

The Role of Responsible Tourist Behavior in Achieving Sustainable Tourism Development: A Field Study on a Sample of Tourists in Skikda Province

Hafida HANOU

Fatima HALLOUZ

University of 20th August 1955 Skikda,
Laboratory of ECOFIMA, Algeria.

University of 20th August 1955 Skikda,
Laboratory of ECOFIMA, Algeria.

h.hanou@univ-skikda.dz

f.hallouz@univ-skikda.dz

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Abstract:

This study aims to explore the role of responsible tourist behavior in promoting sustainable tourism development in Skikda, Algeria, focusing on its four dimensions: environmental awareness, eco-friendly practices, cultural respect, and support for the local economy. The study employed a quantitative descriptive-analytical approach, and data were collected using a structured questionnaire administered to 189 tourists. The data were analyzed using Smart PLS 4 and the Structural Equation Modeling (SEM) technique. The results indicate that all dimensions of responsible tourist behavior play a positive and statistically significant role in fostering sustainable tourism development, with environmental awareness and eco-friendly practices having the most substantial influence, followed by support for the local economy and cultural respect. Based on these findings, the study recommends the development of environmental and cultural awareness programs, the promotion of eco-friendly practices, and the encouragement of support for local initiatives, thereby enhancing responsible tourist behavior and contributing to the achievement of integrated sustainable tourism development.

Keywords: Responsible Tourist Behavior; Sustainable Tourism Development; Environmental Awareness; Eco-Friendly Practices; Cultural and Economic Support.

JEL Classification : Q01, Z32, M31, Q56

* Corresponding author: HANOU Hafida (*h.hanou@univ-skikda.dz*)

Introduction

Tourism has emerged as one of the fastest-growing sectors worldwide, significantly contributing to economic growth, job creation, and cultural exchange. However, this rapid expansion has also generated concerns regarding its environmental, social, and cultural impacts. These challenges have led to the increasing adoption of sustainable tourism development, a paradigm that seeks to balance the economic benefits of tourism with the preservation of natural and cultural resources for current and future generations. Within this framework, tourists themselves play a pivotal role in ensuring sustainability through their behaviors, attitudes, and decision-making during travel.

In recent years, the concept of responsible tourist behavior has attracted considerable attention among scholars and policymakers. Responsible tourists are those who recognize the consequences of their actions and deliberately seek to minimize negative environmental and social effects while enhancing positive contributions to the destinations they visit. Promoting responsible tourist behavior is thus considered a fundamental factor in achieving sustainable tourism development, particularly in emerging destinations that rely heavily on natural and cultural attractions, such as Skikda Province in Algeria.

Research Problem: Despite the growing awareness of sustainable tourism principles, many destinations continue to face challenges in aligning tourist behavior with sustainability objectives. Irresponsible practices, including littering, excessive resource consumption, and neglect of local customs, remain prevalent in several tourist areas, undermining efforts to achieve sustainability. Accordingly, this study seeks to address the following central research question:

To what extent does responsible tourist behavior contribute to achieving sustainable tourism development in Skikda Province?

Research Hypotheses: Based on the research problem, the following null hypotheses were formulated:

Main Hypothesis:

H₀: There is no statistically significant effect of responsible tourist behavior in their various dimensions on the sustainable tourism development.

Sub-Hypotheses

- **H₀₁:** There is no statistically significant effect of environmental awareness on the sustainable tourism development.
- **H₀₂:** There is no statistically significant effect of eco-friendly practices on the sustainable tourism development.
- **H₀₃:** There is no statistically significant effect of cultural respect on the sustainable tourism development.
- **H₀₄:** There is no statistically significant effect of support for local economy on the sustainable tourism development.

Research Significance: This study is important for several reasons. Firstly, it emphasizes the role of tourists as active participants in promoting sustainable tourism rather than passive consumers of tourism services. Secondly, it contributes to the limited empirical research on responsible tourist behavior in the Algerian context, particularly in coastal destinations such as Skikda. Thirdly, it provides valuable insights for policymakers, tourism planners, and service providers to develop strategies and awareness programs that encourage responsible conduct among tourists. Finally, the study enriches the academic discussion on the behavioral aspects of sustainable tourism, bridging theoretical concepts and practical implications.

Research Methodology : The study adopts a quantitative, descriptive–analytical approach to investigate the relationship between responsible tourist behavior and sustainable tourism development. Data were collected through a structured

questionnaire administered to a sample of tourists visiting Skikda Province. The questionnaire measured the dimensions of responsible tourist behavior (environmental awareness, eco-friendly practices, cultural respect, and support for the local economy) alongside the dimensions of sustainable tourism development (economic, environmental, social, and cultural). Data analysis was conducted using Smart PLS 4 software, employing Structural Equation Modeling (SEM) to evaluate both the measurement and structural models.

Research Structure : This research paper is organized in a logical and coherent sequence that moves from the theoretical framework to the empirical analysis. The first section reviews the theoretical and empirical literature related to responsible tourist behavior and sustainable tourism development, with an emphasis on previous studies and the identification of research gaps. The second section presents the research methodology, including the research design, study population, data collection methods, and measurement instruments. The third section provides the presentation and analysis of results based on the measurement and structural models using Smart PLS software. Finally, the study concludes with a discussion of the findings in light of previous literature, highlighting their theoretical and practical implications, while outlining the study's limitations and offering recommendations and suggestions for future research.

