STIESIA
COBUSS
e-ISSN 2746-5667
5th INTERNATIONAL CONFERENCE ON BUSINESS & SOCIAL SCIENCES
RESPONSIBLE AI AND HUMAN-CENTERED DESIGN: BRIDGING ETHICS AND INNOVATION

From Attachment to Action: The Mediating Role of Environmental Attitude in Shaping Responsible Tourist Behaviour

Nihayatu Aslamatis Solekah[1*], Mardiana[2],Hary Saputro Kurniawan[3]

[1,2] Faculty of Economic, Islamic State University Maulana Malik Ibrahim, Malang, Indonesia
[3] Association of Planning Experts East Java Indonesia, Indonesia

*Corresponding Author: aslamatiss_1@pbs.uin-malang.ac.id

Abstract: This study addresses a research gap by investigating how different dimensions of place attachment contribute to fostering environmentally responsible behaviour (ERB) among tourists, an area where empirical evidence remains limited, particularly regarding sanitation and waste management. The purpose of this research is to examine the direct and indirect effects of Place Attachment to Water (PAW), Place Attachment to Sanitation (PAS), and Place Attachment to Management of Waste (PAMW) on ERB, with Environmental Attitude (EA) serving as a mediating variable. A quantitative approach was employed through a cross-sectional survey of 300 domestic tourists visiting Taman Selecta, Batu City, East Java. Data were collected using a structured questionnaire and analysed using Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS. Results reveal that PAW and PAMW significantly influence EA, whereas PAS does not. EA strongly predicts ERB, affirming its central position in the Stimulus–Organism–Response (SOR) framework. Direct effect analysis shows that only PAW significantly affects ERB, while mediation analysis confirms that EA partially mediates the PAW–ERB relationship and fully mediates the PAMW–ERB relationship. These findings underscore the importance of enhancing water-related experiences and communicating waste management practices to strengthen environmental attitudes and encourage pro-environmental tourist behaviour.

Keywords: Environmental Attitude, Place Attachment, Waste Management, Responsible Tourist Behaviour; Sustainable Tourism.

1. Introduction

Tourism destinations across the globe are facing increasing pressure to adopt sustainable practices in order to mitigate negative environmental impacts. Rapid growth in tourist arrivals often leads to issues such as waste accumulation, water pollution, and inadequate sanitation management, which threaten both the ecological integrity of destinations and visitor satisfaction (UNWTO, 2023). In nature-based destinations, where environmental quality is central to the tourist experience, the challenge is even more pronounced. Visitors' behaviour plays a critical role in maintaining environmental quality, as irresponsible actions such as littering or water misuse can degrade the very resources that attract tourists in the first place (Huang et al., 2022). This growing concern underscores the importance of understanding what drives tourists to engage in Environmental Responsible Behaviour (ERB) as part of sustainable tourism management.

Prior studies have examined various determinants of ERB, highlighting factors such as environmental knowledge (Han et al., 2021), moral norms (Zhang et al., 2020), and place attachment (Ramkissoon & Mavondo, 2015). Place attachment, or the emotional and cognitive bond between individuals and specific locations, has been shown to positively influence pro-environmental intentions (Halpenny, 2010). However, evidence regarding the direct effect of place attachment on actual behaviour is mixed, suggesting that additional psychological

mechanisms may be involved. Environmental Attitude (EA), defined as an individual's positive or negative evaluation of environmental protection, has been proposed as a mediator that transforms attachment into concrete action (Lee et al., 2020). Nonetheless, empirical research investigating EA as a mediating variable between multiple dimensions of place attachment—such as attachment to waste management, water resources, and sanitation facilities—and ERB remains limited

Addressing this gap is crucial for advancing both theoretical understanding and practical applications in sustainable tourism. From a scientific perspective, examining EA as a mediator enriches the Stimulus–Organism–Response (SOR) framework by clarifying how emotional bonds (stimulus) are translated into attitudes (organism) and subsequently into behaviour (response) (Mehrabian & Russell, 1974). Practically, the findings can inform destination managers and policymakers to design targeted interventions that go beyond infrastructure provision, focusing on strengthening tourists' pro-environmental attitudes through education, interpretation programs, and participatory engagement. Such strategies are expected to foster a deeper sense of stewardship among visitors, resulting in long-term behavioural change and improved environmental outcomes for destinations.

2. Literature Review

Stimulus–Organism–Response (SOR) Framework

The Stimulus–Organism–Response (SOR) framework, first proposed by Mehrabian and Russell (1974), provides a theoretical lens to explain how environmental stimuli influence individuals' internal states, which in turn drive behavioural responses. Within this framework, stimuli (S) represent external factors that individuals are exposed to, organisms (O) denote internal cognitive or affective processes, and responses (R) are the resulting behaviours. In the context of tourism, place attachment dimensions such as attachment to waste management, water resources, and sanitation facilities serve as the *stimuli.* These attachments trigger the *organism*—in this case, Environmental Attitude (EA)—which subsequently leads to the *response,* manifested as Environmental Responsible Behaviour (ERB). Employing the SOR model allows researchers to examine not only the direct effects of place attachment on behaviour but also the mediating mechanism of environmental attitudes that transform emotional bonds into concrete actions (Jin et al., 2023).

