THE RELATIONSHIP BETWEEN KNOWLEDGE, AWARENESS OF CONSEQUENCES, AND TOURIST ATTITUDES TOWARD PLASTIC WASTE DISPOSAL BEHAVIOURS AT NATURAL TOURIST DESTINATIONS

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ABSTRACT

Currently, tourism activities in Indonesia are increasingly being directed towards sustainable tourism. Many programs have been designed by the government and destination owners to support this initiative, such as movements to reduce plastic waste at destinations or events. However, these programs have not been well supported by tourists. Findings from the field and previous research show that many tourists still dispose of their plastic waste carelessly. The aim of this study is to identify the level of knowledge, the response to the consequences of plastic waste disposal, attitudes, and behaviours of tourists regarding plastic waste disposal. Additionally, this research is expected to contribute recommendations to the government and other stakeholders to create programs that prevent tourists from disposing of or generating plastic waste in order to achieve the SDGs 2030 goal of "Sustainable Tourism." The method used is quantitative with descriptive and verificative analysis. The findings of this study reveal a gap between attitudes and behaviour's regarding plastic waste disposal at natural tourist destinations. Visitors in this study, who are predominantly young, have good knowledge, awareness, and attitudes toward the behaviour of disposing of plastic waste at natural tourist destinations, but they do not practice these behaviours. This study suggests that in order to create more significant change, a comprehensive education strategy is necessary, such as outreach, informational campaigns, and participation in environmental cleanliness activities. The use of digital technology, such as mobile apps, can also strengthen awareness and motivate more responsible behaviour. Furthermore, strengthening social norms through community campaigns and cross-sector collaboration between the government, tourism managers, and local communities is key to creating an environment that supports sustainability.

Keywords: Sustainable tourism; Tourist behavior; Environmental knowledge; Tourist attitudes; Waste management

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INTRODUCTION

Tourism activities have both direct and indirect impacts on the environment (Gössling 2002). The impacts generated can threaten the environment and contribute to 4.6% of global warming (Moreno-Luna et al. 2021), Another impact indicates that tourism destinations produce approximately 15,080 kilograms of waste every day (Pham Phu et al. 2019), Not only that, waste can also harm local communities (Sherry P. Broder 2023). In West Java, tourism activities are a major contributor to waste. The Head of the Tourism and Culture Office of West Java Province mentioned that tourist destinations are among the areas with the largest potential for waste, especially in the Bandung Raya and Bogor Raya regions, which are known for having the highest waste production in the province. "Furthermore," the Head of Tourism and Culture stated, "the tourism magnets in West Java are located in Bandung Raya and Bogor Raya. Therefore, the largest waste production is found in these two regions"(Ritonga, 2023).

According to data obtained from opendata.jabarprov.go.id, the total volume of waste transported to the Final Disposal Site (TPA) in West Java in 2021 reached 11,189 tons per day. From this total, the Bandung Raya region contributes by sending around 2,485 tons of waste to the Final Disposal Site (TPA), while the Bogor Raya region sends approximately 1,235 tons per day. The city of Bandung holds the highest position in waste disposal, with a total of 1,430 tons every day, followed by Bandung Regency with 738 tons, Cimahi City with 173 tons, and West Bandung Regency with 738 tons. (n.d.) If the current trend continues, it is estimated that by 2050, an additional 12 billion metric tons of plastic waste will be discarded in landfills or left unmanaged around the world, which will further exacerbate environmental degradation (Geyer, Jambeck, and Law 2017).

With the growing number of tourists visiting various natural tourist destinations in West Java, the issue of waste has become an increasingly concerning problem (Herdiansah 2021). It is important to remember that tourists are one of the largest contributors to waste at tourist destinations (Hilman et al. 2023). The waste generated by tourists includes plastic waste, food scraps, and others. The plastic waste produced cannot decompose significantly, but will fragment into smaller particles that can reach sizes of millimetres or micrometres (Geyer et al. 2017). This poses a significant danger to human health, as health impacts can occur through groundwater contamination and gas emissions, leading to both carcinogenic and non-carcinogenic effects on the populations exposed around them (Kedzierski et al. 2020; Siddiqua, Hahladakis, and Al-Attiya 2022).

