



Environmental responsibility as a value proposition: Segmenting coastal tourists through perceived destination environmental responsibility

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ABSTRACT

Environmental responsibility is increasingly recognized as a key contributor to destination competitiveness, particularly in coastal tourism contexts where environmental quality is closely linked to visitor experiences. However, limited research has examined how tourists perceive environmental responsibility and how these perceptions can be used for market segmentation. Addressing this gap, this study conceptualizes Destination Environmental Responsibility (DER) as a perception-based construct and operationalizes it as a segmentation criterion.

Using survey data from 1909 tourists in the Algarve (Portugal), cluster analysis identified three distinct segments: eco-engaged, eco-friendly, and eco-restrained. The results indicate that tourists generally evaluate environmental responsibility positively, particularly for cleanliness and environmental preservation. Importantly, DER provides a meaningful basis for segmentation, revealing differences in tourism profiles, satisfaction, and loyalty.

Tourists with stronger environmental evaluations report higher levels of satisfaction and loyalty, suggesting that perceived environmental responsibility is associated with destination differentiation and competitiveness, as well as more positive tourism experiences and behavioral intentions. The study contributes to the literature by advancing DER as a perception-based, formative construct, extending segmentation research by positioning perceived environmental responsibility as a segmentation criterion, and demonstrating how tourists' environmental evaluations can inform destination positioning. Heterogeneity in these evaluations is interpreted through the complementary perspectives of VBN, S-O-R, and TPB.

From a managerial perspective, the findings emphasize the importance of visible, segment-specific sustainability strategies. By aligning environmental practices with different tourist profiles, destination management organizations may strengthen visitor satisfaction, loyalty, and competitive positioning in coastal tourism markets.

1. Introduction

Global tourism continues to expand, yet this growth intensifies pressures on destination environments, particularly in coastal regions where ecological sensitivity and seasonal demand increase resource depletion and environmental degradation (Gössling & Higham, 2021; Matei et al., 2023; OECD, 2025). At the same time, sustainability has become an increasingly prominent dimension in tourists' destination evaluations, with growing attention to visible environmental practices linked to satisfaction, loyalty, and destination competitiveness

(Alonso-Almeida et al., 2024; Sahabuddin et al., 2024). Recent research indicates that sustainability-related attributes—such as environmental practices and community engagement—correspond with tourist experiences and behavioral intentions (Nguyen et al., 2026; Sahabuddin et al., 2024). In particular, observable sustainability practices, such as environmental cleanliness and eco-friendly infrastructure, are consistently related to higher perceived value and positive psychological responses, satisfaction and experiential quality (Bilynets et al., 2023; Nguyen et al., 2026). Moreover, the way sustainability is communicated and contextualized may influence how tourists interpret these practices,

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as communication strategies and contextual factors can affect destination evaluations (Salazar et al., 2026; Yang et al., 2025). Accordingly, tourists' perceptions of environmental responsibility are increasingly recognized as an important component of tourists' experiential evaluations and behavioral responses, including satisfaction and loyalty (S. Lee & Xue, 2020; Sahabuddin et al., 2024).

Although environmentally responsible practices are widely recognized as contributing to tourist decision-making, destination image and competitiveness (Forleo & Bredice, 2025; Nguyen et al., 2026; Xu & Au, 2023), research has largely focused on environmental performance indicators or tourists' pro-environmental behavior. However, emerging studies also indicate that tourists' responses to sustainability are shaped by contextual and technological factors, such as AI-mediated communication, which influence how sustainability messages are perceived and internalized across different tourist segments (Yang et al., 2025). Despite these advances, comparatively limited attention has been devoted to how tourists perceive environmental responsibility as a distinct, experience-based construct and how these perceptions are associated with different tourism experiences and behavioral outcomes. Moreover, prior research has predominantly examined sustainability as a broad destination attribute, often combining environmental, social, and economic dimensions, with limited focus on isolating tourists' perceptions of environmental responsibility as an independent construct (Nguyen et al., 2026; Salazar et al., 2026). This limitation is particularly relevant in coastal tourism, where environmental quality is a core experiential attribute (Iamkovaia et al., 2020; Sánchez-Fernández et al., 2019). Coastal tourism refers to activities in coastal and marine environments, including beach recreation, marine-based activities, and experiences linked to coastal ecosystems and landscapes (Hall, 2001; Ocean Panel, 2020). These destinations depend heavily on environmental quality, as beaches, marine ecosystems, and coastal landscapes constitute core tourism resources whose preservation directly affects tourists' experiences and the long-term viability of the destination (Chi & Pham, 2024; Lam-González et al., 2020). As a result, environmental responsibility is not only a sustainability concern but also a central component of destination competitiveness.

For mature coastal destinations such as the Algarve, environmental degradation is not only an ecological concern but a policy and planning challenge. Declining environmental quality may reduce visitor satisfaction, weaken destination competitiveness, and increase the resources required to maintain destination attractiveness. Consequently, destination planning increasingly requires integrating of environmental stewardship into long-term tourism development, competitiveness, and sustainability strategies. Understanding how tourists perceive environmental responsibility is therefore essential not only for environmental management but also for strategic positioning and long-term tourism planning.

Furthermore, segmentation studies in tourism have typically centered on motivations, activities, or behavioral intentions (W. Carvache-Franco, Carvache-Franco, Carvache-Franco, & Hernández-Lara, 2020; Lukoseviciute & Pereira, 2021; Yang et al., 2025). However, these studies have largely overlooked perception-based constructs, especially regarding how tourists interpret environmental responsibility at the destination level. While some studies have explored environmental attitudes and sustainability awareness, relatively few have used perceptions of environmental responsibility as a segmentation criterion, especially in coastal and marine tourism contexts (Carvache-Franco et al., 2022; Fahlevi, 2023; Iamkovaia et al., 2020; Sánchez-Fernández et al., 2019). This represents an important research gap, as tourists differ in how they recognize and value environmental practices, and these differences may shape their tourism experiences and behavioral responses.

From a theoretical perspective, this gap is relevant, as sustainability evaluations differ among tourists, reflecting variations in how environmental attributes are perceived and interpreted. Previous research has demonstrated that tourists differ significantly in their environmental

concern, awareness, and interpretation of sustainability-related attributes, which correspond to differences in destination evaluations and tourism experiences (Penagos-Londoño et al., 2021; Sánchez-Fernández et al., 2019). However, much of the literature has treated sustainability as a contextual attribute or as a predictor of tourist behavior, rather than as a primary segmentation criterion capable of capturing heterogeneity in tourism demand. Positioning environmental responsibility as a basis for segmentation, therefore, advances tourism segmentation research by moving beyond traditional demographic and behavioral variables toward perception-based sustainability evaluations. From a destination management perspective, understanding these differences is equally relevant (Forleo & Bredice, 2025; Lukoseviciute & Pereira, 2021). Segmenting tourists based on their perceptions of environmental responsibility enables destination management organizations (DMOs) to design more targeted marketing strategies, prioritize environmental management initiatives, and communicate sustainability efforts more effectively. By aligning sustainability actions with distinct visitor profiles, destinations can improve both marketing effectiveness and resource allocation, while strengthening their competitive positioning (Dolnicar et al., 2008; Pulido-Fernández et al., 2024). More specifically, it helps identify groups that are more responsive to green branding, visible sustainability initiatives, conservation programs, and environmentally oriented tourism experiences, supporting more efficient demand management that aligns with long-term sustainability goals (Font & McCabe, 2017).

Despite extensive research linking sustainability to tourist satisfaction and loyalty, segmentation approaches grounded in tourists' perceptions of environmental responsibility remain underexplored, particularly in coastal tourism contexts where environmental quality is a core component of the experience (Iamkovaia et al., 2020; Sánchez-Fernández et al., 2016, 2019). This gap is especially relevant given that tourists' evaluations of environmental quality and sustainability are closely linked to perceived value, destination attachment, satisfaction, and revisit intentions (S. S. Lee & Xue, 2020; Sahabuddin et al., 2024). While prior research has examined destination social responsibility (DSR), its effects are not always direct, as perceptions of responsibility are often associated with broader evaluative and behavioral predispositions rather than specific outcomes (Balıkcıoğlu Dedeoğlu & Aydın, 2026). Building on this perspective, the present study conceptualizes DER as a perception-based construct and advances its application as a segmentation criterion. DER captures tourists' subjective evaluations of environmental responsibility at the destination level, inferred from observable environmental attributes such as cleanliness, pollution levels, and environmental preservation. Rather than representing an objective measure of environmental performance, DER reflects experience-based evaluations formed through tourists' interactions with the destination environment. Taken together, these insights suggest that perceived environmental responsibility constitutes a meaningful yet underutilized basis for segmentation in coastal tourism.

This study recognizes that tourists differ in how they perceive, interpret, and value environmental responsibility. Three complementary theoretical perspectives inform the interpretation of these differences. Value-Belief-Norm (VBN) theory suggests that environmental values and moral norms may inform tourists' evaluations of responsible destinations (Han, 2021). The Stimulus-Organism-Response (S-O-R) framework offers a useful lens for understanding how observable environmental attributes may be perceived as experiential stimuli associated with satisfaction and loyalty (Su & Swanson, 2017). The Theory of Planned Behavior (TPB) complements this perspective by highlighting how attitudes and perceived norms may relate to evaluative judgments and behavioral responses (Ajzen, 1991). Together, these perspectives provide an interpretative framework for understanding heterogeneity in DER evaluations and their associations with tourism outcomes. Accordingly, this study aims to: (1) segment tourists based on DER; (2) profile the identified segments in terms of sociodemographic characteristics, destination familiarity, and travel characteristics; and (3)

examine differences in satisfaction and loyalty. Using survey data from 1909 tourists in a leading European coastal destination, three segments were identified: eco-engaged, eco-friendly, and eco-restrained. The results indicate that stronger DER evaluations are associated with older age, higher education, first-time visitation, and higher levels of satisfaction and loyalty.

