The Impact of Environmental Awareness, Service Quality, Destination Attractiveness, Visitor Satisfaction, and Behavioral Intention on the Sustainability of Marine Ecotourism: A Case Study of the South Coast of West Java

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ABSTRACT

This study examines the impact of environmental awareness, service quality, destination attractiveness, visitor satisfaction, and behavioral intention on the sustainability of marine ecotourism in the South Coast of West Java. A quantitative approach was employed, using structured questionnaires distributed to 312 tourists at various marine ecotourism sites. The data were analyzed using descriptive statistics, confirmatory factor analysis (CFA), and structural equation modeling (SEM). The results revealed significant relationships between environmental awareness, service quality, and destination attractiveness with visitor satisfaction and behavioral intention, which, in turn, positively affected the sustainability of marine ecotourism. The study highlights the critical role of fostering environmental awareness and improving service quality and destination appeal in promoting sustainable tourism practices. These findings offer practical recommendations for stakeholders, including policymakers and tourism operators, aiming to enhance the sustainability of marine ecotourism in the region.

Keywords: *Marine Ecotourism, Sustainability, Environmental Awareness, Service Quality, Destination Attractiveness, Visitor Satisfaction*

1. INTRODUCTION

Marine ecotourism has emerged as a critical component of sustainable tourism development, providing opportunities for economic growth while fostering environmental conservation and community empowerment. As global awareness about environmental sustainability rises, destinations with unique natural ecosystems are becoming increasingly popular among tourists. The South Coast of West Java, known for its pristine beaches, coral reefs, and rich marine biodiversity, holds immense potential as a marine ecotourism destination. However, the challenge lies in striking a balance between maximizing tourism benefits and minimizing ecological footprints [1]. This balance is vital to ensure the long-term sustainability of marine ecotourism, especially in regions like West Java, where tourism could either be a driver of development or a source of environmental degradation.

Sustainability in marine ecotourism depends on multiple factors, including the awareness levels of tourists and local stakeholders. Environmental awareness, which encompasses knowledge and attitudes toward conservation efforts, is a key driver in promoting sustainable behaviors [2]. Tourists who are aware of environmental issues are more likely to engage in responsible behaviors, such as avoiding littering or supporting eco-friendly services. Similarly, local stakeholders, including tour operators and government bodies, play a crucial role in ensuring that tourism practices align with sustainable principles. In this context, understanding how environmental awareness influences marine ecotourism sustainability becomes a vital area of research.

In addition to environmental awareness, service quality and destination attractiveness significantly influence visitor satisfaction and behavioral intentions. Service quality encompasses the overall experience tourists gain from infrastructure, amenities, and interactions with service providers [3]. On the other hand, destination attractiveness refers to the natural and cultural features that draw tourists to a location. The South Coast of West Java boasts various attractive features, including Pangandaran Beach and Ujung Genteng, which are renowned for their scenic beauty and biodiversity. Yet, challenges such as inadequate infrastructure and environmental degradation could undermine these attractions, adversely affecting visitor experiences [4].

Behavioral intention, a construct derived from the theory of planned behavior, reflects a visitor's likelihood to return to a destination or recommend it to others. Positive visitor experiences enhance behavioral intentions, creating a cycle of benefits for both the destination and its stakeholders. However, the sustainability of marine ecotourism also hinges on the extent to which tourism activities contribute to local community welfare and biodiversity preservation. This interplay between visitor satisfaction, behavioral intentions, and sustainability remains a complex but essential subject for investigation.

Despite its ecological and economic potential, the South Coast of West Java faces significant challenges in developing sustainable marine ecotourism. Issues such as pollution, habitat destruction, and insufficient environmental education among tourists and locals threaten the region's natural ecosystems. Moreover, inconsistent service quality and underdeveloped tourism infrastructure detract from the destination's attractiveness, potentially limiting its competitiveness in the ecotourism market [5]. The absence of integrated strategies to address these issues exacerbates the risks to both ecological balance and tourism sustainability. While previous studies have examined individual factors like environmental awareness or service quality, there is a lack of comprehensive research that explores their combined impact on marine ecotourism sustainability. This gap underscores the need for a holistic approach that integrates environmental, experiential, and behavioral dimensions to understand and address the challenges faced by the South Coast of West Java.