Environmental Responsible Behaviour (ERB)

Environmental Responsible Behaviour (ERB) refers to actions taken by individuals to minimize their negative impact on the environment and contribute to environmental sustainability (Kollmuss & Agyeman, 2002). In tourism research, ERB includes behaviours such as proper waste disposal, water conservation, participation in recycling activities, and adherence to eco-friendly guidelines provided by destinations (Han et al., 2021). Empirical evidence has shown that tourists with stronger pro-environmental values are more likely to exhibit ERB, thereby supporting sustainable tourism outcomes (Cheng & Wu, 2015). Understanding the drivers of ERB is essential for destination managers aiming to achieve long-term ecological and social benefits.

Environmental Attitude (EA)

Environmental Attitude (EA) is commonly defined as an individual's cognitive and affective orientation toward environmental protection and conservation (Lee et al., 2020). EA has been

widely studied as a predictor of ERB and is considered a critical psychological mechanism that translates environmental awareness into behavioural intention (Ajzen, 1991). Attitudes shape behavioural tendencies by influencing how individuals evaluate environmental issues and prioritize pro-environmental choices. Recent studies suggest that strengthening EA can significantly increase tourists' willingness to adopt responsible practices during their visits, making EA a valuable mediating variable in tourism behaviour models (Liu & Lin, 2021).

Place Attachment to Management of Waste (PAMW)
Place attachment to management of waste (PAMW) represents tourists' emotional connection to the cleanliness and waste management practices within a destination. When visitors perceive that waste management is well-organized and aligns with their environmental values, they are more likely to feel bonded to the destination and to adopt responsible waste disposal behaviours (Ramkissoon et al., 2013). This attachment acts as a stimulus that can strengthen environmental attitudes, which subsequently drive ERB.

Place Attachment to Water (PAW)
Place attachment to water (PAW) reflects the emotional bond between visitors and the water-related features of a destination, including rivers, lakes, and marine environments. Water resources are often central to tourists' experiences, and strong attachment can foster stewardship behaviours such as conserving water and avoiding pollution (Lewicka, 2011). PAW is therefore expected to positively influence EA, which in turn leads to responsible water-use behaviour as part of ERB.

Place Attachment to Sanitation (PAS)
Place attachment to sanitation (PAS) refers to the perceived connection and satisfaction tourists feel toward the sanitation infrastructure of a destination. While the availability of sanitation facilities is critical for health and hygiene, its effect on EA and ERB may depend on whether tourists perceive it as part of their emotional experience with the place (Prayag & Ryan, 2012). Some studies suggest that merely providing facilities does not necessarily elicit pro-environmental attitudes unless it is combined with educational and experiential components that enhance emotional engagement (Zhang et al., 2020).

Place Attachment to Management of Waste (PAMW) affect Environmental Attitude (EA).
Waste management is one of the most visible indicators of environmental quality at a destination. Tourists who perceive effective waste management systems tend to develop a positive emotional connection to the destination, which in turn strengthens their pro-environmental attitudes (Ramkissoon et al., 2013). A well-managed waste environment signals that the destination values sustainability, which can enhance tourists' sense of responsibility and trigger attitudinal alignment toward environmental protection (Yoon et al., 2021).
H_1: Place Attachment to Management of Waste (PAMW) has a positive and significant effect on Environmental Attitude (EA).

Place Attachment to Water (PAW) affect to Environmental Attitude (EA)
Water resources are often central to destination attractiveness, particularly in nature-based tourism. Emotional attachment to water-related features can evoke concern for water quality and inspire pro-environmental attitudes (Lewicka, 2011). Research shows that tourists who feel a strong connection to lakes, rivers, or coastal areas are more likely to value water conservation and adopt eco-friendly practices (Kibler et al., 2020). Thus, PAW is expected to positively

influence EA.
H2: Place Attachment to Water (PAW) has a positive and significant effect on Environmental Attitude (EA).

Place Attachment to Sanitation (PAS) affect to Environmental Attitude (EA)
Sanitation infrastructure is essential for health and hygiene; however, its impact on EA is less straightforward. Some studies suggest that tourists take sanitation for granted unless it is presented as part of an environmental education or awareness program (Prayag & Ryan, 2012). Zhang et al. (2020) argue that the mere presence of facilities does not necessarily promote pro-environmental attitudes unless visitors perceive a personal or emotional connection. This suggests that PAS may have a weaker effect on EA compared to PAMW and PAW.
H3: Place Attachment to Sanitation (PAS) has a positive and significant effect on Environmental Attitude (EA).

Environmental Attitude (EA) affect to Environmental Responsible Behaviour (ERB)
Environmental Attitude is widely recognized as a key predictor of pro-environmental behaviour (Ajzen, 1991). Tourists with strong EA are more likely to engage in behaviours such as proper waste disposal, resource conservation, and participation in eco-friendly programs (Han et al., 2021). Empirical research consistently confirms that positive EA leads to higher levels of ERB across various tourism contexts (Lee et al., 2020).
H4: Environmental Attitude (EA) has a positive and significant effect on Environmental Responsible Behaviour (ERB).

Direct Relationships between PAMW, PAW, PAS and ERB
Although Environmental Attitude (EA) is hypothesized to mediate the relationship between place attachment dimensions and Environmental Responsible Behaviour (ERB), several studies indicate that place attachment can also have a direct effect on pro-environmental behaviour.When waste management systems are highly visible and efficient, tourists not only develop positive attitudes but may also directly engage in responsible behaviours, such as separating waste or reducing littering (Yoon et al., 2021). Ramkissoon et al. (2013) demonstrated that attachment to a clean and well-maintained environment is associated with immediate behavioural responses, bypassing attitudinal processes.
H5: Place Attachment to Management of Waste (PAMW) has a positive and significant direct effect on ERB.