I. Theoretical and Empirical literature Review:

1- Theoretical background of the Study :

This section presents the theoretical background of the study, starting with the concepts of responsible tourist behavior and sustainable tourism development.

1.1- Responsible Tourist Behavior:

a- Definition: Responsible tourist behavior denotes the set of attitudes, knowledge and deliberate actions by tourists that aim to minimize negative environmental and social impacts while maximizing positive contributions to host destinations. Responsible tourists consciously consider the consequences of their choices (e.g., transport, consumption, waste disposal, interactions with locals) and adopt practices that reflect environmental awareness, social respect, and economic reciprocity with host communities. (Li, Coca-Stefaniak, Nguyen, & Alastair , 2023) This concept is increasingly framed in the literature as multidimensional encompassing pro-environmental actions, cultural sensitivity, economic support for local actors, and ethical consumption rather than a single attitudinal disposition. (Eichelberger, Heigl, Peters, & Pikkemaat, 2021)

Based on the foregoing, responsible tourist behavior can be defined as a conscious and value-driven pattern of conduct that guides tourists' decisions and actions in a manner that ensures a balanced consideration of environmental integrity, social responsibility, and economic sustainability.

b- Dimensions : Contemporary studies and systematic reviews converge on a multidimensional structure for responsible tourist behavior. For the purposes of this study (and consistent with established frameworks), four practical dimensions are commonly identified and operationalized:

b.1- Environmental awareness: tourists' knowledge and concern about environmental issues affecting destinations (e.g., awareness of resource limits, biodiversity value, and pollution risks). (Li, Coca-Stefaniak, Nguyen, & Alastair , 2023)

b.2- Eco-friendly practices: concrete pro-environmental actions during travel such as waste avoidance, resource conservation (water/energy), use of low-impact transport, and participation in local environmental initiatives. (Hu & Sung, 2022)

b.3- Cultural respect: behavior reflecting sensitivity to local norms, customs and heritage; includes respectful dress/behavior, attention to sacred sites, and avoidance of culturally offensive acts. (Li, Nguyen, Morrison, & Coca-Stefaniak, 2022)

b.4- Support for the local economy: tourist behaviors that favor local livelihoods and small enterprises (purchasing local products, choosing local accommodation and guides), thereby enhancing economic benefits for host communities. (World Tourism Organization, 2013)

These four dimensions align with recent measurement efforts and scale developments that treat responsible tourist behavior as latent constructs composed of observable items (awareness indicators, self-reported practices, purchase/choice behaviors, and culturally oriented items). (Tiwari, Prentice, & Khoo, 2025)

1.2- Sustainable Tourism Development

a- Definition: Sustainable tourism development is defined by leading institutions as tourism that takes full account of its present and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities. It aims to manage all resources so that economic, social and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity and life support systems. This definition rooted in UNWTO policy statements underpins most academic and policy formulations of sustainable tourism. (United Nations, 2025)

Based on the foregoing, sustainable tourism development can be defined as a strategic and balanced approach to tourism management that seeks to harmonize economic growth, social well-being, and environmental protection in a manner that ensures the long-term viability and resilience of tourism systems.

b- Dimensions: The multidimensional nature of sustainable tourism development is typically captured through four interrelated domains that reflect sustainability's triple-bottom-line logic plus cultural considerations:

b.1- Economic dimension: long-term viability of tourism as a source of income and employment, local value capture, diversification of economic opportunities, and minimization of economic leakage. (World Tourism Organization, 2013)

b.2- Environmental dimension: conservation of natural assets, reduction of pollution, adoption of resource-efficient practices, and protection of biodiversity and landscapes. (United Nations, 2025)

b.3- Social dimension: enhancement of local well-being, equitable distribution of tourism benefits, community participation in planning and governance, and protection of social cohesion. (United Nations, 2025)

b.4- Cultural dimension: safeguarding of tangible and intangible heritage, respect for local identity, and promotion of cultural exchange that does not commodify or degrade heritage. (Li, Nguyen, Morrison, & Coca-Stefaniak, 2022)

These dimensions are commonly operationalized in empirical studies through indicators such as employment generation and income (economic), waste management and habitat condition (environmental), community attitudes and participation (social), and preservation/valorization of heritage and cultural practices (cultural). (United Nations, 2025)

1.3- The Relationship Between Responsible Tourist Behavior and Sustainable Tourism Development:

The literature indicates a theoretically and empirically plausible link whereby responsible tourist behavior acts as a proximate driver of sustainable tourism outcomes. Conceptually, tourists' awareness, choices and practices influence resource use, social interactions, and local economies in ways that either support or undermine sustainability objectives: pro-environmental actions reduce ecological pressures; cultural respect reduces social tensions and heritage degradation; and economic support for local actors increases local benefits and community resilience. (Li, Coca-Stefaniak, Nguyen, & Alastair , 2023)