Recognizing the dangers posed by waste, the Head of the Tourism and Culture Office of West Java created the 2023 West Java Festival as a role model event. "The public is encouraged to bring their own tumblers or drinking bottles. This aims to reduce waste after the event," he explained*. "If this initiative is successful, we will promote it to tourist destinations in the Bandung Raya and Bogor Raya regions. These are the areas with the largest waste production, as West Java's tourism magnet is located in these two regions,"* he added (Bagaskara 2023). **However, field findings during the event revealed that a significant number of visitors still engaged in the practice of littering. Nevertheless, this issue was addressed by hundreds of volunteers who helped comb through the area and clean up the waste during the event.** (Alhamidi 2023), Not only during the event, but other tourist

destinations also experience the same issue (Akhtar, Helly, and Soetjipto 2014; Herdiansah 2021; Teknologi Lingkungan et al. 2021). **It raises the question: Do tourists have knowledge of the practice of littering plastic waste? Are tourists aware of the consequences of this careless plastic waste disposal? What is the actual attitude of tourists toward this behavior? This is crucial to explore because not all destinations have cleanliness volunteers.**

Therefore, understanding behavior, especially the factors that influence whether and how an individual changes their behavior, is a critical part of any solution to reduce plastic waste. Progress in this area is hindered by a lack of research focused on behavior and behavioral change based on strong theory and evidence; this impedes efforts to design effective behavioral change interventions to reduce plastic waste (Allison et al. 2022; Kedzierski et al. 2020).

Certainly, if the role model established during the "West Java Festival 2023" is to be socialized to tourist destinations in the Bandung Raya region, research is necessary to further explore the behavioral patterns at these destinations. The research findings are expected to provide valuable insights as a foundation and reference for policies to be implemented by stakeholders in order to achieve sustainable development. Research focusing on environmental knowledge has been widely studied, with most of the research examining its relationship with pro-environmental attitudes and behaviors. Attitudes, in shaping behavior, are influenced by an individual's knowledge related to the behavior being studied. (Akhtar et al. 2014; Duan and Sheng 2017; Harmuningsih, Ronald Jacob Saleky, and Peduli Kwartir Daerah Gerakan Pramuka Jawa Timur n.d.; Kim, Kim, and Thapa 2018; Muhammad Affan Ardana and Aflit Nuryulia Praswati 2024; Pandey et al. 2023). Pandey's research highlights the need for awareness and proper plastic waste management practices to reduce plastic waste and protect the environment. (Pandey et al. 2023). **Awareness of the consequences is used as a moderator to understand tourists' behavior in disposing of plastic waste and is a result of the knowledge they have acquired.** (Badawi et al. 2024). In this study, the researcher tests awareness of consequences as a mediator in shaping attitudes.

METHOD

The research process begins with formulating the research background, narrowing the focus, and defining the research problem. The subsequent step involves compiling relevant theories associated with the identified problems and variables, which then serve as the basis for developing measurement instruments for the variables under investigation. In addition, this study incorporates a salient belief test to obtain direct insights from the research sample regarding their beliefs about the benefits of the predicted behavior, the individuals who may influence such behavior, and the factors that may facilitate or hinder the occurrence of the predicted behavior. The questionnaires were distributed to 100 prospective respondents traveling to nature-based tourist destinations in Bandung Regency and West Bandung Regency in 2024, and the collected data were analyzed using Smart PLS.

The next stage comprises descriptive and confirmatory analyses. Descriptive analysis examines each variable independently, whereas confirmatory analysis tests hypotheses concerning the relationships and effects among the variables.

RESULTS AND DISCUSSION

The questionnaire results revealed the following demographic data: 90 female and 10 male respondents, with 93% aged 13-25 years and the remaining 7 people (7%) aged 26-45. Seventy percent (70%) of respondents came from outside Bandung city, 70% had high school/vocational school education, and 80% were students. Regarding travel purposes, 53% visited for relaxation while 35% came to explore and enjoy the natural scenery and unique environment.

