ecosystem, rich cultural heritage, and favorable geographical location, Can Tho possesses great potential for sustainable ecotourism development. However, the city still faces numerous challenges such as underdeveloped infrastructure, environmental pollution, limited human resource quality, and a lack of empirical and systematic studies on influencing factors, which hinders the formulation of effective development policies for this tourism sector. Based on a theoretical foundation derived from both domestic and international studies, this research proposes a model comprising six main factors influencing ecotourism development: (1) Infrastructure and Support Services, (2) Reasonable Service Prices, (3) Quality of Human Resources, (4) Safety and Security, (5) Technical facilities, and (6) Natural Environment. The research hypotheses were constructed to examine the relationship between each factor and ecotourism development. The survey data were collected from 211 domestic tourists at ecotourism destinations in Can Tho City between April and July 2024. The analytical methods used include Cronbach's Alpha reliability testing, Exploratory Factor Analysis and multiple linear regression analysis. The research results reveal that all six factors have statistically significant and positive impacts on ecotourism development. Among them, the Natural Environment has the strongest influence, followed by the Quality of Human Resources and Reasonable Service Prices. The remaining factors - Infrastructure and Support Services, Safety and security, and technical facilities - also contribute positively but with relatively lower influence. Based on the findings, the study proposes several managerial implications, including: enhancing environmental protection and promoting the integration of agriculture and ecotourism; investing in capacity-building, service skills, and professional attitudes for tourism personnel; adjusting and monitoring service pricing to ensure fairness and competitiveness; improving infrastructure and transportation systems; and ensuring safety and public order at ecotourism sites. These recommendations aim to provide strategic directions for sustainable ecotourism development and to enhance the position of Can Tho City as a key ecotourism destination both regionally and nationally.

Key words: Can Tho City, Mekong Delta, ecotourism development, sustainable tourism, tourism management factors, environmental sustainability

INTRODUCTION

In the context of increasing global economic development, ecotourism has emerged as a sustainable trend that fulfills tourists' desires to experience nature and indigenous culture while playing a crucial role in conserving environmental resources. Particularly, in countries with diverse ecosystems like Vietnam, ecotourism not only drives economic growth but also enhances public awareness of natural resource preservation. According to the World Economic Forum (WEF) report on the Travel and Tourism Development Index (TTDI) 2024, Vietnam ranks 59th out of 119 countries and territories, with its tourism and travel industry evaluated based on five index groups and 17 pillars¹.

Can Tho is a centrally governed municipality in Vietnam and serves as the economic, cultural, and transportation hub of the Mekong Delta region. With its strategic location, river-based ecosystem, and rich cultural heritage. The city holds significant potential for tourism development, especially in ecotourism. Iconic sites such as Cai Rang Floating Market, Con Son, Phong Dien fruit gardens, and an extensive canal network are not only symbolize the region but also present opportunities to develop a tourism model that combines nature exploration with local cultural experiences. However, to fully capitalize on this potential, it is crucial to assess the key influencing factors and propose solutions for the sustainable development of ecotourism. This, in turn, will enhance the city's im-

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age and contribute to its economic growth. Tourism has become an essential economic sector, attracting extensive research on development theories and tourism. According to Maleki², various tourist destinations, including historical and cultural sites, as well as urban and rural areas, have the potential to tap into the tourism market and generate revenue from visitors. Britton³ highlights that tourism not only generates foreign exchange earnings but also contributes to job creation, investment attraction, and economic growth. In the current context, environmental issues and sustainable development have become increasingly significant, as the tourism industry heavily depends on natural resource conservation (Kenan, O. K.; Okan, T.; And Yilmaz, E)⁴. Butler⁵, emphasizes in his theory of sustainable ecotourism development that tourism must be managed within a defined space and timeframe to prevent the degradation of both human and environmental adaptability. Hens L⁶ asserts that sustainable development requires the efficient management of all resources to balance economic, social, and aesthetic needs while preserving cultural identity, biodiversity, and essential ecosystems.

The WEF TTDI 2024 report highly ranked Vietnam in several indicators, including Price Competitiveness (5.68 points, ranked 16th) and Safety and Security (6.19 points, ranked 23rd). Vietnam also performed well in tourism-related resources, including Natural Resources (ranked 26th), Cultural Resources (ranked 28th), and Non-Leisure Resources (ranked 38th)¹. In line with this, the Law on Tourism⁷ in Vietnam emphasizes tourism as a comprehensive economic sector, encouraging sustainable development based on the effective use of natural, human, and cultural resources. Phan Thi Dang's research⁸ identified the four key factors at Nam Cat Tien: human resources, safety and technical facilities, service pricing and natural environment, education and conservation; along with community benefits. Nguyen Trong Nhan and Phan Thanh Khoi⁹ found the five main factors in Tra Su Melaleuca Forest: infrastructure, service pricing, human resource quality, security, and technical facilities. In a study at Tam Dao National Park, Bui Thi Minh Nguyet¹⁰ highlighted geographical location and tourism resources as primary factors. In Tien Giang, Le Hong An and Do Van Xe¹¹ emphasized external factors such as economy, politics, and nature, alongside internal factors such as infrastructure, human resources for tourism, and investment capital.

Overall, both domestic and international studies have significantly contributed to identifying the factors influencing ecotourism development. These studies

provide an essential empirical foundation for constructing the author's proposed research model. Some key factors frequently mentioned in various studies include: (1) Infrastructure and Support Services, (2) Reasonable Service Prices, (3) Quality of Human Resources, (4) Security, Order, and Safety, (5) Technical facilities, and (6) Natural Environment.

Can Tho City (CTC) is considered as a high-potential destination; however, a comprehensive and scientific data system to fully assess resources such as natural assets, culture, services, and infrastructure for ecotourism development is still lacking. In existing research, many factors such as infrastructure, human resource quality, and the natural environment have been identified as crucial to the development of ecotourism. Nevertheless, current theoretical models do not fully explain how these factors interact in the unique context of Can Tho, a region characterized by its riverine ecosystem and cultural heritage. One significant gap in the existing literature is the lack of studies that analyze the interaction between natural environmental factors and social dynamics in the development of ecotourism.

