# Sustainable Loyalty Boost: Influence of Sustainability on Ecotourist Loyalty: The Role of Tourist Experience as a Mediator

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**Abstract**
This study underscores the critical importance of sustainability in fostering tourist loyalty within the ecotourism sector, emphasising that sustainable practices across economic, environmental, and social dimensions significantly influence tourists' experiences and satisfaction, which in turn promote loyalty. The primary aim was to empirically examine the direct and mediated relationships among these variables, providing insights into how sustainable practices impact long-term visitor retention. Data were collected through structured surveys, with a total of 289 valid responses used for analysis. The study employed Partial Least Squares Structural Equation Modelling (PLS-SEM) to test the proposed hypotheses, assessing the strength and significance of the relationships among constructs. The results revealed that economic sustainability directly affects tourist experience but does not directly influence loyalty, indicating the mediating role of experience and satisfaction. In contrast, environmental and social sustainability directly and indirectly impact loyalty through

enhanced experience and satisfaction. All hypotheses related to the mediating effects were supported, emphasising the importance of integrating sustainability practices to foster loyalty. The study suggests future research should explore moderating variables such as cultural differences, leverage longitudinal designs to examine changes over time, and incorporate digital technology's role in enhancing sustainable experiences. The findings have practical implications for ecotourism stakeholders, highlighting the need to develop comprehensive sustainability strategies that elevate visitor experiences, foster satisfaction, and promote loyalty. By effectively implementing sustainability initiatives, ecotourism destinations can secure competitive advantages, ensure visitor retention, and contribute meaningfully to conservation and community development. Ultimately, the study adds to the growing body of knowledge urging the ecotourism sector to prioritise sustainability as a core driver of long-term tourist loyalty.

**Keywords:** Economics, Sustainability, Environmental Sustainability, Social Sustainability, Tourist Experience, Tourist Satisfaction, Tourist Loyalty

**Introduction**
Ensuring repeat visitation and ongoing engagement from visitors is crucial for the sustained success and growth of the ecotourism sector. Loyal tourists are more likely to revisit eco-destinations, recommend them to others, and contribute to local economies while supporting conservation efforts. This repeat visitation not only stabilises revenues for ecotourism operators but also fosters long-term environmental and social sustainability, aligning economic benefits with ecological preservation (Hoang et al., 2023). Moreover, loyal ecotourists tend to have a higher commitment to environmentally responsible behaviours, thus reinforcing the core principles of ecotourism. Globally, the ecotourism sector faces several issues and trends related to tourist loyalty. One prominent trend is the increasing demand for authentic, meaningful experiences that align with tourists' environmental and social values (Rahayu et al., 2023). However, scepticism remains regarding the authenticity of these experiences and greenwashing practices of some destinations, which can diminish trust and loyalty. Additionally, eco-tourists are becoming more conscious of their carbon footprint and social impacts, fueling a preference for responsible travel. Yet, inconsistent sustainability standards across destinations pose significant challenges (Kusumah, 2024). The COVID-19 pandemic further disrupted tourist flows, highlighting the importance of fostering loyalty through safety and resilience strategies (Amit et al., 2025). Research gaps persist in understanding the specific factors influencing loyalty within diverse ecological and cultural contexts. While studies have explored perceived authenticity, service quality, and experience, less attention has been paid to cultural differences, local community involvement, and the role of digital platforms in cultivating loyalty (Talukder et al., 2024). The dynamics of how eco-tourists' expectations evolve are also underexplored (Sarangi & Ghosh, 2025). The problem of maintaining tourist loyalty in ecotourism stems from divergence between tourists' expectations and actual experiences, often influenced by inconsistent sustainability practices and service quality (Van Phung, Tri, & Nguyen, 2024). Overcoming perceptions of greenwashing and ensuring genuine, impactful experiences are crucial for fostering loyalty (Jaitip et al., 2024). This study has significant implications for policymakers, ecotourism operators, and tourists. For policymakers, understanding loyalty drivers informs regulations and incentives promoting sustainable tourism (Arevin et al., 2025). Ecotourism operators can leverage insights to enhance service quality, authenticity, and engagement strategies (Naparin, 2025). For tourists, the findings can educate responsible travel behaviours and

guide them in selecting authentic eco-destinations (Singh et al., 2025). Ultimately, fostering loyalty is essential for aligning economic benefits with conservation goals, ensuring the sustainable growth of ecotourism worldwide.