The contributions of this study are threefold. First, it positions environmental responsibility as a primary segmentation criterion rather than a contextual attribute, moving beyond traditional approaches that rely predominantly on demographic or behavioral variables. In doing so, it connects sustainability research with segmentation theory by demonstrating that perceptions of environmental responsibility are not merely evaluative constructs but also meaningful bases for classifying tourists, thereby addressing a gap in sustainability-focused segmentation research. Second, it contributes methodologically by applying a perception-based segmentation approach informed by VBN, S–O–R, and TPB, which serve as complementary interpretative perspectives for understanding heterogeneity in DER evaluations and associated tourism outcomes. Third, the study contributes to practice by providing guidance for destination management organizations (DMOs) to design more targeted sustainability strategies, emphasizing the role of subjective evaluations and perceived value in destination management.

Building on this perspective, the study addresses the following research questions.

- RQ1 How do tourists evaluate destination environmental responsibility (DER) in a coastal tourism context?
- RQ2 Can tourists be meaningfully segmented based on DER?
- RQ3 How do these segments differ in terms of sociodemographic characteristics, destination familiarity, travel characteristics, satisfaction, and loyalty?

2. Theoretical background

2.1. Destination environmental responsibility (DER) as a perception-based construct

Destination Social Responsibility (DSR) refers to the set of social, environmental, and economic responsibilities undertaken by tourism destinations to ensure sustainable development and positive stakeholder outcomes (Su & Swanson, 2017). Extending Corporate Social Responsibility to the destination level, DSR emphasizes coordinated action among public institutions, tourism businesses, residents, and visitors in promoting responsible tourism development (Agapito et al., 2023; Su & Swanson, 2017). Within this broader framework, Destination Environmental Responsibility (DER) represents the environmental dimension of destination responsibility. While prior research has typically operationalized DSR as a multidimensional construct, embedding environmental responsibility alongside economic and social dimensions (Y. Lee et al., 2025; Su et al., 2020), this approach has limited the analytical visibility of environmental responsibility as a distinct construct. Recent research highlights that DSR remains a concept with evolving definitions and multidimensional characteristics, requiring more coherent and comprehensive approaches to understand its effects on tourism development (Agapito et al., 2023; Balıkcıoğlu Dedeoğlu & Aydın, 2026).

In this study, DER is conceptualized as a perception-based construct that reflects tourists' evaluations of environmental responsibility at the destination level and is operationalized through observable environmental attributes. These evaluations are based on observable attributes such as cleanliness and hygiene, the absence of pollution, the preservation of natural environments, and the destination's perceived environmental orientation. Importantly, these attributes do not constitute objective environmental indicators; rather they serve as perceptual inputs through which tourists interpret environmental responsibility. This distinction aligns with prior research differentiating objective environmental indicators from perception-based constructs (Niemeijer & de

Groot, 2008).

In tourism contexts, visitors rarely assess environmental performance directly; instead, they form judgments based on perceived environmental conditions and visible attributes encountered during their visit (Bilynets et al., 2023; Rasoolimanesh et al., 2023). Accordingly, it is important to distinguish between DER as a governance- and performance-based concept and DER as operationalized in this study, which reflects a subjective, experience-based evaluation. Therefore, DER is conceptualized as a perception-based construct that reflects tourists' subjective evaluations of environmental responsibility, rather than as an objective measure of environmental performance. From a marketing and destination management perspective, this distinction is particularly relevant. Tourists rely on perceived environmental attributes when forming evaluations that shape satisfaction, destination image, and loyalty (Guerreiro, Pinto, deMatos, et al., 2025; S. S. Lee & Xue, 2020; Nguyen et al., 2026). In this sense, visible environmental practices—such as clean natural settings or environmentally friendly infrastructure—serve as salient signals through which tourists infer a destination's responsibility and form evaluative judgments (Nguyen et al., 2026). Conceptualizing DER as a perception-based construct, therefore, provides a more accurate representation of how environmental responsibility is experienced and evaluated by tourists.

2.2. Theoretical foundations for perception-based segmentation

To provide a theoretical framework for interpreting how tourists evaluate environmental responsibility and why these evaluations differ across tourists, this study draws on three complementary theoretical perspectives: Value-Belief-Norm (VBN) theory, the Stimulus–Organism–Response (S–O–R) model, and the Theory of Planned Behavior (TPB).

First, VBN Theory (Stern et al., 1999) provides a useful perspective for understanding how environmental values and personal moral norms influence individuals' evaluations and responses to environmental issues. In tourism contexts, tourists with stronger environmental values are more likely to recognize and positively evaluate environmentally responsible practices at destinations (Han, 2021). These value-based differences help explain heterogeneity in how tourists perceive environmental responsibility, providing theoretical support for using DER as a segmentation criterion.

Second, the S–O–R model (Mehrabian & Russell, 1974) provides an interpretive framework for understanding how environmental conditions are interpreted during tourism experiences. In this context, observable environmental attributes—such as cleanliness, preserved landscapes, and low levels of pollution—serve as stimuli. These stimuli are interpreted by tourists and are associated with cognitive and affective evaluations (organism) that are reflected in outcomes such as satisfaction and loyalty (response) (Su & Swanson, 2017). This framework suggests that environmental responsibility is not directly evaluated but is interpreted through experiential attributes, reinforcing the perception-based nature of DER.

Third, the TPB (Ajzen, 1991) provides an additional interpretive perspective for understanding how attitudes, subjective norms, and perceived behavioral control relate to evaluations and behavioral intentions. In this context, favorable evaluations of DER are consistent with positive attitudes, perceived social expectations supporting sustainability reflect subjective norms, and confidence in choosing eco-responsible destinations represents perceived behavioral control. Together, these elements help interpret behavioral intentions (Nguyen et al., 2026), reinforcing the intention-driven nature of tourists' responses to DER. Although the study does not assess behavioral intention directly, TPB provides useful insights for interpreting how perceived DER is associated with attitudinal and evaluative outcomes, such as satisfaction and loyalty.

In contrast, alternative approaches, such as the Norm Activation Model (Schwartz, 1977) emphasize morally driven behavior. However,

the objective of this study is to explain heterogeneity in perception-based evaluations of environmental responsibility. Consequently, drawing on VBN, S-O-R, and TPB provides a more suitable interpretive framework. Together, these perspectives provide a complementary theoretical framework for interpreting heterogeneity in DER evaluations. Specifically, VBN highlights differences in environmental values, S-O-R emphasizes the interpretation of observable environmental attributes during the tourism experience, and TPB offers insights into the role of attitudes and perceived norms in evaluative judgments. Collectively, these perspectives provide theoretical support for interpreting DER as a perception-based segmentation criterion and for understanding differences in tourists' environmental evaluations and associated tourism outcomes.

2.3. Perception-based segmentation and tourism outcomes

Tourism demand is inherently heterogeneous, and segmentation has long been used to identify groups of tourists with similar characteristics, motivations, or behaviors (Dolnicar et al., 2013, 2018). However, traditional segmentation approaches have primarily focused on socio-demographic characteristics, travel motivations, or activities, often overlooking perception-based variables (M. Carvache-Franco, Carvache-Franco, & Hernández-Lara, 2020, 2023). Previous research indicates that perception-based constructs, particularly those related to sustainability, offer a meaningful basis for segmentation. Tourists differ in how they perceive environmental sustainability, and these differences can be used to identify distinct market segments (Penagos-Londoño et al., 2021; Sánchez-Fernández et al., 2016, 2019). Variations in environmental awareness, cultural background, travel motivations, and prior experience contribute to heterogeneous evaluations of sustainability, reinforcing the need for segmentation approaches that capture these differences (Dolnicar et al., 2008; Forleo & Bredice, 2025; Pulido-Fernández et al., 2024). Additionally, cultural and contextual factors, including tourists' origins and how sustainability is communicated, are associated with how environmental responsibility is perceived and evaluated, further supporting the need for segmentation that accounts for such heterogeneity (Salazar et al., 2026). Tourism segments also differ in key tourist outcomes, including satisfaction, loyalty, and behavioral intentions (Kusumah, 2024; S. Lee et al., 2021). In this context, segmenting tourists by DER is theoretically justified, as it captures how environmental responsibility is perceived and valued by different individuals. This perspective shifts sustainability from a contextual attribute to a primary classification variable, enabling a more nuanced understanding of differences in experiential and behavioral outcomes.

From a managerial perspective, this approach is particularly relevant. Tourists with stronger evaluations of environmental responsibility tend to report higher satisfaction and stronger intentions to be loyal (Kusumah, 2024; S. S. Lee & Xue, 2020). Identifying such segments allows destination managers to design more effective sustainability strategies, tailor communication efforts, and enhance overall destination competitiveness (Iamkovaia et al., 2020; Lukoseviciute & Pereira, 2021). In this sense, segmentation supports prioritizing visitor groups that are more aligned with sustainability objectives while improving the efficiency of marketing actions and resource allocation (Alonso-Almeida et al., 2024; Dolnicar, 2020; Pulido-Fernández et al., 2024; Sahabuddin et al., 2024). This differentiation is particularly meaningful in coastal tourism contexts, where environmental quality is directly linked to both ecosystem integrity and visitor experience (Chi & Pham, 2024; Lam-González et al., 2020; Ocean Panel, 2020). In such contexts, perception-based segmentation becomes especially relevant, as observable environmental attributes—such as clean beaches, preserved landscapes, and low pollution levels—serve as salient signals of destination quality and responsibility, shaping tourists' evaluations and behavioral responses (Iamkovaia et al., 2020; Sahabuddin et al., 2024). As coastal destinations face increasing environmental pressures (Matei et al.,

2023), understanding how different tourist segments perceive and respond to environmental responsibility becomes critical for sustainable destination management.

Although previous segmentation studies in coastal tourism have identified diverse tourist profiles based on motivations, activities, or sociodemographic characteristics (M. Carvache-Franco, Carvache-Franco, et al., 2019, 2020; Onofri & Nunes, 2013; Pafi et al., 2020), sustainability has generally been treated as a secondary attribute rather than as a core segmentation criterion. At the same time, perceived environmental sustainability has been shown to influence destination attractiveness and travel decision-making (Alonso-Almeida et al., 2024; Forleo & Bredice, 2025). However, limited attention has been given to how these perceptions translate into experiential evaluations, such as satisfaction and loyalty, despite strong evidence that subjective evaluations are key drivers of tourism competitiveness (Bilynets & Knezevic Cvelbar, 2022; Sahabuddin et al., 2024).