Attachment to water bodies has been shown to evoke a strong stewardship sense, leading to behaviours such as water conservation and prevention of water pollution (Lewicka, 2011). Empirical research suggests that tourists emotionally connected to natural water features may take direct action to preserve water quality (Kibler et al., 2020).
H6: Place Attachment to Water (PAW) has a positive and significant direct effect on ERB.

The direct effect of Place Attachment to Sanitation (PAS) on ERB is less clear. While well-maintained sanitation facilities can enhance visitor satisfaction, they may not necessarily translate into behavioural changes unless visitors perceive them as part of an environmental sustainability effort (Prayag & Ryan, 2012). Some studies even report non-significant direct effects of PAS on ERB, suggesting that attitudes or norms might be necessary for behavioural activation (Zhang et al., 2020).
H7: Place Attachment to Sanitation (PAS) has a positive and significant direct effect on ERB.

Mediating Role of Environmental Attitude (EA)

The Stimulus–Organism–Response (SOR) model suggests that attitudes function as a psychological mechanism that mediates the effect of environmental stimuli on behaviour (Mehrabian & Russell, 1974). Place attachment dimensions (PAMW, PAW, PAS) can enhance EA, which then drives ERB (Ramkissoon & Mavondo, 2015). This mediating role is supported by findings showing that attitudes often serve as the "bridge" between contextual factors and pro-environmental actions (Liu & Lin, 2021). These hypotheses collectively test whether EA plays a mediating role in transforming place attachment into actionable environmental behaviour, offering insights for both theory and practice in sustainable tourism management.

H_8: EA mediates the relationship between PAMW and ERB.
H_9: EA mediates the relationship between PAW and ERB.
H_{10}: EA mediates the relationship between PAS and ERB.

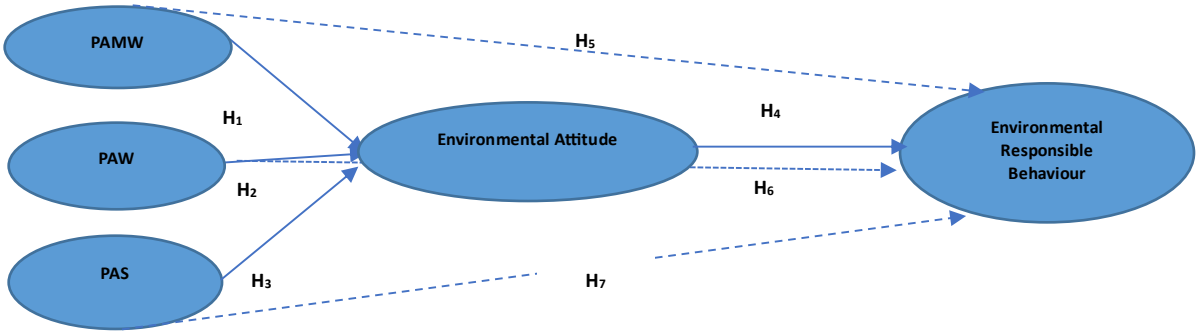

Figure 1: Conceptual Framework
Sources: Authors (2025)

3. Method

This study used a cross-sectional survey approach with a quantitative research design. The purpose of the study was to investigate how Environmental Attitude (EA) mediates the relationship between Environmental Responsible Behavior (ERB) and Place Attachment dimensions, specifically Place Attachment to Sanitation (PAS), Place Attachment to Water (PAW), and Place Attachment to Management of Waste (PAMW). The Stimulus–Organism–Response (SOR) model, which views place attachment as the stimulus, EA as the organism, and ERB as the response, served as the foundation for the development of the study framework. Every statement item uses a 5-point Likert scale for measurement. The questionnaire's validity and reliability were assessed before it was given to research participants.

The population of this study consisted of domestic tourists who had visited Taman Selecta, Batu City, East Java. Three criteria were used to determine the study's sample using purposive sampling: Tourists who were at least 15 years old, as well as those who have visited or experienced Taman Selecta in Batu City East Java Through the distribution of the

questionnaire, Were willing to participate in the survey voluntarily. 300 samples that met the criteria for further processing were obtained for the study.

This study employs both descriptive and inferential analysis. Descriptive analysis is used in the study to determine the characteristics of the participants. For inferential analysis, SEM is utilized in conjunction with Smart PLS. The measurement model, also known as the outer model, first assesses whether the observed variable appropriately captures the latent variable that needs to be measured. The structural model, sometimes referred to as the inner model, measures the capacity of estimation between latent variables (Ghozali, 2005). In order to address the research objectives and the proposed conceptual framework model, the data was evaluated using PLS-SEM with Smart PLS once it was collected. Hair et al. (2011) employed both internal and external measurements to assess the data. The proposed model is then used to undertake hypothesis testing.

4. Result and Discussion

Respondent Characteristic

Table 1 shows that the characteristics of the respondents in this study are Among the 300 respondents, the majority were female, about 65%. In contrast, most respondents are 15-25 years, as much as 77% or 231respondents. Based on the respondent's occupation, 74,3% are Students.