While international research has emphasized the importance of environmental protection and sustainable resource use in ecotourism, most of these studies focus on regions with developed economies or similar ecosystems. These studies fail to adequately address the socio-environmental conditions of the Mekong Delta, particularly Can Tho, where the river-based ecosystem plays a central role in shaping ecotourism development.

This study aims to fill this theoretical gap by providing new insights into how natural and cultural resources interact with socio-economic factors to create a sustainable model for ecotourism in Can Tho. By doing so, it will extend existing theoretical frameworks and provide a deeper understanding of ecotourism in regions with unique environmental and cultural characteristics.

The absence of such studies makes it difficult to identify and analyze influential factors such as the natural environment, infrastructure, management policies, and community participation. Additionally, challenges like climate change, erosion, environmental pollution, and the risk of resource overexploitation remain inadequately addressed. These issues significantly affect the branding and promotion of CTC's ecotourism, reducing its attractiveness to both domestic and international tourists. Therefore, a comprehensive study to determine the factors influencing ecotourism development in CTC is necessary.

Despite Can Tho's considerable potential for ecotourism development, there remains a notable gap in comprehensive, systematic, and empirical research specifically addressing the key factors that influence ecotourism growth within this city. Most existing studies tend to focus on broader regional or national contexts, lacking detailed consideration of Can Tho's unique environmental characteristics and socio-economic conditions. This deficiency limits the ability to design targeted policies and effective strategies that promote sustainable ecotourism development tailored to the local context.

Accordingly, this study aims to:

(1) Assess the current status and identify challenges associated with ecotourism development in Can Tho City; (2) Determine and evaluate the critical factors that significantly affect sustainable ecotourism growth; and (3) Offer evidence-based managerial recommendations to guide policymakers, tourism practitioners, and local stakeholders in fostering sustainable ecotourism development.

By achieving these objectives, the study seeks to contribute novel empirical insights and practical implications specific to Can Tho's ecotourism sector.

RESEARCH MODEL

Theoretical Background

Prior research has identified a wide range of factors influencing ecotourism development. Core elements frequently discussed include infrastructure and support services, quality of human resources, security and safety, technical facilities, and the natural environment^{5,8,12}.

However, beyond these, several critical factors have been emphasized in the literature but are yet to be integrated into many localized studies. Community participation, for example, plays a vital role in promoting sustainable ecotourism by fostering local stewardship, ensuring equitable benefit-sharing, and enhancing the resilience of tourism ecosystems¹³. Cultural resources, encompassing both tangible heritage sites and intangible cultural practices, add uniqueness to destinations and attract niche markets⁹. Furthermore, policy support in the form of effective regulations, funding, and strategic planning is essential to facilitate long-term sustainable development¹⁴.

Given Can Tho's unique socio-environmental context, these additional factors are especially relevant and warrant inclusion to provide a comprehensive framework for understanding and promoting ecotourism development in the region.

Hypothesis Development

Based on practical insights, this study builds upon previous research and proposes a model identifying the six key factors affecting the development of ecotourism in CTC:

- *Impact of Infrastructure and Support Services on Ecotourism Development* : Numerous studies have demonstrated that infrastructure and support services are crucial for the growth of ecotourism. Several researchers emphasize that infrastructure and services form the foundation for expanding this tourism model (Phan Thi Dang⁸; Nguyen Trong Nhan and Phan Thanh Khoi⁹). Moreover, Butler, R.W.⁵ highlighted that factors such as transportation, utilities, and accommodation play a crucial role in sustaining tourism development. Weaver, D.B.¹² also stressed that ecotourism infrastructure must ensure seamless connectivity between tourists and destinations, including transportation, lodging, energy, and telecommunications. Additionally, these infrastructure systems should be environmentally sustainable, utilizing renewable energy and minimizing negative impacts on ecosystems. Dr. Ibun Kombo's study¹⁵ further indicated that infrastructure and local government tourism strategies are vital in promoting tourism growth. Infrastructure such as transportation, lodging, and utilities facilitates tourist access and comfort, which are essential to attract and retain visitors in Can Tho. Based on this theoretical foundation, the following hypothesis is proposed:

H₁:Infrastructure and supporting services positively influence ecotourism development in Can Tho City.

- *Impact of Reasonable Service Prices on Ecotourism Development*: Research has shown that tourists are concerned about service prices, which reflect the cost they are willing to pay for services. In Petrick, J. F.¹⁶'s measurement scale, price is evaluated based on the balance between the cost paid by tourists and the quality of service received. When service prices are reasonable and meet tourists' expectations, their perceived service value increases. Weaver, D. B.¹² highlighted the economic impacts of ecotourism, including fluctuations in the prices of goods and services at destinations, emphasizing the importance of controlling price increases to avoid negative effects on local communities. Phan Thi Dang⁸ identified that service prices are among the key factors affected by ecotourism development. Furthermore, Ngo Thi Phuong Thao¹⁷ explored the five factors influencing tourists' perceived value of ecotourism services: price, perceived quality, behavioral pricing, reputation, and emotional response. Thus, competitive and reasonable pricing plays a crucial role in attracting tourists

and enhancing their perceived value of services. This, in turn, contributes significantly to the sustainable development of ecotourism. Based on this, the following hypothesis is proposed:

H₂: Reasonable service pricing positively affects ecotourism development in Can Tho City.

- Impact of Human Resources Quality on Ecotourism Development: Ecotourism not only generates economic benefits but also contributes to job creation, income improvement, and the enhancement of local communities' livelihoods. Bendick and Egan (1995)¹⁸, along with Gordon (2004)¹⁹, emphasized that the quality of human resources is fundamental to ensuring sustainable ecotourism development. Mowforth, M., & Munt, I.²⁰ argued that training and skill development for local human resources enable communities to participate effectively in tourism activities and benefit in the long term. Scheyvens, R.¹³ also highlighted the role of capacity-building in ensuring the sustainability of ecotourism. Domestic studies, such as those by Phan Thi Dang⁸, Nguyen Trong Nhan and Phan Thanh Khoi⁹, and Bui Thi Minh Nguyet¹⁰ have underscored the importance of human resource quality in Vietnam's sustainable ecotourism development. Well-trained, knowledgeable, and hospitable staff improve visitor satisfaction and contribute to the reputation of Can Tho as a desirable ecotourism destination. Based on these studies, the following hypothesis is proposed:

H₃: Quality of human resources positively impacts ecotourism development in Can Tho City.