The measurement model was then evaluated using convergent validity, with factor loadings >0.7 retained and those <0.7 removed from the model.
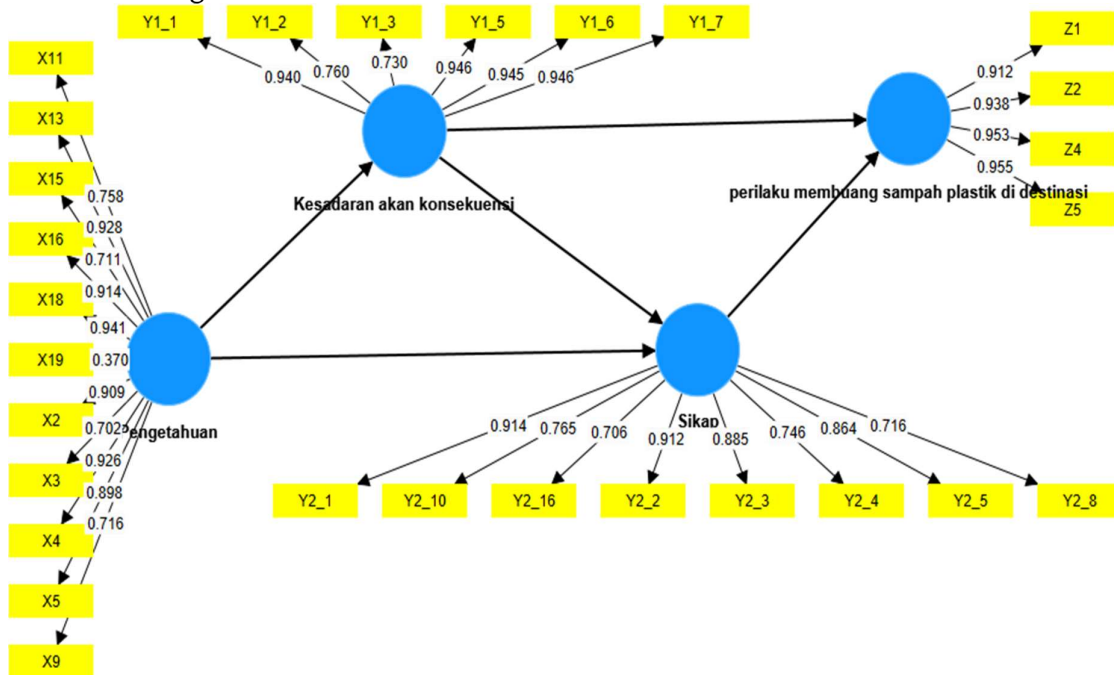

Figure 1. Results of outer loading value
Resource: Data processing Researcher

2) Discriminant Validity

Every variable must have a value of> 0.70(Hamid and Anwar 2019). The discriminant validity of a model is declared sufficient if each construct in the AVE root is greater than the correlation between constructs and other constructs. For the AVE (Average Variance Inflation Factor) value must be more than 0.5 (Hamid and Anwar 2019), and in this study it has fulfilled as shown in Figure 2
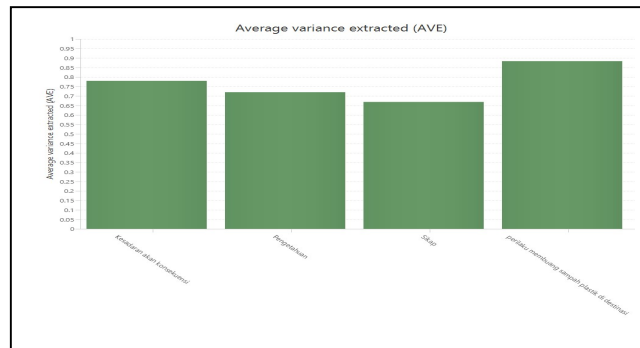

Figure 2. AVE value results
Resource: Data processing Researcher

3) Heterotrait Monotrait Ratio Value

Table 1. HTMT Test Results

	Heterotrait-monotrait ratio (HTMT)
Knowledge <-> Awareness of consequences	0,585
Attitudes <-> Awareness of consequences	0,705
Attitudes <-> Knowledge	0,782
plastic littering behaviour at the destination <-> Awareness of consequences	0,243
plastic littering behaviour at the destination <-> Knowledge	0,127
plastic littering behaviour at the destination <-> attitudes	0,098

Source: Processed by Researcher

In Table 1, it can be seen that the HTMT value is already <0.9, so it is eligible to proceed to the next stage.

Reliability Test

Reliability test in SEM can be measured using two categories, namely Composite Reliability and Cronbach's Alpha. Both categories are acceptable if the value is > 0.70 (Sihombing and Arsani 2022).