Empirical studies corroborate these mechanisms. Several quantitative and mixed-methods investigations show that tourists' pro-environmental behaviors and engagement with local initiatives are associated with improved environmental indicators and more positive community perceptions of tourism (thus enhancing social sustainability). For example, research on island and coastal destinations has found that place attachment, destination involvement and social interactions can positively predict responsible behaviors, which in turn relate to desirable sustainability outcomes. Other field studies demonstrate that higher levels of tourist environmental awareness and eco-practices are linked to stronger intentions to support destination conservation and local enterprises. (Hongxia , Jun, & Jian, 2022) Systematic reviews and recent measurement advances further indicate that while the potential for tourists to contribute to sustainability is real, a persistent gap remains between pro-environmental attitudes and consistent on-site behaviors (the so-called attitude-behavior gap). This gap highlights the importance of contextual factors (infrastructure, destination governance, awareness campaigns, social norms) that moderate how tourist intentions translate into sustainable outcomes. (Carvajal-Trujillo , Pérez-Gálvez , & Orts-Cardador, 2024)

2- Empirical literature Related to the study :

This section reviews the empirical literature related to the study, including previous studies, and identifies the research gap and the added value of the current study.

2.1-Previous Studies:

- Li, J, et al., (2023) *Sustainable tourist behavior: A systematic literature review and research agenda.*

This comprehensive systematic review synthesizes the global literature on sustainable (or pro-environmental) tourist behavior, mapping theories, antecedents, measurement approaches, and empirical contexts. The authors identify dominant

theoretical frameworks (e.g., TPB, VBN, social exchange), common antecedents (environmental knowledge, place attachment, experience quality), and recurring methodological patterns (cross-sectional surveys, SEM analysis). Importantly, the review highlights conceptual fragmentation, measurement heterogeneity, and research gaps such as insufficient attention to contextual moderators and limited research in many geographic regions. This paper provides a rigorous conceptual baseline and a research agenda that underscores the need for field studies applying validated multidimensional measures and testing context-sensitive models.

– Zhang, J, et al., (2024) ***Pro-Environmental Behavior of Tourists in Ecotourism Scenic Spots: The Promoting Role of Tourist Experience Quality in Place Attachment.***

Using large field samples (n = 806) from two ecotourism scenic spots, this quantitative study employs exploratory factor analysis and SEM to demonstrate that high tourism experience quality fosters place attachment (place dependence and identity), which in turn increases tourists' pro-environmental behavior. The study empirically underlines emotional and experiential mechanisms (experience → attachment → behavior) as effective levers for promoting onsite eco-practices, thereby contributing to ecological sustainability of destinations. Its coastal/ecotourism setting and use of SEM make it methodologically relevant for comparable field investigations.

– Lin, H. et al. (2022) ***Effects of tourist-to-tourist interactions on tourism experience and related outcomes.***

This influential study examines how tourist-to-tourist interactions (information sharing, self-disclosure, social cohesion) shape tourism experience and downstream behavioral outcomes. The results suggest that peer interactions influence perceived group norms and social motivations that can facilitate responsible behaviors in situ. Although not focused exclusively on environmental behavior, the work demonstrates the social pathways (norms, social influence) through which tourist conduct can be shaped an important complement to cognitive/emotional models. Its findings support inclusion of social-interaction variables as potential moderators or antecedents in models of responsible tourist behavior.

– Lu, F. et al. (2024) ***Study on the Influence of Host–Guest Interaction on Tourists' Pro-Environmental Behavior.***

Based on field data (n = 499) from a national forest park, this SEM study shows that high-quality host–guest interactions activate tourists' personal norms via consequence awareness and emotional experience value, promoting pro-environmental conduct. The paper demonstrates that interactional and situational factors significantly mediate the translation of awareness into action. Lu et al.'s results point to the importance of destination governance and service practices in enabling responsible tourist behavior findings directly relevant for policy and management implications in coastal destinations.

2.2- Research Gap and Add Value :

A review of the existing literature reveals several gaps that justify the need for further empirical investigation into the relationship between responsible tourist behavior and sustainable tourism development. Most previous studies have been geographically concentrated in East Asia, Europe, and island-based ecotourism destinations, leaving North African coastal contexts such as Algeria largely underexplored. Additionally, although responsible tourist behavior is widely recognized as a multidimensional construct, prior research has often used heterogeneous measurement tools and conceptual frameworks, which limits the comparability and generalizability of results across different contexts. Moreover, the majority of existing studies tend to focus narrowly on environmental aspects of responsible behavior, with limited attention to how such behaviors collectively affect the economic, social, and cultural dimensions of sustainable tourism development. As highlighted by (Li, Coca-Stefaniak, Nguyen, & Alastair , 2023)there remains a pressing need for context-sensitive field research employing validated multidimensional scales and robust analytical methods, such as structural equation modeling (SEM), to capture the complex interplay between tourist behavior and sustainability outcomes.