Table 1. Respondent Characteristic

Items	Frekuency	Precentage
Gender		
Male	99	33
Female	201	67
Age		
15-25 years old	231	77
26-35 years old	26	8,7
36-45 years old	17	5,7
> 45 years old	26	8,7
Occupation		
Self-employed	22	7,3
Private employees	10	3,3
Civil servants	33	11
Students	223	74,3
etc	12	4

Sources: Authors (2025)

Convergent Validity

Convergent validity was initially reviewed in the findings section, and the results show a high correlation between the items and valid convergent validity. The data indicates that while Alpha and CR are larger than 0.70, loadings and AVE are greater than 0.50. These values are shown in Table 2.

Table 2. Convergent Validity

	Items	Loadings	Alpha	CR	AVE
Place Attachment to Water (PAW)	PAW1	0,858			
	PAW2	0,820			
	PAW3	0,873			
	PAW4	0,875			
	PAW5	0,881	0,913	0,935	0,747
Place Attachment to Sanitation (PAS)	PAS1	0,871			
	PAS2	0,856			
	PAS3	0,907			
	PAS4	0,910			
	PAS5	0,888	0,932	0,948	0,786
Place Attachment to Management of Waste (PAMW)	PAMW1	0,876			
	PAMW2	0,896			
	PAMW3	0,915	0,939	0,954	0,804
	PAMW4	0,909			
	PAMW5	0,886			
Environmental Attitude (EA)	EA1	0,809			
	EA2	0,840			
	EA3	0,815			
	EA4	0,758	0,908	0,927	0,646
	EA5	0,828			
	EA6	0,705			
	EA7	0,861			
Environmental Responsible Behaviour (ERB)	ERB1	0,853			
	ERB2	0,839			
	ERB3	0,892			
	ERB4	0,897			
	ERB5	0,887	0,955	0,961	0,715
	ERB6	0,729			
	ERB7	0,815			
	ERB8	0,836			
	ERB9	0,833			
	ERB10	0,860			

Sources: Authors (2025)

The test after elimination results shown in Table 2 can be used to understand the outer loading value of all instruments, the composite reliability value, Cronbach's alpha, and the AVE value, which is already greater than 0.50. As a result, every instrument used in the study was accepted as legitimate and trustworthy. The measurement model test (Outer Loading) can be conducted using the convergent and discriminant validity tests. The association between the constructed and indicator values demonstrated the convergent validity of the measurement model incorporating the reflection indicator. If the correlation value of the construct indicator is more than 0.70, it is considered valid (Hair et al., 2011). The correlation results between the indicators and their constructs were as follows: table 1 displayed the cross-loading value. The table indicates that the outer loading (cross-loading) value, over 0.70, complies with the standards. The construct's convergent validity was strong.

Discriminant Validity

The findings section includes a second examination of the discriminant validity, and the statistics indicate no significant link between the variables and valid discriminant validity. The cross-loading value between the reflection indicator and its concept indicates the discriminant validity of the indicator, and there shouldn't be a strong correlation between the measures of

the various constructions. The findings indicate that the Heterotrait Monotrait (HTMT) ratios do not exceed 0.90. Table 3 displays these values

Table 3. Heterotrait Monotrait (HTMT) Ratio

	EA	ERB	PAMW	PAS	PAW
EA					
ERB	0.895				
PAMW	0.638	0.582			
PAS	0.620	0.563	0.871		
PAW	0.666	0.626	0.863	0.895	

Sources: Authors (2025)

Goodness of Fit (GoF) Analysis

The overall model fit was assessed using several fit indices, including the Standardized Root Mean Square Residual (SRMR), Squared Euclidean Distance (d_ULS), Geodesic Distance (d_G), Chi-square, and Normed Fit Index (NFI). The results of both the saturated and estimated models show identical values, indicating a well-specified and stable model (Table 4).

Table 4. *Goodness of Fit (GoF)*

	Saturated model	Estimated model
SRMR	0.056	0.056
d_ULS	1.665	1.665
d_G	1.214	1.214
Chi-square	2124.649	2124.649
NFI	0.803	0.803

Sources: Authors (2025)

The obtained SRMR value was 0.056, below the 0.08 threshold that is advised. Hu and Bentler (1999) state that a model has an adequate fit if the SRMR value is less than 0.08, which shows that there is little difference between the observed and predicted correlation matrices. Similarly, for both the saturated and approximated models, the d_ULS and d_G values were 1.665 and 1.214, respectively. Lower values show that the estimated model accurately reproduces the empirical covariance matrix, even if there are no strict cut-off requirements for these distances (Henseler et al., 2016). As is typical in large sample SEM investigations, the chi-square statistic of 2,124.649 indicates that the data is statistically significant. However, as Chi-square is sensitive to sample size, a substantial Chi-square does not always signify a poor fit given the sample size (n = 300) (Kline, 2016). Lastly, an adequate degree of model fit was shown by the Normed Fit Index (NFI), which produced a value of 0.803, over the suggested minimum of 0.80 (Bentler & Bonett, 1980). When combined, these results show that the suggested model has a sufficient goodness of fit, indicating that the structural model is reliable and appropriate

for testing hypotheses. The model's stability and efficacy in explaining the relationships between the latent variables are further supported by the consistency between the saturated and estimated model values.

Structural Model Testing (Inner Model)

Structural model testing looks at how one latent variable affects another latent variable in the research model. This test is also frequently referred to as testing the hypothesis of the influence of exogenous latent factors on endogenous latent variables and endogenous latent variables on other endogenous latent variables. Examining the structural path coefficients and the R2 percentage of variance for the endogenous latent variables—which are predicted to affect exogenous latent variables—is how the test is carried out.