Composite *Reliability Test*
Cronbach's Alpha

Table 2. Composite *Reliability & Cronbach's Alpha Test Results*

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)
Awareness of consequences	0,941	0,945	0,955
Knowledge	0,955	0,960	0,962
Attitudes	0,928	0,931	0,941
plastic littering behaviour at the destination	0,957	0,995	0,968

One measure of the reliability of a construct is Composite Reliability. If the construct value can exceed 0.70, it can be accepted and declared reliable. The following are the results of compostite reliability testing

Table 3. Composite *R-Square Value*

R-Square Value

Table 10. R-Square value results

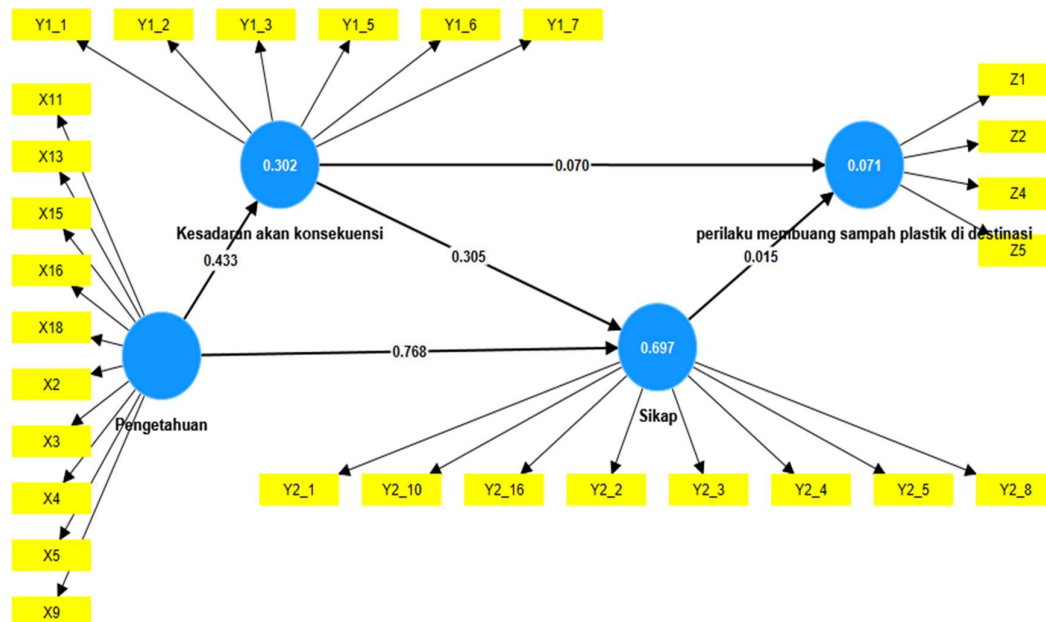|	R-square	R-square adjusted
Awareness of consequences	0,302	0,295
Attitude	0,697	0,691
Behavior of disposing of plastic waste at destinations	0,071	0,052

Figure 2. Output Calculation Results using SmartPLS

Table 3 and Figure 2 show the following:

The R square value on the awareness of consequences variable (Y1) gets the number 0.302 (30.2%), which means that the Knowledge variable (X) has an effect of 30.2% on the awareness of consequences variable (Y1). Meanwhile, the remaining 69.8% is influenced by factors outside of this study.

The R square value on the Attitude variable (Y2) gets the number 0.697 (69.7%) which means that the Knowledge variable (X) and Awareness of consequences have an effect of 69.7% on the Attitude variable (Y2). Meanwhile, the remaining 29.3% is influenced by factors outside of this study.

The R square value on the Behaviour variable (Z) gets a figure of 0.071 (7.1%) which means that the variables Knowledge (X) and Awareness of consequences (Y1) and Attitude (Y2) have an effect of 7.1% on the Behaviour variable (Z). Meanwhile, the remaining 92.9% is influenced by factors outside of this study.

