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Experiential loyalty in nature-based adventure tourism: relationships among satisfaction, sustainable engagement, and return and recommendation intentions - a descriptive study in Pernambuco's Agreste region, Brazil

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Abstract

Nature-based adventure tourism has become established as a form of tourism capable of providing consumers with unique and memorable experiences, particularly in regions that combine natural landscapes with sustainable practices and active leisure. In Pernambuco's Agreste region, the city of Gravatá stands out as an emerging destination in this segment, attracting specialized companies, tourists, and investments that stimulate the local economy. This study aimed to analyze how satisfaction with the experience and sustainable engagement in nature-based adventure tourism affect and influence tourist-consumers' return and recommendation intentions, based on four hypotheses, two dependent variables, and two independent variables. The research adopted a descriptive quantitative approach through a questionnaire administered to respondents using a five-point Likert scale. The data were analyzed using descriptive statistics, exploratory and confirmatory factor analyses, and multiple linear regression. The results indicate that a satisfactory experience and sustainable engagement positively affect tourists' intention to return. The study contributes to understanding experiential consumption in nature-based adventure tourism and provides support for tourism management strategies focused on enhancing sustainability and visitors' experiential loyalty.

Keywords: Consumption experience; Nature-based adventure tourism; Experiential loyalty; Spontaneous dissemination.

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1. Introduction

Nature-based adventure tourism has become established as an important tourism modality, especially in regions that combine natural wealth with sports and cultural practices, primarily for leisure purposes (Miller et al., 2022; Ertaş et al., 2022; Nyaupane, 2023; Silva et al., 2024). In Pernambuco's Agreste region, environmental diversity creates opportunities for consumption in nature tourism (Freitas, 2021), encouraging unique and memorable immersive experiences (Cavalcanti, 2024), the overcoming of challenges in natural environments, and positive effects on physical and mental health (Li, 2022).

Contemporary authors emphasize that tourism experiences in natural environments positively affect tourist satisfaction and sustainable engagement (Nyaupane, 2024; Ordiñana-Bellver et al., 2024). Accordingly, this study was conducted in Pernambuco's Agreste region, Brazil, particularly in the municipality of Gravatá, an area well suited to such practices (Freitas, 2021). It focused on two modalities: hiking and rappelling, which are among the most frequently experienced activities because of their connection with biophilia (Trevisan & Oliveira, 2024), thereby increasing the potential for local development generated by this type of tourism (Rosa & Dos Anjos, 2022).

Understanding hiking and rappelling as fundamental modalities within the nature-based adventure tourism segment (Calegari et al., 2020), and as activities frequently experienced in the region under study (De Brito Alves et al., 2024), is essential to recognizing that this form of tourism extends beyond the consumption of services. Rather, it constitutes a unique and memorable experience for its participants (Cavalcanti, 2024), framed in this study as a leisure experience (Oliveira et al., 2023).

Nature-based adventure tourism as a leisure activity promotes interaction with the environment through exciting, challenging, and sometimes risky experiences, and depends on nature itself for its existence (Pomfret et al., 2023). Building on a previous qualitative study by the same authors, this research examined the experiential value of hiking and rappelling in Gravatá, Pernambuco, using the EVM method developed by Cavalcanti (2024), the "Experiential Value Map." The principal values identified were "experience satisfaction" and "sustainable engagement" (De Brito Alves et al., 2024).

Experience satisfaction is associated with feelings such as happiness, joy, peace, personal achievement, and a positive connection with nature. Sustainable engagement, in turn, is understood as tourists' commitment to preserving, caring for, and valuing the natural environment, thereby supporting its continuity. In this context, the substantial growth of nature-based adventure tourism in Pernambuco's Agreste region, particularly in Gravatá, has consolidated it as a strong niche that stimulates several other forms of consumption and experience (Freitas, 2021; Bezerra & Lima, 2023). Nevertheless, few academic studies

investigate consumption and experiential dynamics in this segment. Marketing research still focuses predominantly on major tourism hubs or the technical aspects of the activities (Nyaupane, 2024), while paying less attention to the factors that shape experience and consumption in smaller, yet no less relevant, market niches (Leopoldo et al., 2024; Rodrigues et al., 2024).

This study seeks to address this gap by analyzing the consumption experience in nature-based adventure tourism in Gravatá, focusing on two independent variables scientifically recognized as positive: tourists' satisfaction with the experience and sustainable engagement. It examines whether satisfaction significantly influences the intention to return to activity sites, such as hiking trails and rappelling locations, as well as the intention to recommend these experiences. It also investigates whether sustainable engagement positively affects these return and recommendation intentions.

Based on this context and a theoretical model in which two independent variables affect and influence two dependent variables through the relevant constructs, the general objective of this study is to investigate how experience satisfaction and the sustainable engagement of nature-based adventure tourism participants in the Gravatá region affect and influence tourists' intentions to return and recommend the experience.

To achieve this purpose, the following specific objectives were established:

a) to analyze how satisfaction with the nature-based adventure tourism experience affects consumers' intention to return and influences their intention to recommend;

b) to investigate whether these tourists' sustainable engagement affects their intention to return and influences their intention to recommend; and

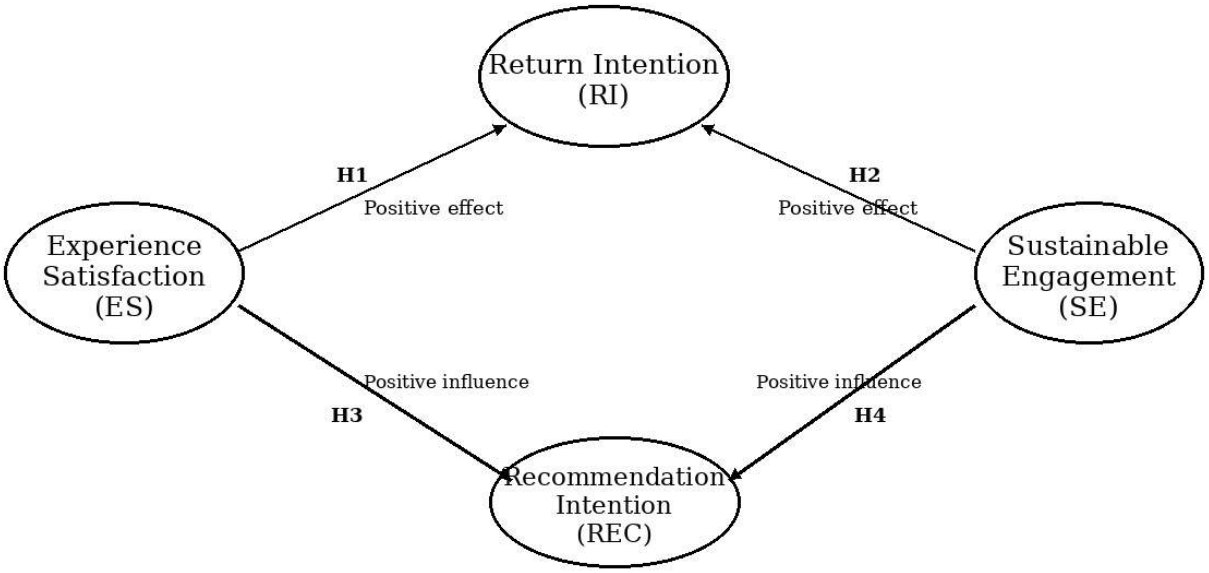
c) to assess the effect and influence indices among the proposed hypotheses.