- Impact of Security and Safety on Ecotourism Development: Security, order, and safety are key factors influencing the sustainable development of tourism. Tourists need to feel safe throughout their journey, and destinations must ensure social order conditions to maintain their attractiveness. According to Maslow's hierarchy of needs (A.H. Maslow)²¹, safety is the second level after basic physiological needs. Tourists will not participate in tourism activities if they feel unsafe at the destination. The study by Roehl, W.S., & Fesenmaier, D.R.²² indicates that tourists tend to avoid destinations with high risks related to security issues, accidents, or social conflicts. Risk perception plays a significant role in destination selection, particularly in the context of globalization and the rapid spread of information via social media. Therefore, security and safety are crucial factors that create opportunities for ecotourism development to preserve natural resources, which is currently an urgent issue (Kenan, O.K.; Okan, T.; and Yilmaz, E.A.⁴). The participation of local communities in the ecotourism development process is a vital factor for sustainable tourism development, and such participation

must be voluntary. Local authorities should implement measures to ensure security, order, and safety for tourists (Sharpley, R.; Telfer, D.J.¹⁴). According to Phan Thi Dang [8], security, order, and safety significantly impact ecotourism development. Managing public order issues like begging, solicitation, price gouging, and theft is crucial for enhancing local ecotourism. In addition, well-trained, knowledgeable, and friendly staff play a vital role in improving visitor satisfaction and strengthening Can Tho's reputation as an attractive ecotourism destination. Based on this, the following hypothesis is proposed:

H₄: Security, order, and safety have a positive effect on ecotourism development in Can Tho City.

- Impact of technical facilities on Ecotourism Development: Butler, R.W.'s²³ tourism area lifecycle model suggests that infrastructure plays a crucial role during a destination's development and saturation phases. If technical facilities are not upgraded in line with growing demands, the destination will face a decline in attractiveness. Transportation infrastructure determines costs, travel time, and convenience, thereby directly influencing the destination's appeal (Prideaux, B.²⁴). The study by Swarbrooke, J.²⁵ emphasizes that the quality of technical facilities affects tourist satisfaction and their intention to revisit. Technical facilities include transportation for sightseeing and road infrastructure. According to Nguyen Trong Nhan and Phan Thanh Khoi⁹, these two factors need to be upgraded and expanded. In a study on the ecotourism development of Cat Tien National Park, Phan Thi Dang⁸ suggests that technical facilities should include multiple ecotourism attractions along different routes, spacious docks for water transport, and well-equipped life jackets on water vehicles. In Can Tho, adequate technical facilities - such as well-maintained docks, clear signage, and safety equipment - directly underpin visitor safety and the quality of the ecotourism experience. Based on this foundation, the following hypothesis is proposed:

H₅: Technical facilities positively influence ecotourism development in Can Tho City.

- Impact of the Natural Environment on Ecotourism Development: The natural environment is the fundamental foundation for tourism development, especially ecotourism. Butler, R.W.²³ points out that the natural environment plays a crucial role in the early development stages of a destination. Without protective measures, natural resources may degrade, leading to a decline in the destination's attractiveness. The relationship between humans and the natural environment is deeply interconnected, with tourism acting as a bridge between the two elements. According to McCool, S.F., & Lime, D.W.²⁶, destinations

with unique natural environments (such as mangrove ecosystems, rivers, and beaches) have a strong appeal to tourists. However, unsustainable exploitation can lead to environmental degradation. Phan Thi Dang⁸ also highlights that the natural environment is reflected in waste management, landscape conservation education for the community, and the benefits ecotourism brings to local residents. The well-preserved natural landscapes and rich biodiversity of Can Tho serve as the primary attractions that draw tourists to the region. The city's pristine environment, scenic waterways, and diverse flora and fauna play a crucial role in promoting and sustaining ecotourism development. Building on these factors, the following hypothesis is proposed:

H₆: The natural environment positively contributes to ecotourism development in Can Tho City.

Based on the above theoretical discussions, the author conducted direct interviews with experts, including tourism management officials, tourism business administrators, and local households involved in tourism. After incorporating expert feedback, the author recommends a research model consisting of six key influencing factors. The proposed research model, illustrating the relationships among the identified factors and ecotourism development in Can Tho City, is presented in Figure 1.

RESEARCH METHODOLOGY

Data Collection Method

Survey Participants: A cross-sectional survey design was employed to collect quantitative data from domestic tourists visiting ecotourism destinations across Can Tho City. A total of 240 questionnaires were disseminated between April and July 2024. Following data screening for completeness and consistency, 211 valid responses were retained for analysis, yielding an effective response rate of 87.9%.

Participants in the study were selected based on the following criteria: (1) domestic tourists aged 18 years or older; (2) individuals who had engaged in ecotourism activities within Can Tho City during the designated study period; and (3) those who voluntarily agreed to participate after providing informed consent. International tourists were intentionally excluded to ensure sample homogeneity and to align with the study's specific focus on the domestic tourism market, given the research's scope, resource limitations, and targeted analytical objectives.

Data collection was conducted at key ecotourism sites, including Cai Rang Floating Market, Phong Dien Fruit Gardens, and Con Son Island. Trained enumerators administered face-to-face questionnaires to

ensure participants fully understood each item and to encourage accurate, high-quality responses. Sampling was carried out on both weekdays and weekends to capture a diverse range of visitor profiles.

Sample Size: In exploratory factor analysis (EFA), sample size is determined based on the minimum requirement and the number of observed variables included in the analysis. Hair et al.²⁷ suggest that for EFA, the minimum sample size should be 50, with a preferable threshold of 100. The recommended ratio of observations to measured variables is 5:1, meaning each observed variable should have at least five observations, with 10 or more being ideal (Nguyen Dinh Tho²⁸). If the Maximum Likelihood estimation method is used, the minimum required sample size should range from 100 to 150 (Hair et al.²⁷). In this study, there are 31 observed variables. Hence, the minimum required sample size for conducting EFA is 155, and a larger sample size would improve the model's accuracy.