**Literature Review**
*Underpinning Theory*
The combined application of the Stimulus-Organism-Response (S-O-R) model and Expectancy-Disconfirmation Theory (EDT) provides a comprehensive framework for understanding tourist loyalty in ecotourism. The S-O-R model posits that external environmental Stimuli (e.g., economic, environmental, and social sustainability practices) influence internal cognitive and emotional states, referred to as the Organism, which subsequently lead to behavioural responses, such as loyalty (Mehrabian & Russell, 1974). In this context, the stimuli are the sustainability initiatives adopted by ecotourism destinations, shaping tourists' perceptions and experiences. Integrating EDT enriches this framework by explaining how tourists' satisfaction is formed. According to Oliver (1980), satisfaction results from the comparison between tourists' pre-visit expectations and their actual experiences. Disconfirmation occurs when actual experiences match, exceed, or fall short of expectations. When sustainability practices meet or surpass expectations, tourists experience positive disconfirmation, leading to higher satisfaction levels. This satisfaction then acts as a mediator between experience and loyalty within the S-O-R framework. By combining these theories, the model captures how external sustainability stimuli influence internal states (experience and satisfaction), which in turn drive behavioural intentions. As a result, the integrated framework explicates not only the direct effects of sustainability on loyalty but also the mediating roles of experience and satisfaction, rooted in cognitive evaluations of the experience (Oliver, 1980; Mehrabian & Russell, 1974). This dual-theoretical approach offers a robust basis for examining the nuanced pathways through which ecotourism impacts tourist loyalty.

*Relationship between Economic Sustainability, Tourist Experience & Tourist Loyalty*
The nexus between economic sustainability, tourist experience, and tourist loyalty is increasingly vital for the long-term viability of destinations, as highlighted by recent academic inquiries. A compelling tourist experience is a fundamental precursor to loyalty, which in turn underpins economic sustainability. Studies indicate that memorable tourism experiences, encompassing educational and escapism elements, directly contribute to "sustainability-oriented loyalty" (Naparin, 2025a; Naparin, 2025b). Such loyalty signifies a tourist's intention to return and recommend, fostering a stable demand crucial for a destination's economic health. Furthermore, the perception of affordability significantly drives loyalty in sustainable tourism contexts, demonstrating a direct link between economic value and tourist retention (Naparin, 2025c). Sustainable tourism development, which inherently includes economic benefits for local communities, demonstrably enhances tourist satisfaction (Irfan & Azli, 2023), a critical mediator for loyalty (Sarangi & Ghosh, 2025). When tourists are satisfied with their experience in a sustainably managed destination, they are more likely to exhibit repeat visitation and positive word-of-mouth, directly translating into sustained economic activity. Moreover, fostering consumer engagement with a sustainable destination image is crucial, as this alignment encourages loyalty (Suhartanto et al., 2023), ensuring continued economic benefits. Ultimately, the intricate relationship suggests that by providing enriching and value-for-money experiences within a framework of economic sustainability, destinations can

cultivate a loyal tourist base, thereby securing their enduring prosperity. *Therefore, the following hypotheses were proposed for this study:*

> *H1: There is a relationship between economic sustainability and tourist experience in the ecotourism sector.*

> *H2: There is a relationship between economic sustainability and tourist loyalty in the ecotourism sector.*

> *H3: There is a mediating effect of tourist experience on the relationship between economic sustainability and tourist loyalty in the ecotourism sector.*

*Relationship between Environmental Sustainability, Tourist Experience & Tourist Loyalty*
The relationship between environmental sustainability, tourist experience, and tourist loyalty has garnered increasing scholarly attention, with studies indicating a strong interconnectedness among these factors. Naparin (2025) demonstrates that memorable, eco-centred experiences, such as those related to biodiversity education, enhance tourists' loyalty toward sustainable attractions by fostering a sense of environmental responsibility and personal engagement. Zhu and Wang (2025) highlight that technological innovations, including immersive VR experiences, can elevate perceived environmental value, thus strengthening tourists' loyalty by offering engaging, eco-friendly virtual environments. Musa et al. (2025) find that escapism and affordability at heritage sites bolster loyalty, emphasising that conservation and sustainability factors influence the quality of the experience. Supriadi et al. (2024) emphasise that safety measures post-COVID-19 are critical in rebuilding trust and loyalty, tying safety perceptions to overall environmental sustainability efforts. Baruah and Chatterjee (2024) reveal that virtual tourism experiences, which often highlight environmental themes, can shape positive post-purchase attitudes, reinforcing loyalty through affective and cognitive responses linked to sustainability imagery. Lastly, Meldayanoor et al. (2023) underline that sustainable ecotourism development, prioritised by tourists' perceptions of environmental management, significantly enhances their overall experience and loyalty intentions. Collectively, these studies underscore that environmental sustainability is vital in creating meaningful tourist experiences that foster long-term loyalty. *Thus, the following hypotheses were proposed for this study:*

> *H4: There is a relationship between environmental sustainability and tourist experience in the ecotourism sector.*

> *H5: There is a relationship between economic sustainability and tourist loyalty in the ecotourism sector.*

> *H6: There is a mediating effect of tourist experience on the relationship between environmental sustainability and tourist loyalty in the ecotourism sector.*