This descriptive quantitative study (Hair et al., 2019) therefore contributes to the advancement of marketing science, particularly through one of its more contemporary approaches:

consumption experience. It also provides practical support for destination management in Pernambuco's Agreste region, addressing the strengthening of the local economy, the professional development of tourism promoters and participating companies, tourists, climate and environmental debate, environmental education, the Sustainable Development Goals (SDGs), and other areas of consumption (Dotto et al., 2022; Iwamoto et al., 2024).

Based on this understanding, the theoretical model proposed in the study assumes that Experience Satisfaction positively affects Return Intention and positively influences Recommendation Intention, while Sustainable Engagement positively affects Return Intention and positively influences Recommendation Intention, as shown in Figure 1:

Figure 1
Theoretical model of the study



Source: The authors (2025).

Hypotheses

H1 - Experience Satisfaction positively affects Return Intention. H2 - Sustainable Engagement positively affects Return Intention.

H3 - Experience Satisfaction positively influences the intention to recommend the experience.

H4 - Sustainable Engagement positively influences the intention to recommend the experience.

2. Theoretical foundation of the research hypotheses

2.1. Nature-based adventure tourism, consumption experiences, and satisfaction (H1)

Tourism activities conducted in natural environments continue to grow and stand out for their diversity and range of modalities, whether for leisure, adventure, contemplation, or competition worldwide (Ertaş et al., 2022; Miller et al., 2022; Nyaupane, 2023; Silva et al., 2024). Each offers specific characteristics and possibilities for participants (Martins & Da Silva, 2018), ranging from hiking and wildlife observation to more extreme activities such as rafting, rappelling, and climbing (Oliveira et al., 2023).

Because they take place in natural settings, including forests, parks, mountains, rivers, beaches, and woodlands, these tourism activities have attracted many participants (Massini et al., 2021) seeking to experience or relive relaxing, positive, restorative, challenging, and stimulating moments (Su et al., 2020, 2021).

This form of tourism provides intense experiences in natural environments, characterized by physical and emotional challenges, while also promoting physical and mental health benefits (Li, 2022). In

Pernambuco's Agreste region, environmental richness favors immersive and distinctive experiences such as hiking and rappelling, particularly in the municipality of Gravatá, where this type of tourism has emerged as a growing niche (Freitas, 2021; Cavalcanti, 2024).

In this context, adventure tourism constitutes a form of experiential consumption that extends beyond the purchase of services and is experienced as a memorable and transformative practice (Carú & Cova, 2020; Scussel et al., 2022). Hiking and rappelling, in particular, have been recognized as central activities in this segment because of their connection with biophilia - the human affinity with nature - and their significant presence in the local context (Trevisan & Oliveira, 2024; De Brito Alves et al., 2024).

However, because this leisure modality combines emotion, risk, and personal achievement, it also depends on environmental preservation, reinforcing its sustainable nature (Pomfret et al., 2023), an essential element in achieving participant satisfaction (Borja & Corbin, 2025). Consumer satisfaction is therefore understood as the result of a positive evaluation of the experience, generally based on a comparison between prior expectations and actual perceptions of both individual performance and the setting in which the experience occurred (Borges & Santos Lobo, 2025).

In adventure tourism, satisfaction is closely linked to emotional experience, a sense of achievement, connection with the natural environment, peace, a feeling of welcome, and freedom (Borges & Santos Lobo, 2025; Oliveira et al., 2023; Pomfret et al., 2023). Reinforcing the subjective and symbolic value of satisfaction in this context, successful nature-based adventure tourism experiences are characterized by feelings such as happiness, joy, peace, personal fulfillment, and the perception of a sustainable environment (Nyaupane, 2024; Cavalcanti, 2024; Borges & Santos Lobo, 2025).

2.2. Sustainable engagement, return intention, and recommendation intention (H2, H3, H4)

Sustainable engagement refers to consumers' active involvement in practices that promote environmental conservation and sociocultural responsibility (Nguyen et al., 2025). In nature tourism, sustainable engagement is regarded as a crucial factor in maintaining destinations' long-term attractiveness and constructing a more authentic and responsible experience.

According to Nguyen et al. (2025, p. 8), sustainable engagement as a consumer of nature-based adventure tourism concerns tourists' individual and collective commitment to attitudes and practices aimed at environmental conservation and sociocultural respect for the setting. This engagement is expressed through conscious actions to care for the visited environment, value natural resources, and promote the responsible use of spaces (Rosa & Dos Anjos, 2022). In addition to reflecting participants' ethical and behavioral stance, this form of engagement contributes to the longevity of tourism destinations and enhances the authenticity of

the tourist experience (Ordiñana-Bellver et al., 2024).

In nature-based adventure tourism experiences, behavioral intentions, such as returning to the destination or recommending the experience to others, are strongly related to a positive perception of the experience (Baker & Crompton, 2000). In this context, these intentions are influenced not only by the objective assessment of the services provided but also by the emotions elicited during the activity (Leopoldo et al., 2024; Rodrigues et al., 2024).

The current literature therefore supports the view that both experience satisfaction and sustainable engagement can play decisive roles in shaping these intentions, particularly in experiential consumption contexts and emerging tourism niches such as Pernambuco's Agreste region (Bezerra & Lima, 2023; De Brito Alves et al., 2024).

3. Methodology

3.1. Methodological procedures

This descriptive quantitative study (Hair et al., 2019) investigated how experience satisfaction and sustainable engagement influence return and recommendation intentions among adventure tourism participants in the Gravatá region of Pernambuco. Data were collected using a structured questionnaire with five-point Likert scales adapted from instruments validated in previous studies.

Data analysis followed four stages: (1) descriptive statistics to characterize the sample; (2) exploratory factor analysis (EFA) to explore the structure of the constructs; (3) confirmatory factor analysis (CFA) to validate the scales; and (4) multiple linear regression to test the model hypotheses by examining relationships between the independent and dependent variables. Although structural equation modeling (SEM) was not used at this stage because of scope limitations, the combination of EFA, CFA, and regression ensured the robustness of the results. Figure 2 presents the hypotheses investigated.

Figure 2

Contextualization of the hypotheses

H1	**Experience Satisfaction in nature tourism positively affects tourists' intention to return to Gravatá, Pernambuco, more frequently and potentially become regular consumers of these experiences.**
H2	Tourists' Sustainable Engagement positively affects their intention to return to Gravatá, Pernambuco, and participate in nature tourism experiences more frequently.
H3	Experience Satisfaction in nature tourism positively influences tourists' intention to recommend the experiences to peers, friends, and acquaintances and to share them positively on social media.
H4	Sustainable Engagement positively influences tourists' intention to recommend the nature tourism experiences they have undertaken.