Table 4. R-Square Value

Relationships	R Square	R Square Adjusted
Environmental Attitude	0.388	0.382
Environmental Responsible Behaviour	0.710	0.706

Sources: Authors (2023)

Based on Table 4, it can be seen that the R-Square value for Environmental attitude is 0,382, which means the environmental attitude variable is explained by Place Attachment to Water, Place Attachment to Sanitation, Place Attachment to Management Waste with a percentage of 38,2% which means it is included in the weak category and Environmental Responsible Behaviour explained by Place Attachment to Water, Place Attachment to Sanitation, Place Attachment to Management Waste and Environmental Attitude of 0,706 with a percentage of 70,7%, which means it is in the stronght category.

The result of path coefficient is to see the significance of the influence between variables. The results of the bootstrapping data processing are presented in the following table 5 and figure 2:

Table 5. Result of Path Coeffisient Direct Causal Effect

Relationships	Beta	S.D.	t-statistics	p-values
Place Attachment to Water (PAW)->Environmental Attitude (EA)	0,433	0,157	2.758	0.006
Place Attachment to Sanitation (PAS)->Environmental Attitude (EA)	-0,064	0,177	0.359	0.720
Place Attachment to Management of Waste (PAMW)->Environmental Attitude (EA)	0,267	0,127	2.064	0.039
Environmental Attitude (EA)->Environmental Responsible Behaviour (ERB)	0,767	0,043	17.940	0.000
Place Attachment to Water (PAW)->Environmental Responsible Behaviour (ERB)	0,208	0,096	2.174	0.030
Place Attachment to Sanitation (PAS)->Environmental Responsible Behaviour (ERB)	-0,119	0,098	1.214	0.225
Place Attachment to Management of Waste (PAMW)->Environmental Responsible Behaviour (ERB)	0,017	0,097	0.171	0.865

Sources: Authors (2025)

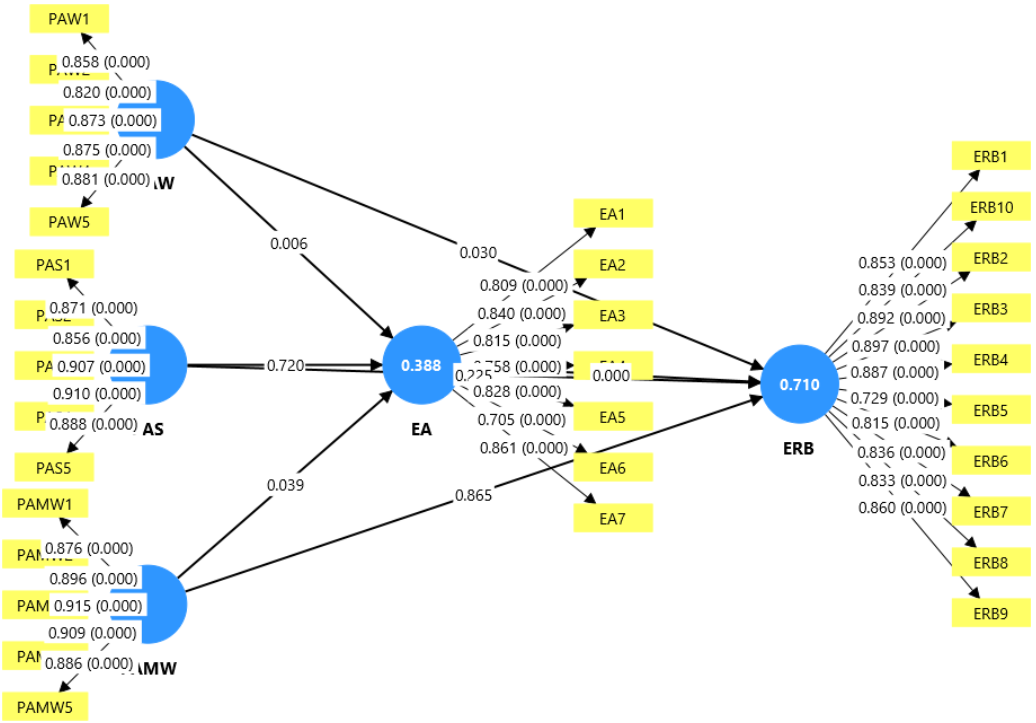

Figure 2: Structural Model Assesment
Sources: Autors (2025)

The findings show that PAW significantly and favorably affects EA (β = 0.433, t = 2.758, p = 0.006). In line with Lewicka (2011) and Kibler et al. (2020), who contend that emotional ties to water resources cultivate a sense of concern and stewardship that strengthens pro-environmental views, this finding validates the hypothesis. The presence of natural water features at Taman Selecta seems to arouse favorable feelings and raise visitors' propensity to practice water conservation. The substantial and powerful effect demonstrates that environmental sentiments are significantly influenced by attachment to water features. Water is a key element of destination image and emotional connection, which is consistent with earlier research (Kibler et al., 2020). Given the dominance of younger respondents, their higher awareness of water scarcity and climate issues may further amplify this effect.