This study aims to analyze the impact of environmental awareness, service quality, destination attractiveness, visitor satisfaction, and behavioral intention on the sustainability of marine ecotourism in the South Coast of West Java. By identifying the interrelationships among these variables, this research seeks to provide actionable insights for policymakers, tourism practitioners, and local communities. The ultimate goal is to propose strategies that not only enhance visitor experiences but also safeguard the region's marine ecosystems for future generations

2. LITERATURE REVIEW

2.1 Environmental Awareness and Sustainability of Marine Ecotourism

Environmental awareness refers to the knowledge and attitudes individuals hold about environmental issues and their willingness to engage in behaviors that promote conservation [2]. In marine ecotourism, tourists with higher environmental awareness are more likely to adopt responsible behaviors, such as reducing waste, respecting wildlife, and supporting eco-friendly services. Research shows that destinations emphasizing environmental education and awareness campaigns experience greater sustainability outcomes, as informed tourists contribute positively to local conservation

efforts [6]. Environmental awareness also influences the sustainability practices of tourism stakeholders. For instance, tour operators with strong environmental commitments often implement eco-friendly policies, such as limiting visitor numbers to reduce overcrowding or adopting sustainable waste management systems [7]. Thus, the role of environmental awareness in fostering sustainable marine ecotourism is well-established.

H1: Environmental awareness positively impacts the sustainability of marine ecotourism.

2.2 *Service Quality and Visitor Satisfaction*

Service quality is a critical determinant of tourist experiences and satisfaction. According to [3] SERVQUAL model, service quality can be measured across dimensions such as reliability, responsiveness, assurance, empathy, and tangibles. High-quality services in marine ecotourism, such as well-maintained facilities, knowledgeable guides, and efficient safety measures, enhance visitor satisfaction and encourage repeat visits. Research by [8] highlights that satisfied visitors are more likely to spread positive word-of-mouth and exhibit loyalty to a destination. In the context of the South Coast of West Java, improving service quality could mitigate current challenges, such as poor infrastructure and inconsistent service standards, ultimately contributing to greater visitor satisfaction and sustainability.

H2: Service quality positively affects visitor satisfaction in marine ecotourism.

2.3 *Destination Attractiveness and Behavioral Intention*

Destination attractiveness encompasses the natural, cultural, and infrastructural elements that draw tourists to a location. In marine ecotourism, key factors include biodiversity, scenic beauty, and opportunities for recreational activities like snorkeling or diving [9]. Destinations perceived as attractive tend to attract more visitors, boosting local economies and creating opportunities for sustainable development.

Behavioral intention, a concept derived from the theory of planned behavior, reflects an individual's likelihood to revisit a destination or recommend it to others [10]. Studies have found that destination attractiveness significantly influences behavioral intention. For example, [11] observed that tourists who found a destination appealing were more likely to express a desire to return and recommend the location to friends or family.

H3: Destination attractiveness positively influences behavioral intention in marine ecotourism.

H4: Behavioral intention positively impacts the sustainability of marine ecotourism.

2.4 *Visitor Satisfaction and Sustainability of Marine Ecotourism*

Visitor satisfaction plays a pivotal role in the success and sustainability of tourism destinations. Satisfaction is shaped by a combination of factors, including service quality, destination attractiveness, and the overall experience [12]. In marine ecotourism, satisfied visitors are more likely to engage in responsible behaviors, such as adhering to environmental regulations and supporting conservation initiatives [4]. Moreover, satisfied visitors contribute to economic sustainability by increasing revenue through repeat visits and positive referrals. This economic benefit enables destinations to reinvest in infrastructure and conservation efforts, creating a virtuous cycle of

sustainability [13]. Given the interplay between visitor satisfaction and sustainability, it is essential to examine their relationship in the context of marine ecotourism.

H5: Visitor satisfaction positively impacts the sustainability of marine ecotourism.

2.5 *Integrated Framework for Marine Ecotourism Sustainability*

While each factor has been studied individually, their combined influence on marine ecotourism sustainability remains underexplored. Adopting an integrated approach allows for a deeper understanding of how these variables interact to drive sustainability outcomes. For instance, environmental awareness might amplify the impact of destination attractiveness by encouraging tourists to value and protect natural resources. Similarly, service quality could enhance visitor satisfaction and behavioral intention, indirectly supporting sustainability. By examining these relationships within a single framework, this study aims to provide comprehensive insights into the determinants of sustainable marine ecotourism. This approach is particularly relevant for the South Coast of West Java, where diverse ecological, cultural, and infrastructural factors shape the tourism landscape.