Source: The authors (2025).

3.2. Research context

This cross-sectional quantitative study was preceded by a qualitative investigation that identified five experiential values in adventure and nature tourism practices. Two principal values stood out: experience satisfaction, expressed through feelings of peace, happiness, renewal, and achievement; and sustainable engagement, expressed through contact with nature, preservation practices, and connection with the natural environment.

Data were collected on five separate occasions during experiences promoted by five tourism companies based in Recife, Pernambuco, which market hiking and rappelling packages in Gravatá through digital platforms. The experiences took place only after a minimum number of packages had been sold, making it possible to capture varied perceptions among participating tourists and increasing the representativeness of the sample. The approach adopted supported the formulation of the hypotheses and the analysis of the study variables, as shown in Figure 3.

Figure 3

Methodological framework of the study

Respondent profile	**Nature tourism participants who hike and rappel in Gravatá, a city in the Agreste region of the state of Pernambuco.**
Sample	200 respondents
Sampling technique	Purposive/judgmental
Data collection period	March to July 2024.
Collection duration	Five months.
Key details	Data were collected on six occasions during experiences promoted by six different companies. All companies are based in Recife, Pernambuco, and all participants/tourists reside in Pernambuco.
Mode	Online - messages were sent to request participation and present the study.

Source: The authors (2025).

3.3. Sample and data collection technique

3.3.1. Sample

The study included 200 participants selected through non-probability convenience sampling (Hair et al., 2019), ensuring the relevance of the data. Data were collected between March and July 2024 using a structured

survey administered through Google Forms and validated by two experts in the research field. The study had a cross-sectional design, with the researcher present in the field during the experiences.

At the end of each activity, participants were invited to complete the questionnaire through a link sent via WhatsApp and were reminded of the importance of the study. This procedure was repeated across seven

experiences over five months, with the questionnaire remaining available for one week after each event. Figure 4 presents details of the sample and data collection.

Figure 4

Sample characteristics

Months	No. of experiences and promoting companies	Total participants per experience (population)	Sample (study respondents)	Area where the experiences occurred (hiking and rappelling)
March	2 (same company)	68	54	Public
April	1	30	29	Private
May	1	35	32	Private
June	1	32	26	Public
July	2 (same company)	64	59	Public and private
Total	7	229	200	-

Source: The authors (2025).

3.3.2. Data collection technique

Data were collected through a structured questionnaire organized on a five-point Likert scale, ranging from strongly disagree to strongly agree, and containing 17 statements. The scales were based on the study constructs: Experience Satisfaction (ES); Return Intention (RI); Sustainable Engagement (SE); and Recommendation Intention (REC). The variable types, constructs, questions, scales, and references are presented in Figure 5.

Figure 5

Characteristics of the data collection instrument

Variable type	Factor/construct	Observed variable, adapted	Scale	References
Independent variable (IV)	Experience Satisfaction (ES)	P1. My experience at the destination exceeded my expectations.	Likert 1-5	Cong (2016).
Independent variable (IV)	Experience Satisfaction (ES)	P2. The site infrastructure and tourist reception services met my expectations and needs.	Likert 1-5	Cong (2016).
Independent variable (IV)	Experience Satisfaction (ES)	P3. Contact with nature was enriching, memorable, and unforgettable.	Likert 1-5	Cong (2016).
Independent variable (IV)	Experience Satisfaction (ES)	P4. The experience brought me joy and a sense of well-being.	Likert 1-5	Cong (2016).
Dependent variable (DV)	Return Intention (RI)	P5. I intend to return to this destination in the near future.	Likert 1-5	Stylos et al. (2016).

Variable type	Factor/construct	Observed variable, adapted	Scale	References
Dependent variable (DV)	Return Intention (RI)	P6. The experience was so positive that I wish to repeat it whenever possible.	Likert 1-5	Stylos et al. (2016).
Independent variable (IV)	Sustainable Engagement (SE)	P7. During my experience in nature, I avoided practices that harm the environment.	Likert 1-5	Piva et al. (2025).
Independent variable (IV)	Sustainable Engagement (SE)	P8. I prefer destinations that promote sustainable tourism.	Likert 1-5	Piva et al. (2025).
Independent variable (IV)	Sustainable Engagement (SE)	P9. I feel motivated to become more engaged in protecting the environment.	Likert 1-5	Piva et al. (2025).
Independent variable (IV)	Sustainable Engagement (SE)	P10. I contributed to this through my experience.	Likert 1-5	Piva et al. (2025).
Independent variable (IV)	Sustainable Engagement (SE)	P11. I invested financial and material resources to have an experience like this.	Likert 1-5	Piva et al. (2025).
Independent variable (IV)	Sustainable Engagement (SE)	P12. I made a substantial personal investment in this experience.	Likert 1-5	Piva et al. (2025).
Dependent variable (DV)	Recommendation Intention (REC)	P13. Based on my experience, I would recommend this destination to friends and family.	Likert 1-5	Quintal and Polczynski (2010); Jannach and Lerche (2017).
Dependent variable (DV)	Recommendation Intention (REC)	P14. I believe this destination is suitable for people with interests similar to mine.	Likert 1-5	Quintal and Polczynski (2010); Jannach and Lerche (2017).
Dependent variable (DV)	Recommendation Intention (REC)	P15. Given the opportunity, I will share my experience at this destination on social media or in online reviews.	Likert 1-5	Quintal and Polczynski (2010); Jannach and Lerche (2017).
Dependent variable (DV)	Recommendation Intention (REC)	P16. I recommend this destination to friends and family.	Likert 1-5	Quintal and Polczynski (2010); Jannach and Lerche (2017).

Source: The authors (2025), based on the scales employed.

3.4. Methods of analysis

Descriptive statistics were used to characterize the sample profile and summarize the principal study variables, following Triola (2021). The internal reliability of the scales was assessed using Cronbach's alpha,

$\alpha = (k / (k - 1)) \times (1 - (\text{sum of the variances of the individual items} / \text{variance of the combined score}))$, according to the criteria established by Hair et al. (2019).

Exploratory factor analysis was conducted to assess construct validity, followed by confirmatory factor analysis to evaluate the validity of the study's theoretical model, in accordance with the procedures described by Field (2024) and Hair et al. (2019), as summarized in Figure 6.

Figure 6

Statistical methods and techniques used in this study

Analyses	References
Descriptive statistics	Triola (2021).
Multiple regression	Field (2024); Hair et al. (2019); Montgomery and Runger (2020).
Exploratory factor analysis	Field (2024); Hair et al. (2019).
Confirmatory factor analysis	Field (2024); Hair et al. (2019).

Source: The authors (2025).

Relationships among the variables were examined using multiple linear regression, based on the methodological recommendations of Field (2024), Hair et al. (2019), and Montgomery and Runger (2020).