For regression analysis, Tabachnick, B. G., & Fidell, L. S.²⁹ suggest that the sample size should follow the formula: $n \geq 8m + 50$ (where n is the sample size and m is the number of independent variables in the model). Since this study's model includes six independent variables, the minimum required sample size for regression analysis is 98 observations.

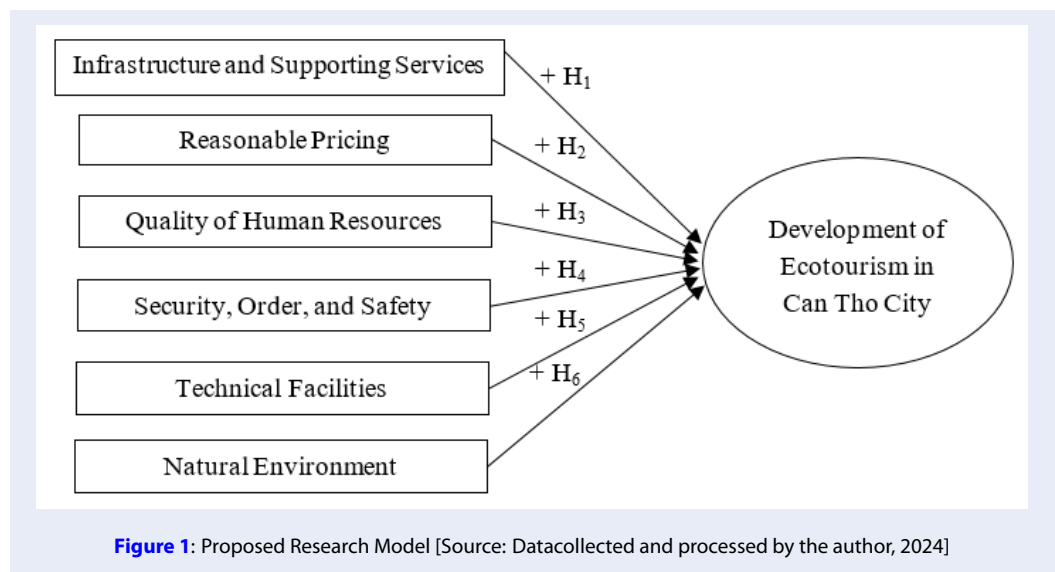
Sampling Method: This study employs the convenience sampling method. The advantage of this approach is that it facilitates easier access to respondents and shortens the data collection process. Nonetheless, since this is a non-probability sampling method, it may limit the representativeness of the sample for the overall population. To mitigate these limitations, data collection was conducted at multiple locations, including ecotourism sites across various districts in Can Tho City.

Data Analysis Method

After data collection and the removal of invalid responses, a total of 211 valid questionnaires were analyzed and compared to determine the impact of various factors. The analytical methods used in this study include descriptive statistics, reliability and validity testing of measurement scales, model testing, hypothesis testing, and linear regression analysis.

Reliability Testing: Cronbach's Alpha coefficient was calculated to assess the internal consistency of the measurement scales. A value greater than 0.7 was considered acceptable for reliability.

Exploratory Factor Analysis (EFA): EFA was conducted using Principal Component Analysis with



Varimax rotation to validate the factorial structure of the scales. Items with factor loadings below 0.5 or significant cross-loadings were removed to ensure construct validity.

Regression Analysis and Diagnostics:

Multiple linear regression was employed to evaluate the relationships between independent variables and ecotourism development. Before interpreting the regression results, diagnostic tests were performed to check the underlying assumptions:

- Multicollinearity: Variance Inflation Factor (VIF) values below 10 confirmed no serious multicollinearity among independent variables.
- Homoscedasticity: Residual plots and Breusch-Pagan test confirmed constant variance of errors.
- Normality: Kolmogorov-Smirnov test and Q-Q plots indicated that residuals followed a normal distribution.
- Autocorrelation: Durbin-Watson statistic values between 1.5 and 2.5 suggested no significant autocorrelation in residuals.

These tests affirm the robustness and validity of the regression model employed.

RESULTS AND DISCUSSION

Sample Characteristics

The study analyzed 211 observations from domestic tourists visiting ecotourism sites in Can Tho City. The detailed characteristics of the survey sample are presented in Table 1.

Based on the data in the table, the surveyed sample distribution is as follows:

- *Gender:* Among the 211 respondents, the gender ratio is relatively balanced, with no significant disparity. Specifically, male respondents account for 112 individuals (53.1%), while female respondents make up 99 individuals (46.9%).

- *Age:* Tourists visiting ecotourism sites belong to various age groups. The data are categorized into four age groups, ranging from younger to older visitors. The largest group consists of those aged 25 to 34 years old, making up 48.3% of the sample. This is followed by those aged 35 to 44, accounting for 26.5%. Visitors under 25 years old comprise 18.5%, while the smallest group, those over 44 years old, represents only 6.6%. This indicates that the 25 - 34 age group is the primary visitor segment in the surveyed areas.

- *Educational Background:* The majority of surveyed tourists hold a university degree, accounting for 55.9% of the sample. The second largest group consists of those with vocational or college education (22.7%). The remaining two groups include high school graduates (11.4%) and those with postgraduate education (10.0%), showing a relatively small gap between these latter two groups.

- *Place of Residence:* In terms of residential location, most tourists reside in urban areas. The specific statistics indicate that 87 respondents (41.2%) live in cities, 66 individuals (31.3%) reside in towns or townships, and 58 respondents (27.5%) come from rural areas.