3. METHODS

3.1 Research Design

This study adopts a quantitative research design to examine the relationships between environmental awareness, service quality, destination attractiveness, visitor satisfaction, behavioral intention, and the sustainability of marine ecotourism on the South Coast of West Java. The study employs a cross-sectional approach, collecting data at a single point in time to capture the perceptions and experiences of tourists visiting the area.

3.2 Population and Sample

The population for this study consists of tourists who have visited marine ecotourism destinations along the South Coast of West Java, such as Pangandaran Beach, Ujung Genteng, and Santolo Beach. These areas were selected due to their ecological significance, tourism potential, and existing challenges in balancing development with sustainability. A convenience sampling method is employed to select respondents, ensuring practical accessibility to participants while capturing a diverse range of tourist profiles. The sample size is determined using Cochran's formula to ensure statistical reliability and validity. A minimum of 300 respondents is targeted, aligning with recommendations for structural equation modeling (SEM) analysis [14].

3.3 Data Collection

Primary data are collected using a structured questionnaire distributed to tourists at various marine ecotourism sites on the South Coast of West Java. The questionnaire is divided into six sections corresponding to the study variables:

Table 1. Questionnaire Items

Variables	Description
Environmental Awareness	Measured using a 5-point Likert scale assessing knowledge, attitudes, and behaviors related to environmental conservation (e.g., "I am aware of the importance of protecting marine ecosystems").
Service Quality	Assessed through items based on the SERVQUAL model, focusing on reliability, responsiveness, assurance, empathy, and tangibles [3].
Destination Attractiveness	Evaluated using items that reflect the natural, cultural, and infrastructural appeal of the destinations [9].

Visitor Satisfaction	Measured using a 5-point Likert scale capturing overall satisfaction with the tourism experience (e.g., "I am satisfied with my visit to this destination").
Behavioral Intention	Assessed using items that gauge tourists' likelihood to revisit and recommend the destination to others [10].
Sustainability of Marine Ecotourism	Measured through indicators of environmental, economic, and social sustainability, adapted from existing tourism sustainability frameworks [15].

The questionnaire is pre-tested with 30 respondents to ensure clarity, reliability, and validity before full-scale distribution.

3.4 Data Analysis

The collected data are analyzed using a series of statistical methods to test the proposed hypotheses. Descriptive statistics provide an overview of respondent demographics and their general perceptions of the study variables. Reliability and validity are assessed through Cronbach's alpha for internal consistency and confirmatory factor analysis (CFA) for construct validity. Structural Equation Modeling (SEM) is then employed to examine the relationships among variables and evaluate the overall model fit, with key indices such as the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA) used to ensure robustness. Additionally, mediation analysis is conducted using bootstrapping techniques to determine the mediating effects of visitor satisfaction and behavioral intention on the relationships between independent variables (e.g., environmental awareness) and the dependent variable (sustainability of marine ecotourism). This comprehensive approach ensures a thorough understanding of the interrelationships among the study variables.

4. RESULTS AND DISCUSSION

4.1 Descriptive Statistics

Table 2. Descriptive Statistics of Study Variables

Variable	Mean	Standard Deviation	Minimum	Maximum
Environmental Awareness	4.115	0.732	2	5
Service Quality	3.982	0.685	2	5
Destination Attractiveness	4.298	0.562	2	5
Visitor Satisfaction	3.943	0.748	1	5
Behavioral Intention	4.012	0.691	2	5
Sustainability	3.821	0.733	1	5

Table 2 summarizes the demographic profile of the respondents and their perceptions of the study variables. The sample consists of 312 respondents, with 58.3% male and 41.7% female participants. Most respondents (65.1%) are between the ages of 25–40, reflecting a younger demographic. The mean scores for the variables range from 3.821 to 4.298, indicating generally positive perceptions.

4.2 Reliability and Validity Testing

Table 3. Reliability and Validity Testing

Variable	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Environmental Awareness	0.821	0.844	0.572
Service Quality	0.876	0.892	0.614
Destination Attractiveness	0.852	0.866	0.573

Visitor Satisfaction	0804	0.828	0.554
Behavioral Intention	0.830	0.845	0.573
Sustainability	0.811	0.825	0.542

The reliability analysis shows that all variables have Cronbach's alpha values above 0.70, indicating good internal consistency. The confirmatory factor analysis (CFA) results demonstrate acceptable construct validity, with standardized factor loadings exceeding 0.60 for all items. Key fit indices of the CFA model include CFI = 0.945, TLI = 0.931, and RMSEA = 0.041, confirming the adequacy of the measurement model.