4. Results and analyses

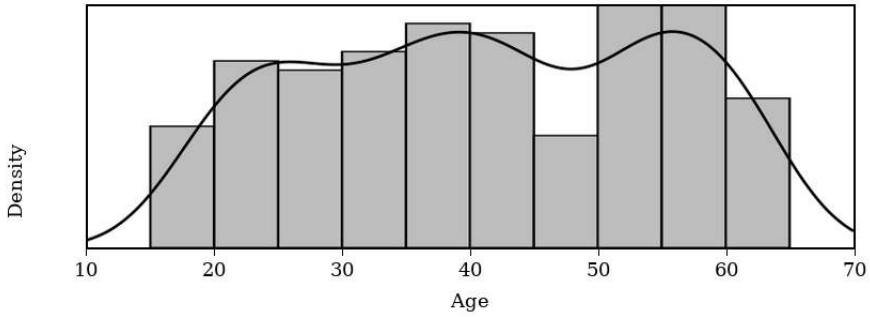
4.1. General descriptive statistics

The analyses began with descriptive statistics to characterize the respondent profile and the constructs investigated. Cronbach's alpha was then calculated to assess scale reliability. The data were also subjected to multiple regression, exploratory factor analysis, and confirmatory factor analysis, following Hair et al. (2019), Montgomery and Runger (2020), and Triola (2021).

Descriptive statistics made it possible to: (a) describe the sample in terms of age, gender identity, and previous experience with the activities; and (b) analyze response concentration based on the standard deviation and coefficient of variation using a five-point Likert scale. Figures 7, 8, and 9 present, respectively, the participants' age distribution, gender identity, and previous hiking and rappelling experience.

Figure 7

Age density

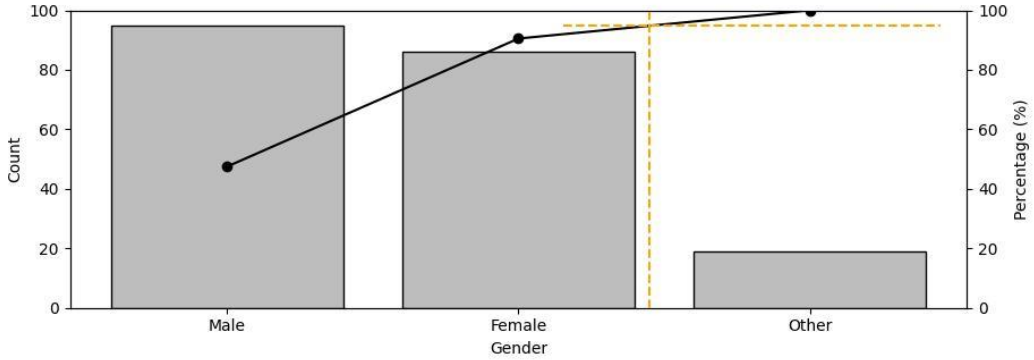


Source: JASP database (2025).

The data were collected during six nature tourism experiences in Gravatá, Pernambuco, three on private properties and two in public areas. After each experience, participants completed a questionnaire. Ages were concentrated between 30 and 68 years, indicating a more mature public, which is strategically relevant for local organizers. The gender analysis showed a balanced sample, suggesting that nature hiking and rappelling attract people of different genders and age groups, especially those aged 30 and above.

Figure 8

Gender identity

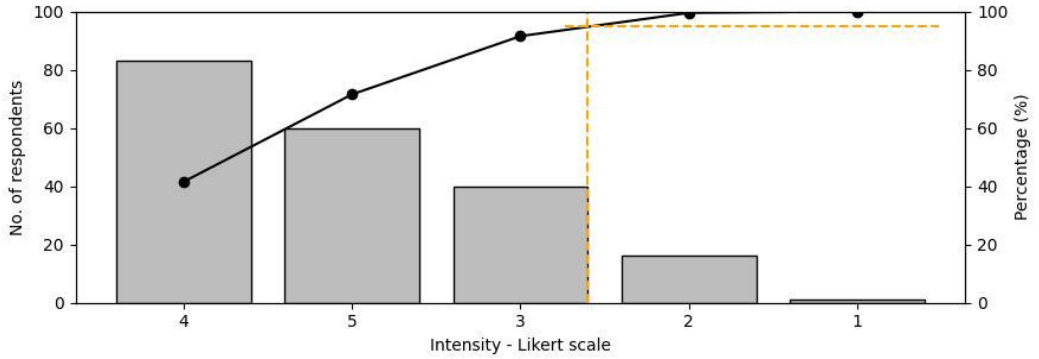


Source: JASP database (2025).

Figure 9 presents the intensity of participation in nature hiking and rappelling, distinguishing participants with prior experience from first-time participants. The sample suggests that most respondents were already familiar with or had previously participated in the activities. Responses were concentrated at levels 4 and 5 of the Likert scale, corresponding to partially agree and strongly agree, indicating previous experience with these modalities.

Figure 9

Previous experience with nature hiking and rappelling



Source: JASP database (2025).

Table 1 presents the general descriptive data and the standard deviation for each construct: respondents' previous experience with nature tourism in Gravatá, satisfaction with the experience, intention to return, sustainable engagement in terms of caring for and protecting nature, and intention to recommend the experience to people in their social circles or share it on social media.

Table 1

General descriptive statistics

Variable	Valid cases	Mean	Standard deviation	Coefficient of variation
Nature tourism practice	200	3.925	0.929	0.237
Experience Satisfaction	200	17.465	2.312	0.132
Return Intention	200	8.085	1.318	0.163
Sustainable Engagement	200	11.500	1.563	0.136
Recommendation Intention	200	17.840	1.828	0.102

Source: JASP database (2025).

The descriptive analysis in Table 1 indicates generally satisfactory levels and internal consistency in the responses relative to the mean, particularly regarding the standard deviation and coefficient of variation. These indices show acceptable standard normality (Triola, 2021).

The coefficients of variation (CV) ranged from 10.2% to 23.7%, indicating low to moderate relative variability. Recommendation Intention (CV = 10.2%), Experience Satisfaction (CV = 13.2%), and Sustainable Engagement (CV = 13.6%) showed excellent homogeneity across responses, demonstrating good data consistency.

Return Intention showed good stability (CV = 16.3%). Although Nature Tourism Practice had the highest coefficient of variation (CV = 23.7%), the value remains acceptable for five-point Likert scales. The standard deviations support this interpretation, indicating that the relative dispersion of the data falls within appropriate limits for the study.

Cronbach's alpha test

Cronbach's alpha was then calculated to assess the internal reliability of the scales. According to Hair et al. (2019), values above 0.70 are considered satisfactory, supporting instrument reliability and reducing measurement error. Table 2 presents the overall scale value, and Table 3 reports the results for each scale used.

Table 2

Cronbach's alpha test

			95% CI	
Coefficient	**Estimate**	**Std. Error**	**Lower**	**Upper**
Coefficient α	0.903	0.031	0.741	0.864

Source: JASP database (2025).

The results indicate that the scales used in the study have high internal reliability, as shown by the overall Cronbach's alpha of 0.903. This value demonstrates that the instrument items are highly consistent with one another, strengthening the validity of the measures applied. Table 3 presents the values for the individual scales.