Reliability Testing with Cronbach's Alpha

Table 1: The Description of the Research Sample [Source: Data collected and processed by the author, 2024]

Sample Information	Frequency	Percentage %	% Cumulative
Gender			
Male	112	53,1	53,1
Female	99	46,9	100,0
Age			
Under 25 years old	39	18,5	18,5
25 to 34 years old	102	48,3	66,8
35 to 44 years old	56	26,5	93,4
Above 44 years old	14	6,6	100,0
Educational Attainment			
High school	24	11,4	11,4
Vocational/College	48	22,7	34,1
University	118	55,9	90,0
Postgraduate	21	10,0	100,0
Place of Residence			
Urban area	87	41,2	41,2
Town/Small city	66	31,3	72,5
Rural area	58	27,5	100,0

Cronbach’s Alpha Analysis for Scales Measuring Factors Affecting Ecotourism Development

The results of the Cronbach’s Alpha analysis for each scale (Table 2) show that all coefficients exceed the commonly accepted threshold of 0.7, indicating satisfactory internal consistency. The “Technical facilities” scale has the lowest Cronbach’s Alpha value at 0.767, which, although acceptable, is lower than those of other constructs. The “Infrastructure and Support Services” scale exhibits the highest reliability coefficient at 0.894. All corrected item-total correlation coefficients are above 0.5, supporting the homogeneity of items within each scale. Besides, no items were removed since deleting any item did not improve the overall Cronbach’s Alpha. These findings confirm that all 31 observed variables meet reliability criteria and are suitable for subsequent Exploratory Factor Analysis (EFA).

Cronbach’s Alpha Analysis for the Ecotourism Development Scale

Based on the results in Table 3, the Cronbach’s Alpha coefficient for the ecotourism development scale

is 0.888, exceeding the commonly accepted threshold of 0.7. The corrected item-total correlation coefficients are all relatively high, with the lowest being PT3 at 0.644. Furthermore, none of the items have a Cronbach’s Alpha value higher than the overall scale alpha when deleted, supporting the retention of all observed variables. These results confirm that the scale demonstrates good internal consistency and is suitable for inclusion in Exploratory Factor Analysis (EFA).

Exploratory Factor Analysis (EFA) EFA for Independent Variable Scales

After verifying the reliability of the Cronbach’s Alpha coefficients for the observed variables in the scales, all qualified variables were included in the EFA process. The purpose of EFA is to identify the key factors affecting the dependent variable. The Principal Components extraction method with Varimax rotation was applied in the analysis. The criteria for factor loading thresholds, eigenvalue selection, and variance explanation percentage are applied according to the guidelines of Hoang Trong and Chu Nguyen Mong Ngoc³⁰.

The first round of EFA eliminated two variables, MT4 and MT2, as their factor loadings were below 0.3. After the rotation, EFA was repeated with the remaining

Table 2: Cronbach’s Alpha Analysis for Scales Measuring Independent Variables [Source: Data collected and processed by the author, 2024]

Observed variable	Mean of the scale if the variable is removed	Variance of the scale if the variable is removed	Total item correlation	Cronbach’s Alpha if the variable is removed
Infrastructure and Supporting Services (HT): Cronbach’s Alpha = 0,894				
HT1	26,744	13,210	0,699	0,879
HT2	26,730	13,436	0,645	0,884
HT3	26,720	13,288	0,640	0,884
HT4	26,720	12,955	0,681	0,880
HT5	26,735	13,091	0,660	0,882
HT6	26,735	13,310	0,627	0,885
HT7	26,730	12,884	0,727	0,876
HT8	26,668	13,061	0,709	0,878
Reasonable Pricing (GC): Cronbach’s Alpha = 0,870				
GC1	11,180	3,291	0,697	0,844
GC2	11,322	3,172	0,694	0,846
GC3	11,156	3,075	0,724	0,834
GC4	11,171	3,018	0,779	0,811
Quality of Human Resources (NL): Cronbach’s Alpha = 0,868				
NL1	15,379	4,608	0,710	0,836
NL2	15,502	4,708	0,687	0,842
NL3	15,379	4,656	0,690	0,841
NL4	15,327	4,659	0,672	0,846
NL5	15,436	4,761	0,699	0,839
Security, Order, and Safety (AN): Cronbach’s Alpha = 0,789				
AN1	11,223	2,745	0,590	0,748
AN2	10,986	3,109	0,616	0,730
AN3	11,133	2,906	0,670	0,701
AN4	11,019	3,295	0,532	0,769
Technical Facilities (CS): Cronbach’s Alpha = 0,767				
CS1	11,209	2,366	0,607	0,690
CS2	11,246	2,806	0,470	0,759
CS3	11,204	2,439	0,641	0,672
CS4	11,171	2,542	0,556	0,718
Natural Environment (MT): Cronbach’s Alpha = 0,868				
MT1	18,758	6,422	0,707	0,838
MT2	18,787	6,521	0,677	0,844
MT3	18,829	6,495	0,675	0,844
MT4	18,773	6,643	0,643	0,850
MT5	18,796	7,087	0,599	0,857
MT6	18,758	6,756	0,697	0,841

Table 3: Cronbach’s Alpha Analysis for Ecotourism Development Scales [Source: Data collected and processed by the author, 2024]

Observed variables	Mean of the scale if the variable is removed	Variance of the scale if the variable is removed	Total item correlation	Cronbach’s Alpha if the variable is removed
Ecotourism Development (PT): Cronbach’s Alpha = 0,888				
PT1	15,351	4,972	0,751	0,858
PT2	15,365	5,052	0,728	0,864
PT3	15,393	5,364	0,644	0,882
PT4	15,445	4,839	0,744	0,860
PT5	15,374	4,864	0,775	0,853

29 variables, and the final results are shown in Table 4. Kaiser-Meyer-Olkin (KMO) coefficient = 0.918, indicating that the data is suitable for EFA. Bartlett’s test of sphericity is statistically significant (Sig. = 0.000), confirming that the variables are correlated within the dataset. All variables were retained, as their factor loadings exceeded 0.5. The extracted variance is 63.933%, meaning that the identified factors explain 63.933% of the data variability. The Eigenvalue is 1.147, confirming that the extracted factor groups are acceptable.

The Exploratory Factor Analysis (EFA) was conducted using Principal Component Extraction with Varimax rotation to identify the underlying factor structure. Six factors were retained based on the Kaiser criterion, i.e., eigenvalues greater than 1. The eigenvalues of these factors were 2.97, 2.45, 2.10, 1.85, 1.55, and 1.30, respectively. These factors collectively accounted for 63.93% of the total variance in the dataset, exceeding the commonly accepted threshold of 60% for social science research. This indicates that the extracted factors adequately represent the observed variables.