Building on these arguments, DER-based segmentation is expected to reveal distinct groups of tourists and to be associated with differences in their profiles and tourism-related outcomes. Accordingly, the following hypotheses are proposed.

H1. Tourists can be segmented into distinct groups based on their evaluations of destination environmental responsibility (DER), reflecting varying levels of perceived environmental responsibility.

H2. Tourist segments based on DER differ significantly in their profiles and tourism-related outcomes.

H2.1. Tourist segments differ significantly in their sociodemographic characteristics.

H2.2. Tourist segments differ significantly in terms of destination familiarity.

H2.3. Tourist segments differ significantly in their travel characteristics.

H2.4. Tourist segments characterized by higher DER evaluations report higher levels of satisfaction than those with lower DER evaluations.

H2.5. Tourist segments characterized by higher DER evaluations report stronger loyalty intentions than those with lower DER evaluations.

Satisfaction is defined as the extent to which tourism experiences meet or exceed expectations, reflecting both cognitive and affective evaluations (S. S. Lee & Xue, 2020; Tran et al., 2021). Loyalty refers to tourists' intentions to revisit or recommend the destination, serving as a key indicator of destination competitiveness (Martín-Santana et al., 2017). Destination familiarity, understood as prior visitation and accumulated knowledge, shapes expectations and influences how tourists interpret and evaluate their experiences (Stylidis et al., 2020). Fig. 1 presents the conceptual framework guiding this research.

3. Methodology

3.1. Study context and sample

The Algarve, located in southern Portugal, is one of Europe's leading coastal tourism destinations and has been repeatedly recognized as the Best Beach Destination in Europe and Worldwide (World Travel Awards, 2024). Traditionally associated with sun-and-sea tourism, the region has diversified its offer to include golf, business events, nature-based experiences, and residential tourism (Algarve Tourism Board, 2022). Situated within a Mediterranean bioclimatic zone, the Algarve faces environmental pressures such as coastal erosion, water scarcity, and biodiversity loss, which are intensified by strong seasonality and peak summer demand (OECD, 2025; Samora-Arvela et al., 2020; Turismo do Algarve, 2024). Tourism plays a fundamental role in the regional

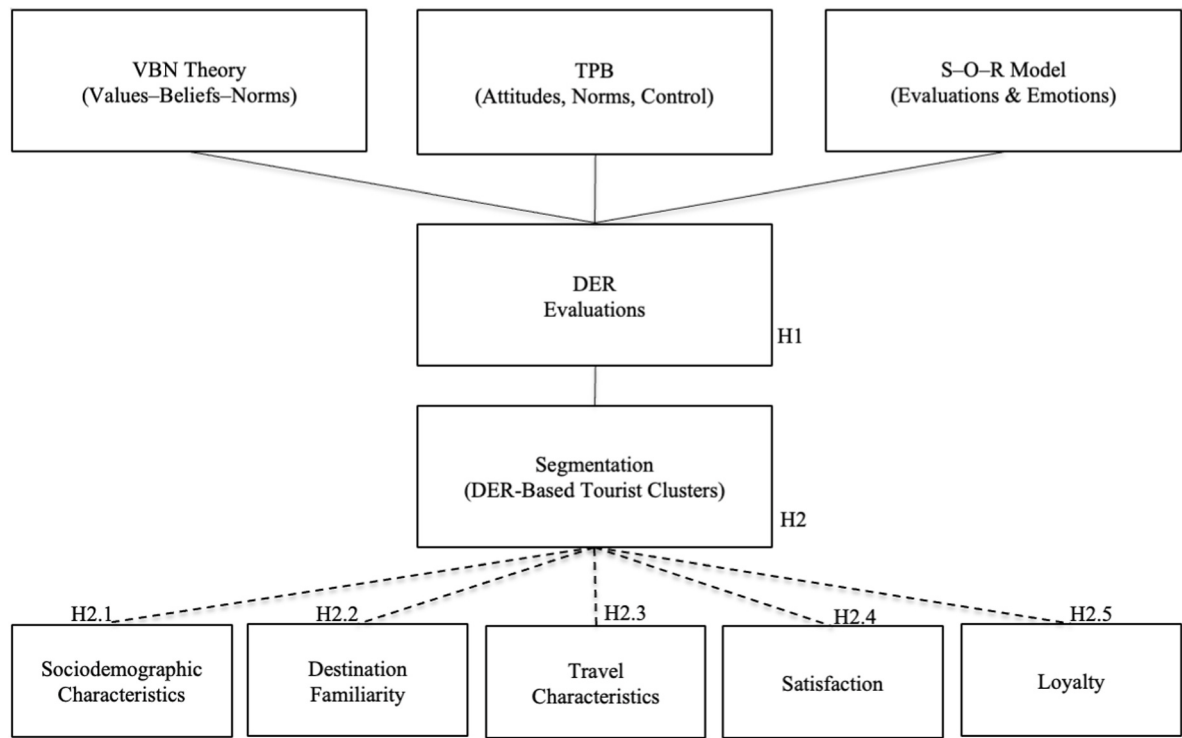


Figure 1. Conceptual framework: DER-based tourist segmentation and comparison across sociodemographic characteristics, destination familiarity, travel characteristics, satisfaction, and loyalty.

Fig. 1. Conceptual framework: DER-based tourist segmentation and comparison across sociodemographic characteristics, destination familiarity, travel characteristics, satisfaction, and loyalty.

economy, accounting for 26.4% of national overnight stays between 2019 and 2023 (Turismo do Algarve, 2024). In 2024, international tourists accounted for 72.5% of arrivals (Travel BI by Turismo de Portugal, 2025). This diverse visitor base implies that destination evaluations are influenced by heterogeneous cultural backgrounds, travel motivations, and levels of familiarity (Dolnicar, 2020; Prayag et al., 2017; Styliadis et al., 2020).

Data were collected through a face-to-face survey conducted in the departure area of Faro International Airport, the region's main tourism gateway. The survey took place during the high season (July 15–September 15, 2021) and included both domestic and international tourists. A stratified sampling approach was employed to ensure proportional representation of the Algarve's main outbound markets (Instituto Nacional de Estatística de Portugal, 2021). The seven most representative nationalities (Portuguese, British, German, French, Spanish, Dutch, and Irish) were sampled individually, while 39 additional nationalities were grouped due to low frequency. This strategy enhances representativeness and supports valid comparisons across groups (Dolnicar et al., 2018), consistent with previous studies conducted in the Algarve (Guerreiro, Pinto, Bagheri, & DeMatos, 2025). A total of 1909 valid responses were obtained, corresponding to a margin of error $\leq 2\%$ at a 95% confidence level.

3.2. Measures

This study adopts a quantitative approach using measurement scales adapted from prior research and adjusted to the coastal tourism context. DER was measured as a perception-based construct reflecting evaluations of visible environmental practices at the destination level. The measurement items capture subjective assessments inferred from observable environmental attributes and were derived from the

environmental dimension of DSR and perception-based sustainability studies (Amendah & Park, 2008; Bilynets et al., 2023; B. K. Lee et al., 2014; S. S. Lee & Xue, 2020; W. W. Lee & Jeong, 2018; Martín-Santana et al., 2017). Tourist satisfaction and destination loyalty were measured using established scales capturing cognitive–affective evaluations and behavioral intentions (Bosque & San Martín, 2008) (Appendix Table 1). All constructs were measured using a five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The questionnaire also included sociodemographic variables (age, gender, education, marital status, occupation, and country of residence) and travel characteristics (previous visits, length of stay, motivation, accommodation type, booking system, travel party, activities, and familiarity with the destination). The questionnaire was developed in English and translated into Portuguese, French, German, and Spanish, with validation by native speakers to ensure linguistic accuracy (Guerreiro, Pinto, Bagheri, & DeMatos, 2025).

Data were analyzed using IBM SPSS Statistics 28.

3.3. Measurement of constructs

To ensure a rigorous assessment of the measurement model, distinct validation procedures were applied depending on the nature of the constructs, explicitly differentiating between formative and reflective specifications, as traditional confirmatory factor analysis (CFA) does not apply to formative constructs (Hair & Sarstedt, 2019; Jarvis et al., 2003).

DER is conceptualized as a formative construct comprising observable environmental attributes that reflects tourists' subjective evaluations of environmental responsibility at the destination level. These indicators do not capture objective environmental performance, but rather perception-based assessments inferred from observable conditions, such as cleanliness, pollution levels, environmental preservation,

and perceptions of the destination as environmentally oriented. As these attributes represent complementary dimensions, DER is specified as a formative construct in which each attribute contributes uniquely to the overall construct, rather than acting as interchangeable manifestations of a single latent dimension (Hair et al., 2019; Hair & Sarstedt, 2019). Consequently, the validation of DER cannot rely on internal consistency reliability or convergent validity metrics typical of reflective measurement models; instead, it follows the formative assessment guidelines proposed by Hair et al. (2019).

To ensure content validity and domain specification, the development of the DER construct followed a structured multiphase research design integrating conceptual, qualitative, and empirical procedures (Hair et al., 2019; Jarvis et al., 2003). Initially, environmental attributes were identified through a review of the literature on destination image, environmental perception, and tourism experience, particularly in coastal and sun-and-beach contexts (Agapito et al., 2013; S. S. Lee & Xue, 2020; W. W. Lee & Jeong, 2018). This process supported the identification of key environmental dimensions commonly associated with tourists' experiential evaluations, including environmental cleanliness, natural preservation, and perceived ecological quality.

To enhance contextual grounding, a qualitative visual analysis was conducted using photographs shared by both destination management organizations and tourists, allowing context-specific environmental attributes to emerge. The use of visual data follows recommendations to incorporate pictorial representations in destination image research (MacKay & Couldwell, 2004). This analysis highlighted elements such as beaches, natural landscapes, and visible indicators of environmental quality, reinforcing the salience of environmental dimensions in the formation of destination experience.