*Relationship between Social Sustainability, Tourist Experience & Tourist Loyalty*
The relationship between social sustainability, tourist experience, and tourist loyalty is increasingly recognised as integral to sustainable tourism development. Musa et al. (2025) reveal that social factors such as community involvement and cultural authenticity foster

positive tourist experiences, which in turn enhance loyalty, especially when coupled with affordable access and escapism. Choudhary and Khatoon (2025) emphasise that effective social media communication can strengthen visitor loyalty by promoting social engagement and transparency, shaping perceptions of social sustainability. Gao et al. (2024) demonstrate that quality interactions among tourists, such as peer-to-peer engagement, positively influence experiences, thereby fostering loyalty in sustainable destinations. Naparin and Rahman (2024) highlight that the co-creation of experiences related to social sustainability, such as community participation and shared values, boosts satisfaction and loyalty. Sawu (2024) discusses the importance of meaningful social interactions within destinations to create memorable experiences that lead to loyalty. Pakan and Purwandani (2023) further support this by showing that active consumer engagement in social and community-based initiatives enhances perceived destination loyalty. Saraswati, Indraswari, and Susanto (2023) conclude that tourist satisfaction rooted in social sustainability practices is a vital driver of destination loyalty. Collectively, these studies demonstrate that social sustainability enriches tourist experiences, which significantly contribute to long-term loyalty in sustainable tourism. Hence*, the following hypotheses were proposed for this study:*

> *H7: There is a relationship between social sustainability and tourist experience in the ecotourism sector.*

> *H8: There is a relationship between social sustainability and tourist loyalty in the ecotourism sector.*

> *H9: There is a mediating effect of tourist experience on the relationship between social sustainability and tourist loyalty in the ecotourism sector.*

*Relationship between Tourist Experience, Tourist Satisfaction & Tourist Loyalty*
The relationship between tourist experience, satisfaction, and loyalty is well-documented in recent research, highlighting their interconnectedness in fostering sustainable tourism growth. Bagheri and Genc (2025) emphasise that a sense of well-being derived from meaningful experiences significantly enhances tourist satisfaction, which in turn increases loyalty by fostering emotional attachment. Santos-Automono and Priyambodo (2025) demonstrate that positive experiences in forest tourism directly influence satisfaction and revisit intentions, underscoring experience as a key driver of loyalty. Suryani et al. (2024) further support that cultural experiences shape tourists' attitudes, which mediate satisfaction and loyalty, emphasising the importance of cultural authenticity. Othman & Osman (2024) reveal that perceived value and destination image influence loyalty motivation through enhanced experiences. Rahmawati et al. (2024) highlight that service quality and emotional value positively affect satisfaction, which subsequently drives loyalty. Priyono et al. (2023) show that authenticity mediates the effect of destination image on loyalty, reinforcing the importance of genuine experiences. Lastly, Saputra et al. (2023) indicate that the quality of special events, along with destination image and satisfaction, significantly impacts tourist loyalty. Collectively, these studies confirm that enriching tourist experiences and ensuring satisfaction are vital for cultivating long-term loyalty in various tourism contexts. *Therefore, the following hypotheses were proposed for this study:*

> *H10: There is a relationship between tourist experience and tourist loyalty in the ecotourism sector.*

*H11: There is a relationship between tourist experience and tourist satisfaction in the ecotourism sector.*

*H12: There is a relationship between tourist satisfaction and tourist loyalty in the ecotourism sector.*

*H13: There is a mediating effect of tourist satisfaction on the relationship between tourist experience and tourist loyalty in the ecotourism sector.*
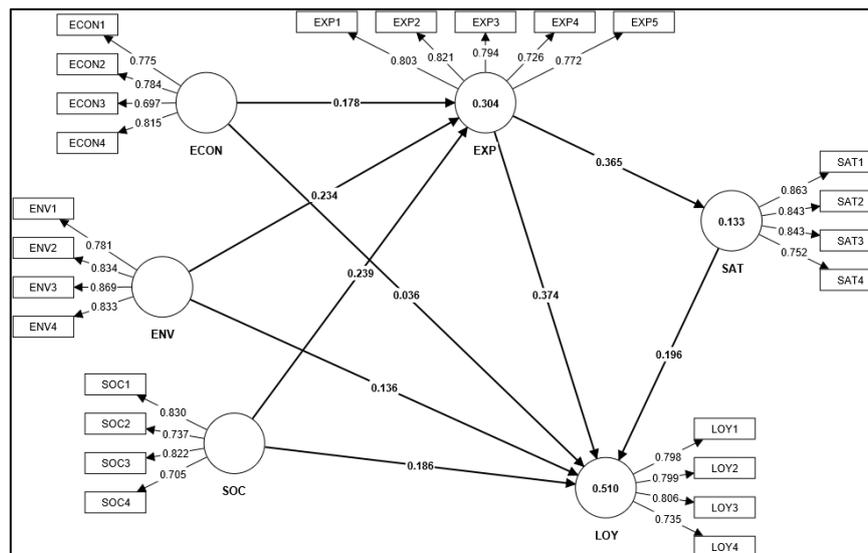