All retained observed variables demonstrated factor loadings above 0.50, confirming their satisfactory representation within the respective factors and the overall robustness of the measurement model.

EFA for the Ecotourism Development Scale

The EFA results for the Ecotourism Development scale are presented in Table 5. All observed variables had factor loadings greater than 0.5, meeting the criteria for analysis. The Kaiser-Meyer-Olkin (KMO) coefficient is 0.875, confirming the suitability of the data at a 1% significance level. The Eigenvalue is 3.454 (greater than 1), which indicates that the extracted factor is valid. The total variance explained is 69.084%, meaning that the identified factor accounts

for 69.084% of the data variation. These results meet all necessary statistical criteria, confirming that the Ecotourism Development scale remains unchanged, ensuring high consistency and reliability for further analysis.

These findings satisfy all necessary statistical criteria, confirming that the Ecotourism Development scale is unidimensional and possesses high consistency and reliability for subsequent analyses.

Linear Regression Model

The author conducted regression analysis with Ecotourism Development in Can Tho City (CTC) as the dependent variable and six independent variables: Infrastructure and Supporting Services, Reasonable Pricing, Human Resource Quality, Security and Safety, Technical Facilities, Natural Environment. The detailed results of the linear regression analysis are summarized in Table 6.

The regression analysis results indicate that the coefficient of determination (R^2) is 0.764, meaning that 76.4% of the variation in Ecotourism Development in CTC is explained by the variables in the model. The Variance Inflation Factor (VIF) for all variables is less than 2, indicating that multicollinearity is not present. The chi-square test result shows a significance value (Sig.) of 0.000 (less than 0.01), confirming that the regression model is statistically significant at the 1% level. This proves that the regression model is appropriate and can be used for data analysis.

The estimated regression model identifies six factors with a statistically significant impact on Ecotourism Development, with all significance values (Sig.) below 0.05, confirming their significance at the 5% level.

Both the independent variables and the dependent variable were measured using a five-point Likert scale. Consequently, the unstandardized regression coefficients (B) represent the expected change in the ecotourism development score associated with a one-unit

Table 4: The Result of EFA for the Independent Variables Scale [Source: Data collected and processed by the author, 2024]

Observed Variables	Rotated Factor Matrix					
	1	2	3	4	5	6
HT7	0,748					
HT4	0,740					
HT8	0,731					
HT1	0,722					
HT5	0,699					
HT3	0,681					
HT2	0,680					
HT6	0,644					
NL1		0,791				
NL4		0,779				
NL3		0,727				
NL5		0,715				
NL2		0,679				
GC2			0,778			
GC4			0,736			
GC3			0,729			
GC1			0,698			
AN3				0,723		
AN1				0,714		
AN4				0,708		
AN2				0,629		
MT5					0,770	
MT3					0,723	
MT6					0,649	
MT1					0,629	
CS3						0,809
CS4						0,772
CS1						0,743
CS2						0,638

KMO coefficient = 0,918; Sig. = 0,000;
 Eigenvalue value = 1,147; Total variance extracted = 63,933%.

Table 5: The EFA Results for the Ecotourism Development Scale [Source: Data collected and processed by the author, 2024]

Observed Variables	Rotated Factor Matrix
	1
PT1	0,866
PT2	0,848
PT3	0,843
PT4	0,832
PT5	0,764
KMO coefficient = 0,875; Sig. = 0,000;	
Eigenvalue value = 3,454;	
Total variance extracted= 69,084%.	

Table 6: Regression Results [Source: Extracted from the regression analysis results]

Factors Influencing	Unstandardized Regression Coefficients		Standardized Regression Coefficients	t-statistic Value	Significance Level	Multicollinearity Statistics	
	Coefficient (B)	Standard Error Estimate				Tolerance	VIF
Constan	-0,671	0,190		-3,525	0,001		
HT	0,196	0,048	0,182	4,039	0,000	0,570	1,755
NL	0,228	0,045	0,220	5,031	0,000	0,607	1,648
GC	0,205	0,045	0,214	4,525	0,000	0,517	1,936
AN	0,177	0,044	0,180	4,039	0,000	0,585	1,710
MT	0,275	0,049	0,258	5,575	0,000	0,541	1,848
CS	0,118	0,040	0,109	2,914	0,004	0,825	1,212
R ² = 0,764; Durbin-Watson = 2,054; Sig. = 0,000							
Note: All independent and dependent variables were measured using a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree)							

increase in the Likert scale of each predictor variable. For example, the coefficient of 0.275 for the Natural Environment variable indicates that a one-point increase in the perceived quality of the natural environment corresponds to an average increase of 0.275 points in the ecotourism development score. Regarding multicollinearity diagnostics, the Variance Inflation Factor (VIF) values were all below 2, and the tolerance statistics exceeded 0.50 for all predictor variables, indicating that multicollinearity is not a concern within the regression model. These results affirm the stability and reliability of the estimated coefficients.

To validate the assumptions underlying the regression model, several diagnostic tests were conducted. The histogram of standardized residuals suggested an approximately normal distribution, which was further confirmed by the Kolmogorov-Smirnov test yielding a nonsignificant result ($p = 0.112 > 0.05$), indicating that the residuals do not significantly deviate from normality. Additionally, the Durbin-Watson statistic was 2.054, which is close to the ideal value of 2, providing evidence that there is no autocorrelation among the residuals.

Together, these diagnostic analyses enhance the empirical rigor of the study by demonstrating that the

data meet the key statistical assumptions required for valid inference in multiple linear regression analysis. The regression coefficients are used to determine the importance of each independent variable in relation to the dependent variable. Based on the regression results, the factors influencing Ecotourism Development in order of impact from most to least significant are: Natural Environment, Quality of Human Resources, Reasonable Pricing, Infrastructure and Support Services, Security and Safety, Technical Facilities. The accepted regression equation is:

$$PT = - 0,671 + 0,196 HT + 0,228 NL + 0,205 GC + 0,177 AN + 0,275 MT + 0,118 CS$$

The degree of influence of these factors serves as a crucial basis for the author to propose managerial implications.

