

# FACTORS AFFECTING TOURIST SATISFACTION IN ECOTOURISM: A CASE STUDY OF THE PHONG NHA-KE BANG NATIONAL PARK, VIETNAM

ANH TOAI LE <sup>1,2</sup>, LESZEK BUTOWSKI <sup>3</sup>, ŁUKASZ QUIRINI-POPLAWSKI <sup>4</sup>,  
HOANG SON NGUYEN <sup>5</sup>

<sup>1</sup> University of the National Education Commission, Krakow, Poland

<sup>2</sup> Hue University of Education, Hue University, Vietnam

<sup>3</sup> University of Lodz, Poland

<sup>4</sup> Institute of Geography and Spatial Organization Polish Academy of Sciences, Poland

<sup>5</sup> Institute of Open Education and Information Technology, Hue University of Education, Vietnam

Manuscript received: September 22, 2024

Revised version: April 8, 2025

LE A.T., BUTOWSKI L., QUIRINI-POPLAWSKI Ł., NGUYEN H.S., 2025. Factors affecting tourist satisfaction in ecotourism: A case study of the Phong Nha-Ke Bang National Park, Vietnam. *Quaestiones Geographicae* 44(2), Bogucki Wydawnictwo Naukowe, Poznań, pp. 77–94. 2 figs, 10 tables.

**ABSTRACT:** The Phong Nha-Ke Bang National Park (PNKBNP) is one of the leading ecotourism destinations in Vietnam. To ensure sustainable development, understanding the factors influencing tourist satisfaction is crucial. This study surveyed 185 tourists using questionnaires to assess the significant factors affecting tourist satisfaction at the PNKBNP. The questionnaire responses were coded and analysed using Cronbach's alpha reliability coefficient, exploratory factor analysis and regression analysis through the SPSS (Statistical Package for Social Sciences) 26.0 software. The study results revealed that tourist satisfaction is primarily dependent on five main factors: (1) destination attraction, (2) ecotourism services, (3) staff quality, (4) price, and (5) infrastructure. Among these, 'destination attraction' and 'ecotourism services' had the most significant impact on tourist satisfaction at the PNKBNP. This study also found that 'staff quality' had the least impact on tourist satisfaction. These findings provide a scientific basis for improving staff quality and enhancing tourist satisfaction at the Phong Nha-Ke Bang, while contributing to the sustainable development of ecotourism in Vietnam.

**KEYWORDS:** ecotourism, satisfaction, tourist, SPSS, Phong Nha-Ke Bang

*Corresponding author: Anh Toai Le, University of the National Education Commission, Krakow, ul. Podchorążych 2, pok. 31C, 30-084 Krakow, Poland; e-mail: [anhtoai.le@doktorant.up.krakow.pl](mailto:anhtoai.le@doktorant.up.krakow.pl); [latoai@hueuni.edu.vn](mailto:latoai@hueuni.edu.vn)*

## Introduction

Ecotourism is one of the forms of sustainable tourism that aims to meet the needs of sustainable development (Donohoe, Needham 2006, Das, Chatterjee 2015, Fennell 2019). This approach aims to minimise the negative impacts of tourism

on the natural environment while enhancing the well-being of local communities (Butowski 2021, Le, Nguyen 2023). Generally, many researchers concur that ecotourism is often employed interchangeably with terms such as sustainable tourism, responsible tourism, ethical tourism, nature tourism, cultural tourism, and heritage tourism

(Blamey 1997, Weaver 2001, Niñerola et al. 2019). According to Hector Ceballos-Lascurain, ecotourism is “travelling to relatively undisturbed or uncontaminated natural areas with the specific objective of studying, admiring and enjoying the scenery and its wild plants and animals, as well as any existing cultural manifestations (both past and present) found in these areas” (Ceballos-Lascurain 1987: 14). From the initial definition in 1987 to the present, the concept of ecotourism has progressed, shifting from a focus on minimising the impact of tourism on the natural environment to a more responsible form of tourism that supports conservation and education, and improves the lives of local communities. Many definitions now emphasise the element of ‘responsibility’ in tourism activities (Stronza et al. 2019).

In ecotourism, tourist satisfaction is a multifaceted construct that reflects the degree to which visitors’ expectations are met or exceeded by their experiences (Beard, Ragheb 1980, Oliver 2014). Tourist satisfaction is an important indicator for assessing on-site experience during participation in tourism activities (Stumpf et al. 2020, Bhuiyan, Darda 2021, Kubickova, Campbell 2022). Additionally, tourist satisfaction is a crucial aspect of destination management and marketing, influencing behavioural intentions and economic impact (Cárdenas-García et al. 2016, Bulatović, Stranjančević 2019, Kubickova, Campbell 2022). In the above context, tourist satisfaction is defined as a result of the comparison between “feelings and expectations about the destinations” (Parasuraman et al. 1994). Pearce (1980) argues that tourist satisfaction is influenced by tourists’ perspectives before and after their trip. Tourist satisfaction is key to the success of businesses and serves as the foundation for evaluating the quality of services provided (Prayag 2009). Meeting and satisfying tourist needs is considered the most effective strategy for attracting and retaining customers in the current era (Crespi-Vallbona 2021). The more satisfied the tourists are, the more likely they are to return to use the tourism products and services of a destination. Additionally, satisfied tourists are likely to encourage others, including their friends and family, to visit those destinations. Previous research has identified a range of factors influencing tourist satisfaction, including destination quality, services, staff, pricing, and

elements related to experience and environmental conservation (Correia et al. 2008, Cárdenas-García et al. 2016, Oliveri et al. 2019, Bhuiyan, Darda 2021, Peng, Jiang 2022). However, satisfaction is a somewhat abstract and multidimensional concept, making it challenging to be defined precisely and consistently, as it primarily depends on tourists’ perceptions and is influenced by numerous factors (Marques et al. 2021). Current measurement scales for satisfaction do not fully encompass all aspects of the concept, particularly in the diverse and complex context of ecotourism (Beall, Boley 2022).

The Phong Nha-Ke Bang National Park (PNKBNP) is a renowned ecotourism destination, attracting millions of domestic and international tourists each year, especially after being recognised as a World Heritage Site by UNESCO (2020). The national park is distinguished by its vast cave system, the largest in the world, its rich biodiversity and its stunning natural landscapes, making it an ideal site for exploration and nature conservation activities (Tran 2020). Although the PNKBNP has garnered significant attention from tourists, research on their satisfaction levels at the national park remains quite limited. Many previous studies have focused on collecting qualitative data or conducting preliminary surveys on tourist perceptions, without delving into quantitative analysis of specific factors affecting satisfaction (Ly, Xiao 2016, Van Mai, Doo-Chul 2020, Selcuk et al. 2023). This has made it difficult to accurately assess and compare various elements. Moreover, data analysis methods used in previous studies typically rely on descriptive statistics (mean, median), without employing more advanced quantitative techniques such as regression analysis, factor analysis, or structural equation modelling (Giao et al. 2021). This limits the ability to detect relationships between the factors influencing tourist satisfaction and reduces the persuasiveness of research findings.

Therefore, the purpose of this study is to determine the influence of chosen factors on tourists’ satisfaction in the PNKBNP using the SPSS 26.0 statistical analysis software. By identifying the key factors affecting visitor satisfaction, the research aims to provide valuable insights for destination managers in developing sustainable development strategies for local ecotourism. Additionally, the specific case study of the

PNKBNP contributes to the existing body of research on this subject and offers useful perspectives for other ecotourism destinations.