Figure 1: Research Model
*Notes: ECON=Economic Sustainability   ENV=Environmental Sustainability SOC=Social Sustainability SAT=Tourist Satisfaction   EXP=Tourist Experience LOY=Tourist Loyalty*

**Methodology**
This study aimed to explore rural tourists' perceptions regarding the direct relationships among tourist experiences, economic sustainability, environmental sustainability, social sustainability, tourist satisfaction, and tourist loyalty within the context of Malaysian ecotourism. Data were collected through surveys, with reliable measurement items selected after a comprehensive review of existing literature. Given the lack of a complete population list, participants were purposively sampled, and the survey was administered via email. The analysis involved 25 observed variables and 6 latent variables, comprising economic sustainability (measured with four items based on Oh et al., 2007), environmental sustainability (assessed using four items from Quoquab et al., 2019), and social sustainability (evaluated with four items by Larimian & Sadeghi, 2021). Mediating variables comprised tourist satisfaction (measured by four items from Carlos Castro et al., 2017) and tourist experience (assessed via a five-item scale from Zatori et al., 2018). The dependent variable, tourist loyalty, was gauged using four items as outlined by Cronning et al. (2000). All constructs used a 5-point Likert scale ranging from strongly disagree to strongly agree. Out of 381 distributed surveys, 308 responses were received, resulting in an 81% response rate, suitable for structural equation modelling (SEM). After screening, 289 responses were deemed valid for further analysis. Data analysis and hypothesis testing were performed using

SmartPLS 4 software, following the guidelines of Ringle et al. (2022), enabling detailed evaluation of both measurement and structural models.

**Data Analysis**
*Respondents' Profiles*
The table offers a detailed demographic profile of the survey participants. In terms of gender, 151 respondents identified as male, representing 52.2%, while 138 identified as female, accounting for 47.8%. The age distribution indicates that 12 individuals (4.2%) were under 20 years old, 137 participants (47.4%) were between 21 and 40 years old, 128 respondents (44.3%) fell within the 41-60 age bracket, and another 12 (4.2%) were over 60 years old. Ethnically, the sample is diverse, with 168 participants (58.1%) identifying as Malay, 74 (25.6%) as Chinese, 40 (13.8%) as Indian, and 7 (2.4%) from other ethnic groups. Regarding marital status, 200 respondents (69.2%) were single, 88 (30.4%) were married, and 1 person (0.3%) reported being divorced. Educational attainment shows that 42 individuals (14.5%) completed secondary education, 157 (54.3%) attended college, and 90 respondents (31.1%) held university degrees. Income levels varied: 154 participants (53.3%) earned RM1000 or less, 89 (30.8%) earned between RM1001 and RM5000, and 46 (15.9%) reported incomes between RM5001 and RM10,000. The total sample size was 289 respondents, reflecting a broad range of demographic backgrounds.

*Common Method Bias*
Based on the Full Collinearity Variance Inflation Factor (VIF) values presented in Table 1, all variables exhibit VIF scores below the recommended threshold of 3.3, as suggested by Kock and Lynn (2012) and Kock (2015). Specifically, the highest VIF observed is 2.199 for Environmental Sustainability, indicating that multicollinearity among the variables is not problematic. This suggests that common method bias, which can occur when measurement artefacts inflate correlations, is unlikely to threaten the validity of the findings. Ensuring low VIF scores confirms that the data's common method variance is minimal, thus supporting the robustness of the structural model.

Table 1
*Full Collinearity (VIF)*

|  | LOY | ENV | EXP | ECON | SAT | SOC |
|---|---|---|---|---|---|---|
| LOY |  | 1.467 | 1.61O | 1.742 | 1.714 | 1.633 |
| ENV | 2.199 |  | 2.112 | 1.638 | 1.652 | 1.874 |
| EXP | 1.474 | 1,652 |  | 1.472 | 1.744 | 1.582 |
| ECON | 1.621 | 1.468 | 1.723 |  | 1.682 | 1.362 |
| SAT | 1.287 | 1.481 | 1.634 | 1.662 |  | 1.693 |
| SOC | 1.821 | 1.762 | 1.698 | 1.785 | 1.863 |  |