Based on the results of calculations using the SmartPLS application listed in Table 3 and Figure 2, the R-Square value obtained a coefficient of determination of 0.302. In the context of this study, this value indicates that the Knowledge variable (X) is able to explain the Consequence Awareness variable (Y1) by 30.2%. The remaining 69.8% is the contribution of other independent variables not examined in this study. These results indicate that the effect of the Knowledge variable (X) on awareness of consequences (Y1) is moderate, which means that the effect is moderate;

On the Attitude variable (Y2), the figure is 0.697 (69.7%), which means that the Knowledge variable (X) and Awareness of consequences have an effect of 69.7% on the Attitude variable (Y2). Meanwhile, the remaining 29.3% is influenced by factors outside of this study, this also shows that the effect of variables X, Y1 on Attitude (Y2) is strong / large;

Meanwhile, the Behaviour variable (Z) gets a figure of 0.367 (36.7%) which means that the variables Knowledge (X) and Awareness of consequences (Y1) and Attitude (Y2) have an effect of 7.1% on the Behaviour variable (Z). Meanwhile, the remaining 92.9% is influenced by factors outside of this study, this also shows that the influence of variables (X), Awareness of consequences (Y1), Attitude (Y2) on Behaviour (Z) is weak (small). Visualisation of the determination of each variable can be seen in Figure 2.

Hypothesis Test

Significance Value and Path Coefficient

Table 4. Value of Path Coefficients

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Awareness of consequences -> Attitude	0,364	0,366	0,070	5,170	0,000
Awareness of consequences -> littering behaviour at destination	0,349	0,360	0,123	2,831	0,005
Knowledge -> Awareness of consequences	0,550	0,552	0,069	7,976	0,000
Knowledge -> Attitude	0,577	0,577	0,066	8,693	0,000
Attitude -> plastic waste disposal behaviour at destination	-0,162	-0,169	0,129	1,257	0,209
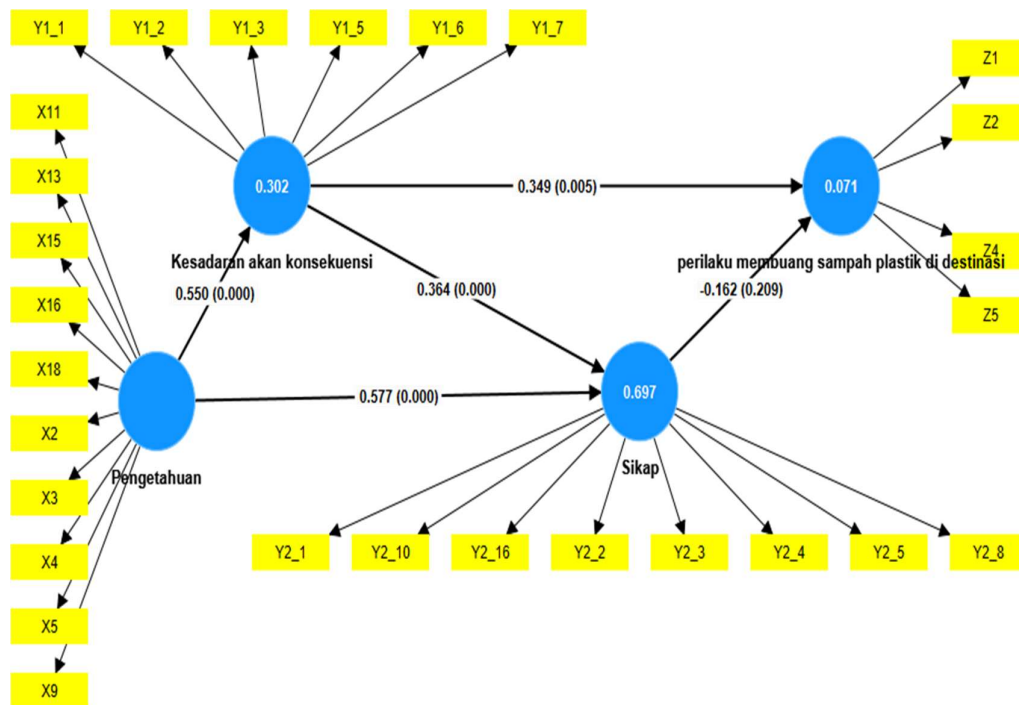
Discussion

Consequence Awareness -> Attitude-> Plastic Waste Disposal Behaviour at Destinations

Table 4 shows that the total effect of awareness of consequences (Y1) on plastic waste disposal behaviour in natural tourism destinations (Z) is 0.550, with a p-value of 0.000. This indicates that the effect is positive and significant. This suggests that awareness of consequences affects behaviour both directly and through mediating factors such as attitudes (Y2). This significant total effect confirms the importance of increasing environmental awareness as a key strategy for encouraging better plastic waste management behaviour among visitors to natural tourism destinations.