## Proposed model of the study

Drawing upon theoretical frameworks and empirical studies, this research proposes a model to examine the factors influencing tourist

satisfaction at the PNKBNP. The proposed model includes eight independent variables, such as sightseeing; ecotour guide; transport; food and beverage; accommodation; entertainment and shopping; price and public facilities. These independent variables are hypothesised to have a direct influence on the dependent variable – ‘tourist satisfaction’ (Fig. 1).

Each of the aforementioned variables is measured through a specific set of observed variables.

Table 1. Independent variables of the proposed model.

Independent variables	Observed variables	Encryption	Sources
Sightseeing	Natural and cultural attractions	SS1	Tarlow (2014), Toker, Emir (2023), Mbira (2024), Phung et al. (2024)
	Convenience in travelling to locations	SS2	
	Safety at attractions	SS3	
Ecotour guide	Language proficiency	EG1	Geva, Goldman (1991), Ap, Wong (2001), Huynh et al. (2024), Zhang, Fukami (2024)
	Friendliness, professionalism and enthusiasm	EG2	
	Presentation skills	EG3	
	Information and educational content provided	EG4	
Transport	Easy access to transport	TS1	Iniesta-Bonillo et al. (2016), Rohini (2024)
	Available means of transport	TS2	
	Transport safety	TS3	
Food and beverage	Availability of food and beverage services	FB1	Björk, Kauppinen-Räsänen (2016), Stone et al. (2018), Peng, Jiang (2022)
	Standards of hygiene and quality of food services	FB2	
	Variety of cuisine options	FB3	
	Staff professionalism and service quality	FB4	
Accommodation	Availability of accommodation	AS1	Oliver (2014), Carvache-Franco et al. (2022), Sugiyama et al. (2022)
	Accommodation quality	AS2	
	Staff professionalism and service quality	AS3	
Entertainment and shopping	Various recreational activities	ES1	Hong, Saizen (2019), Cheraghzadeh et al. (2023), Shang et al. (2023)
	Various souvenirs	ES2	
	Staff professionalism and service quality	ES3	
Price	Entrance tickets	PS1	Rivera and Croes (2010), Hau (2014), Chua et al. (2015) and Giao et al. (2021)
	Transport	PS2	
	Food and beverage	PS3	
	Accommodation	PS4	
	Entertainment and shopping	PS5	
Public facilities	Clean water availability	PF1	An et al. (2024), Baloch et al. (2023), Giao et al. (2021), Mandić et al. (2018) and Luo et al. (2022)
	Communication systems	PF2	
	Garbage dumps	PF3	
	Parking areas	PF4	
	Public signs	PF5	
	Security facilities	PF6	
	Health facilities	PF7	
	Rest areas	PF8	
	Interpretative facilities	PF9	

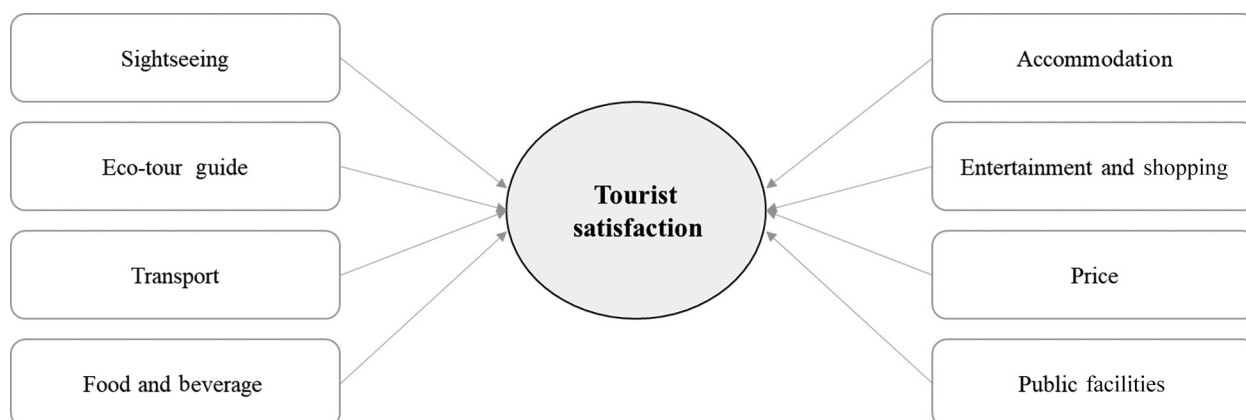


Fig. 1. The proposed model of the study.

In particular, this study employs a total of nine variables, including eight independent variables (34 observed variables) and a dependent variable (Table 1).

## Study area and methods

This section will delve into a detailed description of the study area and the research methods applied to collect and analyse data.

### Study area

The PNKBNP is a UNESCO World Natural Heritage site, featuring a magnificent cave system and rich biodiversity, making it an attractive destination for ecotourism (Van Mai, Doo-Chul 2020). The national park is located in Quang Binh Province, part of the North Central region of Vietnam. Currently, the national park covers a total area of 85,754 ha, including three main zones: the strictly protected zone, the ecological restoration zone, and the buffer zone (Ly, Xiao 2016). The PNKBNP was established to protect one of the world's two largest limestone mountain regions, encompassing approximately 300 caves, and to conserve the Northern Truong Son ecosystem in the North Central region of Vietnam. The park is characterised by limestone formations, caves, underground rivers, and rare flora and fauna. The predominant vegetation type is tropical moist evergreen forest on limestone, at an elevation of 800 m above sea level. Forests cover 96.2% of the park's area, with 92.2% being typical primary forests on limestone

mountains, featuring distinctive vegetation types (Khuong, Huong 2014). In recent years, the number of visitors to the PNKBNP has increased rapidly, generating a large amount of data for research (Selcuk et al. 2023). Additionally, compared to other tourist destinations, research on ecotourism at the PNKBNP remains limited. Therefore, to provide further information for researchers, this study selected the PNKBNP as the study area.

### Methods

Based on the proposed research model and the identified observed variables, a questionnaire was designed to collect empirical data from tourists (as shown in Appendix). The data were then analysed using statistical techniques to identify factors influencing tourist satisfaction.

### Data collection

Primary data were gathered through a survey administered directly to tourists from June to September 2024. The survey consisted predominantly of closed-ended questions, using a 5-point Likert scale to ensure reliable responses. For instance, tourist satisfaction was assessed on the scale, where 1 indicated 'strongly unsatisfied' and 5 represented 'strongly satisfied'.

After finalising the questionnaire, the next crucial step was to determine the sample size to ensure the survey results were highly reliable. Methods such as regression and exploratory factor analysis typically require a large sample size to ensure high research reliability. However, owing to time and financial constraints in collecting



a substantial amount of data, this study determined the sample size based on factor analysis methodology. The observation-to-measurement ratio is 5:1, meaning that each measure requires at least five observations (Hair et al. 1998). The required number of observations was determined using the following formula:

$$N = 5 \times m$$

where:

- $N$ : number of observations;
- $m$ : number of observed variables.

Ultimately, the survey yielded 185 valid questionnaires. The collected data were subsequently digitised, organised, tabulated, and analysed using the SPSS 26.0 software (IBM Corporation).

### Data reliability

Cronbach's alpha method measures unsuitable variables and reduces noise variables in the research process by evaluating the scale using Cronbach's alpha reliability coefficient. It measures the extent to which items on a scale measure the same concept (Agbo 2010). The higher the Cronbach's alpha coefficient, the greater the reliability of the scale. Regarding the reliability of the observed variables, they were considered reliable when the corrected item-total correlation coefficient was  $\geq 0.3$  (Bland, Altman 1997). Variables with an item-total correlation coefficient of  $< 0.3$  will be removed. The scale with a Cronbach's alpha coefficient of 0.6 or higher can be used in cases where the concept being studied is new (Tavakol, Dennick 2011). Regarding the reliability of the measurement scale, Cronbach's alpha of 0.7 to nearly 0.8 indicates an acceptable measurement scale, while Cronbach's alpha of 0.8 to almost 1 indicates a good measurement scale (Cortina 1993).