*Measurement Model*
Based on the data presented in Table 2 and following the guidelines outlined by Hair et al. (2019), the constructs exhibit satisfactory levels of reliability and validity. The Cronbach's alpha (CA) values for all constructs exceed the threshold of 0.70, with values ranging from 0.768 for Economic Sustainability to 0.863 for Tourist Satisfaction, indicating good internal consistency. Similarly, composite reliability (CR) scores are all above 0.70, with values between 0.779 for Social Sustainability and 0.870 for Environmental Sustainability, confirming

that the constructs are reliably measured. The average variance extracted (AVE) for each construct surpasses the 0.50 benchmark, ranging from 0.591 for Economic Sustainability to 0.688 for Environmental Sustainability, demonstrating adequate convergent validity. Additionally, the item loadings are above 0.70 across most items, with some slightly lower at 0.697 (Econ3), which remains acceptable as per Hair et al. (2019). Overall, these indicators collectively confirm that the measurement model demonstrates high construct reliability and convergent validity, ensuring the robustness of the measurement properties used in this study. The HTMT ratios in Table 3 are all below the conservative threshold of 0.85 recommended by Henseler et al. (2015), indicating adequate discriminant validity among the constructs. Specifically, the highest HTMT value is 0.761 between Social Sustainability and Environmental Sustainability, demonstrating that the constructs are sufficiently distinct for reliable measurement.

Table 2
*Construct Reliability and Validity & Items Loadings*

| Constructs | Items | Loadings | CA | CR | AVE |
|---|---|---|---|---|---|
| Economic Sustainability | ECON1 | 0.775 | 0.768 | 0.770 | 0.591 |
| | ECON2 | 0.784 | | | |
| | ECON3 | 0.697 | | | |
| | ECON4 | 0.815 | | | |
| Environmental Sustainability | ENV1 | 0.781 | 0.850 | 0.870 | 0.688 |
| | ENV2 | 0.834 | | | |
| | ENV3 | 0.869 | | | |
| | ENV4 | 0.833 | | | |
| Tourist Experience | EXP1 | 0.803 | 0.843 | 0.848 | 0.614 |
| | EXP2 | 0.821 | | | |
| | EXP3 | 0.794 | | | |
| | EXP4 | 0.726 | | | |
| | EXP5 | 0.772 | | | |
| Tourist Loyalty | LOY1 | 0.798 | 0.793 | 0.801 | 0.616 |
| | LOY2 | 0.799 | | | |
| | LOY3 | 0.806 | | | |
| | LOY4 | 0.735 | | | |
| Tourist Satisfaction | SAT1 | 0.863 | 0.844 | 0.846 | 0.683 |
| | SAT2 | 0.843 | | | |
| | SAT3 | 0.843 | | | |
| | SAT4 | 0.752 | | | |
| Social Sustainability | SOC1 | 0.830 | 0.779 | 0.779 | 0.601 |
| | SOC2 | 0.737 | | | |
| | SOC3 | 0.822 | | | |
| | SOC4 | 0.705 | | | |

*Notes: CA=Cronbach Alpha   CR=Composite Reliability   AVE=Average Variance Extracted*

Table 3
*Heterotrait-Monotrait (HTMT) Ratios*

|      | ECON  | ENV   | EXP   | LOY   | SAT   |
|------|-------|-------|-------|-------|-------|
| ENV  | 0.736 |       |       |       |       |
| EXP  | 0.525 | 0.565 |       |       |       |
| LOY  | 0.550 | 0.627 | 0.741 |       |       |
| SAT  | 0.458 | 0.435 | 0.432 | 0.569 |       |
| SOC  | 0.587 | 0.761 | 0.564 | 0.666 | 0.466 |

*Structural Model*

This research followed the approach recommended by Hair et al. (2017) to assess the structural model, involving simultaneous examination of the pathway coefficients (β) and the R-squared ($R^2$) values. The Partial Least Squares (PLS) method was employed, using 5000 bootstrap samples to evaluate the significance of the path coefficients. Table 4 presents detailed results from the hypothesis testing, including confidence intervals, path coefficients (beta), t-statistics, and p-values. This thorough analysis offers valuable insights into the strength and statistical significance of the relationships among the variables within the model. The hypothesis testing results indicate strong support for most proposed relationships. *H1*, which posits that economic sustainability (ECON) positively influences tourist experience (EXP), is supported, with a beta of 0.178, a t-value of 2.731, and a p-value of 0.006, leading to its acceptance. However, *H2*, suggesting that ECON directly affects tourist loyalty (LOY), is rejected due to a low beta of 0.036, a t-value of 0.596, and a p-value of 0.552, indicating no significant direct effect. *H3* confirms that the indirect effect of ECON on LOY through EXP is significant (beta=0.067, t=2.417, p=0.016), supporting the mediating role of experience. Similarly, environmental sustainability (ENV) positively impacts EXP (*H4*: beta=0.234, t=3.094, p=0.002), and directly influences LOY (*H5*: beta=0.136, t=2.022, p=0.043); both hypotheses are supported. The mediating effect of EXP between ENV and LOY (*H6*: beta=0.087, t=2.697, p=0.007) is also accepted. Social sustainability (SOC) significantly influences EXP (*H7*: beta=0.239, t=3.624, p=0.000), LOY (*H8*: beta=0.186, t=3.092, p=0.002), and mediates impacts on LOY through EXP (*H9*: beta=0.089, t=3.492, p=0.000), all supported. The direct effect of EXP on LOY (*H10*: beta=0.374, t=6.969, p=0.000) and its influence on SAT (*H11*: beta=0.365, t=6.100, p=0.000) are both significant, validating their roles. Additionally, SAT significantly affects LOY (*H12*: beta=0.196, t=3.888, p=0.000), and the mediated pathway from EXP through SAT to LOY (*H13*: beta=0.071, t=3.193, p=0.001) is supported, indicating that satisfaction partially mediates the effect of experience on loyalty at a significance level of p<0.05.

