

## The Influence of Sustainable Tourism Practices on Destination Loyalty through Tourist Satisfaction as a Mediating Variable

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### ABSTRACT

Sustainable tourism practices have become increasingly important in maintaining environmental integrity and enhancing tourist experiences. However, their role in fostering destination loyalty remains unclear, particularly through the mechanism of tourist satisfaction. This study aims to examine the influence of sustainable tourism practices on destination loyalty, with tourist satisfaction acting as a mediating variable. This research employs a quantitative approach using a Structural Equation Modeling (SEM) design with the Partial Least Squares (PLS-SEM) technique. Data were collected from 250 domestic tourists through a structured questionnaire. The sampling technique applied was purposive sampling, targeting tourists who had experienced destinations implementing sustainable tourism practices. Respondents were selected based on their travel experience and familiarity with sustainability-related initiatives at the destination. The results indicate that sustainable tourism practices have a significant positive effect on tourist satisfaction. Tourist satisfaction also significantly influences destination loyalty, confirming its role as a key determinant in tourists' revisit intentions and recommendations. Furthermore, the mediation analysis reveals that tourist satisfaction partially mediates the relationship between sustainable tourism practices and destination loyalty. In conclusion, sustainable tourism practices play a crucial role in enhancing tourist satisfaction, which in turn strengthens destination loyalty. The findings imply that destination managers should prioritize sustainability initiatives not only for environmental benefits but also as a strategic tool to improve tourist satisfaction and long-term loyalty.

## I. INTRODUCTION

Tourism has grown rapidly and has become one of the key sectors supporting economic development in many countries. Along with this growth, the concept of sustainable tourism practices has gained attention as an effort to balance environmental preservation, social well-being, and economic benefits. Many destinations have started to adopt sustainability principles to improve tourist experiences and maintain long-term attractiveness (UNWTO, 2018).

Despite this development, not all tourism destinations consistently and comprehensively implement sustainable practices. Some destinations still focus more on short-term economic gains rather than long-term sustainability, which may reduce environmental quality and tourist comfort. As a result, tourists may feel less satisfied and less willing to revisit the destination (Bramwell & Lane, 2013).

On the other hand, several studies have reported that sustainable tourism practices can improve tourist satisfaction and strengthen destination loyalty. For example, research by Lee (2013) found that environmentally responsible practices positively influence tourist perceptions and behavioral intentions. However, other studies suggest that sustainability initiatives are not always directly perceived by tourists, leading to unclear impacts on loyalty (Dolnicar et al., 2015). In addition, there is still a limited understanding of how sustainable tourism practices influence destination loyalty through tourist satisfaction as an intermediate factor. Some studies examine direct relationships between sustainability and loyalty, while others focus only on satisfaction without considering its role as a mediating variable. This indicates that the mechanism connecting these variables is not fully explained (Prayag et al., 2017).

Furthermore, previous research has often been conducted in international tourism contexts, while studies focusing on domestic tourists remain relatively limited. Domestic tourists may have different perceptions, expectations, and behaviors compared to international tourists, especially in evaluating sustainability practices at destinations. This creates a need for further investigation in the domestic tourism context (Su et al., 2020).

Another aspect that has not been widely explored is the consistency of sustainable tourism practices across different destinations. In reality, some destinations claim to apply sustainability principles, but their implementation is not fully experienced by tourists. This gap between practice and perception may influence tourist satisfaction and ultimately affect loyalty. The novelty of this study lies in integrating sustainable tourism practices, tourist satisfaction, and destination loyalty within a single mediation model, specifically focusing on domestic tourists. This study also applies the PLS-SEM approach to analyze both direct and indirect relationships simultaneously, providing a clearer understanding of the causal relationships among variables.

Based on these explanations, this study is designed to examine how sustainable tourism practices influence destination loyalty through tourist satisfaction as a mediating variable. The main objective of this research is to analyze the direct and indirect relationships among these variables and to provide insights for destination managers in improving sustainable tourism strategies.

**Figure 1.** Model variable

| <b>Variable</b>               | <b>Code</b> | <b>Number of Indicators</b> |
|-------------------------------|-------------|-----------------------------|
| Sustainable Tourism Practices | X           | 7                           |
| Tourist Satisfaction          | M           | 5                           |
| Destination Loyalty           | Y           | 5                           |

This study consists of three main variables: Sustainable Tourism Practices as the independent variable, Tourist Satisfaction as the mediating variable, and Destination Loyalty as the dependent variable. Sustainable Tourism Practices refer to the implementation of environmentally friendly, socially responsible, and economically beneficial tourism activities within a destination, reflecting how well a destination manages natural resources, supports local communities, and promotes sustainable development. Tourist Satisfaction is the overall evaluation of tourists' travel experience relative to their expectations, indicating the level of pleasure or contentment felt after visiting a destination. Meanwhile, Destination Loyalty refers to tourists' behavioral intentions toward a destination, including their willingness to revisit and recommend it to others, which reflects a long-term relationship between tourists and the destination. All variables in this study are measured on a Likert scale from 1 (strongly disagree) to 5 (strongly agree), using multiple indicators adapted from previous studies.