DISCUSSION AND FUTURE RESEARCH

This study confirms that all six examined factors significantly influence ecotourism development in Can Tho City, with the Natural Environment having the strongest effect. The results of this study confirm that the natural environment has the strongest influence on ecotourism development in Can Tho, which is consistent with previous research, such as Butler's (1993) emphasis on the fundamental role of natural resources in attracting tourists. On the other hand, this study reveals that in Can Tho, the importance of the natural environment is not isolated; it must be integrated with other factors, including human resource quality and infrastructure to create a truly sustainable ecotourism model.

My results differ from previous studies in terms of the relative impact of each factor. For instance, the research by Phan Thi Dang⁸ in Nam Cat Tien highlighted the critical role of human resource quality and security in ecotourism development. However, in Can Tho, while human resources and security are still important, the natural environment emerged as the most significant factor. This could be attributed to the unique river-based ecosystem in Can Tho, which serves as a major attraction for ecotourism, making environmental preservation a priority for sustainable tourism development.

The findings of my study contribute significantly to theoretical frameworks in ecotourism development. Especially, this research demonstrates that ecotourism in areas like Can Tho requires a balanced integration of natural resources and supporting services. This insight suggests that ecotourism models should not only focus on environmental preservation but also

on developing infrastructure and human resources in a way that supports sustainable tourism. This represents an important expansion of current ecotourism theory, which often overlooks the complex interactions between environmental, social, and economic factors.

This finding is consistent with previous research emphasizing the foundational role of ecological assets in attracting tourists^{5,8}. The strong impacts of Human Resource Quality and Reasonable Pricing are also in line with existing studies, highlighting the importance of service professionalism¹⁸ and price fairness¹⁵ in shaping tourist satisfaction.

While factors such as Infrastructure, Safety and Security, and Technical facilities showed relatively lower standardized coefficients, they remain essential components supporting the ecotourism experience. These results reinforce the need for a balanced development strategy that strengthens both core environmental assets and supporting services^{14,28}.

In practical terms, the study provides a clear prioritization for policymakers and tourism planners. Key strategic directions include: conserving natural resources; developing human resource capacity through targeted training programs; implementing transparent and dynamic pricing models; and upgrading infrastructure and visitor services. In localities such as Phong Dien District, promoting community-based tourism linked to agricultural production could serve as an effective and sustainable model.

Nevertheless, the study has certain limitations. The research sample excluded international tourists and relied on convenience sampling, which may limit the generalizability of findings. Furthermore, some important variables - such as community participation and policy support - were not included in the current model, despite their recognized importance in the literature^{13,14}. Future studies should seek to broaden the sampling framework, incorporate additional influencing factors, and adopt longitudinal or mixed - method designs to better capture the dynamics of ecotourism development.

Recent literature further indicates that the COVID-19 pandemic has shifted tourist preferences toward open-air, nature-based, and less crowded destinations - traits that strongly align with ecotourism^{31,32}. These shifts underscore the urgency of enhancing environmental conservation and promoting localized, resilient tourism models in destinations such as Can Tho.

CONCLUSION AND MANAGERIAL IMPLICATIONS

In the context of evolving global tourism trends shaped by the COVID-19 pandemic, these findings carry timely and practical relevance. As travelers increasingly seek destinations that offer natural, open-air environments and a sense of well-being and sustainability, ecotourism has gained renewed attention^{33,34}. This presents Can Tho with a strategic opportunity to reposition itself as a leading post-pandemic ecotourism destination.

The regression analysis results have identified factors that positively influence the development of ecotourism. Among these, the Natural Environment has the strongest impact, with a regression coefficient of 0.275. Following this are Quality of Human Resources (0.228), Reasonable Pricing (0.205), Infrastructure and Support Services (0.196), and Security and Safety (0.177), with decreasing levels of impact, as indicated by their respective regression coefficients. The factor with the least influence on ecotourism development is technical facilities, with a regression coefficient of 0.118.

These findings not only achieve the research objectives but also accurately reflect the characteristics and conditions of ecotourism. Based on the impact levels of each factor, the author proposes managerial implications, focusing particularly on the key factors that play a crucial role in promoting ecotourism development.

Firstly, the Natural Environment (MT) is identified as the most influential factor in ecotourism development in Can Tho City. Therefore, policies should prioritize the conservation and sustainable management of natural resources, including riverine ecosystems, mangrove forests, and biodiversity hotspots. It is essential to encourage local communities, specifically in areas like Phong Điền District, to integrate agricultural and aquaculture activities with ecotourism development. Such integration not only helps preserve environmental quality but also technical facilities sources and fosters community engagement. Environmental protection measures, including effective waste management and public awareness campaigns about landscape conservation, should be intensified to ensure long-term sustainability.

Secondly, Quality of Human Resources (NL) is the second most significant factor influencing ecotourism development in Can Tho City. Investment in targeted training programs is crucial to enhance the expertise, communication skills, and service attitudes of tour guides and tourism staff. Collaborative efforts

with vocational schools and tourism enterprises can formalize these training initiatives, improving professionalism and visitor satisfaction, thereby boosting Can Tho's competitive advantage as an ecotourism destination.

Thirdly, Reasonable Pricing of Services (GC) ranks as the third most influential factor and positively impacts ecotourism development in Can Tho City. Besides natural attractions, tourists are sensitive to the overall costs of sightseeing, accommodation, dining, and shopping. It is recommended to implement dynamic and transparent pricing strategies that reflect demand fluctuations and market conditions, while preventing price gouging. Developing value-added tourism packages that combine local cultural and agricultural experiences can also enhance tourists' perceived value and promote repeat visits.

Fourthly, Infrastructure and Support Services (HT) rank fourth in influencing ecotourism development in Can Tho City. Visitors consider not only the beauty of nature but also the quality of accompanying services such as sanitary facilities, restaurants, lodging, communication networks, electricity, water supply, entertainment options, and authentic souvenirs that reflect the cultural heritage of the Mekong Delta. Investing in upgrading and expanding these infrastructures will enhance visitor experience and support sustainable tourism growth.