It was shown that there was a negative and statistically insignificant connection between PAS and EA (β = -0.064, t = 0.359, p = 0.720). This finding implies that, despite being essential for tourists' comfort, sanitary facilities do not always lead to more positive environmental sentiments. This result is in line with the findings of Prayag and Ryan (2012) and Zhang et al. (2020), who point out that unless environmental education is included, sanitation services by themselves are frequently taken for granted and do not always inspire emotional or attitudinal participation. The fact that PAS had no discernible impact on EA shows that sanitary facilities do not always arouse environmental concern. The findings imply that rather than being an emotive experience, tourists might view cleanliness as a practical consideration. Converting functional appreciation into attitudinal involvement could be facilitated by educational signage that connects ecological health and sanitation

The hypothesis is supported by the favorable and significant effect of PAMW on EA (β = 0.267, t = 2.064, p = 0.039). This supports the claims made by Yoon et al. (2021) and Ramkissoon et al. (2013) that efficient waste management systems serve as outward manifestations of a destination's environmental commitment and strengthen tourists' pro-environmental sentiments. This beneficial outcome demonstrates that obvious waste management methods convey a destination's dedication to the environment (Yoon et al., 2021), which aligns with the values of the respondents. This conclusion may also be explained by the prevalence of students, who are more accustomed to recycling and garbage separation programs implemented in colleges and universities.

EA demonstrates a substantial and significant impact on ERB (β = 0.767, t = 17.940, p < 0.001), supporting the SOR framework's suggestion that it plays a mediating role. According to Ajzen (1991) and Lee et al. (2020), attitudes are strong determinants of behavioral intention and action, and this finding is in line with their findings. The significance of psychological factors in influencing traveler behavior is demonstrated by the strength of this link. According to Value–Identity–Personal Norm models, younger, better-educated respondents might be more sensitive to environmental challenges and their opinions are more likely to materialize into tangible behavior (Stern & Dietz, 1994). This implies that programs aimed at younger travelers may be more successful in fostering sustainable behavior over the long run. The model's strongest relationship supports the SOR framework (Mehrabian & Russell, 1974), which holds that attitudes act as mediators to transform emotional ties into behaviors. The Theory of Planned Behavior by Ajzen (1991), which emphasizes the crucial role that attitudes play in forecasting behavioral intention, is likewise in line with this.

PAW significantly influences ERB directly (β = 0.208, t = 2.174, p = 0.030), suggesting that responsible behavior might be directly inspired by an emotional bond with water resources without necessarily being mediated by attitudes. According to Kibler et al. (2020), events with water frequently inspire stewardship behaviors. By using natural resources for both leisure and education, students are more likely to develop a deeper emotional and cognitive connection to water features. The findings of Lewicka (2011), who discovered that stewardship attitudes are strongly predicted by emotional attachments to natural features like rivers or lakes, are consistent with this outcome.The significant direct effect shows that tourists can translate their emotional bond with water resources into immediate behaviour, even without attitudinal mediation. This supports Kibler et al. (2020), suggesting that water-related experiences have a direct stewardship effect.

The relationship between PAS and ERB is negative and insignificant (β = -0.119, t = 1.214, p = 0.225). This indicates that attachment to sanitation does not translate into responsible environmental actions. The result mirrors findings by Zhang et al. (2020), who note that sanitation-related behaviour often requires activation through norms or educational interventions. The young respondents may perceive sanitation as a basic right or standard facility rather than as a valued feature of the destination. This supports Zhang et al. (2020), who suggest that sanitation infrastructure alone does not elicit pro-environmental concern

unless paired with educational or experiential framing. The non-significant effect indicates that sanitation does not trigger behavioural changes. This highlights the need for interpretive interventions to raise awareness that sanitation behaviour contributes to environmental health

PAMW shows a very weak and non-significant effect on ERB (β = 0.017, t = 0.171, p = 0.865), suggesting that even though tourists may recognize waste management efforts, this does not necessarily translate into immediate behavioural change. This finding differs from Yoon et al. (2021), who found direct effects in some eco-destinations, suggesting that context matters. This indicates that while tourists appreciate well-organized waste management systems, their behavioural engagement (e.g., actively sorting waste) may depend on additional motivational cues. The very weak and non-significant effect shows that waste management systems alone are insufficient to induce behaviour change. This finding diverges from some previous studies (Ramkissoon et al., 2013), suggesting that context (urban vs. nature-based destination) and visitor profile may moderate this relationship.

Table 6. Result of Path Coeffisient Indirect Causal Effect

Relationships	Beta	S.D.	t-statistics	p-values
Place Attachment to Water (PAW)-> Environmental Attitude (EA)-> Environmental Responsible Behaviour (ERB)	0,333	0,126	2.641	0.008
Place Attachment to Sanitation (PAS)-> Environmental Attitude (EA)-> Environmental Responsible Behaviour (ERB)	-0,049	0,137	0.357	0.721
Place Attachment to Management of Waste (PAMW)-> Environmental Attitude (EA)-> Environmental Responsible Behaviour (ERB)	0,205	0,101	2.030	0.042