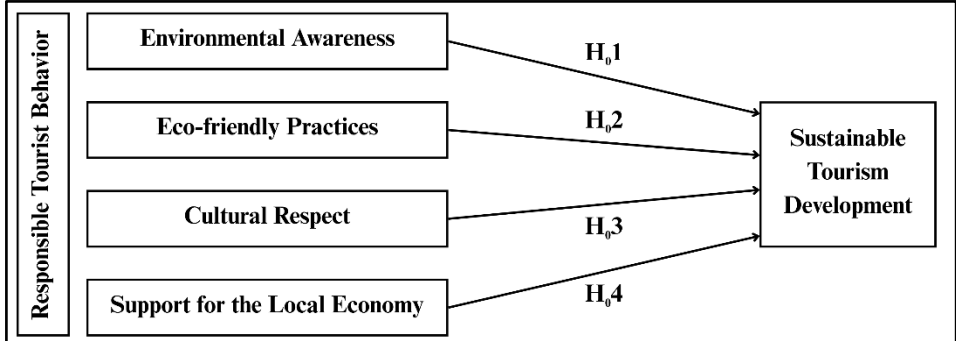
Responding to these gaps, the present study seeks to make a meaningful contribution both theoretically and practically. Conducted in Skikda Province, a coastal destination in Algeria, it provides an original empirical perspective from a region that has received limited academic attention in this domain. The study integrates a multidimensional conceptualization of responsible tourist behavior comprising environmental awareness, eco-friendly practices, cultural respect, and support for the local economy with an equally comprehensive framework of sustainable tourism development that includes economic, environmental, social, and cultural dimensions. By employing Smart PLS software and SEM techniques, this research enables the testing of both overall and dimension-specific relationships, thereby offering a more nuanced and contextually grounded analysis than what is typically found in prior studies. Beyond its academic contribution, the study also holds significant managerial and policy relevance. Its findings are expected to provide local decision-makers, tourism planners, and service providers in Skikda with evidence-based insights that can inform strategies to promote responsible tourist behavior through awareness programs, infrastructure improvements, and community engagement initiatives. In doing so, this research bridges a critical empirical gap and advances the understanding of how responsible tourism can effectively contribute to achieving sustainable development goals in emerging destinations.

II. Methodology

1- Research Design

A quantitative descriptive–analytical research design was adopted to examine the relationship between responsible tourist behavior and the dimensions of sustainable tourism development in Skikda Province. This design allows for testing the pre-defined hypotheses through the collection and statistical analysis of quantitative data, enabling the measurement of both direct and partial effects of the different dimensions of responsible tourist behavior on sustainable tourism development.

Fig. 1 : Research Model



Source : Prepared by the researchers.

2- Population and sample:

The study population consists of tourists visiting Skikda Province during the data collection period. Based on specific selection criteria, a sample of 189 participants was determined, which is adequate for analyzing models using Structural Equation Modeling (SEM) with Smart PLS software, according to modern statistical standards for assessing relationships among multiple variables.

3- Data Collection Procedure:

Data were collected using a structured questionnaire distributed directly to tourists at the main tourist sites in Skikda Province during the end of the 2025 summer season. The objectives of the study were clearly explained, confidentiality of information was ensured, and participation was voluntary. A pilot test was also conducted with 18 participants to verify the clarity and measurability of the questionnaire items.

4- Measurement Scale:

Variables were measured using scales validated in the scientific literature:

- Responsible Tourist Behavior: measured through four dimensions: environmental awareness, eco-friendly practices, cultural respect, and support for the local economy.
- Sustainable Tourism Development: measured through four dimensions: economic, environmental, social, and cultural.

The validity and reliability of these measures were confirmed based on previous studies and similar measurement experiences (Li et al., 2023; Hu & Sung, 2022).

The questionnaire included closed-ended questions and 5-point Likert scales (1 = Strongly Disagree, 5 = Strongly Agree).

5- Data Analysis Techniques:

Data were analyzed using Smart PLS 4 for Structural Equation Modeling (SEM), including:

- Measurement Model Assessment: to evaluate reliability, construct validity, and discriminant validity of the scales.
- Structural Model Assessment: to examine the strength of relationships among variables, estimate path coefficients, determine the coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and test the research hypotheses.

6- Descriptive Statistics of the Sample:

To provide a comprehensive overview of the respondents' demographic characteristics, descriptive statistics were computed based on gender, age group, educational level, monthly income, and number of visits to Skikda Province. The distribution of the sample according to these characteristics is presented in the following table:

Table 1: Demographic Profile of the Sample (N = 189)

Variable	Categories	Frequency (n)	Percentage (%)	Total
Gender	Male	113	59.8%	100%
	Female	76	40.2%	
Age Group	Less than 35 years	74	39.2%	100%
	35 to 50 years	89	47.1%	
	Over 50 years	26	13.7%	
Educational Level	Secondary	51	27.0%	100%
	Technical	35	18.5%	
	University	89	47.1%	
	Postgraduate	14	7.4%	
Number of Visits	Less than twice	68	36.0%	100%
	2 to 4 times	77	40.7%	
	More than 4 times	44	23.3%	
Monthly Income	Less than 50,000 DA	56	29.6%	100%
	50,000 – 100,000 DA	94	49.7%	
	More than 100,000 DA	39	20.7%	

Source : Authors' own elaboration based on survey data.