Fifthly, although Security and Safety (AN) rank fifth in influence, they remain essential. Comprehensive safety and security measures are necessary to address issues like begging, aggressive solicitation, price gouging, and theft, particularly in high-risk areas such as docks and tourist gathering points. Strengthening security presence and community involvement in safety programs will increase tourists' peace of mind and support sustainable tourism development.

Lastly, Technical facilities (CS), despite their relatively lower impact, are important enablers of ecotourism. Investment should focus on improving transportation connectivity among tourist sites and ensuring tourism vehicles like boats and buses, are equipped with safety devices including life jackets. Providing comfortable and safe travel conditions will enhance visitor satisfaction and contribute to projecting a modern, professional image of Can Tho's ecotourism sector.

ABBREVIATIONS

AN: Security, Order, and Safety
 CS: Technical Facilities
 CTC: Can Tho City
 EFA: Exploratory Factor Analysis
 GC: Reasonable Pricing

HT: Infrastructure and Supporting Services
 KMO: Kaiser-Meyer-Olkin (Measure of Sampling Adequacy)
 MT: Natural Environment
 NL: Quality of Human Resources
 PT: Ecotourism Development
 Sig.: Significance Level
 TTDI: Travel and Tourism Development Index
 VIF: Variance Inflation Factor
 WEF: World Economic Forum

CONFLICT OF INTEREST

No potential conflicts of interest were reported by the authors.

AUTHOR CONTRIBUTION

All authors contributed significantly to the development of this research article. Specifically:

Huynh Canh Thanh Thanh: Led the research project, designed the research model, supervised the data collection and analysis, interpreted the results, and finalized the manuscript for submission.

Pham Hong Doan: Collected data through field surveys, conducted interviews with domestic tourists at ecotourism sites, and contributed to data processing.

Tran Thao Vy: Performed statistical analyses, including reliability testing, Exploratory Factor Analysis (EFA), and regression analysis, and assisted in drafting the results section.

Huynh Thanh Nha: Coordinated fieldwork activities, contacted local tourism businesses and authorities, and supported the interpretation of field survey findings.

Nguyen Thi Ngoc Anh: Provided overall supervision, methodological guidance, and critical revisions to enhance the scientific quality and coherence of the article.

Scientific contribution of the article: This study identifies and empirically verifies the six key factors influencing the development of ecotourism in Can Tho City. The research offers the practical managerial implications for enhancing sustainable ecotourism and contributes new empirical evidence to the academic literature on tourism development in the Mekong Delta region of Vietnam.

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Các nhân tố ảnh hưởng đến sự phát triển du lịch sinh thái trên địa bàn thành phố Cần Thơ

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TÓM TẮT

Nghiên cứu này nhằm xác định và đánh giá các nhân tố chủ yếu ảnh hưởng đến sự phát triển du lịch sinh thái tại thành phố Cần Thơ - trung tâm kinh tế, văn hóa và giao thông của vùng Đồng bằng sông Cửu Long, Việt Nam. Với hệ sinh thái sông nước đặc trưng, di sản văn hóa phong phú và vị trí địa lý thuận lợi, Cần Thơ có tiềm năng lớn để phát triển du lịch sinh thái bền vững. Tuy nhiên, thành phố vẫn đang đối mặt với nhiều thách thức như cơ sở hạ tầng chưa hoàn thiện, ô nhiễm môi trường, chất lượng nguồn nhân lực còn hạn chế và sự thiếu vắng các nghiên cứu mang tính thực nghiệm, cũng như việc hệ thống hóa các yếu tố tác động đang là rào cản trong hoạch định chính sách phát triển loại hình du lịch này. Trên cơ sở lý luận kế thừa các nghiên cứu trong và ngoài nước, nghiên cứu đề xuất mô hình gồm sáu nhân tố chính ảnh hưởng đến sự phát triển du lịch sinh thái: (1) Cơ sở hạ tầng và dịch vụ hỗ trợ, (2) Giá cả dịch vụ hợp lý, (3) Chất lượng nguồn nhân lực, (4) An ninh trật tự và an toàn, (5) Cơ sở vật chất kỹ thuật, (6) Môi trường tự nhiên. Các giả thuyết nghiên cứu được xây dựng dựa trên mối liên hệ giữa từng yếu tố với sự phát triển du lịch sinh thái. Dữ liệu khảo sát được thu thập từ 211 khách du lịch nội địa tại các điểm đến sinh thái trên địa bàn thành phố Cần Thơ trong thời gian từ tháng 4 đến tháng 7 năm 2024. Các phương pháp phân tích được sử dụng gồm: Cronbach's Alpha, phân tích nhân tố khám phá và hồi quy tuyến tính đa biến. Kết quả nghiên cứu cho thấy cả sáu nhân tố đều có ảnh hưởng tích cực và có ý nghĩa thống kê đến sự phát triển du lịch sinh thái. Trong đó, Môi trường tự nhiên là nhân tố có tác động mạnh nhất, tiếp theo là Chất lượng nguồn nhân lực và Giá cả dịch vụ hợp lý. Ba yếu tố còn lại gồm Cơ sở hạ tầng và dịch vụ hỗ trợ, An ninh trật tự và an toàn, Cơ sở vật chất kỹ thuật cũng có ảnh hưởng nhưng ở mức độ thấp hơn. Dựa trên các kết quả phân tích, nghiên cứu đề xuất những hàm ý quản trị cụ thể như: tăng cường bảo vệ môi trường và phát triển du lịch gắn với nông nghiệp sinh thái; đầu tư nâng cao năng lực, kỹ năng và thái độ phục vụ của nhân lực ngành du lịch; điều chỉnh và kiểm soát hợp lý giá cả dịch vụ; nâng cấp hạ tầng và phương tiện vận chuyển; đảm bảo an ninh trật tự tại các điểm du lịch. Những gợi ý này góp phần định hướng phát triển du lịch sinh thái bền vững và nâng cao vị thế của Cần Thơ trên bản đồ du lịch sinh thái khu vực và quốc gia.

Từ khoá: Thành phố Cần Thơ, Đồng bằng sông Cửu Long, du lịch sinh thái, du lịch bền vững, các yếu tố quản lý du lịch, tính bền vững môi trường

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