### Exploratory factor analysis

The exploratory factor analysis is a statistical technique used to identify hidden structures (also known as factors) from a large set of observed variables (Cudeck 2000). The primary objective of the exploratory factor analysis in this study is to simplify the data collected from multiple survey questions, uncover key latent factors influencing tourist satisfaction, and evaluate the significance

of each factor. This approach provides a deeper understanding of tourists' needs and enables effective management decisions to enhance service quality (Correia et al. 2008).

To assess whether the dataset is suitable for factor analysis, the following criteria are applied:

- Kaiser-Meyer-Olkin (KMO) measure: The index measures the adequacy of data for factor analysis. The value between 0.5 and 1 is considered appropriate for factor analysis (Kaiser, Rice 1974).
- Bartlett's test: It checks whether the observed variables are significantly correlated. If the result is statistically significant ( $p$ -value  $< 0.05$ ), it indicates that the variables are interrelated and suitable for factor analysis (Kaiser, Rice 1974).
- Eigenvalue standard: Each factor is associated with an eigenvalue. Factors with an eigenvalue greater than 1 are typically retained in the model (Hair et al. 1998).
- Total variance explained (TVE): The index refers to the percentage of the variance of the observed variables explained by the extracted factors. Typically, if the TVE is 50% or higher, the exploratory factor analysis model is considered appropriate (Anderson, Gerbing 1988).
- Factor loading: The index represents the correlation between an observed variable and a factor. Higher factor loadings indicate stronger relationships between the variable and the factor. According to Hair et al. (1998), a factor loading of 0.5 or higher is considered good, while the minimum acceptable loading is 0.3.

### Regression analysis

Multivariate regression analysis is a widely used statistical method for modelling the relationship between a dependent variable and one or more independent variables (Harrell 2001). It helps understand how independent variables affect the dependent variable (Chadee, Mattsson 1996, Suanmali 2014). By identifying key factors, regression analysis enables a deeper understanding of what tourists expect and value. This allows service providers in the tourism industry to develop forecasting models, make informed business decisions, and improve service quality effectively.

To measure and evaluate the influence of the factors on tourist satisfaction, a multivariate regression method is used. The multiple regression model is represented by Eq. (1):

$$\text{Tourist satisfaction} = \beta_0 + \beta_1 \times F_1 + \beta_2 \times F_2 + \dots + \beta_n \times F_n + \varepsilon \quad (1)$$

where:

- $\beta_0$ : regression constant;
- $F_1, F_2, \dots, F_n$ : factors influence to tourist satisfaction;
- $\beta_1, \beta_2, \dots, \beta_n$ : coefficients of factors;
- $\varepsilon$ : error values.

## Results

### Demographic background of respondents

Demographic information obtained from the survey sample is presented in Table 2. Domestic tourists accounted for 53.0%, indicating the significance of the domestic tourism market. However, the number of international tourists was also substantial, suggesting the potential for international tourism development. In terms of gender, 58.3% of tourists were female, while the remaining 41.7% were male. Regarding age, the majority

of respondents were between 29 and 48 years old, implying a higher capacity to afford ecotourism; followed by the age group of 49–65. Those with a college degree constituted 61.9% of the sample, suggesting an association between ecotourism and higher educational attainment, followed by 21.85% who indicated having only a high school degree. Regarding occupation, the majority were private employees, indicating a higher capacity to afford tourism, followed by students, reflecting the younger generation's inclination towards nature exploration.

### Data reliability

Cronbach's alpha was used to examine the reliability of factors affecting tourist satisfaction. In other words, this technique is employed to determine whether the observed variables align with the underlying concept of a factor. After conducting Cronbach's alpha, four observed variables were excluded (EG1, EG2, EG3, and PF1) due to item-total correlation coefficients of <0.3.

The second test confirmed the reliability of the scales, as Cronbach's alpha coefficients were relatively high (>0.7). Additionally, all 30 remaining observed variables had total variable correlation coefficients greater than 0.3, further supporting their reliability. Cronbach's overall alpha value

Table 2. Sociodemographic aspects of respondents (N = 185).

Demographics	Categories	N	Percentage (%)
Nationality	National	98	53.0
	Foreign	87	47.0
Gender	Male	77	41.7
	Female	108	58.3
Age (years)	18–28	12	6.7
	29–48	78	42
	49–65	52	28.2
	>65	5	2.6
Education level	Primary	3	1.6
	Secondary	40	21.8
	University	115	61.9
	Postgraduate/Master/PhD	27	14.8
Professional activity	Student	46	24.9
	Researcher/scientist	8	4.1
	Businessman	16	8.5
	Private employee	53	28.5
	Public employee	26	14.2
	Unemployed	5	2.6
	Retired	4	2.1
	Other	15	8.3

Table 3. Cronbach's alpha coefficient for each variable.

Independent variables	Cronbach's alpha	No. of items
Sightseeing	0.834	3
Ecotour guide	0.804	4
Transport	0.810	3
Food and beverage	0.734	4
Accommodation	0.733	3
Price	0.823	5
Public facilities	0.807	8

was 0.806, indicating that 80.6% of the variance in the combined 30 items represents true score variance, demonstrating strong internal consistency.

The study continued to analyse Cronbach's alpha coefficients for each independent variable. However, the independent variable 'entertainment and shopping' was excluded from the model because its observed variables had been removed in previous steps. All remaining variables had a Cronbach's alpha value greater than 0.7, indicating that the observed variables within each variable consistently measured a common concept and thus can proceed with further evaluation (Table 3).

### Results of the exploratory factor analysis

The first step in applying exploratory factor analysis is to evaluate whether the dataset meets the necessary conditions. The results show that the KMO measure was 0.8, indicating that the variables in the dataset were sufficiently correlated to conduct factor analysis. Additionally, Bartlett's test was statistically significant ( $p$ -value <0.05), confirming that the correlation matrix of the variables significantly differed from the identity matrix, meaning that the variables were interrelated.

Using the principal component analysis extraction method with Varimax rotation for independent variables, five factors were extracted from the 30 observed variables at an eigenvalue of 1.069 (representing five latent factors affecting tourist satisfaction). Furthermore, the TVE showed that these five factors accounted for 70.4% of the dataset's variance, exceeding the minimum threshold of 50%, thus confirming the model's adequacy. Finally, in the rotated component matrix, all factors had factor loadings greater than 0.5, meeting the requirements. As a result, no factors needed to be removed from the scale (Table 4).

Table 4. Exploratory factor analysis.

Factors	Observed variables	Factor loading
Factor 1	SS1	0.772
	SS2	0.706
	SS3	0.710
	TS3	0.688
	FB3	0.606
Factor 2	TS1	0.784
	TS2	0.742
	FB1	0.669
	FB2	0.726
	AS1	0.739
	AS2	0.682
Factor 3	ES1	0.830
	ES2	0.771
	ES3	0.770
	EG4	0.769
	FB4	0.703
	AS3	0.687
Factor 4	PS1	0.706
	PS2	0.692
	PS3	0.678
	PS4	0.619
	PS5	0.625
Factor 5	PF2	0.620
	PF3	0.721
	PF4	0.671
	PF5	0.676
	PF6	0.673
	PF7	0.687
	PF8	0.541
	PF9	0.645

Eigenvalue: 1.069.