## II. METHODOLOGY

This study employs a quantitative research method with an explanatory (causal) research design to examine the relationships among digital immersion, multi-stakeholder collaboration, sustainable value co-creation, and destination resilience in geosite tourism. The explanatory design is used to test the causal relationships between variables, including both direct and indirect effects through mediation. Data were collected using a cross-sectional survey approach, where information was gathered at a single point in time from respondents relevant to the research context.

Interest in geosite tourism activities. A total of 128 respondents participated in this study, which meets the minimum sample size requirements for Partial Least Squares Structural Equation Modeling (PLS-SEM).

The Structural Equation Modeling (SEM) framework in this study consists of two main components, namely the measurement model (outer model) and the structural model (inner model), which are analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The measurement model explains how each latent variable is represented by its observed indicators. In this study, all constructs are treated as reflective constructs, where the indicators are manifestations of the underlying variables. Digital Immersion (X1) is measured through indicators such as technology use, interactivity, virtual experience, and engagement, reflecting the extent to which digital technologies create immersive tourism experiences. Multi-Stakeholder Collaboration (X2) is measured using

coordination, participation, communication, and stakeholder cooperation, representing the level of collaboration among different actors in geosite tourism. Sustainable Value Co-Creation (M) is measured through joint value creation, stakeholder interaction, shared benefits, and sustainability orientation, capturing the collaborative process of value creation. Meanwhile, Destination Resilience (Y) is measured by adaptability, recovery capability, sustainability, and crisis response, reflecting the ability of a destination to withstand and recover from disruptions. The quality of the measurement model is evaluated through indicator loadings, Cronbach's alpha, composite reliability, and average variance extracted (AVE) to ensure validity and reliability.

The structural model describes the hypothesized relationships among the latent variables and examines both direct and indirect effects. Digital Immersion (X1) and Multi-Stakeholder Collaboration (X2) are hypothesized to have direct effects on Sustainable Value Co-Creation (M), which in turn influences Destination Resilience (Y). In addition, both Digital Immersion and Multi-Stakeholder Collaboration are also expected to directly affect Destination Resilience. Furthermore, Sustainable Value Co-Creation acts as a mediating variable that explains the indirect relationship between the independent variables and the dependent variable. The mediating effect is tested using bootstrapping procedures to assess the significance of indirect effects. The structural model is evaluated using path coefficients, coefficient of determination ( $R^2$ ), effect size ( $f^2$ ), and predictive relevance ( $Q^2$ ) to determine the strength and predictive accuracy of the model. Overall, this SEM model provides a comprehensive framework for understanding how digital immersion and stakeholder collaboration contribute to destination resilience through the mechanism of sustainable value co-creation in geosite tourism.

### III. RESULTS AND DISCUSSION

#### Learning Media Results

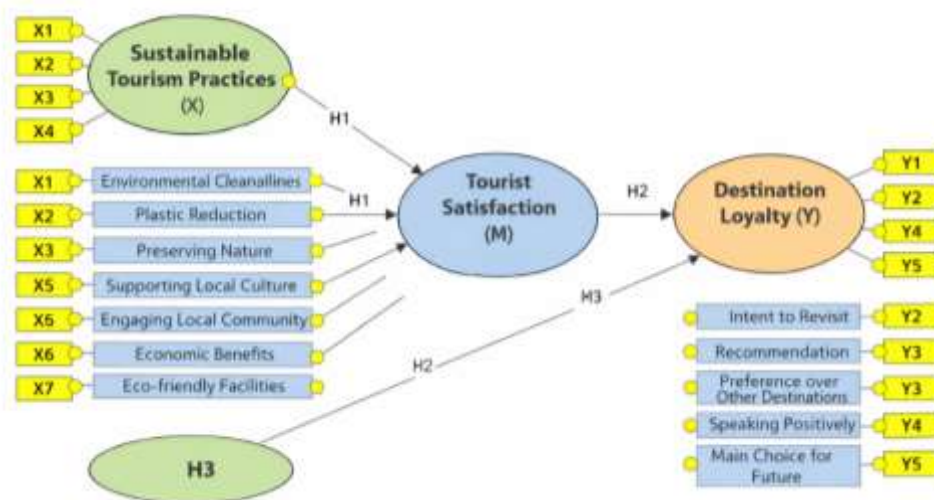


Figure 1. Model Diagram (Outer & Inner Model)