Table 1 summarizes the demographic characteristics of the 189 respondents. The sample was predominantly male (59.8%), with the largest age group being 35–50 years (47.1%). Most participants held a university degree (47.1%), followed by secondary education (27.0%). Regarding visitation frequency, 40.7% of tourists reported 2–4 visits, while 36.0% visited less than twice. In terms of monthly income, nearly half of the respondents (49.7%) earned between 50,000 and 100,000 DA.

III. Empirical Results

1- Measurement Model Evaluation :

This section presents the evaluation of the measurement model, including indicator reliability, construct validity, and discriminant validity.

1.1- Indicator Reliability and Construct validity:

The quality of the measurement model was evaluated in terms of indicator reliability and construct validity. Indicator reliability was assessed using outer loadings, with values above 0.700 considered acceptable (Hair et al., 2021). Construct reliability was tested using Composite Reliability (CR) and Cronbach's Alpha, with a threshold of 0.7 indicating good internal consistency. Convergent validity was assessed using the Average Variance Extracted (AVE), where values above 0.5 are considered satisfactory.

Table 2: Results of the Measurement Model Assessment

variable		Item Indicators	Type of Measure	Item Loadings	Composite Reliability	Cronbach Alpha	AVE
Responsible Tourist Behavior	Environmental Awareness	Rtb-Ea 1	Reflective	0.784	0.891	0.861	0.613
		Rtb-Ea 2		0.765			
		Rtb-Ea 3		0.762			
		Rtb-Ea 4		0.789			
	Eco-friendly Practices	Rtb-Ep 1	Reflective	0.772	0.885	0.854	0.602
		Rtb-Ep 2		0.749			
		Rtb-Ep 3		0.738			
		Rtb-Ep 4		0.760			
	Cultural Respect	Rtb-Cr 1	Reflective	0.754	0.872	0.835	0.588
		Rtb-Cr 2		0.736			
		Rtb-Cr 3		0.724			
		Rtb-Cr 4		0.759			
	Support for the Local Economy	Rtb-Sle 1	Reflective	0.751	0.879	0.842	0.597
		Rtb-Sle 2		0.764			
		Rtb-Sle 3		0.779			
		Rtb-Sle 4		0.756			
Sustainable Tourism Development	Economic Dimension	Std-Ecd 1	Reflective	0.748	0.884	0.849	0.603
		Std-Ecd 2		0.754			
		Std-Ecd 3		0.767			
		Std-Ecd 4		0.771			
	Environmental Dimension	Std-Evd 1	Reflective	0.764	0.891	0.858	0.620
		Std-Evd 2		0.776			
		Std-Evd 3		0.789			
		Std-Evd 4		0.772			
	Social Dimension	Std-Scd 1	Reflective	0.734	0.874	0.837	0.595
		Std-Scd 2		0.758			
		Std-Scd 3		0.747			
		Std-Scd 4		0.761			
	Cultural Dimension	Std-Cld 1	Reflective	0.753	0.881	0.847	0.610
		Std-Cld 2		0.768			
		Std-Cld 3		0.779			
		Std-Cld 4		0.772			

Source : Outputs of statistical analysis using Smart PLS software.

All outer loadings exceed the minimum acceptable threshold of 0.700, indicating that all items contribute significantly to their respective constructs (Hair et al., 2021). The values range from 0.724 to 0.789 for Responsible Tourist Behavior dimensions and from 0.734 to 0.789 for Sustainable Tourism Development dimensions, confirming indicator reliability. Regarding internal consistency, both Composite Reliability (CR) and Cronbach's Alpha values are well above the recommended cutoff of 0.700, ranging from 0.872 to 0.891 and 0.835 to 0.861 respectively, reflecting strong internal reliability across all constructs. Additionally, the Average Variance Extracted (AVE) values exceed 0.500 for all constructs (ranging between 0.588 and 0.620), confirming satisfactory convergent validity and demonstrating that each construct explains more than half of the variance of its indicators.

Consequently, the measurement model demonstrates good reliability and convergent validity, ensuring its adequacy for subsequent structural model evaluation.

1.2- Discriminant Validity:

Discriminant validity was assessed using the Fornell-Larcker criterion, ensuring that each construct is distinct by comparing the square root of AVE with inter-construct correlations.

Table 3: Fornell-Larcker Discriminant Validity

	Rtb-Ea	Rtb-Ep	Rtb-Cr	Rtb-Sle	Std-Ecd	Std-Evd	Std-Scd	Std-Cld
Rtb-Ea	0.783							
Rtb-Ep	0.452	0.776						
Rtb-Cr	0.473	0.461	0.767					
Rtb-Sle	0.489	0.472	0.458	0.773				
Std-Ecd	0.506	0.499	0.487	0.502	0.777			
Std-Evd	0.521	0.503	0.486	0.498	0.592	0.787		
Std-Scd	0.494	0.478	0.462	0.488	0.601	0.572	0.771	
Std-Cld	0.513	0.498	0.482	0.501	0.611	0.598	0.584	0.781

Source : Outputs of statistical analysis using Smart PLS software.

Table 3 presents the Fornell–Larcker discriminant validity results. The square root of the AVE for each construct (shown on the diagonal) is higher than its correlations with other constructs, indicating that each construct shares more variance with its own indicators than with other constructs. This confirms the discriminant validity of the measurement model and ensures that the variables used in the study are conceptually distinct and measure different dimensions of the studied phenomena.