The results reveal a significant and substantial mediation effect for the PAW pathway. Since the direct path from PAW to ERB is also significant (β = 0.208, p = 0.030), this pattern represents *partial mediation*: attachment to water elements (e.g., lakes, ponds, streams) promotes ERB *both directly* (practical, immediate concern for water use) and *indirectly* through the formation of pro-environmental attitudes (EA). The proportion of the effect transmitted through EA is relatively large (61.6% of the total effect), indicating that attitudinal change is the primary channel translating emotional attachment to water into concrete actions. This finding is consistent with Lewicka (2011) and Kibler et al. (2020), who argue that emotional bonds with natural elements—particularly water—enhance concern and stewardship behavior. It also supports the SOR perspective, which posits that stimulus (place attachment to water) affects the organism (attitude), which then triggers a response (behavior) (Mehrabian & Russell, 1974). The mediating role of EA is further reinforced by Liu & Lin (2021), who emphasized the centrality of attitude in pro-environmental behavior models. This result is not surprising, given that the majority of respondents were young students (aged 15–25) and predominantly female. Younger individuals tend to be more environmentally aware due to formal education and social media exposure, and females often report higher environmental concern (Wang et al., 2021). This profile explains why attachment to water features strongly activates pro-environmental attitudes, which then lead to responsible behavior. The findings reinforce the Stimulus–Organism–Response (SOR) framework (Mehrabian & Russell, 1974), confirming that the organism (environmental attitude) plays a crucial mediating role in translating stimuli (place attachment dimensions) into responses (environmentally responsible

behavior). Importantly, the results highlight that *not all stimuli are equally effective*: emotional attachment to natural resources (PAW) and visible management practices (PAMW) activate attitudinal processes, whereas purely functional facilities (PAS) do not. This nuance extends the SOR framework by emphasizing that the symbolic and affective value of the stimulus determines whether the mediating mechanism of attitude is triggered.

The direct effect of PAMW on ERB was not significant ($\beta = 0.017$, $p = 0.865$); however, the indirect effect through EA was significant ($\beta = 0.205$, $p = 0.042$). This shows that there is a full mediation in practice: attachment to waste management systems only affects responsible behavior by changing people's attitudes toward the environment. In other words, visible waste management programs make EA better, which then leads to ERB. However, just having these kinds of systems isn't enough to make people change their behavior directly. This outcome corroborates the conclusions of Ramkissoon et al. (2013) and Yoon et al. (2021), who contend that effectively managed waste systems serve as a discernible indicator of a destination's commitment to sustainability, consequently influencing perceptions. However, in contrast to certain studies indicating direct effects, particularly within eco-tourism contexts, the Taman Selecta scenario implies that infrastructure should be supplemented with cognitive or affective interventions (e.g., education, visitor engagement) to elicit behavioral outcomes. The identification of practical full mediation for PAMW reinforces previous findings by Liu & Lin (2021), which indicate that attitudes serve as a psychological "bridge" connecting contextual cues to behavior. The partial mediation identified for PAW indicates that experiential and aesthetic attachments can influence behavior via both cognitive (attitudinal) and direct affective pathways—an understanding that enhances the current literature on place attachment (Lewicka, 2011; Ramkissoon & Mavondo, 2015).

The direct and indirect effects of PAS were not significant. This indicates that attachment to sanitation facilities does not contribute to the development of environmental attitudes or responsible behavior within this sample. This finding aligns with the assertions of Prayag & Ryan (2012) and Zhang et al. (2020), who contend that sanitation is frequently perceived as a utilitarian necessity rather than an emotional or symbolic aspect of the tourism experience. Consequently, it does not elicit attitudinal or behavioral change unless contextualized within an educational or environmental narrative. The younger respondents may view sanitation facilities as a fundamental right rather than a desirable aspect of the destination. The negative (though not significant) beta coefficient may suggest that contentment with sanitation does not correlate with pro-environmental motivation in leisure settings.

5. Conclusions

This study investigated the direct and mediated relationships between three dimensions of place attachment—Place Attachment to Water (PAW), Place Attachment to Sanitation (PAS), and Place Attachment to Management of Waste (PAMW)—and Environmental Responsible Behaviour (ERB), with Environmental Attitude (EA) as a mediating variable. Using PLS-SEM on data from 300 tourists visiting Taman Selecta, Batu City, the results demonstrate several key findings. ***First,*** PAW and PAMW were found to significantly influence EA, whereas PAS did not exhibit a significant relationship. This indicates that emotional bonds with natural elements such as water and visible waste management systems are more effective in shaping environmental attitudes compared to utilitarian infrastructure such as sanitation facilities. ***Second***, EA was shown to be the strongest predictor of ERB ($\beta = 0.767$, $p < 0.001$), confirming its central role as proposed by the SOR framework and the Theory of Planned Behaviour

(Ajzen, 1991). The strength of this relationship underscores the importance of psychological mechanisms in driving pro-environmental behaviour. ***Third,*** the direct effects reveal that PAW also significantly and directly affects ERB, whereas PAMW and PAS do not. This suggests that water-related experiences can trigger immediate behavioural responses, while waste management requires attitudinal activation before influencing behaviour. ***Finally***, the mediation analysis revealed that EA significantly mediates the relationships between PAW and ERB (partial mediation) and PAMW and ERB (practical full mediation), but does not mediate the PAS–ERB link. These findings enrich the understanding of how place attachment operates within the SOR framework, showing that attitudes act as a key psychological bridge, but only when the stimulus carries symbolic and affective value.