TVE: 70.4%.

KMO measure of sampling adequacy: 0.872.

Bartlett's test: Sig. = 0.000.

KMO - Kaiser-Meyer-Olkin; TVE - total variance explained

### Naming and explaining the factors affecting tourist satisfaction

After identifying the factors, the next step is to assign names and interpret their meanings. This process involves analysing the observed variables with high factor loadings on the same factor, as these variables define the underlying concept of each factor. Based on the characteristics of the grouped observed variables from independent variables, a new name for the factor is determined (this attribute is known as the exploratory attribute of factor analysis) (Table 5).

- Factor 1: Renamed as 'destination attraction'; this factor includes observed variables SS1, SS2, SS3, TS3, and FB3.

Table 5. Factors affecting tourist satisfaction.

Factors	Observed variables	Encryption
Destination attraction	Natural and cultural attractions	SS1
	Convenience on travelling to location	SS2
	Safety at attraction	SS3
	Transport safety	TS3
	Variety of cuisine options	FB3
Ecotourism services	Easy access to transport	TS1
	Available means of transport	TS2
	Availability of food and beverage services	FB1
	Standards of hygiene and quality of food services	FB2
	Accommodation availability	AS1
	Accommodation quality	AS2
Staff quality	Language proficiency	ES1
	Friendliness, professionalism and enthusiasm	ES2
	Presentation skills	ES3
	Information and educational content provided	EG4
	Staff professionalism and service quality of food services	FB4
	Staff professionalism and service quality of accommodation	AS3
Price	Entrance ticket	PS1
	Transport	PS2
	Food and beverage	PS3
	Accommodation	PS4
	Entertainment and shopping	PS5
Infrastructure	Communication systems	PF2
	Garbage dumps	PF3
	Parking areas	PF4
	Public signs	PF5
	Security facilities	PF6
	Health facilities	PF7
	Rest areas	PF8
	Interpretative facilities	PF9

- Factor 2: Renamed as 'ecotourism services'; this factor includes observed variables TS1, TS2, FB1, FB2, AS1, and AS2.
- Factor 3: Renamed as 'staff quality'; this factor includes observed variables ES1, ES2, ES3, ES4, FB4, and AS3.
- Factor 4: Retained as 'price'; this factor includes observed variables PS1, PS2, PS3, PS4, and PS5.
- Factor 5: Renamed as 'infrastructure'; this factor includes observed variables PF2, PF3, PF4, PF5, PF6, PF7, PF8, and PF9.

### Adjusting the research model

Based on the factor analysis results, the research model has been adjusted to include five factors: (1) destination attraction, (2) ecotourism services, (3) staff quality, (4) price, and (5) infrastructure. Tourist satisfaction remains the dependent variable, while the newly identified components serve as the independent variables in the revised model. Accordingly, the proposed hypotheses are presented in Table 6.

Table 6. Research hypotheses.

Order	Hypotheses
H1	Destination attractions have a positive impact on tourist satisfaction at the PNKBNP.
H2	Ecotourism services have a positive impact on tourist satisfaction at the PNKBNP.
H3	Staff quality has a positive impact on tourist satisfaction at the PNKBNP.
H4	Price has a positive impact on tourist satisfaction at the PNKBNP.
H5	Infrastructure has a positive impact on tourist satisfaction at the PNKBNP.

PNKBNP – Phong Nha-Ke Bang National Park.



The proposed hypotheses provide a more comprehensive understanding of the factors influencing tourist satisfaction. By focusing on these specific factors, the research can delve deeper into the individual effects of each factor on overall tourist satisfaction at the PNKBNP.

### Results of regression analysis

The results showed an adjusted  $R^2$  value of 0.840. This indicates that the independent variables in the model explain 84.0% of the variation in the dependent variable (Table 7). The remaining 16% is attributed to other factors not included in the model.

Table 7. Model summary.

Model	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Std. error of the estimate
1	0.925	0.856	0.840	0.28414

Additionally, to assess the overall fit of the regression model, the study examines the  $F$ -value using the analysis of variance (ANOVA) (Table 8). The  $F$ -value is 53.082, and the Sig-value is 0.00, indicating that the multiple regression model is suitable for the dataset and can be used.

Table 8. ANOVA table of regression model.

Model		Sum of squares	df	Mean square	F	p-value
1	Regression	98.568	23	4.286	53.082	0.00
	Residual	16.632	206	0.081		
	Total	115.200	229			

ANOVA - analysis of variance

The variance inflation factor (VIF) for each factor is less than 10 (Table 9), indicating that the regression model does not violate the multicollinearity phenomenon (independent variables are highly correlated).

Table 9. The variance inflation factor (VIF) of regression analysis.

Model		Collinearity statistics	
		Tolerance	VIF
1	Destination attraction	0.749	1.259
	Ecotourism services	0.766	1.324
	Staff quality	0.730	1.370
	Price	0.793	1.421
	Infrastructure	0.750	1.258

### Hypotheses testing

After the conditions for multiple regression analysis were met, the results determined that there is a significant linear relationship between the five factors and tourist satisfaction ( $p$ -value  $< 0.05$ ). Among the five factors, 'destination attraction' had the strongest impact on tourist satisfaction at the PNKBNP ( $\beta = 0.322$ ), followed by 'ecotourism services' ( $\beta = 0.213$ ), 'infrastructure' ( $\beta = 0.096$ ), and 'price' ( $\beta = 0.076$ ). Although 'staff quality' showed the weakest effect ( $\beta = 0.009$ ), all corresponding hypotheses (H1-H5) were statistically supported (Table 10).

Table 10. Coefficients of regression analysis.

	Hypotheses	Standardised coefficients ( $\beta$ )	p-value	Decision
	Regression constant ( $\beta_0$ )	0.197	0.003	
H1	Destination attraction $\rightarrow$ tourist satisfaction	0.322	0.000	Supported
H2	Ecotourism services $\rightarrow$ tourist satisfaction	0.213	0.005	Supported
H3	Staff quality $\rightarrow$ tourist satisfaction	0.009	0.000	Supported
H4	Price $\rightarrow$ tourist satisfaction	0.076	0.006	Supported
H5	Infrastructure $\rightarrow$ tourist satisfaction	0.096	0.027	Supported

Based on the identified regression coefficients, Eq. (1) can therefore be re-expressed as Eq. (2):

$$\text{Tourist satisfaction} = 0.197 + 0.322 \times \text{destination attraction} + 0.213 \times \text{ecotourism services} + 0.096 \times \text{infrastructure} + 0.076 \times \text{price} + 0.009 \times \text{staff quality} \quad (2)$$

Therefore, the final research model of factors affecting tourist satisfaction at the PNKBNP has been established (Fig. 2). The model not only highlights the relative influence of each factor but also serves as a useful framework for policymakers, tourism managers, and stakeholders in designing appropriate strategies to enhance tourist experiences and promote sustainable ecotourism development in the PNKBNP.