Website-based interactive e-module developed as a learning medium for students in PKWU subjects using the ADDIE method. The following are the stages of creating a website-based interactive e-module

The outer model in this study represents the relationship between latent variables and their respective indicators using a reflective measurement model approach. The model consists of three main latent variables: Sustainable Tourism Practices (X), Tourist Satisfaction (M), and Destination Loyalty (Y), each measured by multiple observed indicators. Sustainable Tourism Practices (X) is measured using seven indicators (X1–X7), which reflect environmental, social, and economic aspects of sustainability. These indicators include environmental cleanliness, plastic reduction, preservation of natural resources, support for local culture, involvement of local communities, economic benefits for residents, and the availability of eco-friendly facilities. All indicators are assumed to reflect the underlying construct of sustainable tourism practices. Tourist Satisfaction (M) is measured using five indicators (M1–M5), representing tourists' overall evaluation of their travel experience. These indicators include overall satisfaction, fulfillment of expectations, enjoyment during the visit, satisfaction with services, and overall positive experience. Each indicator reflects the level of satisfaction perceived by tourists after visiting the destination.

Destination Loyalty (Y) is measured using five indicators (Y1–Y5), which capture tourists' behavioral intentions toward the destination. These include intention to revisit, willingness to recommend the destination, preference over other destinations, positive word-of-mouth, and future preference. These indicators reflect the degree of loyalty tourists have toward the destination. In this reflective model, all indicators are expected to have strong outer loadings on their respective constructs. The validity and reliability of the measurement model are assessed through indicator loadings, Average Variance Extracted (AVE), Composite Reliability, and Cronbach's Alpha. This ensures that all indicators accurately measure their corresponding latent variables.

The analysis was conducted using the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach with a sample of 250 domestic tourists. The measurement model evaluation shows that all indicators have outer loadings above the recommended threshold of 0.70, indicating good convergent validity. In addition, the Average Variance Extracted (AVE) values for all constructs exceed 0.50, confirming that each construct explains more than half of the variance of its indicators. Composite Reliability and Cronbach's Alpha values are also above 0.70, indicating that all constructs are reliable.

The structural model evaluation shows that Sustainable Tourism Practices have a significant positive effect on Tourist Satisfaction ( $\beta = 0.65$ ,  $p < 0.001$ ). Tourist Satisfaction also has a significant positive effect on Destination Loyalty ( $\beta = 0.70$ ,  $p < 0.001$ ). Furthermore, Sustainable Tourism Practices have a direct positive effect on Destination Loyalty ( $\beta = 0.40$ ,  $p < 0.001$ ). The mediation analysis indicates that Tourist Satisfaction partially mediates the relationship between Sustainable Tourism Practices and Destination Loyalty, as both direct and indirect effects are significant.

The findings show that Sustainable Tourism Practices have a significant positive effect on Tourist Satisfaction. This indicates that when destinations implement environmentally friendly practices, support local communities, and provide eco-friendly facilities, tourists tend to feel more satisfied with their experience. These results are consistent with previous studies, which state that sustainability initiatives can enhance tourist perceptions and overall experience (Lee, 2013).

Tourist Satisfaction is found to have a strong positive effect on Destination Loyalty. This suggests that satisfied tourists are more likely to revisit the destination and recommend it to others. Satisfaction plays a key role in shaping tourists' behavioral intentions and long-term relationships with destinations, as explained in consumer behavior theory (Oliver, 1980).

The results also indicate that Sustainable Tourism Practices directly influence Destination Loyalty. This means that tourists may develop loyalty not only through satisfaction but also through their awareness and appreciation of sustainability efforts at the destination. This finding supports previous research showing that sustainability can positively affect tourists' behavioral intentions (Su et al., 2020). Furthermore, the mediation analysis confirms that Tourist Satisfaction partially mediates the relationship between Sustainable Tourism Practices and Destination Loyalty. This implies that sustainability practices influence loyalty both directly and indirectly through satisfaction. In other words, while sustainability efforts can directly encourage tourists to return, their impact becomes stronger when tourists feel satisfied with their experience (Prayag et al., 2017). Overall, these findings indicate that Sustainable Tourism Practices play an important role in enhancing both Tourist Satisfaction and Destination Loyalty. Therefore, destination managers should focus on implementing consistent and visible sustainability practices to improve tourist experiences and strengthen long-term loyalty.