Table 3

Cronbach's alpha by item

Item	**Coefficient α (if item dropped)**		
	Estimate	**Lower 95% CI**	**Upper 95% CI**
Sustainable Engagement	0.755	0.671	0.739
Experience Satisfaction	0.886	0.746	0.725
Recommendation Intention	0.805	0.740	0.770
Return Intention	0.803	0.623	0.782

Source: JASP database (2025).

Each scale item was analyzed individually, with coefficients ranging from 0.755 to 0.878. Experience Satisfaction showed particularly high consistency, while Sustainable Engagement displayed slight variation but remained within acceptable levels. Recommendation Intention and Return Intention also showed good reliability, confirming their relevance to construct measurement (Hair et al., 2019).

4.2. Exploratory factor analysis

Exploratory factor analysis was conducted to identify possible patterns among the study variables and determine which variables clustered together, thereby forming factor blocks suitable for subsequent confirmatory factor analysis. Two factors were identified, and their results were analyzed using the data presented in Table 4.

Table 4

Chi-square test

Model	Value	df	p
Model 1	2.018	1	0.155

Source: JASP database (2025).

The model fit test yielded a chi-square value (χ^2) of 2.018 with 1 degree of freedom (df) and a significance level of p = 0.155. Because the p-value is greater than 0.05, the model is considered to fit the data well. The exploratory factor loadings are presented in Table 5.

Table 5

Factor loadings

Variable	Factor 1	Factor 2	Uniqueness
Return Intention	0.903		0.177
Sustainable Engagement	0.812		0.403
Experience Satisfaction	0.684		0.345
Recommendation Intention		0.903	0.214

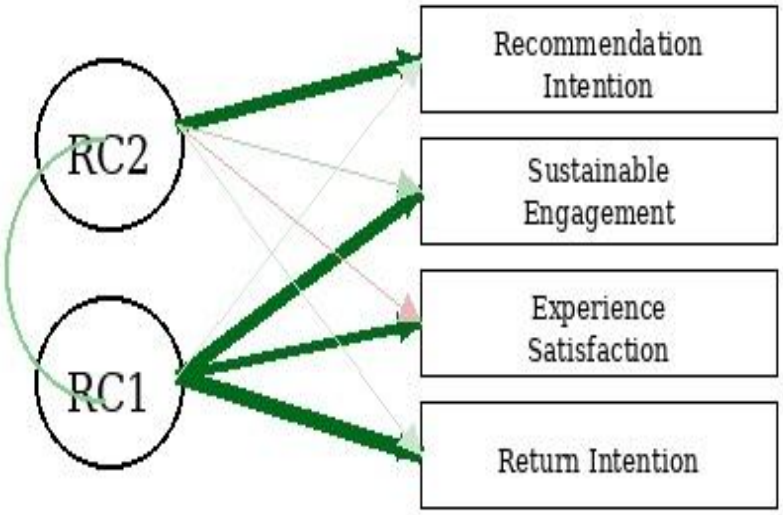
Note. Promax rotation was applied.

Source: JASP database (2025).

The factor loadings were obtained using Promax rotation, which allows the factors to correlate. The results indicated the formation of two principal factors. Factor 1 grouped Return Intention (0.888), Sustainable Engagement (0.841), and Experience Satisfaction (0.640), suggesting a factor related to the "Loyalty and Satisfaction of Tourists" who participated in nature hiking and rappelling. Factor 2 showed a high loading for Recommendation Intention (0.903), indicating a factor associated with "Promotion and Recommendation," in which tourists act as promoters and disseminators of these tourism experiences. These loadings can also be interpreted through the path diagram shown in Figure 10.

Figure 10

Path diagram



Source: JASP database (2025).

Based on the analyses, the authors designate Factor 1 as "Nature-Based Adventure Tourism Consumer Loyalty" and Factor 2 as "Spontaneous Dissemination of Nature-Based Adventure Tourism Experiences." The path diagram in Figure 10 shows the principal relationships between factors RC1 and RC2 and the variables, helping explain why RC2 appears separately from the other factor.

The diagram shows strong positive loadings on factor RC1, represented by thick green arrows, for: 1. Return Intention; 2. Experience Satisfaction; and 3. Sustainable Engagement. This indicates that RC1 groups variables related to tourists' individual experiences and their effects on return behavior. It may be interpreted as a "loyalty and retention factor." Factor RC2 shows a strong positive loading only for Recommendation Intention, represented by a thick green arrow.

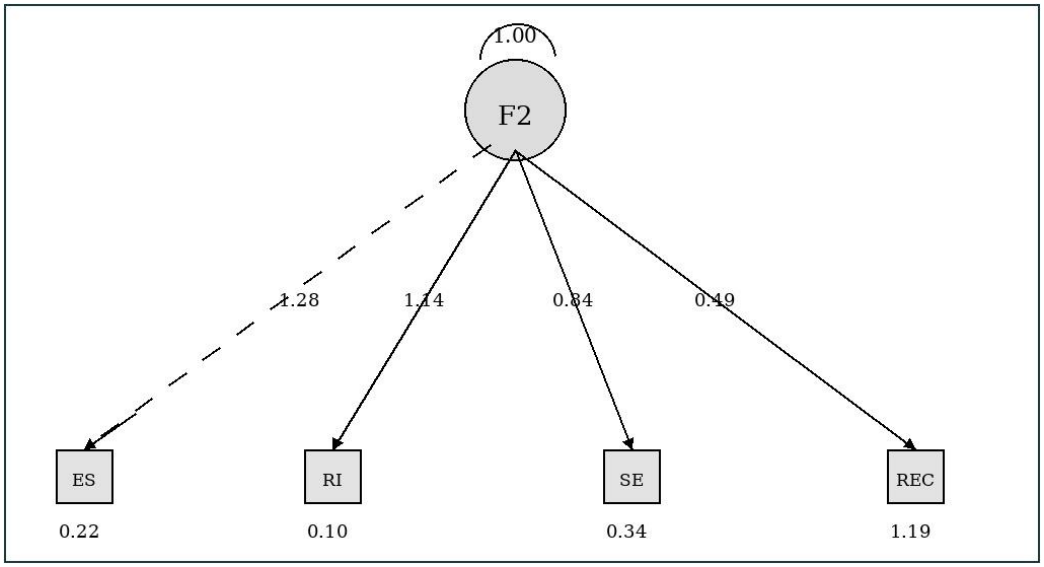
The remaining connections with Sustainable Engagement and Experience Satisfaction appear as thinner or red arrows, suggesting weak, negative, or non-significant loadings. This indicates that RC2 represents a distinct dimension related to willingness to recommend the experience, namely a "spontaneous experience dissemination factor." The result may indicate that even tourists who are satisfied with the experience and engaged in pro-environmental causes do not always recommend it because of factors such as their peers' personal preferences, risk perceptions, or the profiles of friends and relatives. This may explain the variable's statistical independence and justify its formation as a separate factor.