Content validity was further strengthened through two rounds of expert evaluation. The first panel, composed of tourism industry stakeholders, assessed the relevance and contextual adequacy of the identified attributes. A second panel, involving academic experts in tourism and marketing, refined the scale by eliminating redundant or non-representative indicators, ensuring domain representativeness and conceptual clarity (Stylianidis et al., 2020).

Following this refinement, the scale was pilot-tested with international tourists to assess its clarity and comprehensibility. Based on theoretical considerations, expert input, and empirical screening, the final specification comprises four complementary indicators capturing distinct aspects of perceived environmental responsibility. This sequential development process supports the content validity and conceptual coherence of the DER construct (Hair et al., 2019; Hair & Sarstedt, 2019), and is embedded within the broader Turexperience research project, which integrates multiple methodological stages to ensure robust construct development (Guerreiro et al., 2023).

Consistent with the formative specification and in line with Hair et al. (2019), the assessment of DER focused on indicator relevance, indicator weights and loadings, and multicollinearity, rather than on internal consistency or convergent validity criteria applicable only to reflective constructs. Variance Inflation Factor (VIF) values ranged from 1.34 to 2.11, well below the conservative threshold of 3.0, indicating no collinearity concerns among the formative constructs. Indicator weights and loadings were positive and meaningful, with cleanliness and environmental preservation showing relatively stronger contributions to the construct.

Additionally, an exploratory factor analysis (EFA) was conducted as a diagnostic procedure to assess indicator coherence, and not as a confirmatory test of reflective measurement. Sampling adequacy was acceptable ($KMO = 0.72$), and Bartlett's test of sphericity was significant ($\chi^2 = 1032.954$, $p < 0.001$), confirming the suitability of the data for factor analysis. The results indicated a single dominant factor explaining 50.3% of the variance, with factor loadings ranging from 0.55 to 0.77. These findings indicate that the indicators capture related, yet non-redundant, aspects of environmental responsibility perception. It is worth emphasizing that this analysis was conducted exclusively to assess

indicator coherence and does not imply a reflective specification of DER.

In contrast, satisfaction and loyalty were specified as reflective constructs, conceptualized as latent outcome variables measured by interchangeable indicators, and therefore assessed using standard PLS-SEM procedures for reflective measurement models (Hair et al., 2019). Internal consistency reliability was supported by composite reliability values of 0.89 and 0.87 for satisfaction and loyalty, respectively. Convergent validity was confirmed through average variance extracted (AVE) values of 0.67 and 0.63, exceeding the recommended threshold of 0.50 (Fornell & Larcker, 1981). Discriminant validity among constructs (DER, satisfaction and loyalty) was assessed using the Fornell–Larcker criterion (Fornell & Larcker, 1981; Hair et al., 2019). The square root of the AVE ranged from 0.79 to 0.82 and was greater than the inter-construct correlations, thus supporting discriminant validity.

Finally, to further assess conceptual distinctiveness, correlations between DER and satisfaction ($r = 0.42$) and loyalty ($r = 0.39$) were examined. The moderate magnitude of these relationships reinforces the conceptual and empirical distinction between DER, as a formative, perception-based evaluation, and satisfaction and loyalty, as reflective, experiential outcomes, thereby supporting discriminant validity at the conceptual level.

3.4. Segmentation procedure

Cluster analysis was conducted to segment tourists based on DER, measured through its formative observable environmental attributes that reflect tourists' evaluations of environmental responsibility. A two-step clustering approach was applied following established best practices in tourism segmentation (Dolnicar et al., 2013, 2018). First, hierarchical clustering using Ward's method was performed to determine the optimal number of clusters based on the agglomeration schedule and dendrogram. Second, k-means clustering was applied to refine cluster group membership and improve classification accuracy. Differences between segments were analyzed using ANOVA, with Games–Howell post hoc tests applied when the assumption of homogeneity of variance was violated (Sánchez-Fernández et al., 2019). Chi-square tests were used for categorical variables, and effect sizes were calculated to support the substantive interpretation of statistically significant differences (Dolnicar, 2020). Fig. 2 summarizes the research process and analytical procedure.

4. Results

4.1. Sample profile and analysis of the level of agreement with DER

The sociodemographic profile of tourists visiting the Algarve is presented in Appendix Table 2. The sample was predominantly female and consisted primarily of adults aged 25–64, with a relatively high level of education and employment. International tourists represented the majority, particularly from European countries, with the United Kingdom as the largest national group. Most respondents were repeat visitors, traveling primarily for leisure, with an average stay of nine days.

DER was assessed using four indicators (Table 1), and overall evaluations were favorable. Cleanliness and hygiene emerged as the most positively evaluated attribute ($M = 3.72$, $SD = 0.93$), followed by perceptions of an unpolluted/unspoiled environment ($M = 3.47$, $SD = 0.97$) and the characterization of the Algarve as a green destination ($M = 3.47$, $SD = 0.91$). In contrast, the absence of air and noise pollution ($M = 3.43$, $SD = 0.94$) received comparatively lower evaluations, indicating that while environmental conditions are generally perceived positively, some environmental attributes received less favorable evaluations.

Differences in DER evaluations were also observed across selected sociodemographic groups and destination familiarity (Table 2). Older and more highly educated tourists reported more favorable evaluations than younger individuals and those with lower educational attainment.

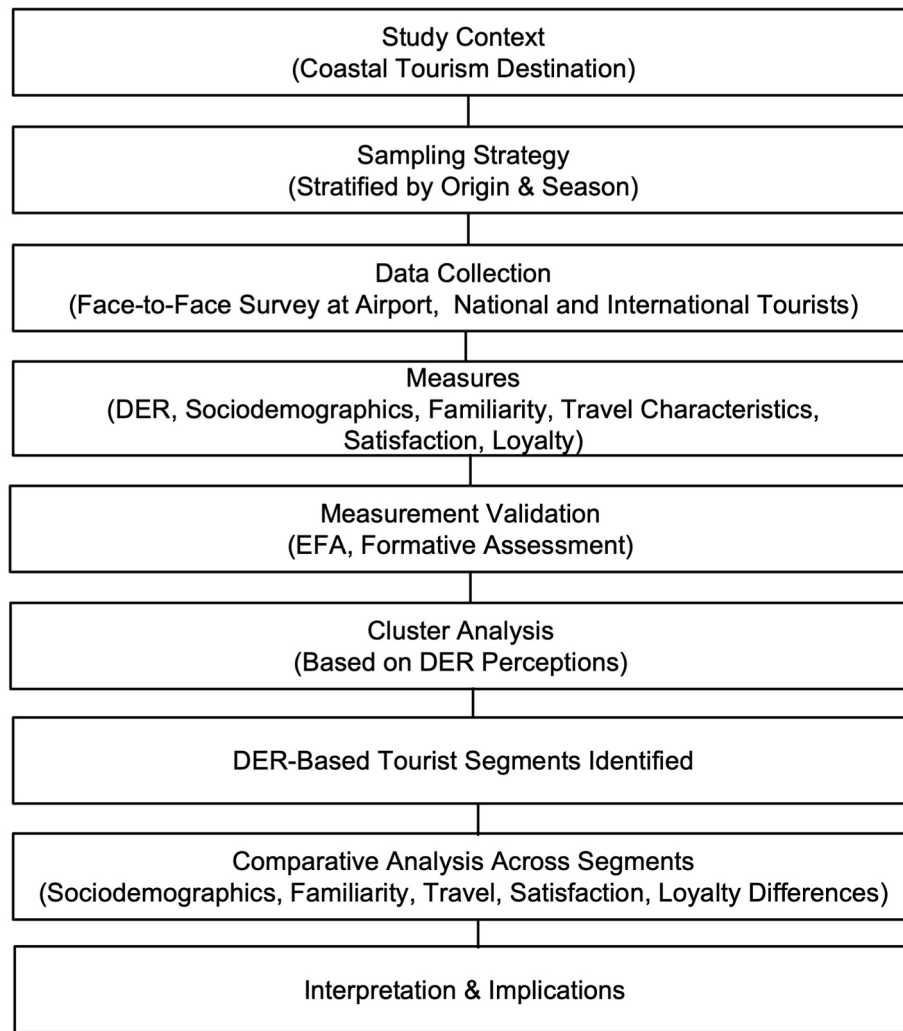


Figure 2. Research process and analytical procedure.

Fig. 2. Research process and analytical procedure.

Table 1

Statistics and distribution of the level of agreement of DER.

	1	2	3	4	5	M	SD
DER1. No air and noise pollution	1.8%	15.2%	32.7%	38.6%	11.7%	3.43	0.94
DER2. Cleanliness and hygiene standards at the destination are high	1.1%	9.9%	24.4%	44.9%	19.8%	3.72	0.93
DER3. Unpolluted/unspoiled environment	1.6%	16.4%	28.4%	40.5%	13.1%	3.47	0.97
DER4. Algarve is a green destination	1.4%	13.3%	33.8%	40.2%	11.4%	3.47	0.91

Measurement scale: 1 = Strongly disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly agree.

Similarly, first-time visitors reported more favorable DER evaluations than repeat visitors.

4.2. Segmentation of tourists based on DER

4.2.1. Identification of the clusters

Cluster analysis was conducted to segment tourists based on DER, operationalized through observable environmental attributes that reflects tourists' evaluations of environmental responsibility. A hierarchical clustering procedure using Ward's method indicated a three-cluster solution, which was subsequently refined using the k-means clustering. One-Way ANOVA confirmed statistically significant differences across clusters for all DER indicators (Table 3), supporting H1. The magnitude and consistency of these differences indicate a robust segmentation structure based on evaluations of environmental responsibility. The three clusters were labeled as eco-engaged, eco-friendly, and eco-restrained, reflecting decreasing levels of agreement with DER indicators. The eco-engaged segment (38.3%) demonstrated consistently strong evaluations of environmental responsibility, whereas the eco-friendly segment (37.4%) reported moderate but generally favorable evaluations. In contrast, the eco-restrained segment (24.3%) expressed the least favorable evaluations of environmental responsibility across all indicators. Overall, the results reveal a clear gradient across the segments, with differences reflecting varying levels of agreement with DER rather than simply distinct categorical groups.