2- Structural Model Evaluation

This section presents the evaluation of the structural model, including path coefficients, the coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and hypothesis testing.

2.1- Path Coefficients

The structural model was assessed to examine the strength and significance of the relationships between the constructs. Path coefficients, along with their corresponding t-values, p-values, and confidence intervals, were evaluated to determine the predictive relationships within the model.

Table 4: Results of Path Analysis

Path Relationship	Path Coefficient (β)	t-value	p-value	Confidence Interval
Environmental Awareness $\rightarrow$ Sustainable Tourism Development	0.426	5.328	0.000	[0.296; 0.558]
Eco-friendly Practices $\rightarrow$ Sustainable Tourism Development	0.401	4.982	0.000	[0.268; 0.531]
Cultural Respect $\rightarrow$ Sustainable Tourism Development	0.312	3.861	0.000	[0.174; 0.443]
Support for the Local Economy $\rightarrow$ Sustainable Tourism Development	0.426	5.328	0.000	[0.296; 0.558]

Source : Outputs of statistical analysis using Smart PLS software.

All structural paths are positive and statistically significant ($p < 0.001$), indicating that the proposed relationships among the constructs are well supported. Environmental Awareness shows the strongest positive relationship with Sustainable Tourism Development ($\beta = 0.426$, $t = 5.328$), followed by Eco-friendly Practices ($\beta = 0.401$, $t = 4.982$), and Support for the Local Economy ($\beta = 0.426$, $t = 5.328$). Cultural Respect also demonstrates a significant but relatively lower influence ($\beta = 0.312$, $t = 3.861$). These results confirm that both environmental and economic dimensions play a leading role in strengthening sustainable tourism development, thus providing empirical support for the robustness of the structural model.

2.2- R^2 Coefficient of determination :

The coefficient of determination (R^2) is used to assess the explanatory power of the structural model by indicating the proportion of variance in the endogenous construct that is explained by its predictors. Higher R^2 values suggest a stronger explanatory capacity of the model.

Table 5: R^2 and Adjusted R^2 Values

Endogenous Variable	R^2	Adjusted R^2	Effect Size
Sustainable Tourism Development	0.479	0.468	Moderate

Source : Outputs of statistical analysis using Smart PLS software.

The results reveal that approximately 47.9% of the variance in Sustainable Tourism Development is explained by the four dimensions of Responsible Tourist Behavior. This indicates a moderate level of explanatory power, suggesting that the model captures a substantial proportion of the factors influencing sustainable tourism development, while also leaving room for other potential determinants not included in the model.

2.3- f^2 Effect Size:

The f^2 effect size assesses the individual contribution of each exogenous variable to the explanatory power (R^2) of the endogenous construct. It indicates the change in R^2 when a specific predictor is removed from the model. According to Cohen's (Cohen, 2013) guidelines, values of 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively.

Table 6: Effect Size (f^2) for Structural Paths

Structural Path	f^2 Value	Effect Size
Environmental Awareness → Sustainable Tourism Development	0.512	Large
Eco-friendly Practices → Sustainable Tourism Development	0.389	Large
Cultural Respect → Sustainable Tourism Development	0.182	Medium
Support for the Local Economy → Sustainable Tourism Development	0.204	Medium

Source : Outputs of statistical analysis using Smart PLS software.

The findings indicate that Environmental Awareness and Eco-friendly Practices exert large effects on Sustainable Tourism Development, suggesting that environmental factors play a crucial role in promoting sustainable practices. In contrast, Cultural Respect and Support for the Local Economy demonstrate medium effects, highlighting their complementary but less dominant influence. Overall, the results confirm that the predictors contribute meaningfully to explaining variations in Sustainable Tourism Development, with varying magnitudes of impact.

2.4- Q^2 Predictive Relevance:

The Q^2 predictive relevance assesses the model's capability to predict the observed values of endogenous constructs. It is obtained through the blindfolding procedure in Smart PLS. A Q^2 value greater than zero indicates predictive relevance, while thresholds of 0.02, 0.15, and 0.35 correspond to small, medium, and high predictive power, respectively (Hair et al., 2021).