4.3. Confirmatory factor analysis

Finally, confirmatory factor analysis was conducted following Hair et al. (2019), based on the proposed theoretical model and the EFA factors. CFA was appropriate because the theoretical model had been specified in advance, allowing it to be tested and validated by determining whether the data structure fit the proposed structure, as shown in Figure 11.

Figure 11

Model diagram



Source: JASP database (2025).

The confirmatory factor analysis (CFA) model diagram shows the relationship between the latent variable F2 and the observed indicators: Experience Satisfaction (ES), Return Intention (RI), Sustainable Engagement (SE), and Recommendation Intention (REC). Based on the results, the authors designate the latent variable F2 as "Experiential Loyalty" in nature-based adventure tourism in Gravatá, Pernambuco. It has a variance of 1.00, reflecting strong internal consistency in relation to the study's theoretical model.

The standardized factor loadings represent the strength of the relationship between the latent factor F2 and each observed variable. In general, a factor loading ≥ 0.70 is considered strong; 0.50 to 0.69, moderate; 0.30 to 0.49, weak; and below 0.30, very weak. ES (Experience Satisfaction) had a loading of 1.28, fixed and represented by a dashed line, with an error of 0.22. This unstandardized value serves as the model's reference parameter and has a low error.

RI (Return Intention) had a factor loading of 1.14, unstandardized, with a measurement error of 0.10, indicating excellent explanation by factor F2 and a very low error. SE (Sustainable Engagement) had a loading of 0.84 and an error of 0.34, representing a high loading with moderate error. REC (Recommendation Intention) had a loading of 0.49 and an error of 1.19, representing a weak loading and high error, which indicates that the variable is only weakly explained by the factor. This may suggest that recommendation intention is not strongly associated with the F2 factor represented by "Experiential Loyalty," at least as it was measured in this study.

4.4. Multiple linear regression

Table 6 presents the multiple linear regression results concerning the effects of the independent

variables on the dependent variables. This analysis is relevant because it enables accurate prediction, assessment of influence and significance, and support for decision-making. The following tables present the first analysis, concerning H1 and H2.

Table 6

Model summary - Return Intention - H1 and H2

					Durbin-Watson test		Durbin-Watson
Model	**R**	**R²**	**Adjusted R²**	**RMSEA**	**Autocorrelation**	**Statistic**	**p**
M_0	0.701	0.492	0.489	0.742	0.907	0.176	< .001
M_1	0.789	0.622	0.618	0.714	0.901	0.197	< .001

Note. M_0 includes Experience Satisfaction.

Note. M_1 includes Experience Satisfaction and Sustainable Engagement.

Source: JASP database (2025).

Table 6 compares model M_0, which includes only Experience Satisfaction, with model M_1, which includes Experience Satisfaction and Sustainable Engagement. M_0 yielded $R^2 = 0.492$, whereas M_1 yielded $R^2 = 0.622$, indicating a 13.1% increase in explanatory power after Sustainable Engagement was added. Both models were statistically significant ($p < 0.001$), and the complete model M_1 explained 62.2% of the variance in Return Intention. The RMSEA index, used to assess model fit, decreased from 0.742 in M_0 to 0.714 in M_1. The Durbin-Watson test indicated positive autocorrelation of the residuals, with a value of 0.9. Table 7 presents the ANOVA results.

Table 7

ANOVA variance analysis

Model	**Component**	**Sum of squares**	**df**	**Mean square**	**F**	**p**
M_0	Regression	169.875	1	169.875	191.458	< .001
	Residuals	175.680	198	0.887		
	Total	345.555	199			
M_1	Regression	214.986	2	107.493	162.183	< .001
	Residuals	130.569	197	0.663		
	Total	345.555	199			

Note. M_0 includes Experience Satisfaction.

Note. M_1 includes Experience Satisfaction and Sustainable Engagement

Source: JASP database (2025).

Experience Satisfaction alone explained 49.2% of the variance, and adding Sustainable Engagement substantially improved model quality, as detailed in Table 7 through the ANOVA results. ANOVA tests whether the model as a whole is significant, that is, whether the independent variables explain the dependent

variable. The analysis in Table 7 showed that both models were statistically significant ($p < 0.001$), indicating that the independent variables contribute meaningfully to explaining the dependent variable, Return Intention.

The initial model M_0, which included only Experience Satisfaction, yielded an F statistic of 191.458 and explained a significant proportion of the variability in the data. After Sustainable Engagement was added in model M_1, the regression sum of squares increased and the residuals decreased, reflecting improved model fit. Although the F statistic declined to 162.183, it remained highly significant. To complete the analysis of hypotheses H1 and H2, the regression coefficients are presented in Table 8 and the partial and part correlations in Table 9.

Table 8

Regression coefficients

Model	Predictor	Unstandardized	Standard error	Standardized	t	p
M_0	Exp. Satisfaction	0.400	0.029	0.701	13.837	< .001
M_1	Exp. Satisfaction	0.270	0.030	0.473	9.142	< .001
	Sustainable Eng.	0.360	0.044	0.427	8.250	< .001

Source: JASP database (2025).

The multiple regression results indicated that Experience Satisfaction had a strong positive effect on Return Intention ($\beta = 0.701$; $p < 0.001$). After Sustainable Engagement was included in the model, both variables had positive and statistically significant effects on the dependent variable, Return Intention (β Experience Satisfaction = 0.473; β Sustainable Engagement = 0.427; $p < 0.001$). Table 9 also presents the partial and part correlations associated with hypotheses H1 and H2.

Table 9

Partial and part correlations

Model	Predictor	Partial	Part
M_0	Experience Satisfaction	0.701	0.701
M_1	Experience Satisfaction	0.546	0.400
	Sustainable Engagement	0.507	0.361

Source: JASP database (2025).

Introducing Sustainable Engagement slightly reduced the correlation between Experience Satisfaction and Return Intention, indicating that both variables have positive effects on this outcome. The partial correlations confirm the relevance of both constructs, demonstrating that each makes a significant contribution to explaining return intention among tourists who participate in hiking and rappelling.

Hypotheses H1, concerning Experience Satisfaction, and H2, concerning Sustainable Engagement, were supported, showing that the combination of experiential quality and environmental responsibility fosters

visitor loyalty. The data also indicate that engaged tourists value both leisure and destination preservation, pointing to a promising strategy for the sustainable development of adventure tourism in Gravatá.

Hypotheses H3 and H4, which examine the effects of experience satisfaction and sustainable engagement on recommendation intention, are discussed next. Table 10 summarizes the model focusing on Recommendation Intention; Table 11 presents the ANOVA results; Table 12 reports the regression coefficients; and Table 13 presents the partial and part correlations. Together, these tables comprise the second analysis, concerning hypotheses H3 and H4.

Table 10

Model summary - Recommendation Intention

					Durbin-Watson test		Durbin-Watson
Model	**R**	**R^2**	**Adjusted R^2**	**RMSEA**	**Autocorrelation**	**Statistic**	**p**
M_0	0.000	0.156	0.205	0.611	0.148	0.095	< .001
M_1	0.453	0.205	0.197	0.715	0.163	0.163	< .001

Note. M_1 includes Experience Satisfaction and Sustainable Engagement.