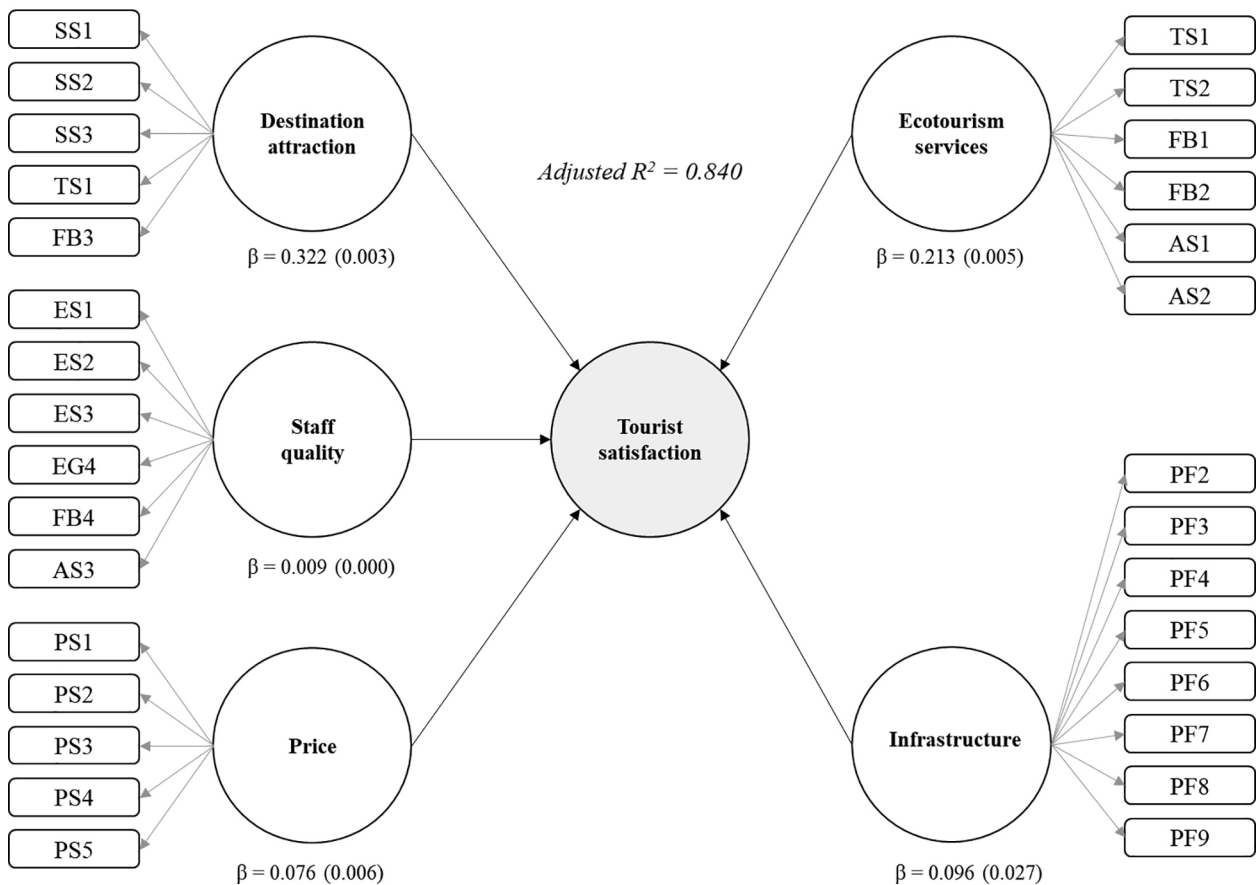


Fig. 2. The final model of the study.

## Discussion

By discussing the extent to which each factor contributes to overall visitor satisfaction, this section provides critical insights into the significant components of the ecotourism experience that require improvement. The findings serve as a foundation for formulating targeted interventions and strategic planning efforts aimed at enhancing tourist experiences and promoting the sustainable development of ecotourism in the PNKBNP.

### Destination attractions

The attractiveness of a destination is a fundamental factor that draws the interest of tourists and tourism managers (Jiménez-García et al. 2020). 'Destination attraction' has the strongest impact on the satisfaction of ecotourists at the PNKBNP because it is a destination with outstanding natural value and scenic beauty, meeting tourists' needs for pristine natural experiences. This underscores that the core value of ecotourism lies in

the beauty and uniqueness of nature, which is the primary factor contributing to the highest levels of tourist satisfaction. The PNKBNP is renowned for its magnificent cave systems, karst landscapes, pristine forests, and diverse ecosystems (Ly, Xiao 2016). These natural features are exceptionally unique and difficult to find elsewhere. Ecotourists often seek close-to-nature experiences, and the pristine, captivating beauty of this destination is the main reason they choose it. Beyond natural landscapes, the PNKBNP also boasts significant cultural, historical, and UNESCO World Heritage values (Tran 2020). Tourists come not only to admire the natural beauty but also to gain insights into local history and culture. The combination of natural and cultural factors enhances the attractiveness of the destination, thereby increasing overall satisfaction.

### Ecotourism services

Previous research indicates that service quality and satisfaction are distinct but closely related concepts, with customer satisfaction seen as an

outcome and service quality as the reason; satisfaction is predictable and service quality is an ideal standard (Hau 2014). Oliver (2014) suggests that service quality should influence customer satisfaction. The better the service meets customer expectations, the higher the satisfaction. According to Parasuraman et al. (1994), service quality is determined by multiple factors and is a key determinant of customer satisfaction. If a service provider delivers high-quality products that meet customers' needs, the business will initially ensure customer satisfaction. Spreng and Mackoy (1996) also assert that service quality can directly impact the overall experience of tourists. Good service increases tourist satisfaction, whereas poor service may diminish it.

Although the primary goal of ecotourists is to explore and experience nature, basic tourism services such as transport, accommodation, and dining remain crucial. The PNKBNP is a pristine area with challenging terrain, making transport services particularly important. The quality of transport services, especially flexibility and safety, significantly affects the tourist experience by enabling access to hard-to-reach areas like caves or primary forests without encountering unforeseen risks or difficulties. Moreover, ecotourism activities in the PNKBNP often require physical exertion, such as climbing, cave exploration, or kayaking. After these activities, tourists need comfortable accommodation and quality dining services to recuperate. Furthermore, while ecotourists may accept some limitations in amenities compared to other types of tourism, they still require basic services to feel satisfied. Comfortable lodging and safe dining services that meet hygiene and quality standards contribute to a better experience and enhance satisfaction after days of nature exploration.

### Infrastructure

Numerous studies have addressed the close relationship between infrastructure and tourist satisfaction (Sugiyama et al. 2022). The infrastructure component of tourism development is crucial as it supports the competitive advantage of a destination. Furthermore, the development of comprehensive public infrastructure is essential for high-quality tourism facilities at tourist destinations (Jusoh et al. 2013). This research

indicates that while infrastructure has a significant impact, it is not the primary factor influencing tourist satisfaction at the PNKBNP. This aligns with the characteristics of an ecotourism destination, where natural attractiveness and nature-based experiences play a more prominent role (Donohoe 2011, Cobbinah 2015, Stronza et al. 2022). Tourists visiting a nature reserve may accept less comfortable infrastructure compared to urban or resort destinations. They may be willing to overlook infrastructural shortcomings if natural tourism experiences offer substantial value. Thus, while infrastructure is important, it is not the foremost factor. Additionally, tourism infrastructure depends heavily on the development of other factors, such as tour guiding activities, tour organisation processes, and access to key sightseeing areas. If these factors are optimised, tourists will experience greater satisfaction with the overall trip, reducing the reliance on the quality of infrastructure.

### Price

Price is always a sensitive factor for tourists (Oliver 2014, Carlos Castro et al. 2017). Tourist satisfaction depends not only on the amount spent but also on the balance between costs and the value received from the experience (Giao et al. 2021). If tourists feel that what they receive – ranging from natural landscapes to service quality – is commensurate with the amount paid, they will feel satisfied. However, because the focus of ecotourism is on experiences, the price factor does not play as significant a role as other factors. Furthermore, the PNKBNP attracts a diverse range of tourists, from international visitors to domestic travellers, including those who are willing to pay high prices for quality services and those with limited budgets (Van Mai, Doo-Chul 2020). This results in varying levels of importance of the price factor for different groups. For those seeking unique travel experiences, price may not be the most critical factor influencing overall satisfaction. Additionally, tourists have a variety of service options, from luxury accommodations to more budget-friendly services, accommodating different budget levels. This diversity helps tourists easily find options that fit their financial capabilities, thereby reducing the impact of price on overall satisfaction.