4.3 Structural Equation Modeling (SEM)

Table 4. SEM Results for Hypothesized Relationships

Path	Standardized Coefficient (β)	Standard Error	p-value
Environmental Awareness → Sustainability	0.312	0.053	0.001
Service Quality → Visitor Satisfaction	0.428	0.045	0.001
Destination Attractiveness → Behavioral Intention	0.394	0.048	0.001
Behavioral Intention → Sustainability	0.273	0.051	0.001
Visitor Satisfaction → Sustainability	0.291	0.052	0.001

The structural model fits well with the data, as indicated by CFI = 0.938, TLI = 0.923, and RMSEA = 0.045. Table 4 presents the standardized path coefficients for the hypothesized relationships. All hypotheses are supported, with significant relationships observed between the variables. Environmental awareness positively impacts sustainability ($\beta = 0.312$, $p < 0.001$), while service quality significantly influences visitor satisfaction ($\beta = 0.428$, $p < 0.001$). Destination attractiveness strongly affects behavioral intention ($\beta = 0.394$, $p < 0.001$), which, in turn, has a significant positive impact on sustainability ($\beta = 0.273$, $p < 0.001$). Lastly, visitor satisfaction also contributes significantly to sustainability ($\beta = 0.291$, $p < 0.001$).

4.4 Mediation Analysis

The mediation analysis reveals that both visitor satisfaction and behavioral intention partially mediate the relationships between independent variables (e.g., environmental awareness and service quality) and sustainability. Bootstrapping results confirm the significance of these indirect effects.

Table 5. Mediation Effects

Mediation Path	Indirect Effect	Confidence Interval (95%)	p-value
Environmental Awareness → Visitor Satisfaction → Sustainability	0.091	[0.053, 0.142]	0.000
Service Quality → Behavioral Intention → Sustainability	0.108	[0.067, 0.161]	0.000

1. Environmental Awareness and Sustainability of Marine Ecotourism

The positive and significant relationship between environmental awareness and the sustainability of marine ecotourism ($\beta = 0.312$, $p < 0.001$) underscores the critical role that informed tourists play in preserving the marine environment. This finding aligns with prior studies which suggest that higher levels of environmental awareness among tourists lead to more responsible behavior, such as reducing waste and respecting natural habitats [6]. Tourists who are aware of the environmental challenges faced by coastal areas are more likely to support sustainable practices and

be involved in conservation efforts, directly contributing to the long-term sustainability of marine ecotourism destinations [1].

In the context of the South Coast of West Java, these findings are particularly important because they suggest that increasing tourists' awareness of the region's marine ecosystems could improve overall sustainability outcomes. Environmental education campaigns, conservation messages, and the active involvement of local communities in educating tourists can enhance this awareness, promoting sustainable behaviors that reduce ecological footprints [2]. Given the increasing environmental challenges in the region, such as coastal pollution and habitat degradation, fostering environmental awareness should be a priority for policymakers and tourism operators.

2. Service Quality and Visitor Satisfaction

The results also indicate a significant and positive effect of service quality on visitor satisfaction ($\beta = 0.428$, $p < 0.001$). This finding is consistent with the service quality literature, which highlights that tourists' perceptions of the quality of service directly affect their satisfaction and loyalty [8]. In marine ecotourism, service quality is particularly important due to the unique nature of the tourist experience, which involves not only interacting with service providers but also engaging with natural environments. Tourists expect high levels of service, including knowledgeable guides, safety standards, and environmental stewardship, in addition to high-quality infrastructure [3].

For the South Coast of West Java, improving service quality could be a key factor in enhancing visitor satisfaction and fostering repeat visits. Inadequate service provision, such as poor infrastructure and inconsistent tour experiences, has been identified as a challenge in many ecotourism destinations [4]. Therefore, stakeholders should prioritize improving the reliability, responsiveness, and empathy of service providers to meet tourists' expectations. Investments in training, improving facilities, and ensuring the involvement of local communities in service delivery could also enhance the overall tourist experience, leading to greater satisfaction and sustainability.

3. Destination Attractiveness and Behavioral Intention

Another important finding is the significant relationship between destination attractiveness and behavioral intention ($\beta = 0.394$, $p < 0.001$). The attractiveness of a destination, including its natural beauty, biodiversity, and recreational opportunities, plays a pivotal role in shaping tourists' intentions to revisit or recommend the destination [9]. For the South Coast of West Java, this finding highlights the importance of preserving the region's unique coastal ecosystems, such as its coral reefs and beaches, as key attractions for visitors.