Source: JASP database (2025).

Table 11

ANOVA variance analysis

Model	Component	Sum of squares	df	Mean square	F	p
M_0	Regression	103.543	1	103.543	36.523	< .001
	Residuals	561.337	198	2.835		
	Total	664.880	199			
M_1	Regression	136.250	2	68.125	25.388	< .001
	Residuals	528.630	197	2.683		
	Total	664.880	199			

Note. M_0 includes Experience Satisfaction.

Source: JASP database (2025).

Table 12

Regression coefficients

Model	Predictor	Unstandardized	Standard error	Standardized	t	p
M_0	(Intercept)	12.391	0.909		13.625	< .001
	Exp. Satisfaction	0.312	0.052	0.395	6.043	< .001
M_1	(Intercept)	13.987	0.996		14.045	< .001
	Exp. Satisfaction	0.423	0.059	0.534	7.117	< .001
	Sustainable Eng.	-0.307	0.088	-0.262	-3.491	< .001

Source: JASP database (2025).

Table 13

Partial and part correlations

Model	Predictor	Partial	Part
M_0	Experience Satisfaction	0.395	0.395
M_1	Experience Satisfaction	0.452	0.452
	Sustainable Engagement	-0.241	-0.222

Source: JASP database (2025).

The multiple regression results indicate that model M_1, which includes Experience Satisfaction and Sustainable Engagement, had greater explanatory power for Recommendation Intention ($R^2 = 0.205$) than model M_0, which includes only Experience Satisfaction ($R^2 = 0.156$). The 4.9% difference in explained variance ($\Delta R^2 = 0.049$) suggests that adding the second predictor significantly improves the model, although RMSEA increased slightly from 0.611 to 0.715.

The significance of the models was confirmed by analysis of variance (ANOVA), with statistically significant F values ($p < 0.001$). The Durbin-Watson statistics were also interpreted in relation to the assumptions of linear regression. Overall, model M_1 was considered more robust because it combined improved explanatory capacity with an acceptable model structure.

Experience Satisfaction had a standardized coefficient of 0.395 in model M_0, with a highly significant t value of 6.043 ($p < 0.001$). This result confirms that satisfaction with nature-based adventure tourism experiences has a positive and meaningful effect on Recommendation Intention. When Sustainable Engagement was added in model M_1, the standardized coefficient for Experience Satisfaction increased to 0.534, with $t = 7.117$ ($p < 0.001$), suggesting that the effect became stronger. Hypothesis H3, concerning the positive influence of Experience Satisfaction on Recommendation Intention, was therefore supported and remained relevant.

Sustainable Engagement showed a significant negative coefficient in model M_1 ($\beta = -0.262$; $t = -3.491$; $p < 0.001$), indicating that greater engagement was associated with lower recommendation intention. The partial correlation of -0.241 reinforces this inverse relationship and led to the rejection of H4, which proposed a positive effect. One possible explanation is that sustainably engaged tourists do not necessarily become active promoters of these experiences. By contrast, H3 confirms that satisfaction positively influences recommendation. The regression analysis therefore shows that H1 and H2 positively explain Return Intention, H3 confirms the effect of satisfaction on recommendation, and H4 indicates that Sustainable Engagement does not positively influence Recommendation Intention. The hypothesis map in Figure 12 summarizes these findings.

Figure 12

Hypothesis map

Hypothesis	Tested relationship	Effect	Status
H1	Experience Satisfaction → Return Intention	POSITIVE EFFECT (+)	Supported
H2	Sustainable Engagement → Return Intention	POSITIVE EFFECT (+)	Supported
H3	Experience Satisfaction → Recommendation Intention	POSITIVE INFLUENCE (+)	Supported
H4	Sustainable Engagement → Recommendation Intention	NO POSITIVE INFLUENCE (-)	Rejected

Source: The authors (2025).

5. Analysis of the results

The results show that Sustainable Engagement plays a significant role in explaining tourists' intention to return to hiking and rappelling activities in Gravatá, Pernambuco. The initial model, based only on Experience Satisfaction, already performed well. However, adding Sustainable Engagement increased the model's explanatory capacity by demonstrating the influence of environmental responsibility and ecological awareness on tourist behavior, well-being, and health, consistent with Ordiñana-Bellver et al. (2024) and Li (2022).

The robustness of the complete model was confirmed by improved fit indicators and the analysis of variance (ANOVA), which showed greater statistical significance when Sustainable Engagement was included as an explanatory variable. The reduction in residuals and increase in explained variance reinforce the understanding that sustainable practices strengthen loyalty in adventure tourism, in line with Freitas (2021).

Although Experience Satisfaction remained the strongest predictor of Return Intention, the multiple regression results show that Sustainable Engagement had a complementary influence, supporting the studies by Carú and Cova (2020), Scussel et al. (2022), and Cavalcanti (2024) concerning experiential value. Tourists who associate pleasure with sustainable practices therefore show a greater willingness to return (Baker & Crompton, 2000; Rosa & Dos Anjos, 2022).

The partial correlations confirm the joint relevance of these two constructs: tourism loyalty is grounded both in experiential quality and in connection with environmental values (Leopoldo et al., 2024; Rodrigues et al., 2024). These findings validate H1 and H2, according to which experience and engagement positively influence Return Intention, and confirm H3, which associates satisfaction with Recommendation Intention.

These findings reinforce the need for integrated strategies that continue to offer memorable experiences (Cavalcanti, 2024) while simultaneously engaging tourists in sustainable actions (Bezerra & Lima, 2023). This points to a promising path for tourism in Gravatá, where environmental appreciation may become a competitive advantage and a central component in building visitor loyalty (De Brito Alves et al., 2024).

The data therefore indicate that building more sustainable destinations requires a holistic approach in which leisure and nature are integrated with environmental care (Oliveira et al., 2023; Trevisan & Oliveira, 2024). Tourists seek not only leisure but also experiences aligned with their values, which may strengthen and expand the strategic role of tourism marketing not only in Gravatá but throughout Pernambuco's Agreste region. The exploratory factor analysis with Promax rotation revealed two well-defined psychometric factors with good model fit. Factor 1, designated "Nature-Based Adventure Tourism Consumer Loyalty," strongly grouped the variables Return Intention,

Sustainable Engagement, and Experience Satisfaction.

This factor structure indicates a core set of behavioral meanings associated with tourist loyalty. Tourists' bonds with the destination are not limited to a single experience but extend to emotional and attitudinal dimensions (Scussel et al., 2022). In other words, the greater the satisfaction with the experience and engagement with the destination's environmental values, the greater the likelihood that tourists will wish to return.

Factor 2, designated after the analysis as "Spontaneous Dissemination of Nature-Based Adventure Tourism Experiences," had a more limited effect on Recommendation Intention. Although Sustainable Engagement positively contributed to Return Intention, the data indicate that tourists' sustainable engagement did not positively influence the act of recommending the destination and was therefore not a direct consequence of environmental engagement.