## Staff quality

This study indicates that staff quality has a minimal impact on overall tourist satisfaction at the PNKBNP. This can be explained by the fact that ecotourists at the PNKBNP are generally more concerned with factors directly related to nature experiences and tourism services rather than staff quality. Additionally, many activities in ecotourism at the PNKBNP are self-guided experiences, where tourists participate in activities such as trekking, cave exploration, or primary forest hikes on their own (Van Mai, Doo-Chul 2020, Selcuk et al. 2023). The role of staff in these activities is primarily supportive, such as providing information or basic guidance. Therefore, even if the quality of staff is not high, tourists can still explore and experience on their own, making staff quality a non-essential factor in determining satisfaction. Despite its minimal impact, staff quality still plays an important supportive role in ensuring a smooth and comfortable experience for tourists (Han, Hyun 2015, Giao et al. 2021). Tasks such as guiding, service, and safety assurance contribute to maintaining a seamless experience. If the staff quality factor is neglected or not given adequate attention, tourists may encounter difficulties during their visit, which could negatively affect overall satisfaction.

## Conclusions and limitations

The results of Cronbach's alpha analysis and the exploratory factor analysis revealed five factors that affect tourists' satisfaction at the PNKBNP, including 'destination attraction', 'ecotourism services', 'staff quality', 'price' and 'infrastructure'. The results of multiple regression analysis show that these factors have a linear relationship with tourist satisfaction. Tourists' satisfaction depends on these factors in the order of decreasing influence: destination attraction, ecotourism services, infrastructure, price and staff quality. The study also established a multiple regression equation to quantify the impact of these factors on tourist satisfaction. The proposed equation can be used as a basis for tourist managers to develop strategies to improve the quality of tourist services and increase tourist satisfaction at the PNKBNP.

Although the study has achieved its stated research objectives, there remain some limitations. First, while the model explained 84% of the variation in satisfaction through the variation of five variables, 16% of the variation remains unexplained. This suggests that there are some other factors influencing satisfaction that the study has not yet identified (such as tourism policies, environmental regulations, or competition from other destinations). Therefore, future research should delve deeper to identify new factors that may affect tourist satisfaction at the PNKBNP. Second, the study combined both domestic and international tourists, resulting in highly generalised findings. This means the study has not fully captured the distinct characteristics of each group, leading to solutions that may not be entirely appropriate or effective for specific segments of tourists. Consequently, future research should focus on detailed analyses of individual tourist groups and explore additional factors that influence their satisfaction.

## Declaration of competing interest

The authors declare that there are no potential conflicts of interest regarding the research, authorship, and/or publication of this article.

## Acknowledgments

This work was supported by the Doctoral Student Research Project (No. WPBSD/2024/05/00009), funded by the University of the National Education Commission (Poland).

## Authors' contribution

TAL: conceptualisation, methodology, software, field research, formal analysis, investigation, writing, funding acquisition, suggestions for revising the paper; LB: conceptualisation, formal analysis, writing, funding acquisition, suggestions for revising the paper; LQ-P: conceptualisation, writing, graphical support, suggestions for revising the paper; SHN: funding acquisition, field research.



## References

- Agbo A.A., 2010. Cronbach's alpha: Review of limitations and associated recommendations. *Journal of Psychology in Africa* 20(2): 233–239. DOI 10.1080/14330237.2010.10820371.
- Anderson J.C., Gerbing D.W., 1988. Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin* 103(3): 411–423. DOI 10.1037/0033-2909.103.3.411.
- An L.T., Hung P.X., Dung T.Q., Dinh N.C., Kien N.D., Tri T.M., Quy L.A., Phan N.T., Dung V.T.T., 2024. Exploring relationships between nature-based destination attractiveness, satisfaction, perceived COVID-19 risk, and revisit intention in Bach Ma National Park, Vietnam. *Sage Open* 14(4). DOI 10.1177/21582440241289989.
- Ap J., Wong K.K., 2001. Case study on tour guiding: Professionalism, issues and problems. *Tourism Management* 22(5): 551–563. DOI 10.1016/S0261-5177(01)00013-9.
- Baloch Q.B., Shah S.N., Iqbal N., Sheeraz M., Asadullah M., Mahar S., Khan A.U., 2023. Impact of tourism development upon environmental sustainability: A suggested framework for sustainable ecotourism. *Environmental Science and Pollution Research International* 30(3): 5917–5930. DOI 10.1007/s11356-022-22496-w.
- Beall J., Boley B.B., 2022. An ecotourist by whose standards? Developing and testing the Ecotourist Identification Scale (EIS). *Journal of Ecotourism* 21(2): 99–120. DOI 10.1080/14724049.2021.1919126.
- Beard J.G., Ragheb M.G., 1980. Measuring leisure satisfaction. *Journal of Leisure Research* 12(1): 20–33. DOI 10.1080/00222216.1980.11969416.
- Bhuiyan A.H., Darda A., 2021. Measurement of tourists' satisfaction in Lake Kenyir of Malaysia. *Journal of Tourism and Development* 35: 227–242.
- Björk P., Kauppinen-Räsänen H., 2016. Local food: A source for destination attraction. *International Journal of Contemporary Hospitality Management* 28(1): 177–194. DOI 10.1108/IJCHM-05-2014-0214.
- Blamey R.K., 1997. Ecotourism: The search for an operational definition. *Journal of Sustainable Tourism* 5(2): 109–130. DOI 10.1080/09669589708667280.
- Bland J.M., Altman D.G., 1997. Statistics notes: Cronbach's alpha. *BMJ* 314(7080): 572–572. DOI 10.1136/bmj.314.7080.572.
- Bulatović I., Stranjančević A., 2019. Tourist satisfaction Montenegro: Destination management quality indicator. *International Journal for Quality Research* 13(1): 33–46. DOI 10.24874/IJQR13.01-03.
- Butowski L., 2021. Sustainable tourism: A human-centered approach. *Sustainability (Switzerland)* 13(4): 1835.
- Cárdenas-García P.J., Pulido-Fernández J.I., Pulido-Fernández M.D.L.C., 2016. The influence of tourist satisfaction on tourism expenditure in emerging urban cultural destinations. *Journal of Travel and Tourism Marketing* 33(4): 497–512. DOI 10.1080/10548408.2015.1064061.
- Carlos Castro J., Quisimalin M., de Pablos C., Gancino V., Jerez J., 2017. Tourism marketing: Measuring tourist satisfaction. *Journal of Service Science and Management* 10(3): 280–308. DOI 10.4236/jssm.2017.103023.
- Carvache-Franco M., Carvache-Franco W., Pérez-Orozco A., Viquez-Paniagua A.G., Carvache-Franco O., 2022. Satisfaction factors that predict loyalty in ecotourism: A study of foreign tourism in Costa Rica. *Land* 11(1). DOI 10.3390/land11010125.
- Ceballos-Lascurain H., 1987. The future of ecotourism. *Mexico Journal* 13–14.
- Chadee D.D., Mattsson J., 1996. An empirical assessment of customer satisfaction in tourism. *The Service Industries Journal* 16(3): 305–320. DOI 10.1080/02642069600000030.
- Cheraghzadeh M., Rahimian M., Gholamrezai S., 2023. Effective factors on tourist satisfaction with the quality of ecotourism destination: Evidence from Iran. *Environment, Development and Sustainability* 26(11): 28699–28726. DOI 10.1007/s10668-023-03837-2.
- Chua B.-L., Lee S., Goh B., Han H., 2015. Impacts of cruise service quality and price on vacationers' cruise experience: Moderating role of price sensitivity. *International Journal of Hospitality Management* 44: 131–145. DOI 10.1016/j.ijhm.2014.10.012.
- Cobbinah P.B., 2015. Contextualising the meaning of ecotourism. *Tourism Management Perspectives* 16: 179–189. DOI 10.1016/j.tmp.2015.07.015.
- Correia A., Moital M., Da Costa C.F., Peres R., 2008. The determinants of gastronomic tourists' satisfaction: A second-order factor analysis. *Journal of Foodservice* 19(3): 164–176. DOI 10.1111/j.1745-4506.2008.00097.x.
- Cortina J.M., 1993. What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology* 78(1): 98–104. DOI 10.1037/0021-9010.78.1.98.
- Crespi-Vallbona M., 2021. Satisfying experiences: Guided tours at cultural heritage sites. *Journal of Heritage Tourism* 16(2): 201–217. DOI 10.1080/1743873X.2020.1771345.
- Cudeck R., 2000. Exploratory factor analysis. In: *Handbook of applied multivariate statistics and mathematical modeling*. Elsevier: 265–296. DOI 10.1016/B978-012691360-6/50011-2.
- Das M., Chatterjee B., 2015. Ecotourism: A panacea or a predicament? *Tourism Management Perspectives* 14: 3–16. DOI 10.1016/j.tmp.2015.01.002.
- Donohoe H.M., 2011. Defining culturally sensitive ecotourism: A Delphi consensus. *Current Issues in Tourism* 14(1): 27–45. DOI 10.1080/13683500903440689.
- Donohoe H.M., Needham R.D., 2006. Ecotourism: The evolving contemporary definition. *Journal of Ecotourism* 5(3): 192–210. DOI 10.2167/joe152.0.
- Fennell D.A., 2019. Ecotourism. In: *International encyclopedia of human geography*. 2nd ed. DOI 10.1016/B978-0-08-102295-5.10782-6.
- Geva A., Goldman A., 1991. Satisfaction measurement in guided tours. *Annals of Tourism Research* 18(2): 177–185. DOI 10.1016/0160-7383(91)90002-S.
- Giao H.N.K., Vuong B.N., Phuong N.N.D., Dat N.T., 2021. A model of factors affecting domestic tourist satisfaction on eco-tourism service quality in the Mekong Delta, Vietnam. *GeoJournal of Tourism and Geosites* 36(2spl): 663–671. DOI 10.30892/gtg.362spl14-696.
- Hair J.F., Tatham R.L., Black W., Anderson R.E., 1998. *Multivariate data analysis*, 5th ed. Pearson Education.
- Han H., Hyun S.S., 2015. Customer retention in the medical tourism industry: Impact of quality, satisfaction, trust, and price reasonableness. *Tourism Management* 46: 20–29. DOI 10.1016/j.tourman.2014.06.003.
- Harrell F.E., 2001. *Regression modeling strategies*. Springer, New York. DOI 10.1007/978-1-4757-3462-1.
- Hau T.C., 2014. The impact of service quality on tourist satisfaction: The case study of Rantau Abang beach as a turtle sanctuary destination. *Mediterranean Journal of Social Sciences*. DOI 10.5901/mjss.2014.v5n23p1827.
- Hong N.T., Saizen I., 2019. Forest ecosystem services and local communities: Towards a possible solution to reduce