Table 2

DER by sociodemographic characteristics and familiarity with the destination.

Variables	Overall DER	DER 1	DER 2	DER3	DER4
Gender					
Female	3.51	3.39	3.71	3.45	3.49
Male	3.55	3.51	3.75	3.51	3.44
Other	2.86	2.43	3.57	2.43	3.00
F (p-value)	4.369 (0.013)	7.518 (0.001)	NS	4.796 (0.008)	NS
Games-Howell	Female, Male > Other	Male > Female		Female, Male > Other	
Age (years)					
18 - 24	3.46	3.33	3.62	3.38	3.52
25 - 64	3.54	3.46	3.75	3.49	3.44
65 or more	3.69	3.53	3.91	3.72	3.67
F (p-value)	4.834 (0.008)	3.644 (0.026)	4.823 (0.008)	5.154 (0.006)	3.103 (0.045)
Games-Howell	25-64 > 18-24	25-64 > 18-24	25-64, 65+>18-24	65+>18-24	25-64 > 18-24
Level of education					
Less High School	3.39	3.36	3.51	3.19	3.56
High School	3.5	3.44	3.72	3.39	3.45
University	3.52	3.42	3.72	3.45	3.50
F (p-value)	NS	NS	3.503 (0.030)	7.451 (0.001)	NS
Games-Howell			Univ > Less HS	Univ > Less HS	
Familiarity					
First-time	3.62	3.51	3.85	3.60	3.52
Repeater	3.48	3.40	3.66	3.41	3.44
t (p-value)	-4.447(<0.001)	2.372(0.018)	-4.13(<0.001)	-3.851(<0.001)	NS

Notes: NS = not significant ($p > 0.05$).**Table 3**

Comparative analysis of DER indicators across tourist clusters (mean values).

Total (n = 1909) (100%)	Cluster 1 (n = 693) (38.3%)		Cluster 2 (n = 677) (37.5%)		Cluster 3 (n = 438) (24.3%)		One-Way ANOVA		Games-Howell test
	M	SD	M	SD	M	SD	F	p	Results
Overall DER	4.14	0.38	3.45	0.25	2.66	0.35	2761.2	<0.001	1>2 > 3
No air and noise pollution	4.18	0.6	3.13	0.76	2.71	0.81	654.9	<0.001	1>2 > 3
Cleanliness and hygiene standards at the destination are high	4.42	0.57	3.65	0.66	2.75	0.78	864.6	<0.001	1>2 > 3
Unpolluted/unspoiled environment	4.24	0.57	3.35	0.7	2.41	0.72	1054.2	<0.001	1>2 > 3
Algarve is a green destination	3.74	0.93	3.65	0.72	2.78	0.78	210.4	<0.001	1,2>3

4.2.2. Cluster profiles

To facilitate interpretation, the clusters were profiled based on sociodemographic characteristics, destination familiarity, travel characteristics, satisfaction, and loyalty.

Cluster 1: eco-engaged. The eco-engaged segment is characterized by older, more educated, and predominantly international tourists, with a relatively high proportion of first-time visitors. Their travel behavior reflects stronger engagement with diverse and experience-oriented activities, including nautical and leisure experiences, and greater use of structured booking channels. Accommodation choices include a notable share of luxury hotels or resorts, and travel is most often undertaken with family members or partners, although this segment also includes the highest proportion of solo travelers. This segment reports the highest levels of satisfaction and loyalty.

Cluster 2: eco-friendly. The eco-friendly segment occupies an intermediate position across most variables, displaying generally favorable evaluations of environmental responsibility and high, though comparatively lower, levels of satisfaction and loyalty. Their travel behavior reflects a moderate level of environmental engagement. This segment is predominantly composed of repeat visitors but also includes first-time tourists, reflecting a balance between familiarity and exploration. Travel patterns are diversified, with varied accommodation choices, predominantly online bookings, and leisure-oriented trips involving family, partners, or friends, mainly focused on sun-and-sea and nautical activities. This segment represents a transitional group between highly engaged tourists and those with weaker environmental evaluations.

Cluster 3: eco-restrained. The eco-restrained segment includes a higher proportion of younger, less educated, and predominantly domestic tourists, as well as a larger share of repeat visitors. Students are more strongly represented in this group, and travel is more closely associated with traditional patterns. Accommodation choices are concentrated in local lodging, private homes, or staying with family and friends, and online booking is less prevalent than in the other segments. Travel behavior is primarily oriented toward sun-and-sea activities, with lower participation in diversified or experience-based activities.

4.2.3. Cluster profiles according to sociodemographic characteristics, destination familiarity, and travel characteristics

Significant differences were identified among the clusters in terms of sociodemographic characteristics, destination familiarity, and travel characteristics (Tables 4 and 5), supporting H2.1, H2.2, and H2.3, although not uniformly across all variables.

Regarding sociodemographic characteristics (H2.1), significant differences were observed for age, education, and country of residence. The eco-engaged segment tends to be older, more highly educated, and more international, whereas the eco-restrained segment tends to be younger and more domestic. No significant differences were found for gender, marital status, or occupation.

Regarding destination familiarity (H2.2), first-time visitors were more prevalent in the eco-engaged segment, whereas repeat visitors were more concentrated in the eco-restrained segment.

Regarding travel characteristics (H2.3), significant differences were observed across accommodation type, trip organization, travel party, and tourism activities. The eco-engaged segment exhibited greater diversification in travel experiences, including higher participation in

Table 4

Profile of the clusters by sociodemographic characteristics.

	Total (n = 1909)		Cluster 1 (n = 693)		Cluster 2 (n = 677)		Cluster 3 (n = 438)		Chi-square test	
	(100%)		(38.3%)		(37.4%)		(24.3%)		X ²	p
	n	%	n	%	n	%	n	%		
Sociodemographic variables										
Age (years)									11.429	0.022
18 - 24	470	26.3	158	23.1	179	26.8	133	30.8		
25 - 64	1244	69.7	491	71.8	466	69.8	287	66.4		
65 or more	70	3.9	35	5.1	23	3.4	12	2.8		
Gender									8.781	0.067
Female	1091	60.8	411	59.9	401	59.8	279	64.0		
Male	695	38.8	275	40.1	267	39.8	153	35.1		
Other	7	0.4	0	0	3	0.4	4	0.9	9.885	0.042
Level of education										
Less High School	133	8.0	36	5.8	53	8.4	44	10.6		
High School	437	26.2	158	25.4	165	26	114	27.5		
University	1101	65.8	429	68.9	416	65.6	256	61.8	11.785	0.067
Marital status										
Single	804	45.1	278	40.7	327	49.0	199	46.2		
Married/partnership	899	50.4	369	54	316	47.3	214	49.7		
Divorced/separated	68	3.8	31	4.5	23	3.4	14	3.2		
Widowed	11	0.6	5	0.7	2	0.3	4	0.9	17.833	0.121
Occupation										
Employed	1111	62.8	427	62.9	426	64.6	258	60.0		
Self-employed	183	10.4	79	11.6	60	9.1	44	10.2		
Retired	102	5.8	50	7.4	34	5.2	18	4.2		
Domestic	13	0.7	5	0.7	6	0.9	2	0.5		
Unemployed	26	1.5	9	1.3	11	1.7	6	1.4		
Student	329	18.6	108	15.9	120	18.2	101	23.5		
Other	4	0.2	1	0.1	2	0.3	1	0.2	194.819	<0.001
Country of residence										
Portugal	487	26.9	105	15.2	178	26.3	204	46.6		
United Kingdom	442	24.4	240	34.6	155	22.9	47	10.7		
Germany	148	8.2	55	7.9	56	8.3	37	8.4		
Spain	133	7.4	70	10.1	46	6.8	17	3.9		
Netherlands	104	5.8	34	4.9	44	6.5	26	5.9		
Ireland	108	6	57	8.2	38	5.6	13	3		
France	156	8.6	54	7.8	66	9.7	36	8.2		
Others	230	12.7	78	11.3	94	13.9	58	13.2		

nautical and experiential activities. In contrast, the eco-restrained segment is more strongly associated with conventional tourism patterns, particularly sun-and-sea activities and informal accommodation arrangements. The eco-friendly segment again occupied an intermediate position across most travel-related variables.

4.3. Clusters, satisfaction, and loyalty

Significant differences in satisfaction and loyalty were observed across the three segments (Table 6), supporting H2.4 and H2.5. Tourists with stronger evaluations of destination environmental responsibility reported higher satisfaction and stronger intentions to recommend and revisit the destination. In contrast, those with lower DER scores reported lower satisfaction and weaker intentions to recommend and revisit the destination. Overall satisfaction showed a clear downward trend across segments, with mean values of 4.48 for the eco-engaged group, 4.26 for the eco-friendly group, and 4.00 for the eco-restrained group. A similar trend was observed for loyalty, with mean values of 4.46, 4.23, and 4.01, respectively. One-Way ANOVA results confirmed that these differences were statistically significant ($p < 0.001$), and Games–Howell post hoc tests indicated a consistent gradient across the three segments (eco-engaged > eco-friendly > eco-restrained). The magnitude of the differences (F-values ranging from 43.01 to 90.40) supports the robustness of the segmentation.

At the item level, the statements "I have really enjoyed this holiday" and "I will discuss positive things about this holiday" received the highest mean scores among tourists in the eco-engaged segment. In contrast, for the items — "It is exactly what I needed" and "Assuming my current circumstances remain the same, I will choose to come again to

the Algarve"— no significant differences were observed between eco-engaged and eco-friendly segments. However, both groups scored significantly higher than the eco-restrained segment. These results indicate that the largest differences in satisfaction and loyalty occur between tourists with moderate-to-high DER evaluations and those with comparatively weaker evaluations. While the eco-engaged segment consistently reported the highest scores, the eco-engaged and eco-friendly segments exhibited more similar patterns than either did relative to the eco-restrained segment.