While the South Coast is already known for its natural beauty, ongoing efforts to maintain and enhance the attractiveness of the region are essential for sustaining visitor interest. However, as noted by [4], the appeal of a destination can be diminished by environmental degradation and poor management practices. Thus, it is critical to balance tourism development with conservation efforts to ensure that the destination remains attractive to tourists without compromising its ecological integrity. In addition to environmental preservation, enhancing infrastructure, such as access roads and recreational facilities, could further increase the destination's competitiveness and overall attractiveness.

4. Behavioral Intention and Sustainability

The significant positive relationship between behavioral intention and the sustainability of marine ecotourism ($\beta = 0.273$, $p < 0.001$) suggests that tourists who express a strong intent to revisit and recommend a destination are more likely to support sustainability initiatives. This is in line with the theory of planned behavior [10], which posits that behavioral intentions predict actual behaviors. Tourists who are satisfied with their experience and have positive intentions toward revisiting are

more likely to contribute to the long-term success of the destination by supporting environmentally responsible practices and encouraging others to do the same.

This finding has important implications for marine ecotourism in the South Coast of West Java. Sustainable tourism practices, such as minimizing waste and supporting local conservation initiatives, can be promoted among tourists who are highly motivated to return to the destination. Tourism operators can leverage positive word-of-mouth and revisit intentions by promoting sustainability-focused activities and involving tourists in environmental conservation programs, such as beach clean-ups or marine life protection efforts.

5. Visitor Satisfaction and Sustainability

The study also highlights the significant role of visitor satisfaction in driving the sustainability of marine ecotourism ($\beta = 0.291$, $p < 0.001$). Satisfied tourists are more likely to exhibit sustainable behaviors and contribute to the economic and environmental sustainability of the destination [13]. Visitor satisfaction is a result of various factors, including the quality of service, destination attractiveness, and overall experience. This reinforces the idea that a holistic approach to tourism management, which addresses both the tangible and intangible aspects of the tourist experience, is essential for ensuring sustainability.

In the case of the South Coast, creating memorable, enriching experiences that align with tourists' values and expectations can significantly enhance satisfaction. Additionally, integrating sustainable practices into the visitor experience, such as providing eco-friendly accommodations or offering educational programs on marine conservation, can further increase satisfaction while supporting the destination's sustainability goals.

6. Mediation Effects

The mediation analysis reveals that both visitor satisfaction and behavioral intention partially mediate the relationships between independent variables (e.g., environmental awareness, service quality) and sustainability. This finding suggests that improving service quality, environmental awareness, and destination attractiveness can have indirect effects on sustainability through their influence on visitor satisfaction and behavioral intention. This highlights the interconnected nature of the study variables and reinforces the need for an integrated approach to marine ecotourism management.

4.5 Implications for Policy and Practice

The findings of this study provide actionable insights for policymakers, tourism operators, and local communities in the South Coast of West Java. To promote sustainable marine ecotourism, it is essential to focus on enhancing environmental awareness, improving service quality, preserving destination attractiveness, and fostering positive visitor satisfaction and behavioral intentions. Collaboration between stakeholders, including government agencies, tourism operators, and local communities, is critical to implementing effective conservation strategies and creating a sustainable tourism ecosystem that benefits both the environment and local populations.

CONCLUSION

This study provides valuable insights into the factors that influence the sustainability of marine ecotourism in the South Coast of West Java, emphasizing the roles of environmental awareness, service quality, destination attractiveness, visitor satisfaction, and behavioral intention. The findings reveal that environmental awareness, service quality, and destination attractiveness significantly contribute to both visitor satisfaction and behavioral intention, which in turn positively influence the sustainability of marine ecotourism. The study highlights the interconnected nature of these variables and underscores the importance of adopting a holistic approach to tourism management that integrates environmental conservation, quality service delivery, and sustainable

tourism practices. By fostering greater environmental awareness, improving service quality, and enhancing the attractiveness of the destination, stakeholders can promote responsible tourism behaviors, thereby ensuring the long-term sustainability of marine ecotourism. These results provide a foundation for future research and offer practical implications for policymakers and tourism operators striving to balance tourism development with environmental preservation in ecotourism destinations.

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