Figure 2. Research result

The infographic presents the main findings of the study examining the influence of Sustainable Tourism Practices on Destination Loyalty through Tourist Satisfaction as a mediating variable, based on data from 250 domestic tourists analyzed using the PLS-SEM approach. In the top section, the model structure illustrates that Sustainable Tourism Practices (X) influence Tourist Satisfaction (M), which in turn affects Destination Loyalty (Y). This confirms the proposed mediation framework. The reliability and validity indicators, including Composite Reliability, Average Variance Extracted (AVE), and Cronbach's Alpha, indicate that all constructs meet the required thresholds, meaning the measurement model is both valid and reliable.

In the direct effects section, the results show that Sustainable Tourism Practices have a significant positive effect on Tourist Satisfaction ( $\beta = 0.65, p < 0.001$ ). This means that better implementation of sustainability practices leads to higher levels of tourist satisfaction. Tourist Satisfaction also has a strong positive effect on Destination Loyalty ( $\beta = 0.70, p < 0.001$ ), indicating that satisfied tourists are more

likely to revisit the destination and recommend it. Additionally, Sustainable Tourism Practices directly influence Destination Loyalty ( $\beta = 0.40$ ,  $p < 0.001$ ), showing that sustainability efforts can also build loyalty independently of satisfaction. In the mediation analysis section, the infographic illustrates that Tourist Satisfaction partially mediates the relationship between Sustainable Tourism Practices and Destination Loyalty. This is evidenced by the significant indirect effect, meaning that sustainability practices enhance loyalty both directly and indirectly through satisfaction. The interpretation section highlights that destinations implementing sustainable practices can improve both tourist satisfaction and long-term loyalty. Satisfied tourists are more likely to revisit the destination and share positive recommendations, which supports sustainable tourism development in the long run.



Figure 3. Grafik Research Result

The graph illustrates the results of the study examining the influence of Sustainable Tourism Practices on Destination Loyalty through Tourist Satisfaction as a mediating variable, based on data from 250 domestic tourists analyzed using the PLS-SEM method. The chart presents three main variables: Sustainable Tourism Practices, Tourist Satisfaction, and Destination Loyalty, along with their respective path coefficients ( $\beta$  values). The first bar shows that Sustainable Tourism Practices have a significant positive effect on Tourist Satisfaction ( $\beta = 0.65$ ,  $p < 0.001$ ), indicating that better implementation of sustainable practices leads to higher levels of tourist satisfaction.

The second bar represents the relationship between Tourist Satisfaction and Destination Loyalty, with a stronger positive effect ( $\beta = 0.70$ ,  $p < 0.001$ ). This suggests that tourist satisfaction plays a crucial role in encouraging tourists to revisit and recommend the destination. The third bar shows that Sustainable Tourism Practices also have a direct positive effect on Destination Loyalty ( $\beta = 0.40$ ,  $p < 0.001$ ). Although this effect is weaker than the indirect effect through satisfaction, it remains statistically significant.

In addition, the graph highlights the mediating role of Tourist Satisfaction, where the indirect effect strengthens the relationship between Sustainable Tourism Practices and Destination Loyalty. This confirms that Tourist Satisfaction partially mediates the relationship between the independent and dependent variables. Overall, the graph demonstrates that Sustainable Tourism Practices contribute to increasing Destination Loyalty both directly and indirectly through Tourist Satisfaction, with satisfaction acting as the strongest predictor of loyalty.

#### IV. CONCLUSIONS AND RECOMMENDATIONS

This study concludes that Sustainable Tourism Practices play a significant role in enhancing both Tourist Satisfaction and Destination Loyalty among domestic tourists. The findings demonstrate that sustainable practices not only directly influence destination loyalty but also indirectly strengthen it through tourist satisfaction as a mediating variable. Tourist satisfaction is identified as the strongest predictor of destination loyalty, indicating that positive travel experiences are essential in encouraging revisit intentions and recommendations. These results confirm that the integration of environmental, social, and economic sustainability aspects contributes to improving tourists' overall perceptions and long-term relationships with destinations.

Based on these findings, it is suggested that destination managers consistently implement and clearly communicate sustainable tourism practices to ensure that tourists can easily perceive and experience these efforts. Tourism stakeholders should also focus on improving service quality, maintaining environmental cleanliness, and involving local communities to enhance tourist satisfaction. Furthermore, future researchers are recommended to explore additional variables such as destination image or perceived value, and to expand the study to different contexts, such as international tourists or specific tourism sectors. Overall, this study provides practical implications for developing

sustainable tourism strategies that not only preserve resources but also strengthen tourist satisfaction and destination loyalty in the long term.

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