This finding is in line with research conducted by Jayasakera (Jayasekara, Rajapaksa, and Gunawardena 2024), which found that increased environmental awareness significantly increases pro-environmental behaviour across a range of contexts, including tourism. Their study shows that educational programmes designed to increase visitors' understanding of the negative impacts of plastic waste can result in positive and sustainable behavioural change. In addition, research by (Mowen 2018)also supports these findings by showing that awareness of environmental consequences plays a crucial role in changing visitor behaviour towards more sustainable tourism practices (Mowen 2018). Furthermore, (Chen 2020) in their study on the effect of environmental education in tourist destinations, found that interventions that raise awareness of environmental consequences not only increase responsible plastic waste disposal behaviour but also increase visitors' satisfaction with their tourist experience. (Chen 2020). This suggests that increasing environmental awareness can have a double impact, both in increasing eco-behaviour and in improving the quality of the tourism experience.

The recent study by Badawi (Badawi et al. 2024) also showed that awareness of environmental consequences has a significant direct effect on waste management behaviour in tourist destinations. They stressed the importance of integrating effective education programmes and ongoing awareness campaigns to ensure that visitors are not only knowledgeable about the negative impacts of plastic waste but also motivated to change their behaviour in real terms. In addition, research by (Ezzatian 2025) revealed that collaboration (between tourist destination managers, local government, and non-governmental organisations) is crucial in raising environmental awareness and encouraging better waste management behaviour. This research suggests that programmes that involve active participation of visitors, such as waste management workshops and environmental conservation activities, can increase the effectiveness of educational interventions and strengthen the link between awareness and behaviour.

The practical implication of these findings is that managers of nature tourism destinations need to implement strategies aimed at raising awareness of environmental consequences among visitors. This can be done through various methods, such as the provision of informative educational materials, the use of digital technology to disseminate information widely, as well as the organisation of interactive activities that involve visitors directly in environmental conservation efforts. Thus, increased awareness of environmental consequences is expected to lead to significant and sustainable behavioural changes in plastic waste management in natural tourism destinations.

Knowledge -> Awareness of Consequences-> Attitude

In Table 4, it can be seen that the Total Effect of Knowledge (X) on Attitude (Y1) is 0.778 with a p-value of 0.000, which indicates that this effect is positive and significant. This means that Knowledge as a whole has a strong and positive impact on Attitude (Y1), both through direct channels and through mediation by other factors (Y2). This finding confirms the importance of knowledge as a key basis in shaping positive attitudes among visitors to natural tourism destinations, which in turn can influence their behaviour regarding plastic waste management.

Knowledge -> Attitude and Awareness of Consequences -> Plastic Waste Disposal Behaviour at Destinations

In Table 4, it can be seen that the total effect of knowledge (X) on plastic waste disposal behaviour in natural tourism destinations (Z) is 0.066 with a p-value of 0.448. Although this coefficient value shows a positive influence, it is statistically insignificant because the p-value is greater than 0.05. This means that overall, knowledge does not have a significant impact on plastic waste disposal behaviour, either through direct pathways or through mediation by factors such as Attitude (Y1) and Awareness of Consequences (Y2).

This finding may indicate the complexity in the relationship between knowledge, attitude, awareness, and plastic waste management behaviour in nature tourism destinations. One possible cause of this non-significance is the presence of external factors or other mediators that were not measured in this research model, which may affect the relationship between knowledge and behaviour.

CONCLUSIONS

The results show that knowledge has a positive and significant influence on raising visitors' awareness of the consequences of visiting natural tourism destinations. An increase in knowledge directly contributes to individuals' awareness of the positive and negative impacts of their actions. In-depth knowledge, particularly concerning ethical principles and environmental responsibility, plays a pivotal role in fostering moral awareness, personal values, and ethical decision-making. Therefore, by providing relevant information and effective education, people can better understand the short- and long-term consequences of their actions, such as the consequences of irresponsibly disposing of plastic waste. In moral, environmental and professional contexts, knowledge drives more responsible behaviour, as individuals who understand the risks or negative consequences tend to act more cautiously and in line with ethical values. These results are consistent with previous research, such as that conducted by Badawi, which demonstrates that adequate knowledge fosters a better understanding of the consequences. Furthermore, knowledge of positive consequences can be more effective in encouraging desired behaviours, such as responsible and sustainable waste management. Effective education and proper information dissemination are therefore crucial for raising people's awareness of the consequences of their actions. With a better understanding of cause-and-effect relationships, individuals will be better equipped to make decisions that favour sustainability and the common good. Ultimately, the more knowledge a person has, the more likely they are to consider the impact of their actions on others, society, and the environment, creating more responsible and ethical behaviour.