- forest dependence in Bach Ma National Park, Vietnam. *Human Ecology* 47(3): 465–476. DOI 10.1007/s10745-019-00083-x.
- Huynh D., Van Duong L.H., Duong K.Q., Nguyen T.T., 2024. Examining interpretation services and pro-nature conservation behaviours in guided ecotours: Do tour guides and tourists share the same lens? *Journal of Ecotourism* 1–22. DOI 10.1080/14724049.2024.2366933.
- Iniesta-Bonillo M.A., Sánchez-Fernández R., Jiménez-Castillo D., 2016. Sustainability, value, and satisfaction: Model testing and cross-validation in tourist destinations. *Journal of Business Research* 69(11): 5002–5007. DOI 10.1016/j.jbusres.2016.04.071.
- Jiménez-García M., Ruiz-Chico J., Peña-Sánchez A.R., 2020. Landscape and tourism: Evolution of research topics. *Land* 9(12): 488. DOI 10.3390/land9120488.
- Jusoh J., Masron T., Hamid N.F.A., Shahrin N., 2013. Tourist expectation and satisfaction towards physical infrastructure and heritage elements in Melaka UNESCO world heritage site. *Academic Journal of Interdisciplinary Studies*. DOI 10.5901/ajis.2013.v2n8p733.
- Kaiser H.F., Rice J., 1974. Little Jiffy, Mark IV. *Educational and Psychological Measurement* 34(1): 111–117. DOI 10.1177/001316447403400115.
- Khuong D.D., Huong N.T.T., 2014. Study results on species composition of bugs (Heteroptera) in Phong Nha – Ke Bang National Park, Quang Binh province. *Journal of Biology* 31(3). DOI 10.15625/0866-7160/v31n3.4944.
- Kubickova M., Campbell J., 2022. Revisiting the relationship between destination quality and satisfaction: Evidence from developing economy. *Anatolia* 33(1): 1–14. DOI 10.1080/13032917.2021.1897862.
- Le T.A., Nguyen S.H., 2023. Ecotourism research progress: A bibliometric analysis (period 2002–2022) using VOSviewer software. *Turyzm/Tourism* 71–81. DOI 10.18778/0867-5856.33.2.06.
- Luo J.M., Fan Y., Shang Z., 2022. Analysis of critical success factors for entertainment tourism destinations: The supply perspective. *Journal of Quality Assurance in Hospitality & Tourism* 23(5): 1159–1182. DOI 10.1080/1528008X.2021.1958126.
- Ly T.P., Xiao H., 2016. The choice of a park management model: A case study of Phong Nha-Ke Bang National Park in Vietnam. *Tourism Management Perspectives* 17: 1–15. DOI 10.1016/j.tmp.2015.10.004.
- Mandić A., Mrnjavac Ž., Kordić L., 2018. Tourism infrastructure, recreational facilities and tourism development. *Tourism and Hospitality Management* 24(1): 41–62. DOI 10.20867/thm.24.1.12.
- Marques C., Vinhas da Silva R., Antova S., 2021. Image, satisfaction, destination and product post-visit behaviours: How do they relate in emerging destinations? *Tourism Management* 85: 104293. DOI 10.1016/j.tourman.2021.104293.
- Mbira C., 2024. Effect of destination image on tourist satisfaction and destination loyalty: A study of ecotourism destinations in Uganda. *Journal of Hospitality and Tourism* 4(1): 35–45. DOI 10.47672/jht.1977.
- Niñerola A., Sánchez-Rebull M.V., Hernández-Lara A.B., 2019. Tourism research on sustainability: A bibliometric analysis. *Sustainability (Switzerland)* 11(5): 1377. DOI 10.3390/su11051377.
- Oliver R.L., 2014. *Satisfaction: A behavioral perspective on the consumer*. Routledge. DOI 10.4324/9781315700892.
- Oliveri A.M., Polizzi G., Parroco A.M., 2019. Measuring tourist satisfaction through a dual approach: The 4Q methodology. *Social Indicators Research* 146(1–2): 361–382. DOI 10.1007/s11205-018-2013-1.
- Parasuraman A., Zeithaml V.A., Berry L.L., 1994. Reassessment of expectations as a comparison standard in measuring service quality: Implications for further research. *Journal of Marketing* 58(1): 111–124. DOI 10.1177/002224299405800109.
- Pearce P.L., 1980. A favorability-satisfaction model of tourists' evaluations. *Journal of Travel Research* 19(1): 13–17. DOI 10.1177/004728758001900103.
- Peng Y., Jiang X., 2022. Analysis of tourist satisfaction index based on structural equation model. *Journal of Sensors* 2022. DOI 10.1155/2022/6710530.
- Phung P.V., Tri N.G., Nguyen Q.N., 2024. Why are international tourists satisfied with ecotourism in the Mekong Delta, Vietnam? *GeoJournal of Tourism and Geosites* 53(2): 547–553. DOI 10.30892/gtg.53218-1230.
- Prayag G., 2009. Tourists' evaluations of destination image, satisfaction, and future behavioral intentions—the case of mauritius. *Journal of Travel & Tourism Marketing* 26(8): 836–853. DOI 10.1080/10548400903358729.
- Rivera M.A., Croes R., 2010. Ecotourists' loyalty: Will they tell about the destination or will they return? *Journal of Ecotourism* 9(2): 85–103. DOI 10.1080/14724040902795964.
- Rohini P., 2024. The role of transportation in tourism development. *Educational Administration: Theory and Practice* 9308–9312. DOI 10.53555/kuey.v30i4.3584.
- Selcuk O., Karakas H., Cizel B., Ipekci Cetin E., 2023. How does tourism affect protected areas?: A multi-criteria decision making application in UNESCO natural heritage sites. *Natural Hazards* 117(2): 1923–1944. DOI 10.1007/s11069-023-05934-x.
- Shang Y., Bi C., Wei X., Jiang D., Taghizadeh-Hesary F., Rasoulizadeh E., 2023. Eco-tourism, climate change, and environmental policies: Empirical evidence from developing economies. *Humanities and Social Sciences Communications* 10(1): 275. DOI 10.1057/s41599-023-01777-w.
- Spreng R.A., Mackoy R.D., 1996. An empirical examination of a model of perceived service quality and satisfaction. *Journal of Retailing* 72(2): 201–214. DOI 10.1016/S0022-4359(96)90014-7.
- Stone M.J., Soulard J., Migacz S., Wolf E., 2018. Elements of memorable food, drink, and culinary tourism experiences. *Journal of Travel Research* 57(8): 1121–1132. DOI 10.1177/0047287517729758.
- Stronza A.L., Hunt C.A., Fitzgerald L.A., 2019. Ecotourism for conservation? *Annual Review of Environment and Resources* 44(1): 229–253. DOI 10.1146/annurev-envi-ron-101718-033046.
- Stronza A.L., Hunt C.A., Fitzgerald L.A., 2022. Ecotourism for conservation? In: *Routledge handbook of ecotourism*. Taylor and Francis: 372–397. DOI 10.4324/9781003001768-28.
- Stumpf P., Vojtko V., Janecek P., 2020. Do European tourists intend to revisit the same countries? Effect of satisfaction in European Union destinations. *Scandinavian Journal of Hospitality and Tourism* 20(4): 398–417. DOI 10.1080/15022250.2020.1807405.
- Suanmali S., 2014. Factors affecting tourist satisfaction: An empirical study in the northern part of Thailand. *SHS Web of Conferences* 12: 01027. DOI 10.1051/shsconf/20141201027.
- Sugiyama A.G., Oktavia H.C., Karlina M., 2022. The effect of tourism infrastructure asset quality on tourist satisfac-