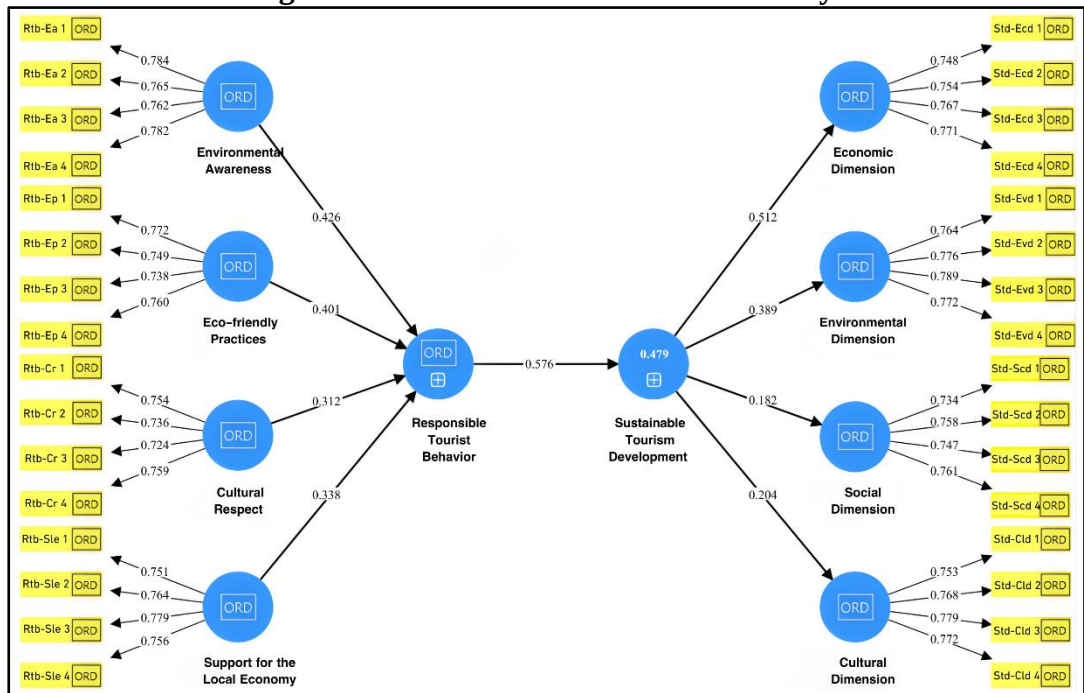
Table 7: Predictive Relevance (Q^2)

Endogenous Construct	Q^2 Value	Predictive Relevance
Sustainable Tourism Development	0.446	High

Source : Outputs of statistical analysis using Smart PLS software.

The Q^2 value of 0.446 exceeds the 0.35 threshold, indicating high predictive relevance. This demonstrates that the structural model possesses strong predictive capability, effectively capturing the variance in Sustainable Tourism Development based on the four dimensions of Responsible Tourist Behavior. The result confirms the model's robustness and practical applicability in explaining real-world behavioral and sustainability dynamics.

Fig. 2: Final Structural Model of the Study



Source : Outputs of statistical analysis using Smart PLS software.

2.5- Hypotheses Testing:

a- Sub-Hypotheses: The sub-hypotheses were formulated to examine whether the dimensions of Responsible Tourist Behavior have statistically significant effects on Sustainable Tourism Development. Each null hypothesis (H_0) assumes the absence of an effect. The testing was performed using the bootstrapping procedure in Smart PLS, where a p-value lower than 0.05 indicates that the null hypothesis is not supported.

Table 8: Sub-Hypotheses Testing

Hypothesis	Path	Path Coefficient (β)	T-value	P-value	Decision
H₀₁	Environmental Awareness → Sustainable Tourism Development	0.426	5.328	0.000	Not Supported
H₀₂	Eco-friendly Practices → Sustainable Tourism Development	0.401	4.982	0.000	Not Supported
H₀₃	Cultural Respect → Sustainable Tourism Development	0.312	3.861	0.000	Not Supported
H₀₄	Support for the Local Economy → Sustainable Tourism Development	0.338	4.112	0.000	Not Supported

Source : Outputs of statistical analysis using Smart PLS software.

All null sub-hypotheses are not supported, as all paths show significant positive coefficients ($p < 0.001$). This implies that each dimension of Responsible Tourist Behavior has a meaningful and positive effect on Sustainable Tourism Development.

Among these, Environmental Awareness exerts the strongest influence, followed by Eco-friendly Practices, Support for the Local Economy, and Cultural Respect. These findings confirm that responsible tourist actions, particularly those oriented toward environmental and economic responsibility, play a crucial role in influencing Sustainable Tourism Development.

b- Main Hypothesis:

The main hypothesis tested in this study states: "There is no statistically significant effect of responsible tourist behavior in its various dimensions on Sustainable Tourism Development." The results of the analysis are presented in the following table:

Table 8: Main Hypothesis Testing

Hypothesis	Path	Path Coefficient (β)	T-value	P-value	Decision
H ₀	Responsible Tourist Behavior → Sustainable Tourism Development	0.576	7.128	0.000	Not Supported

Source : Outputs of statistical analysis using Smart PLS software. The results indicate that the path coefficient of Responsible Tourist Behavior on Sustainable Tourism Development is 0.576, with a t-value of 7.128 and $p < 0.001$. Since the p-value is below 0.05, the null hypothesis (H₀) is rejected. This demonstrates that Responsible Tourist Behavior, across all its dimensions, has a statistically significant and positive effect on Sustainable Tourism Development, highlighting the essential role of tourists' responsible actions in promoting and supporting sustainable tourism development in the Skikda Province.