Recommendation Intention for the tourism destination under study appears to depend on contextual and social variables extending beyond sustainable engagement, including the profile of tourists' social networks, risk perception, and the compatibility of the experience with other people's interests. Hypothesis H4, which predicted a direct positive influence of Sustainable Engagement on recommendation, was therefore rejected, suggesting that recommendation is a more autonomous and multifaceted decision.

This distinction between the factors helps explain different levels of tourist behavioral response: returning is strongly associated with subjective experience and individual values, whereas recommendation involves more complex social mediation. The factor model therefore shows that returning and recommending

are distinct behaviors, although both are relevant to marketing and nature-based adventure tourism management strategies in Gravatá.

Confirmatory factor analysis showed that the latent variable developed in this study to represent tourists' connection with nature-based adventure experiences in Gravatá had high internal consistency with the proposed theoretical model. Three of the four indicators were significantly associated with the factor. Return Intention and Experience Satisfaction showed strong relationships with loyalty, with high loadings and low measurement errors, confirming their central role in connecting tourists to the experience.

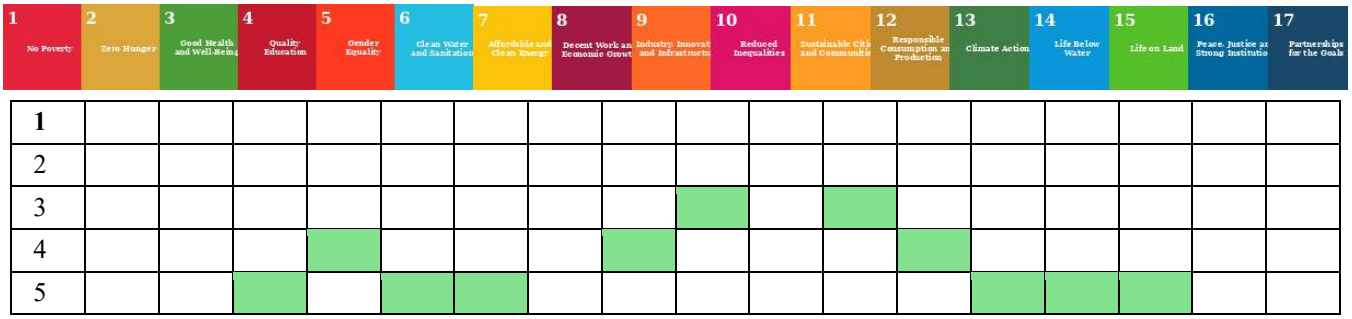
Sustainable Engagement in relation to Return Intention also showed a high loading, although with moderate error, indicating a relevant influence with some variability. Recommendation Intention again showed a weak factor loading and high error, suggesting that, although relevant, it is not directly explained by the construct as conceived in this model.

This dissociation may reflect the more social and relational nature of recommending, which may depend on other factors such as tourists' social network profiles or their perception of the risks posed by the activity to others. In summary, the results support the validity of the latent factor as a representation of loyalty built through personal adventure tourism experience, while also revealing limits in its capacity to explain behavior directed toward disseminating the experience.

The results also emphasize the relevance of the research topic to the 2030 Agenda. Several SDGs were strongly associated with the findings, ranked by importance in Figure 13.

Figure 13

The 2030 Agenda SDGs and their relationship with the study results



1																	
2																	
3									■		■						
4				■				■				■					
5			■		■	■							■	■	■		

Source: The authors (2025).

According to Dotto et al. (2022) and Iwamoto et al. (2024), the findings directly relate to several Sustainable Development Goals (SDGs), reinforcing the relevance of adventure tourism as a driver of social and environmental transformation. Hiking and rappelling in natural environments are particularly aligned with SDG 3, Good Health and Well-Being, because they promote leisure experiences that contribute to participants' physical and emotional balance.

The sustainable engagement reported by tourists also demonstrates environmental awareness related to SDG 13, Climate Action; SDG 14, Life Below Water; and SDG 15, Life on Land, by encouraging pro-environmental behavior and increasing awareness of local ecosystem preservation. The inclusion of women in the activities and perceptions of equity in the experiences relate to SDG 5, Gender Equality, while conscious water use and solid-waste care during hiking and rappelling relate to SDG 6, Clean Water and Sanitation.

More broadly, the results also contribute to SDG 4, Quality Education; SDG 8, Decent Work and Economic Growth; SDG 9, Industry, Innovation and Infrastructure; and SDG 11, Sustainable Cities and Communities, insofar as they promote informal education, stimulate the local economy, value natural heritage, and support the sustainability of emerging tourism destinations such as Gravatá.

This result is particularly relevant to marketing because it reinforces the importance of strategies that involve tourists as active participants in sustainable practices. In this context, spontaneous recommendation, motivated by both satisfaction and ethical-environmental alignment, offers an organic means of promoting Gravatá as a nature-based adventure tourism destination and highlights the symbolic value and outreach potential of hiking and rappelling in Pernambuco's Agreste region within an environmental sustainability perspective (Severo & Guimarães, 2017).

6. Conclusion

The quantitative analyses, particularly exploratory and confirmatory factor analyses and multiple regression, showed that Experience Satisfaction remains the principal factor influencing tourist loyalty. Its effect is significantly strengthened when associated with Sustainable Engagement, demonstrating the relevance of this construct as a variable that positively affects Return Intention in nature-based adventure tourism in Gravatá.

The analyses also indicated the formation of two distinct factors, Consumer Loyalty and Spontaneous Experience Dissemination, supporting hypotheses H1, H2, and H3 of the proposed model. Hypothesis H4, however, was not supported, indicating that the intention to recommend nature-based adventure tourism in Gravatá is a more autonomous behavior among participants and may be mediated by other social variables rather than being directly influenced by Sustainable Engagement.

This distinction makes a meaningful contribution to marketing as both a scientific field and a market practice. From a scientific perspective, the research reinforces the need for integrative theoretical models that treat ethical and environmental values as strategic components of the consumer experience in nature-based adventure tourism in Gravatá. From a managerial perspective, the findings support the development of

sustainability-based loyalty strategies that position tourists not only as consumers but also as agents of environmental transformation and spontaneous promoters of the destination and its experiences.

The findings also establish a contemporary dialogue with the United Nations 2030 Agenda, particularly SDGs 3, 5, 6, 13, 14, and 15, by showing that conscious tourism experiences can promote well-being, gender equality, high-quality environmental education, and conservation of the Agreste ecosystem in Pernambuco. The interface between tourism, sustainability, and marketing thus strengthens the role of nature-based adventure experiences as a driver of local development and ecological awareness.

The academic contributions are linked to the validation of the theoretical model through analysis of the variables, which can be applied in future studies and contributes to the advancement of knowledge.

Future research should examine in greater depth the social factors that influence Recommendation Intention, including social capital, social network profile, and risk perception. The study should also be replicated in other tourism contexts and biomes to broaden the model's external validity and explore cultural, regional, and seasonal differences that may influence experiential loyalty.

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