- tion: A case on forest tourism in Tasikmalaya Regency. *International Journal of Applied Sciences in Tourism and Events* 6(1): 65–71. DOI 10.31940/ijaste.v6i1.65-71.
- Tarlow P., 2014. *Tourism security: Strategies for effectively managing travel risk and safety*. Elsevier.
- Tavakol M., Dennick R., 2011. Making sense of Cronbach's alpha. *International Journal of Medical Education* 2: 53–55. DOI 10.5116/ijme.4dfb.8dfd.
- Toker A., Emir O., 2023. Safety and security research in tourism: A bibliometric mapping. *European Journal of Tourism Research* 34: 3402. DOI 10.54055/ejtr.v34i.2871.
- Tran T.L., 2020. Study on community participation in tourism activities in Phong Nha – Ke Bang National Park. *Current Journal of Applied Science and Technology* 135–144. DOI 10.9734/cjast/2020/v39i1430721.
- UNESCO, 2020. *World heritage list*. Online: <https://whc.unesco.org/en/list/> (accessed 15 May 2023).
- Van Mai T.K., Doo-Chul K., 2020. The effects of Vietnam's tourism development and payments for forest environmental services policies on local livelihoods in Phong Nha-Kẻ Bàng National Park areas. *Geographical Review of Japan Series B* 93(1): 930103. DOI 10.4157/geogrev-japanb.93.1.
- Weaver D.B., 2001. *The encyclopedia of ecotourism*. CABI Publishing. DOI 10.1079/9780851993683.00002001305114200316061.
- Zhang W., Fukami S., 2024. Quantitative content analysis of codes of conduct for ecotourism in Japan. *Journal of Hospitality and Tourism Management* 58: 209–213. DOI 10.1016/j.jhtm.2024.01.002.

**Appendix: Questionnaire for tourists**

Province/ Nation/ Country of residency: .....

Occupation: .....

Gender: ☐ Male ☐ Female

Age group:

☐ 18–28 ☐ 29–48 ☐ 48–65 ☐ >65

Education level:

☐ Primary ☐ Secondary ☐ College & University ☐ Postgraduate/Master/PhD

Tourist's opinions about the tourism services and public facilities at the Phong Nha-Ke Bang National Park: Levels: 1 – Strongly unsatisfied; 2 – Unsatisfied; 3 – Neutral; 4 – Satisfied; 5 – Strongly satisfied

1. In your opinion, what is your level of satisfaction with the following sightseeing services?

Factors	1	2	3	4	5
Natural attractions (flora and fauna)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Price of entrance tickets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Convenience on travelling to locations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Safety at attractions (presence of rescue teams)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. In your opinion, what is your level of satisfaction with the following ecotour guide?

Factors	1	2	3	4	5
Language proficiency	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Friendliness, professionalism and enthusiasm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Presentation skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Information and educational content provided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. In your opinion, what is your level of satisfaction with the following shopping and entertainment services?

<b>Factors</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Various recreational activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Various souvenirs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Staff professionalism and service quality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. In your opinion, what is your level of satisfaction with the following price of services?

<b>Factors</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Entrance tickets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Transport	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Food and beverage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Accommodation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Entertainment and shopping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. In your opinion, what is your level of satisfaction with the following public facilities?

<b>Factors</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Clean water availability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communication systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Garbage dumps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Parking areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Public signs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Security facilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Health facilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rest areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Interpretative facilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. In your opinion, what is your level of satisfaction with the following transport services?

<b>Factors</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Easy access to transport	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Available means of transport	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Transport cost	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Transport safety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. In your opinion, what is your level of satisfaction with the following food and beverage services?

<b>Factors</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Food and beverage availability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Standards of hygiene and quality of food services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Variety of cuisine options	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Staff professionalism and service quality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. In your opinion, what is your level of satisfaction with the following accommodation services?

<b>Factors</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Accommodation availability (e.g. homestay, hotel, camping)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Accommodation quality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Staff professionalism and service quality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>