Based on the results of the analysis, it is known that knowledge has a positive and significant influence on visitors' attitudes towards plastic waste disposal behaviour in natural tourist destinations. This finding confirms that increased knowledge about the negative impacts of plastic waste on the environment can significantly influence visitors' attitudes to be more responsible in waste management. A deeper knowledge of the dangers of plastic waste, such as water and soil pollution, and threats to flora and fauna, encourages a more pro-environmental

attitude change. Previous research supports this finding by showing that visitors who are educated on environmental issues tend to adopt a more caring and responsible attitude towards sustainability. Better knowledge helps visitors understand the importance of waste management and encourages environmentally conscious behaviours, such as disposing of waste in its proper place and reducing the use of single-use plastics. According to the Theory of Planned Behaviour, increased knowledge can change individuals' attitudes and intentions, ultimately influencing their behaviour. In this context, visitors who understand the impact of plastic waste on the environment are more likely to exhibit responsible behaviour, such as bringing back their waste or avoiding the use of single-use plastics. Therefore, natural tourism destinations that integrate environmental education programmes can increase visitors' awareness and knowledge, which in turn contributes to changes in attitudes and behaviours that are more supportive of sustainability. Thus, effective education and information dissemination is a strategic step to develop positive attitudes and responsible behaviour towards plastic waste management in nature tourism destinations. This is important to support environmental conservation and create sustainable destinations.

The results show that awareness of consequences has a positive and significant influence on visitors' attitudes regarding plastic littering behaviour in nature tourism destinations. Any increase in visitors' awareness of the negative impacts of plastic waste on the environment, such as soil and water pollution, and threats to wildlife, significantly contributes to a more caring and responsible attitude change. This encourages visitors to avoid littering behaviour and be more committed to good waste management. This finding is in line with the Theory of Planned Behavior, which states that a person's attitude towards a behaviour is influenced by their understanding of the consequences of that behaviour. Thus, a higher awareness of the impact of plastic waste may shape a more positive attitude towards the environment. Previous research by Schultz also supports that increased awareness of environmental impacts can motivate individuals to engage in pro-environmental behaviours, such as plastic waste reduction or recycling. Furthermore, effective environmental education, whether through direct outreach or information campaigns, has been shown to play an important role in increasing visitors' understanding and awareness of the importance of nature conservation. Studies by Gifford and Nilsson confirm that environmental awareness is a key factor in driving sustainable behaviour change. Campaigns that convey clear information, participation in cleanliness programmes, and the use of eco-friendly plastic alternatives are concrete steps that can be taken to increase visitor awareness. With a good educational strategy and collaborative approach, tourism destination managers can strengthen visitors' awareness about the impact of plastic waste on the ecosystem. This is expected to change their attitude and behaviour to be more environmentally responsible. Ultimately, this increased awareness will not only help keep nature clean and sustainable, but also create a more sustainable and quality tourism experience.

The results show that awareness of consequences has a positive and significant influence on plastic waste behaviour in natural tourism destinations. Increased awareness is a key factor in changing visitor behaviour towards more responsible plastic waste management. This study corroborates previous findings that education-based interventions, such as the delivery of visual information on the

negative impacts of plastic waste, can encourage changes in visitor attitudes and behaviour. Active participation of visitors in environmental conservation activities, such as waste collection and recycling workshops, also proved to be an effective approach. The use of digital technologies, such as mobile apps that provide real-time information on the location of landfills and environmental impacts, also has great potential in strengthening visitor awareness. These technologies not only provide educational information but also give immediate feedback on individual contributions to environmental hygiene. This reinforces awareness and facilitates more responsible behaviour change. In addition, social norms play an important role in influencing visitor behaviour. When visitors witness responsible behaviour from others, they tend to follow the example, creating a domino effect of wider awareness. Campaigns that highlight positive behaviours, such as the use of social media or rewarding responsible visitors, can reinforce social norms and motivate collective behaviour change. Intrinsic motivation is also a major factor in encouraging green behaviour. Visitors with high intrinsic motivation, especially those with a deep understanding of the negative impacts of plastic waste, tend to be more consistent in adopting green behaviour. Therefore, strategies that raise awareness while strengthening intrinsic motivation can create more lasting behaviour change. Finally, cross-sector collaboration between destination managers, government, and local communities is essential to support responsible littering behaviour. The provision of adequate waste disposal facilities, incentives for visitors who participate in conservation, and other supporting policies are necessary to create an environment conducive to behaviour change. Overall, raising awareness of consequences should be supported by integrated and evidence-based strategies, including effective education programmes, leveraging technology, strengthening social norms, enhancing intrinsic motivation, and cross-sector collaboration. These measures will not only help to preserve the environment but also improve the quality of the tourism experience, creating a more sustainable destination.