The findings ***contribute to the literature*** by clarifying the differentiated effects of place attachment dimensions on environmental attitudes and behaviours. They confirm that emotional connection to natural and managed environments (water and waste systems) serves as a strong stimulus for attitudinal and behavioural responses, thereby extending the SOR model with empirical evidence on the relative importance of different place attachment dimensions. The partial mediation observed for PAW and full mediation for PAMW further refine our understanding of how environmental attitudes function as a psychological mechanism linking attachment and behaviour. ***From a practical perspective***, destination managers should prioritize initiatives that strengthen both emotional attachment and environmental attitudes. For PAW, preserving and highlighting water features, combined with educational programs and interpretation, can enhance both direct and mediated pathways to ERB. For PAMW, behavioural interventions should focus on attitude formation through participatory engagement—such as recycling workshops, signage, and gamified waste segregation programs—because the effect on behaviour operates almost entirely through EA. In contrast, PAS did not produce significant effects, suggesting that sanitation infrastructure alone does not foster emotional engagement or attitudinal change. Managers should reframe sanitation as an integral part of the environmental experience, using educational messaging and campaigns that link cleanliness with ecosystem health and community well-being.

Despite offering valuable insights, this study *has several limitations*. ***First,*** the cross-sectional design restricts the ability to draw causal conclusions. Future studies should employ longitudinal or experimental designs to capture changes in attitudes and behaviours over time. ***Second***, the study focused solely on Taman Selecta, which may limit the generalizability of the findings to other destinations with different environmental settings and visitor profiles. Replicating the study in coastal, urban, or cultural destinations could validate and extend the results. ***Third***, the sample was dominated by young respondents (15–25 years old) and students (74.3%), which may have amplified the role of attitudes in predicting behaviour. Future research should include more diverse samples, including families, older tourists, and international visitors, to examine whether demographic variables moderate the observed relationships.

Acknowledgements

Acknowledgments to LP2M UIN Maulana Malik Ibrahim Malang, which funded the Research Program in 2025.

References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin, 88*(3), 588–606. https://doi.org/10.1037/0033-2909.88.3.588

Halpenny, E. A. (2010). Pro-environmental behaviours and park visitors: The effect of place attachment. *Journal of Environmental Psychology, 30*(4), 409–421. https://doi.org/10.1016/j.jenvp.2010.04.006

Han, H., Lee, M. J., & Hwang, J. (2021). Role of environmental knowledge in pro-environmental behavior: Moderating effect of environmental concern. *Sustainability, 13*(6), 3283. https://doi.org/10.3390/su13063283

Henseler, J., Hubona, G., & Ray, P. A. (2016). Using PLS path modeling in new technology research: Updated guidelines. *Industrial Management & Data Systems, 116*(1), 2–20. https://doi.org/10.1108/IMDS-09-2015-0382

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Huang, Y., Wang, L., & Li, J. (2022). Understanding tourists' pro-environmental behavior: A case of nature-based destinations. *Journal of Sustainable Tourism, 30*(5), 1107–1126. https://doi.org/10.1080/09669582.2021.1921307

Kibler, K. M., Reinhart, D., & Duranceau, S. J. (2020). Influence of water attachment on conservation attitudes: Insights from coastal tourism. *Journal of Environmental Management, 260,* 110111. https://doi.org/10.1016/j.jenvman.2020.11011

Kline, R. B. (2016). *Principles and practice of structural equation modeling* (4th ed.). The Guilford Press.

Lee, T. H., Jan, F. H., & Huang, G. W. (2020). The influence of recreation involvement and environmental attitude on responsible behavior: Evidence from recreationists visiting forest recreation areas in Taiwan. *Journal of Outdoor Recreation and Tourism, 30,* 100283. https://doi.org/10.1016/j.jort.2020.100283

Lewicka, M. (2011). Place attachment: How far have we come in the last 40 years? *Journal of Environmental Psychology, 31*(3), 207–230. https://doi.org/10.1016/j.jenvp.2010.10.001

Liu, Y., & Lin, W. (2021). Exploring the mediating role of environmental attitude in pro-environmental behavior models. *Environment, Development and Sustainability, 23*(2), 1459–1478. https://doi.org/10.1007/s10668-020-00658-7

Prayag, G., & Ryan, C. (2012). Antecedents of tourists' loyalty to Mauritius: The role and influence of destination image, place attachment, personal involvement, and satisfaction. *Journal of Travel Research, 51*(3), 342–356. https://doi.org/10.1177/0047287511410321

Mehrabian, A., & Russell, J. A. (1974). *An approach to environmental psychology.* MIT Press.

Ramkissoon, H., & Mavondo, F. (2015). The satisfaction–place attachment relationship: Potential mediators and moderators. *Journal of Business Research, 68*(12), 2593–2602. https://doi.org/10.1016/j.jbusres.2015.05.002

Ramkissoon, H., Smith, L. D. G., & Weiler, B. (2013). Testing the dimensionality of place attachment and its relationships with place satisfaction and pro-environmental behaviours: A structural equation modelling approach. *Tourism Management, 36,* 552–566. https://doi.org/10.1016/j.tourman.2012.09.003

UNWTO. (2023). *Tourism and sustainability: Global report 2023.* World Tourism Organization. Retrieved from https://www.unwto.org

Yoon, A., Jeong, S., & Lee, H. (2021). Destination waste management practices and tourists' environmental attitudes: Evidence from eco-tourism destinations. *Journal of Sustainable Tourism, 29*(8), 1259–1278. https://doi.org/10.1080/09669582.2020.1863975

Zhang, H., Xu, F., & Lu, L. (2020). Moral obligation, environmental identity, and pro-environmental behavior: The moderating role of perceived effectiveness. *Journal of Cleaner Production, 276,* 123178. https://doi.org/10.1016/j.jclepro.2020.123178