5. Discussion

The findings reveal three main patterns. First, tourists generally evaluate environmental responsibility positively, particularly regarding cleanliness and environmental preservation. Second, these evaluations provide a meaningful basis for segmentation, resulting in three distinct groups: eco-engaged, eco-friendly, and eco-restrained. Third, stronger evaluations of environmental responsibility are associated with higher satisfaction and loyalty, highlighting the relevance of DER as a perception-based construct linked to tourism experience and destination competitiveness.

Overall, these results highlight the importance of moving beyond objective environmental indicators and behavioral intentions to consider how tourists interpret environmental responsibility within their experiential evaluation process. This interpretation is consistent with Balıkcıoğlu Dedeoğlu and Aydın (2026), who demonstrated that DSR does not directly drive specific consumption behaviors but instead operates indirectly by fostering a predisposition toward responsible tourist conduct. Notably, these authors call for further research into

Table 5

Profile of the clusters concerning familiarity and travel characteristics.

	Total (n = 1909)		Cluster 1 (n = 693)		Cluster 2 (n = 677)		Cluster 3 (n = 438)		Chi-square test	
	(100%)		(38.3%)		(37.4%)		(24.3%)		X ²	p
	n	%	n	%	n	%	n	%		
Familiarity										
First-time on the Algarve									16.225	<0.001
Yes (first-time)	551	30.7	241	35.1	207	30.8	103	23.7		
No (repeater)	1242	69.3	445	64.9	466	69.2	331	76.3		
Travel characteristics/										
Past trip (times)									31.902	<0.001
None	551	34.2	241	40.0	207	33.9	103	25.9		
1-2	306	19.0	118	19.6	114	18.7	74	18.6		
3 - 4	268	16.6	96	15.9	105	17.2	67	16.9		
5 - 6	237	14.7	66	11.0	91	14.9	80	20.2		
7 or more	248	15.4	81	13.5	94	15.4	73	18.4		
Length of stay (days)									11.014	0.201
1-7	773	44.8	301	45.4	289	44.9	183	43.5		
8-14	673	39.0	267	40.3	246	38.3	160	38.0		
15-21	223	12.9	72	10.9	89	13.8	62	14.7		
22-28	24	1.4	13	2.0	8	1.2	3	0.7		
+ 29	34	2.0	10	1.5	11	1.7	13	3.1		
Trip reason										
Vacation/Holiday	1618	89.5	620	89.5	606	89.5	392	89.5	0.001	1
Study/training	11	0.6	4	0.6	5	0.7	2	0.5	0.368	0.832
Business	34	1.9	11	1.6	12	1.8	11	2.5	1.311	0.519
Meeting/convention	19	1.1	8	1.2	4	0.6	7	1.6	2.711	0.258
Health & Wellness	59	3.3	19	2.7	24	3.5	16	3.7	0.978	0.613
Visiting Friends & Relatives	161	8.9	54	7.8	59	8.7	48	11.0	3.366	0.186
Other	11	0.6	2	0.3	9	1.3	0	0	9.673	0.008
Accommodation										
Luxury hotels/resorts	367	20.3	169	24.4	127	18.8	71	16.2	12.676	0.002
Budget hotels/resorts	128	7.1	53	7.6	51	7.5	24	5.5	2.257	0.324
Local accommodation	367	20.3	106	15.3	153	22.6	108	24.7	18.081	<0.001
Hostel	77	4.3	42	6.1	25	3.7	10	2.3	10.243	0.006
Camping/Caravan	35	1.9	12	1.7	13	1.9	10	2.3	0.431	0.806
With family/friends	277	15.3	82	11.8	104	15.4	91	20.8	16.548	<0.001
Hotel-apartment	235	13	94	13.6	92	13.6	49	11.2	1.676	0.433
Private holiday home	428	23.7	163	23.5	163	24.1	102	23.3	0.106	0.948
Other	13	0.7	6	0.9	6	0.9	1	0.2	1.952	0.377
Travel organization										
Physical shop	55	3	30	4.3	19	2.8	6	1.4	8.171	0.017
Online	1384	76.5	575	83	517	76.4	292	66.7	39.769	<0.001
Travel party										
Alone	131	7.2	55	7.9	48	7.1	28	6.4	0.991	0.609
Friends	451	24.9	149	21.5	177	26.1	125	28.5	7.933	0.019
Partner	500	27.7	183	26.4	204	30.1	113	25.8	3.371	0.185
Work colleagues	18	1	11	1.6	3	0.4	4	0.9	4.588	0.101
Family Members	904	50	348	50.2	329	48.6	227	51.8	1.131	0.568
Organized/package group	17	0.9	8	1.2	6	0.9	3	0.7	0.669	0.716
Other	1	0.1	0	0	1	0.1	0	0	1.672	0.434
Activities										
Touring & Sightseeing	357	19.7	134	19.3	144	21.3	79	18	1.874	0.392
Recreation & Leisure	425	23.5	172	24.8	150	22.2	103	23.5	1.351	0.509
Sporting Activities	158	8.7	60	8.7	69	10.2	29	6.6	4.262	0.119
Nightlife	190	10.5	63	9.1	70	10.3	57	13	4.424	0.109
Cinema & TV	2	0.1	1	0.1	1	0.1	0	0	0.64	0.726
Dining Activities	209	11.6	84	12.1	93	13.7	32	7.3	11.105	0.004
Nautic Activities	689	38.1	289	41.7	250	36.9	150	34.2	6.966	0.031
Sun & Sea Activities	916	50.7	336	48.5	345	51	235	53.7	2.906	0.234
Shopping Activities	77	4.3	29	4.2	32	4.7	16	3.7	0.767	0.681
Rest & Relaxing	179	9.9	83	12	65	9.6	31	7.1	7.33	0.026
Visiting Family/Friends	17	0.9	6	0.9	5	0.7	6	1.4	1.205	0.547
Social Engagement	80	4.4	29	4.2	24	3.5	27	6.2	4.468	0.107
Gastronomy & Wines	342	18.9	138	19.9	117	17.3	87	19.9	1.884	0.390
Business	9	0.5	5	0.7	3	0.4	1	0.2	1.383	0.501
Others	13	0.7	5	0.7	3	0.4	5	1.1	1.817	0.403

whether the environmental dimension of DSR more strongly influences environmental tourist behaviors—a gap that the present study helps address. The present findings extend this perspective by suggesting that DER operates as a perception-based evaluative construct linked to broader tourism outcomes, particularly satisfaction and loyalty, that vary systematically across tourist segments.

5.1. Heterogeneity in DER evaluations and tourist profiles

The predominance of moderate-to-high DER evaluations suggests that environmental responsibility has become an increasingly prominent dimension in coastal tourism. This pattern should not be interpreted as evidence of objectively superior environmental performance, but rather as the result of tourists' context-specific evaluations. Comparisons with

Table 6

Profile of the clusters in terms of satisfaction and loyalty.

Total (n = 1909)	Cluster 1 (n = 693)		Cluster 2 (n = 677)		Cluster 3 (n = 438)		One-Way ANOVA		Games-Howell test
(100%)	(38.3%)		(37.4%)		(24.3%)				
	M	SD	M	SD	M	SD	F	p	Results
Satisfaction	4.48	0.57	4.26	0.59	4.00	0.63	90.399	<0.001	1>2 > 3
I have really enjoyed	4.52	0.58	4.32	0.6	4.10	0.65	64.732	<0.001	1>2 > 3
My choice was a wise one	4.47	0.62	4.21	0.68	3.93	0.74	86.361	<0.001	1>2 > 3
It is exactly what I needed	4.46	0.66	4.25	0.71	3.97	0.8	62.65	<0.001	1.2>3
Loyalty	4.46	0.56	4.23	0.61	4.01	0.62	80.404	<0.001	1>2 > 3
I will encourage my friends and/or family to visit Algarve sometime	4.44	0.63	4.23	0.65	3.95	0.72	72.591	<0.001	1>2 > 3
I will discuss positive things about this holiday with my family and/or friends	4.52	0.57	4.27	0.63	4.07	0.62	75.286	<0.001	1>2 > 3
Assuming my current circumstances remain the same. I will choose to come again to the Algarve	4.43	0.69	4.20	0.79	4.01	0.85	43.014	<0.001	1.2>3

previous studies indicate a higher proportion of environmentally favorable segments than reported in earlier research (e.g., [Iamkovaia et al., 2020](#); [Sánchez-Fernández et al., 2016, 2019](#)), although differences in measurement, context, and time period must be considered. Post-pandemic tourism dynamics may also have increased the salience of cleanliness and environmental quality in destination evaluations ([Alonso-Almeida et al., 2024](#)).

Environmental evaluations are not uniformly distributed across tourists. Older, more educated, and international visitors tend to report stronger DER, supporting prior evidence linking environmental awareness to education and life-stage factors ([Forleo & Bredice, 2025](#); [Iamkovaia et al., 2020](#); [Penagos-Londoño et al., 2021](#)). The comparatively higher DER observed among international tourists also aligns with research indicating greater environmental sensitivity among foreign visitors in coastal destinations ([Carvache-Franco et al., 2022](#); [Iamkovaia et al., 2020](#); [Onofri & Nunes, 2013](#)). The absence of significant differences by gender, marital status, and occupation warrants closer interpretation. Three complementary explanations may account for this pattern. A first explanation derives from the convergence hypothesis in environmental research, which suggests that gender differences in environmental perceptions have progressively narrowed in mature tourism markets, reflecting the social normalization of environmental awareness in tourists' assessments of destinations' environmental performance ([Iamkovaia et al., 2020](#); [Lukoseviciute & Pereira, 2021](#)). This pattern is not confined to Europe: a global analysis of coastal tourism ([Onofri & Nunes, 2013](#)) showed that the distinction between "beach lovers" and "greens" transcends countries and demographic categories, with environmental orientation emerging as a cross-cultural characteristic of coastal tourists. Evidence from Ecuador, Mexico, and Costa Rica further supports this pattern, showing that gender, marital status, and occupation have limited capacity to differentiate tourists' segments. In contrast, motivational and cognitive-evaluative factors are more consistently associated with differences in tourists' environmental evaluations ([M. Carvache-Franco, Carvache-Franco, et al., 2019, 2020, 2021, 2022, 2023](#); [W. Carvache-Franco, Carvache-Franco, et al., 2019, 2020, 2021](#)). EU-27 evidence aligns with this trajectory, as sustainability-related evaluations and destination choices are increasingly explained by cognitive and value-based factors rather than by ascriptive profiles ([Alonso-Almeida et al., 2024](#)). Similarly, [Sánchez-Fernández et al. \(2016, 2019\)](#) found in Spain that ascriptive variables exert weaker effects on environmentally responsible evaluations once environmental concern becomes a shared baseline.