Table 4
*Hypothesis Testing Results*

| Hypotheses | Beta | T statistics | P values | 2.50% | 97.50% | Decision |
|---|---|---|---|---|---|---|
| *H1:* ECON -> EXP | 0.178 | 2.731 | 0.006 | 0.043 | 0.297 | *Accepted* |
| *H2:* ECON -> LOY | 0.036 | 0.596 | 0.552 | -0.082 | 0.154 | *Rejected* |
| *H3:* ECON -> EXP -> LOY | 0.067 | 2.417 | 0.016 | 0.018 | 0.125 | *Accepted* |
| *H4:* ENV -> EXP | 0.234 | 3.094 | 0.002 | 0.087 | 0.381 | *Accepted* |
| *H5:* ENV -> LOY | 0.136 | 2.022 | 0.043 | 0.000 | 0.267 | *Accepted* |
| *H6:* ENV -> EXP -> LOY | 0.087 | 2.697 | 0.007 | 0.032 | 0.161 | *Accepted* |
| *H7:* SOC -> EXP | 0.239 | 3.624 | 0.000 | 0.101 | 0.362 | *Accepted* |
| *H8:* SOC -> LOY | 0.186 | 3.092 | 0.002 | 0.063 | 0.297 | *Accepted* |
| *H9:* SOC -> EXP -> LOY | 0.089 | 3.492 | 0.000 | 0.042 | 0.144 | *Accepted* |
| *H10:* EXP -> LOY | 0.374 | 6.969 | 0.000 | 0.264 | 0.475 | *Accepted* |
| *H11:* EXP -> SAT | 0.365 | 6.100 | 0.000 | 0.234 | 0.469 | *Accepted* |
| *H12:* SAT -> LOY | 0.196 | 3.888 | 0.000 | 0.095 | 0.292 | *Accepted* |
| *H13:* EXP -> SAT -> LOY | 0.071 | 3.193 | 0.001 | 0.033 | 0.121 | *Accepted* |

*Note: Significant at p<0.05*

**Effect Sizes ($f^2$)**
According to Cohen's (1992) guidelines, the effect sizes ($f^2$) in Table 5 indicate that the impact of economic sustainability (ECON) on tourist experience (EXP) ($f^2=0.028$) and tourist loyalty (LOY) ($f^2=0.002$) is small, while environmental sustainability (ENV) shows a small effect on EXP ($f^2=0.037$) and LOY ($f^2=0.017$). The effect of EXP on LOY ($f^2=0.193$) is considered medium, and on satisfaction (SAT) ($f^2=0.154$) is also medium, indicating a moderate impact. Social sustainability (SOC) has small effects on LOY ($f^2=0.039$) and EXP ($f^2=0.048$).

Table 5
*Effect Sizes ($f^2$)*

|  | EXP | LOY | SAT |
|---|---|---|---|
| ECON | 0.028 | 0.002 |  |
| ENV | 0.037 | 0.017 |  |
| EXP |  | 0.193 | 0.154 |
| SAT |  | 0.061 |  |
| SOC | 0.048 | 0.039 |  |

**PLSpredicts & Cross-Validated Predictive Ability Test (CVPAT)**
In line with Shmueli et al. (2016, 2019), the PLS-predictive performance indicated that the RMSE values from PLS-SEM predictions exceeded those of the Linear Model (LM) benchmarks, demonstrating superior predictive accuracy. Specifically, the PLS-RMSE was consistently lower for all nine predictive assessments than the LM-RMSE, with 8 out of 9 cases showing smaller RMSEs in the PLS model. The exception is SAT1, where the RMSE difference was negligible (PLS RMSE=0.790, LM RMSE=0.789). Overall, these results confirm that PLS provides more reliable predictive performance than the linear benchmark across most measures, supporting its effectiveness for the current analysis. Following the guidelines of Hair et al. (2022) and Liengaard et al. (2021), the CVPAT results in Table 7 demonstrate significant predictive capability. The negative average loss differences for EXP, LOY, and SAT (-0.084, -0.110, and -0.060) indicate that the PLS model predicts these constructs more

accurately than benchmarks, with all t-values exceeding 3.974 and p-values less than 0.001. The overall average loss difference of -0.085 and t-value of 5.833 confirm the model's robust predictive validity, validating its effectiveness in forecasting the variables and supporting the reliability of the PLS approach.