The results showed that attitude has a negative and insignificant effect on plastic waste behaviour in natural tourism destinations. This finding indicates an attitude-behaviour gap, which is the gap between positive attitudes towards the environment and actual behaviour in plastic waste management. This suggests that although visitors have attitudes that support environmentally friendly behaviour, they may not always put them into action, especially when there are situational barriers, such as limited facilities or social influence. Previous research by Kasser and Ryan and Bamberg and Möser supports this finding by emphasising that external factors, such as the availability of adequate waste disposal facilities, the presence of supportive social norms, and intrinsic motivation, strongly influence whether one's attitude will translate into behaviour. In the absence of a supportive environment, a positive attitude is often not enough to drive behaviour change. In addition, research by Schultz et al. shows that interventions that focus solely on changing attitudes tend to be ineffective without accompanying changes to the physical environment and supporting policies. In the context of natural tourism destinations, this means that managers need to provide adequate facilities, such as clear and easily accessible rubbish bins, and develop campaigns that reinforce positive social norms related to waste management. The implication of these findings is that a more comprehensive strategy is needed to encourage environmentally friendly behaviour. Tourism destination managers need to combine awareness-raising efforts with improvements in physical facilities, such as

providing separate bins for plastic and organic waste, and providing incentives for visitors who demonstrate responsible behaviour. In addition, community campaigns that involve the active participation of visitors can help build social norms that support pro-environmental behaviour. With a holistic approach, which includes attitude change, physical facilities, and social support, it is expected that the gap between attitude and behaviour can be reduced. This will not only improve plastic waste management in natural tourism destinations but also support the destination's long-term sustainability goals.

Research Suggestions and Implications

The results of this study provide a number of strategic suggestions to improve plastic waste management in natural tourism destinations. First, tourist destination managers need to organise a comprehensive environmental education programme to increase visitors' knowledge about the negative impact of plastic waste on the environment. This programme could include counselling, workshops, and visual materials such as infographics or documentary videos that showcase ecosystem damage caused by plastic waste. In addition, an emphasis on the cause-and-effect relationship of visitors' actions will help them understand the importance of responsible waste management, thus motivating them to adopt more pro-environmental behaviours. Utilisation of digital technology is also a recommended strategic measure. Mobile applications can be used to provide real-time information on the location of landfills, environmental impacts, and advice on plastic waste management. This technology not only provides educational information but also provides direct feedback to visitors on their contribution to the cleanliness of tourist destinations. This can strengthen visitors' intrinsic motivation to continue taking environmentally friendly actions.

In addition, social norms should be reinforced through campaigns that highlight positive visitor behaviours, such as littering or reducing the use of single-use plastics. Social media can be used to promote these norms through hashtags and rewards for responsible visitors. Community campaigns that involve the active participation of visitors, such as joint waste collection activities, can also help create collective awareness that encourages widespread behaviour change. Physical facilities at tourist destinations need to be improved to support the implementation of knowledge and awareness into concrete actions. The provision of clearly marked trash bins, separated for different types of waste, as well as educational information boards at various strategic points will make it easier for visitors to manage their waste properly. Cross-sector collaboration between destination managers, the government, and local communities is crucial to ensure the sustainability of this education and waste management program. Supporting policies, such as providing incentives for visitors who demonstrate environmentally friendly behavior, can further strengthen the impact of the program.

The implications of this study indicate that increasing awareness and changing behavior require not only education and campaigns, but also a supportive physical and social environment. With a holistic approach that includes increasing knowledge, intrinsic motivation, social norms, and supporting facilities, the gap between attitudes and behavior can be minimized. This strategy will not only help maintain the cleanliness and sustainability of natural tourist destinations but also create a higher quality and more sustainable tourist experience for visitors.

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