A second explanation relates to the stage of destination development. In consolidated coastal destinations such as the Algarve—repeatedly recognized as the Best Beach Destination in Europe and Worldwide ([World Travel Awards, 2024](#))—environmental management practices are evident in attributes such as cleanliness, Blue Flag certification, preserved natural landscapes, and pollution control measures. As these practices become embedded in visitors' destination experiences,

environmental responsibility may increasingly be perceived as an expected component of destination quality rather than as a distinctive attribute requiring active evaluation. In this context, DER appears to reflect a shared perception of environmental stewardship and the congruence between sustainability commitments and observed environmental conditions, with evaluations depending less on demographic characteristics and more on tourists' experiences, environmental awareness, and interpretations of destination practices.

A third explanation concerns the greater relevance of cognitive and generational characteristics. No significant differences were found for gender, marital status, or occupation, indicating that environmental evaluations are not uniformly associated with all sociodemographic variables. This non-significance is itself a meaningful finding, as it indicates that, in a mature European coastal destination, ascriptive variables traditionally used in tourism segmentation may play a less prominent role than cognitive and generational characteristics such as age, education, and country of residence. Whereas marital status and occupation primarily describe household structure and labor-market position, age and education are more closely associated with the way individuals acquire, process, and interpret information about environmental conditions and destination management. Recent evidence indicates that generational cohort and educational profile are becoming more relevant than traditional ascriptive characteristics in explaining sustainability-related destination evaluations. [Forleo and Bredice \(2025\)](#) and [Pulido-Fernández et al. \(2024\)](#) report that younger and more highly educated visitors place greater emphasis on environmental attributes when assessing destination quality and competitiveness. Studies in coastal destinations across Latin America suggest that differences in tourist evaluations are more consistently associated with motivations, experiences, knowledge, and evaluative processes than with gender, marital status, or occupation ([Carvache-Franco, Carvache-Franco, et al., 2019, 2020, 2021, 2022, 2023](#)). Collectively, these findings indicate that DER-based segments are mainly determined by cognitive, experiential, and generational characteristics, rather than traditional demographic attributes. More broadly, variation in DER stems from how tourists perceive, interpret, and value environmental responsibility, as opposed to differences rooted in conventional socio-demographic profiles.

5.2. Destination familiarity and the visibility of environmental responsibility

Destination familiarity also differentiated DER evaluations. First-time visitors reported higher DER than repeat visitors ($M = 3.62$ vs. 3.48 ; $p < 0.001$), suggesting that environmental responsibility is more salient in tourists' initial destination assessments. This finding contrasts with evidence from other tourism contexts. In a coastal destination in Ecuador, [M. Carvache-Franco, Carvache-Franco, Carvache-Franco, and Hernández-Lara \(2020\)](#) found that repeat visitors reported stronger

ecotourism motivations and greater appreciation of the natural environment than first-time visitors. Similarly, [Grah et al. \(2023\)](#) observed that repeat visitors perceived higher levels of environmental and economic responsibility. Previous studies have also shown that responsibility-related destination evaluations are closely associated with trust, reputation, and revisit intentions, particularly among returning tourists ([Hassan & Soliman, 2021](#); [Su & Swanson, 2017](#)). These findings further suggest that destination familiarity is associated not only with behavioral responses but also with the way environmental responsibility is interpreted and incorporated into tourists' overall destination evaluations. One plausible explanation relates to how environmental responsibility is interpreted in mature destinations. DER does not capture environmental quality *per se*; rather, it captures tourists' interpretation of environmental conditions as evidence of responsible destination management. For first-time visitors, attributes such as clean beaches, preserved landscapes, and the absence of visible pollution may operate as salient indicators of environmental stewardship. These attributes are interpreted in relation to external reference points, including tourists' home environments and competing destinations. As familiarity increases, environmental conditions may continue to be positively evaluated but become less salient as indicators of responsibility because they no longer provide new information about the destination.

This interpretation is particularly relevant in the context of the Algarve. Recent research identifies eco-friendly attributes as a salient component of the destination's experiential image, suggesting that visitors consistently associate the Algarve with positive environmental characteristics ([Guerreiro, Pinto, deMatos, et al., 2025](#)). However, while these attributes contribute to destination image, DER captures a different evaluative judgment: the extent to which tourists interpret environmental conditions as evidence of responsible environmental management. As familiarity increases, environmental attributes may remain positively evaluated while leading to weaker inferences of environmental responsibility. This view is consistent with research showing that destination familiarity influences how visitors process and evaluate destination attributes over time ([Stylidis et al., 2020](#)).

The contrast with previous studies may therefore reflect differences in destination development stages. In emerging destinations and protected areas, environmental attributes often remain central to the tourism experience and continue to shape visitor evaluations over successive visits ([M. Carvache-Franco, Carvache-Franco, Carvache-Franco, & Hernández-Lara, 2020](#); [Grah et al., 2023](#); [Su & Swanson, 2017](#)). In mature destinations such as the Algarve, repeat visitation is more likely to be sustained by a broader combination of benefits, including climate, gastronomy, accommodation quality, lifestyle, and social connections. In this context, environmental responsibility may remain valued but become increasingly normalized within the tourism experience.

For destination managers, the challenge is therefore not only to improve environmental performance, but also to maintain the visibility of environmental responsibility. Sustainability initiatives that become familiar to repeat visitors risk fading into the background of the destination experience. Regularly communicating environmental achievements, demonstrating progress over time, and creating opportunities for visitors to engage with conservation initiatives may reinforce the salience of environmental responsibility and help maintain its distinctiveness among repeat tourists.

5.3. Associations between DER, satisfaction, loyalty, and destination competitiveness

DER is meaningfully associated with key experiential and behavioral tourism outcomes. Tourists with stronger environmental evaluations—particularly in the eco-engaged and eco-friendly segments—report higher satisfaction and loyalty, indicating that tourists who recognize and value environmental responsibility respond more positively to destinations where such practices are visible and effectively communicated ([Guerreiro, Pinto, Bagheri, & DeMatos, 2025](#);

[Sahabuddin et al., 2024](#)). This result is consistent with recent evidence showing that sustainability-related attributes are positively associated with tourist satisfaction by signaling responsibility, care, and long-term commitment, thereby reinforcing emotional and cognitive evaluations of the destination ([Nguyen et al., 2026](#)). It also aligns with prior research in the Algarve highlighting the importance of environmental attributes in shaping experiential image and loyalty ([Guerreiro, Pinto, deMatos, et al., 2025](#)).

Beyond its association with satisfaction and loyalty, the findings suggest that environmental responsibility is evaluated not solely by environmental conditions themselves but by how tourists interpret them. Accordingly, differences in DER reflect differences in how tourists interpret observable environmental attributes as indicators of environmental responsibility. This interpretation is supported by emerging evidence showing that contextual and communication-related factors – including AI-mediated communication – may affect how sustainability messages are perceived and how pro-environmental responses are formed ([Yang et al., 2025](#)). Consequently, tourists' evaluations of environmental responsibility depend on both the implementation of environmental practices and the visibility and meaningfulness of these practices to different tourist segments ([Salazar et al., 2026](#)).

From a broader perspective, these findings reinforce the growing evidence that sustainability-related attributes positively contribute to tourism experiences and behavioral outcomes across diverse tourism contexts. Previous studies consistently report that visible sustainability practices, environmental preservation, and perceived environmental values are associated with tourist satisfaction, loyalty and revisit intentions, although the magnitude of these effects may vary across contexts and visitor groups ([Nguyen et al., 2026](#); [Sahabuddin et al., 2024](#)). The present study extends this evidence by indicating that these associations differ across environmental perception segments, suggesting that tourists interpret and value environmental responsibility in distinct ways. In coastal settings, where environmental quality constitutes a core tourism resource, visible environmental responsibility represents an important element of the tourism experience and a strategic resource for destination competitiveness because tourists who perceive destinations as environmentally responsible report more positive evaluations, including higher satisfaction and loyalty ([Kusumah, 2024](#); [Sahabuddin et al., 2024](#)).

5.4. Theoretical contributions

From a theoretical perspective, the findings are consistent with the complementary use of VBN, S-O-R, and TPB as interpretative perspectives for understanding heterogeneity in tourists' environmental evaluations. Rather than testing these theories, the study draws on them to interpret how environmental values, perceptions of environmental conditions, and attitudinal predispositions may be associated with differences in tourists' evaluations of environmental responsibility. The decision to draw on VBN, S-O-R, and TPB – rather than alternative frameworks – reflects the need to capture three complementary aspects of the tourism experience: the value-based and moral foundations of environmental evaluations (VBN), the interpretation of observable environmental attributes during the tourism experience (S-O-R), and the role of attitudes and perceived norms in tourists' evaluative responses (TPB).

The Norm Activation Model (NAM) was considered but ultimately not adopted. Although valuable for explaining morally driven behavior, its scope is comparatively narrower, focusing primarily on the activation of personal norms, and it does not explicitly incorporate contextual stimuli or attitudinal processes addressed by S-O-R and TPB. Moreover, its central normative logic is largely incorporated within VBN theory ([Stern et al., 1999](#)), making its separate inclusion conceptually redundant. This positioning is consistent with recent work in the field. [Balıkcıoğlu Dedeoğlu and Aydın \(2026\)](#), for instance, demonstrated in an S-O-R-based study of DSR that destination-related stimuli can

activate tourists' latent altruistic and biospheric values, supporting the view that the normative assumptions underlying NAM can be accommodated within a broader interpretative framework without requiring NAM as a separate theoretical perspective.