Table 6
*PLSpredicts*

|  | Q²predict | PLS-RMSE | LM-RMSE | PLS-LM |
|---|---|---|---|---|
| EXP1 | 0.235 | 0.618 | 0.624 | -0.006 |
| EXP2 | 0.195 | 0.616 | 0.631 | -0.015 |
| EXP3 | 0.110 | 0.683 | 0.694 | -0.011 |
| EXP4 | 0.131 | 0.704 | 0.725 | -0.021 |
| EXP5 | 0.164 | 0.624 | 0.639 | -0.015 |
| LOY1 | 0.280 | 0.617 | 0.631 | -0.014 |
| LOY2 | 0.195 | 0.620 | 0.635 | -0.015 |
| LOY3 | 0.225 | 0.665 | 0.667 | -0.002 |
| LOY4 | 0.120 | 0.727 | 0.739 | -0.012 |
| SAT1 | 0.113 | 0.790 | 0.789 | 0.001 |
| SAT2 | 0.100 | 0.754 | 0.775 | -0.021 |
| SAT3 | 0.067 | 0.780 | 0.789 | -0.009 |
| SAT4 | 0.078 | 0.795 | 0.797 | -0.002 |

Table 7
*Cross-Validated Predictive Ability Test (CVPAT)*

|  | Average loss difference | t value | p value |
|---|---|---|---|
| EXP | -0.084 | 3.974 | 0.000 |
| LOY | -0.110 | 5.360 | 0.000 |
| SAT | -0.060 | 4.760 | 0.000 |
| Overall | -0.085 | 5.833 | 0.000 |

*Importance-Performance Ability Test (IPMA)*
Based on the IPMA results and following the guidance of Ringle and Sarstedt (2016) and Hair et al. (2018), tourist experience (EXP) has the highest importance (0.445) but the lowest performance score (60.522), indicating it is a critical area for improvement with the greatest potential to enhance overall loyalty. Environmental sustainability (ENV) and social sustainability (SOC) have relatively high importance (0.240 and 0.292), with performance levels around 67, suggesting they are functioning reasonably well but still have room for enhancement. To boost the impact of tourist experience, destinations should focus on creating authentic, engaging, and memorable activities, such as eco-tours, cultural exchanges, and personalised service. Improving staff training, enhancing facilities, and ensuring unique eco-friendly activities could elevate the experience quality. Addressing these areas can increase tourist loyalty efficiently, as experience is both highly important and currently underperforming, making it the priority for strategic focus.

Table 8
*Importance-Performance Ability Test (IPMA)*

|  | Importance | Performance |
|---|---|---|
| ECON | 0.115 | 66.505 |
| ENV | 0.240 | 67.119 |
| EXP | 0.445 | 60.522 |
| SAT | 0.196 | 67.392 |
| SOC | 0.292 | 66.715 |

**Discussion & Conclusion**
*Discussion*
Based on the study's findings, the ecotourism sector should prioritise integrated strategies that enhance interactions among economic, environmental, and social sustainability to positively influence tourist loyalty, with tourist experience and satisfaction serving as critical mediators. The hypothesis testing revealed that economic sustainability ($\beta=0.178$) significantly impacts tourist experience, indicating that fostering local economic growth and promoting responsible spending can enrich visitors' engagement. However, the direct link between economic sustainability and tourist loyalty was not significant ($\beta=0.036$), suggesting that economic factors alone do not directly drive loyalty but require a focus on experiential and satisfaction pathways (Bao & Doratli, 2024). To improve this, the sector should develop programs that showcase local economic contributions, such as community-based tourism initiatives, which simultaneously create memorable experiences and increase satisfaction, eventually fostering loyalty (Gao et al., 2024). The significant mediating effects of experience and satisfaction ($\beta=0.067$; $\beta=0.089$) emphasise that enhancing tourists' experiential quality through eco-friendly activities, cultural immersion, and personalised services can substantially boost satisfaction and, consequently, loyalty. For environmental sustainability ($\beta=0.234$), the sector should reinforce conservation efforts and communicate ecological benefits clearly to visitors, strengthening their emotional connection and perceived value, a trend supported in recent literature (Zhu & Wang, 2025). Social sustainability also plays a key role, with significant effects on experience and loyalty ($\beta=0.239$; $\beta=0.186$), implying that fostering community involvement and inclusive practices can elevate tourists' perceptions and attachment (Santos-Automono & Priyambodo, 2025). The lack of support for the direct relationship between economic sustainability and loyalty might be due to tourists perceiving economic benefits as less tangible or secondary to their ecological and social experiences. Overall, the ecotourism industry should adopt a holistic approach, integrating sustainable practices across dimensions, actively communicating conservation and community efforts, and enriching experiential offerings to create a compelling value proposition that fosters satisfaction and enhances loyalty in the long term (Li & Xu, 2024).