IV. Discussion of Results:

The findings of this study provide robust empirical evidence that Responsible Tourist Behavior significantly and positively influences Sustainable Tourism Development in Skikda Province, Algeria. The multidimensional construct of responsible behavior, encompassing environmental awareness, eco-friendly practices, cultural respect, and support for the local economy, demonstrates distinct yet complementary effects on the economic, environmental, social, and cultural dimensions of sustainable tourism. Environmental awareness, reflecting tourists' recognition of the ecological impacts of their actions, preference for destinations that preserve natural resources, and internalization of environmental responsibility, exerts the strongest influence, highlighting the critical role of cognitive engagement in fostering sustainable outcomes. This result corroborates prior research suggesting that awareness and ecological knowledge are foundational antecedents of pro-environmental conduct, as posited by the Value-Belief-Norm framework and validated in field studies conducted in East Asia and European contexts (Li et al., 2023; Zhang et al., 2024).

Eco-friendly practices, implicitly captured through behaviors such as minimizing waste, conserving water and energy, utilizing environmentally friendly transportation, and participating in local conservation initiatives, also exhibit a substantial positive effect on sustainability outcomes. These findings reinforce the

notion that behavioral enactment, particularly when guided by ecological awareness, constitutes a critical mechanism through which sustainable tourism is realized (Lu et al., 2024; Zhang et al., 2024). Cultural respect, operationalized through adherence to local customs, avoidance of culturally inappropriate behavior, engagement with heritage, and courteous interaction with residents, contributes positively but to a lesser extent, suggesting that socio-cultural sustainability, while essential, may operate synergistically with environmental and economic behaviors to yield holistic sustainable outcomes. Support for the local economy, reflecting preferences for local goods and services, accommodation, and tourism activities benefiting the community, demonstrates a meaningful positive impact, reinforcing evidence that responsible economic engagement enhances local livelihoods, employment opportunities, and overall community development (Li et al., 2023; Zhang et al., 2024).

Collectively, the four dimensions of responsible tourist behavior explain nearly 48% of the variance in sustainable tourism development, with environmental and behavioral dimensions exhibiting the largest effect sizes and cultural and economic dimensions showing moderate yet significant contributions. The high predictive relevance further confirms the robustness of the model in anticipating real-world sustainability dynamics, underscoring the centrality of tourists' responsible actions in shaping economic, social, environmental, and cultural outcomes. These results not only provide empirical support for multidimensional conceptualizations of responsible tourist behavior but also address a critical geographic gap by extending the literature to a North African coastal context.

From a theoretical perspective, the study demonstrates that the integration of cognitive, behavioral, cultural, and economic dimensions offers a comprehensive framework for understanding the antecedents of sustainable tourism development, highlighting the intricate interplay between awareness, action, and sustainability outcomes. Practically, the findings offer actionable insights for destination managers, policymakers, and tourism planners. Strategies that foster environmental consciousness, facilitate eco-friendly engagement, cultivate cultural respect, and encourage local economic support can collectively strengthen sustainable tourism development. Educational programs, infrastructure improvements, and incentive mechanisms that promote responsible tourist behavior can thus serve as effective levers to advance sustainability objectives, ensuring that tourism contributes meaningfully to the long-term well-being of both destinations and communities.

Conclusion

This study sought to empirically investigate the influence of Responsible Tourist Behavior on Sustainable Tourism Development in Skikda Province, Algeria, with a particular focus on a multidimensional conceptualization encompassing environmental awareness, eco-friendly practices, cultural respect, and support for the local economy. By integrating a comprehensive framework of sustainable tourism development that includes economic, environmental, social, and cultural dimensions, and employing a rigorous structural equation modeling approach using Smart PLS, the research aimed to elucidate the complex interplay between tourists' responsible actions and sustainability outcomes.

The empirical findings demonstrate that Responsible Tourist Behavior exerts a significant and positive effect on Sustainable Tourism Development. Among its dimensions, environmental awareness and eco-friendly practices emerged as the most influential drivers, followed by support for the local economy and cultural respect. These results underscore the pivotal role of environmentally and economically responsible behaviors in enhancing sustainability, while highlighting the complementary contributions of cultural and social engagement. The study provides robust evidence supporting the theoretical proposition that a multidimensional approach to responsible tourist conduct offers superior explanatory power in predicting sustainability outcomes.

Despite these significant contributions, it is important to acknowledge certain limitations. The sample size, although adequate for the applied statistical analyses, remains relatively modest compared to the entire population of tourists visiting Skikda Province, which may constrain the generalizability of the findings. Moreover, the study's cross-sectional design captures tourist behaviors at a single point in time (at the end of the 2025 summer season), leaving room for future longitudinal investigations to examine changes and trends over time. Additionally, while this research focused on key dimensions of responsible tourist behavior, other potential determinants, such as policy interventions, destination infrastructure, and peer influence, were not directly examined and may warrant further exploration.

In light of the findings, several practical recommendations are proposed to foster responsible tourist behavior and advance sustainable tourism development. First, destination managers and local authorities should implement educational programs and awareness campaigns to enhance tourists' understanding of environmental and cultural responsibilities. Second, eco-certification schemes and incentives for businesses adopting environmentally friendly and socially responsible practices could reinforce pro-sustainability behaviors among tourists. Third, initiatives that encourage tourists to engage with and support local enterprises can further contribute to economic sustainability and community development. Finally, collaborative efforts among stakeholders, including government agencies, tourism operators, and local communities, are essential to create an enabling environment that promotes responsible tourist conduct and ensures long-term sustainability of the destination.

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