By conceptualizing DER as a perception-based construct and applying it as a segmentation criterion, this study extends sustainability-based segmentation research beyond traditional demographic and behavioral approaches. The identification of eco-engaged, eco-friendly, and eco-restrained segments indicates that tourists systematically differ in their evaluations of environmental responsibility, reinforcing the value of perception-based segmentation for understanding heterogeneity in coastal tourism markets.

6. Conclusion

Environmental responsibility is increasingly recognized as a strategic factor in the competitiveness of coastal destinations, yet tourists differ substantially in how they perceive and value it. This study advances the literature by conceptualizing Destination Environmental Responsibility (DER) as a perception-based construct and employing it as a segmentation criterion. In doing so, it shows that environmental responsibility is not uniformly interpreted among tourist groups and should be understood as a perception-based evaluation tied to destination experiences and competitiveness.

The theoretical perspectives adopted in this study provide a useful framework for interpreting these findings. Value-Belief-Norm (VBN) theory helps explain why tourists with different environmental values may evaluate destination environmental responsibility differently. The Stimulus-Organism-Response (S-O-R) framework offers an interpretative perspective on how observable environmental conditions are perceived during the tourism experience and how these perceptions may be associated with satisfaction and loyalty. The Theory of Planned Behavior (TPB) complements this interpretation by highlighting the potential role of attitudes and perceived norms in tourists' evaluations of environmentally responsible destinations. Together, these perspectives provide complementary insights into the heterogeneity of tourists' environmental evaluations without implying that the underlying theoretical mechanisms were directly tested.

The findings further suggest that environmental responsibility should not be regarded as a static destination characteristic but as an evaluative process through which tourists form judgments about environmental destination management. For destination managers, the implication is clear: maintaining environmental quality may be insufficient if sustainability efforts are not consistently translated into meaningful and visible signals for tourists.

The results also underscore the importance of moving beyond generic sustainability strategies and acknowledging the heterogeneity of environmental evaluations across visitor segments (Hult, 2011; Lukoseviciute & Pereira, 2021; Sánchez-Fernández et al., 2019). DER emerges as a valuable basis for understanding how tourists evaluate environmental responsibility and how these evaluations are associated with satisfaction, loyalty, and ultimately destination competitiveness. From this perspective, environmental responsibility serves both as an operational commitment and as a symbolic signal that tourists use when evaluating the quality and value of their destination experiences (Nguyen et al., 2026). Accordingly, making environmental practices more visible and meaningful to different tourist segments may contribute to more positive tourism experiences while supporting more targeted and effective sustainability strategies.

Finally, the findings indicate that the strategic value of environmental responsibility extends beyond environmental management itself. DER is a context-dependent evaluation that varies according to how tourists perceive and interpret environmental responsibility. By conceptualizing DER as a perception-based segmentation criterion informed by VBN, S-O-R, and TPB, this study contributes to a better understanding of heterogeneity in tourists' environmental evaluations.

It highlights the importance of integrating environmental stewardship into destination management and positioning strategies to ensure that sustainability efforts are effectively communicated, perceived, and experienced by tourists.

6.1. Theoretical implications

This study contributes to the tourism and sustainability literature in several ways. First, it advances the conceptualization of DER as a perception-based, formative construct that captures how tourists interpret environmental responsibility through observable environmental attributes. By moving beyond objective environmental indicators, this perspective emphasizes the role of subjective, experience-based evaluations for understanding tourists' perceptions of environmental responsibility. In doing so, it responds to recent calls in the literature to differentiate sustainability dimensions and to examine how environmental responsibility is perceived independently from the broader DSR construct (Nguyen et al., 2026; Salazar et al., 2026). Second, the study contributes to segmentation research by demonstrating that perceptions of environmental responsibility can serve as a meaningful segmentation criterion. While prior research has largely focused on environmental attitudes and pro-environmental behavior, fewer studies have applied perception-based sustainability constructs to segment tourists, particularly in coastal tourism contexts (Fahlevi, 2023; Sánchez-Fernández et al., 2019). By positioning perceived environmental responsibility as a primary segmentation criterion for classifying tourists, this study extends segmentation theory and provides a more nuanced understanding of heterogeneity in tourism demand. Third, the findings indicate that environmental responsibility is meaningfully associated with key tourism outcomes. Tourists with stronger DER evaluations report higher satisfaction and loyalty, suggesting that environmental responsibility may be understood not only as an ethical or regulatory concern but also as a core experiential attribute that contributes to destination competitiveness and visitor attachment (Dolnicar & Greene, 2025; Sahabuddin et al., 2024). Finally, the identification of eco-engaged, eco-friendly, and eco-restrained segments demonstrates the heterogeneity of tourists' environmental evaluations. It supports incorporating perception-based sustainability constructs into segmentation research and future theoretical developments in coastal tourism.

6.2. Practical implications

The findings provide several practical implications for DMOs seeking to integrate environmental responsibility into destination development and marketing strategies. Overall, the results indicate that sustainability strategies should be visible, segment-specific, and closely linked to experiential value. From the perspective of the S-O-R framework, observable environmental practices may function as stimuli associated with tourists' evaluations and subsequent behavioral intentions. Consequently, communication strategies should be adapted to different tourist segments and destination contexts, as the effectiveness of sustainability messaging likely depends on how it is framed and interpreted by visitors (Salazar et al., 2026). Practices such as cleanliness standards, waste management, environmental preservation, renewable energy use, and water-saving systems provide visible signals that tourists use to evaluate environmental responsibility. Accordingly, making these initiatives more visible and meaningful may contribute to more favorable environmental evaluations and tourism experiences.

The segmentation results further indicate that tourists differ in their responsiveness to sustainability initiatives, reflecting the heterogeneity of values and personal norms proposed by VBN theory. As a result, DMOs should adopt differentiated strategies.

- Eco-engaged tourists respond positively to explicit sustainability communication, certifications, and participatory experiences such as conservation initiatives. Consistent with VBN, this segment exhibits

strong pro-environmental values and personal norms; therefore, integrating sustainability into the core tourism offering may strengthen engagement with the destination and foster loyalty.

- Eco-friendly tourists benefit from clear and accessible communication about environmental practices. Consistent with the TPB, visible initiatives – such as beach cleanup programs, waste reduction efforts, and coastal preservation measures – may encourage more positive evaluations of environmental responsibility by reinforcing positive attitudes and social norms.
- Eco-restrained tourists are less responsive to sustainability-focused messaging. For this segment, environmental practices should be framed in terms of experiential benefits, such as improved comfort, cleanliness, and overall destination quality, with the potential to strengthen perceived behavioral control (TPB) and awareness of consequences (VBN).

From a managerial perspective, DMOs in mature coastal destinations should prioritize communication and engagement strategies tailored to generational and educational profiles, rather than relying on segmentation by gender, marital status, or occupation. Segment profiles further reveal that stronger DER is associated with more diversified and experience-oriented patterns of destination use, suggesting that environmental quality and higher service expectations can coexist (M. Carvache-Franco et al., 2023; Dolnicar et al., 2008).

The results also indicate that destination familiarity should be considered in sustainability strategies. Visible environmental practices appear particularly influential for first-time visitors. In contrast, repeat visitors may respond more positively to engagement-based approaches, such as storytelling and participatory initiatives consistent with the value-based perspective proposed by VBN. Finally, the positive association between DER and loyalty suggests that environmental responsibility represents a strategic asset for destination competitiveness. Tourists who perceive destinations as environmentally responsible tend to report stronger intentions to revisit and greater willingness to recommend the destination (Cheng et al., 2024; Sahabuddin et al., 2024). This interpretation is consistent with the S-O-R perspective, in which observable environmental conditions function as stimuli associated with tourists' evaluations of their destination experience. Accordingly, environmental sustainability initiatives should be considered not merely as operational requirements but as important components of the destinations' value proposition (Dolnicar & Greene, 2025; Xu & Au, 2023).

6.3. Limitations and future research

This study has several limitations that provide avenues for future research.

First, the sample includes a high proportion of repeat visitors, which may have affected DER evaluations through accumulated experience with the destination. Future studies could focus on first-time visitors or include more balanced samples of first-time and repeat visitors to examine better how destination familiarity is associated with tourists' evaluations of environmental responsibility.

Second, this study focuses on a European coastal destination. The applicability of DER-based segmentation may vary across different ecological, cultural, and regulatory contexts. In highly regulated destinations, such as many European coastal regions, environmental responsibility may be perceived as an expected component of destination quality. In contrast, in emerging destinations in Asia, Africa, or Latin America, where environmental governance structures, ecological pressures, and sustainability communication practices differ substantially, environmental responsibility may represent a more salient basis for tourist differentiation. Comparative studies across different destination contexts would help identify contextual boundary conditions and assess the international applicability of DER-based segmentation.

Third, this study focused on perception-based evaluations rather

than observed behaviors. Future research could integrate behavioral measures, such as participation in conservation activities, willingness to support sustainability initiatives, or engagement in regenerative tourism practices, to examine how tourists' environmental evaluations are associated with pro-environmental behaviors.

Finally, because this study employed a cross-sectional design, it does not capture how tourists' environmental evaluations evolve. Longitudinal research could examine the stability of DER evaluations across repeated visits and their long-term associations with satisfaction, loyalty, and destination relationships.

CRedit authorship contribution statement

Aline Castro-Rezende: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Software, Validation, Writing – original draft, Writing – review & editing. **Manuela Guerreiro:** Data curation, Formal analysis, Supervision, Validation, Writing – review & editing. **Luís Nobre Pereira:** Data curation, Formal analysis, Methodology, Supervision, Validation, Writing – review & editing.

Declaration of interest statement

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jdmm.2026.101145>.

Data availability

Data will be made available on request.

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