**Theoretical Implications**
The above study significantly advances the existing theoretical frameworks by integrating sustainability dimensions, economic, environmental, and social, with tourist experience, satisfaction, and loyalty, thereby enriching the understanding of sustainable tourism's impact on tourist behaviour. It extends the theoretical discourse by empirically demonstrating that while economic sustainability directly influences tourist experience, it does not have a significant direct effect on loyalty, emphasising the mediating roles of experience and satisfaction as key pathways (Bao & Doratli, 2024). This nuanced insight refines the classic

stimulus-organism-response (S-O-R) theory by highlighting that sustainability as a stimulus influences behavioural outcomes primarily through internal perceptual processes (Gao et al., 2024). The study reaffirms the importance of experiential and emotional factors in shaping loyalty, aligning with the broader tourism behaviour literature (Santos-Automono & Priyambodo, 2025). Moreover, by including social sustainability as a critical construct that affects experience and loyalty, the research underscores the importance of community involvement and social inclusivity, conceptually bridging the gap between community-based tourism and behavioural loyalty (Santos-Automono & Priyambodo, 2025). Additionally, the findings contribute to the development of an integrated sustainability-tourism framework by illustrating how each sustainability pillar interacts with and reinforces experiential and satisfaction constructs, leading to loyalty, thereby offering a more comprehensive view aligned with the stakeholder theory (Li & Xu, 2024). The study also incorporates the Expectancy-Disconfirmation Theory (EDT) by emphasising that satisfaction mediates the relationship between experience and loyalty, as tourists' perceptions are shaped by the confirmation or disconfirmation of their expectations (Oliver, 1980). This integrated model invites further refinement of the mechanisms through which sustainability influences tourism behaviours, encouraging future studies to explore moderating factors and extend empirical evidence on long-term loyalty formation rooted in sustainability practices.

**Practical Implications**
The practical implications of the above study highlight the need for the ecotourism industry to adopt a holistic and strategic approach toward sustainability to foster long-term tourist loyalty. First, tourism operators should focus on enhancing tourist experiences through eco-friendly activities, cultural immersion, and personalised services, as these significantly drive satisfaction and loyalty. Emphasising environmental conservation efforts and communicating ecological benefits can strengthen emotional connections with visitors, making environmental sustainability a core element of the visitor experience. Additionally, integrating social sustainability initiatives, such as community involvement and inclusive practices, can elevate tourists' perceptions and attachment. To optimise economic sustainability's impact, operators should develop community-based projects that create authentic, memorable experiences while supporting local livelihoods, ensuring these contribute indirectly to loyalty via improved experiences. Furthermore, the findings suggest that marketing strategies should highlight sustainability efforts and social responsibility, as tourists value transparent communication about conservation and community initiatives. Overall, these strategies will not only enhance tourists' perceptions of value but also build a sustainable competitive advantage, leading to increased revisit intentions, positive word-of-mouth, and long-term loyalty, which are vital for the growth and resilience of ecotourism destinations.

**Suggestions for Future Studies**
Future studies should explore additional moderating variables, such as cultural differences, environmental awareness, and personal values, to better understand how these factors influence the relationship between sustainability practices and tourist loyalty. Longitudinal research could examine how tourists' perceptions and loyalty evolve as sustainability initiatives become more ingrained in destination branding. Investigating the role of digital platforms, social media, and virtual reality in enhancing sustainable tourism experiences offers another promising avenue, as these technologies can directly influence tourists'

perceptions and satisfaction. Future research could also compare different ecotourism settings, such as rural versus coastal destinations, to identify specific strategies that effectively foster loyalty across diverse contexts. Moreover, examining the impact of specific sustainability initiatives, like community involvement or waste reduction, on tourist behaviour would provide more targeted insights. Finally, integrating behavioural or psychological theories, such as environmental behaviour change models, could deepen understanding of the psychological processes underlying tourists' loyalty decisions related to sustainable tourism.

## Conclusion

The above study underscores the critical role of sustainability, economic, environmental, and social, in shaping tourist experiences, satisfaction, and ultimately, loyalty in ecotourism. The findings reveal that while economic sustainability influences experience, it does not directly impact loyalty without the mediating effects of satisfaction and experience. Environmental and social sustainability, however, directly and indirectly foster loyalty through enhanced perceptions and emotional connections. These insights highlight the importance of adopting an integrated, holistic approach to sustainability practices that prioritise immersive experiences, transparent communication, and community involvement. Practical strategies should focus on enriching tourist experiences through eco-friendly activities and social initiatives, thereby strengthening satisfaction and long-term loyalty. The study also offers valuable directions for future research, emphasising the need to explore moderating variables, longitudinal effects, and technological interventions. Overall, effectively implementing sustainability can provide a competitive advantage for ecotourism destinations by fostering loyal, satisfied visitors committed to conservation and community development.

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