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# EXTERNAL DRIVERS OF PRO-ENVIRONMENTAL BEHAVIOR AS A PATHWAY TO SUSTAINABLE RELIGIOUS TOURISM DEVELOPMENT: EMPIRICAL EVIDENCE FROM INDONESIA'S GREEN ECO-HALAL TOURISM DESTINATIONS

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## ABSTRACT

***Amid escalating environmental crises and the rising demand for ethical tourism, sustainable religious tourism has emerged as a strategic approach to balancing ecological conservation, cultural preservation, and spiritual values. This study examines the influence of external drivers—namely government support and advanced technology—on Pro-Environmental Behavior (PEB) among visitors to Green Eco-Halal tourism destinations in East Java, Indonesia. A quantitative cross-sectional survey was conducted with 311 respondents, and data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings reveal that government support exerts a significant positive effect on PEB, which in turn strongly contributes to sustainable tourism development. Moreover, PEB mediates the relationship between government support and sustainable religious tourism development. In contrast, advanced technology does not show a significant effect on PEB, indicating that technological infrastructure alone is insufficient without supportive values, literacy, and awareness. These results underscore the central role of institutional interventions and value-based strategies in promoting environmentally responsible tourist behavior. The practical implications emphasize the importance of long-term government policy commitment, community-based approaches, and inclusive education programs to embed ecological awareness in religious tourism. At the same time, technological innovations should be designed in a contextual and culturally sensitive manner to complement, rather than replace, value-driven sustainability practices.***

**KEYWORDS:** Eco-Halal Tourism, Sustainable Religious Tourism, Pro-Environmental Behavior, Government Support, Advanced Technology, Structural Equation Modeling.

## 1. INTRODUCTION

In the midst of the escalation of the global environmental crisis and the prolonged impact of the COVID-19 pandemic, the tourism sector management paradigm has undergone a significant transformation. Nature-based tourism is growing rapidly, with the global ecotourism market value reaching USD 295.10 billion in 2023 and predicted to rise to USD 761.39 billion in 2030 (Maximize Market Research, 2025). In addition, religious tourism also shows significant numbers, with around 600 million trips each year. (UNWTO, 2014), with a market value of USD 254-268 billion in 2023-2024 (Mawarni, 2020). Currently, religious tourism integrates the principles and values of sustainable tourism to maintain the cultural, environmental, and spiritual values of the destination. This is based on environmental degradation, tourism waste, and the lack of application of religious ecotourism principles. Examples of success include the Grand Mosque as a destination for the World Muslim Hajj. (Rayan & Salik, 2022), Camino de Santiago in Spanyol (Romanelli et al., 2021) Pomeranian-Catalonia religious route demonstrating the success of cross-border collaboration in the sustainable development of religious tourism (Mróz, 2021). In Indonesia, Borobudur Temple, as the center of world Buddhist civilization, is used as a pilot for Green Tourism. (Wibowo & Nur, 2024), and the Istiqlal Mosque, named the Green Mosque by IFC (Mangunjaya, 2024). The growing interest in ecotourism and religious tourism reflects a shift towards more socially and spiritually responsible tourism preferences.

As a country with the largest Muslim population in the world, Indonesia has a strategic position in the development of halal tourism. About 13% of the world's Muslim population lives in Indonesia, making it a potential market and a major destination for halal tourism (Vargas-Sanchez et al., 2020). This demographic advantage is supported by natural wealth, cultural heritage, and a diversity of religious destinations spread across various regions. The Indonesian government also shows a strong commitment by making Aceh and Lombok leading halal tourism destinations, as well as encouraging the development of halal tourism villages that integrate local wisdom with global halal standards (Hanafi et al., 2024; Sonjaya et al., 2024).

However, this great potential still faces a number of challenges, ranging from the limitations of sharia facilities, such as hotels and travel agencies that are fully compliant with halal standards, to the gap in public awareness and industry players ' understanding of the value of spirituality contained in halal tourism (Hidayah & Solihah, 2025). On the other hand, the development of digital technology, such as the use of Internet Geographic Information Systems (GIS), opens up new opportunities to expand the visibility of halal destinations that are not yet popular (Afnarius et al., 2020). With the right marketing strategy, including digital branding and the role of MSMEs in the halal tourism supply chain, Indonesia has the potential to strengthen its position as the world's halal tourism center.

In line with that, a new idea emerged that emphasized the integration of the concept of ecotourism with halal values, which became known as eco-halal tourism. This concept combines the principles of environmental sustainability with Islamic ethical-religious guidelines, resulting in a tourism model that is not only environmentally friendly, but also maintains spiritual authenticity and halal values (Khan et al., 2025). In an Islamic perspective, the concept of caliph fil ardh emphasizes the responsibility of humans to preserve the earth (Manan et al., 2023), So that the existence of eco-halal tourism is a form of praxis of ecological spirituality that is relevant to contemporary needs.

The Eco-Halal Tourism model not only increases environmental awareness, but also has an impact on improving the economic welfare of the local community (Sonjaya et al., 2024). In addition, the success of halal ecotourism development is highly dependent on mutual business collaboration between stakeholders, including the government, private, and local communities (Ratnasari et al., 2024). The urgency of eco-halal tourism is even stronger when it is associated with three main aspects of sustainability: spiritual authenticity, environmental quality, and community welfare. First, maintaining spiritual authenticity means ensuring that the tourist experience remains in accordance with Islamic values, starting from worship facilities to the religious atmosphere of the destination. Second, environmental quality demands environmentally friendly practices, such as waste management, energy efficiency, and nature conservation (Zulvianti et al., 2022). Third, community welfare emphasizes the active participation of local communities, who not only play the role of beneficiaries, but also as the main managers who ensure the sustainability of the destination (Han et al., 2019).

As in other religious tourism frameworks, the challenges in implementing eco-halal tourism are not few. Ambiguous regulatory frameworks and inconsistent policies are obstacles to creating an

integrated system (Jaelani et al., 2025). In addition, the need for harmonization between halal standards and ecotourism principles demands an inclusive policy approach based on community participation (Pongsakornrungsilp et al., 2024). For this reason, the role of the government as a regulator, the community as a driver, and industry players as innovators is very important in building a resilient eco-halal tourism ecosystem.

Furthermore, the success of eco-halal tourism is not only determined by the availability of facilities and regulations, but also by the behavior of tourists. Pro-Environmental Behavior (PEB) is an important component in ensuring the sustainability of tourism, including in the context of religious tourism. PEB includes the actions of tourists to support environmental conservation, reduce negative impacts, and participate in maintaining the quality of destinations (Yuriev et al., 2020). In tourism studies, these behaviors are influenced by a complex combination of internal and external factors, so a deep understanding of the mechanisms becomes crucial for the sustainability of destinations. Internal factors include personal values, religiosity, and moral norms, where altruistic and biospheric values have been shown to strengthen PEB, while egoistic values weaken them (Hoshyar et al., 2024; Z. Xu et al., 2023). On the other hand, external factors such as government policies, regulations, stakeholder support, the availability of green infrastructure, as well as social norms and collective incentives are important determinants in creating an environment conducive to environmentally friendly behavior (Linder et al., 2021; Q.-S. Yan et al., 2024). The synergy between the two ensures the sustainability of tourist destinations, including religious tourism.

In the context of religious tourism, empirical evidence shows that spiritual factors and religiosity are strong predictors of PEB. Study Kala & Chaubey (2024) found that religious beliefs moderate the relationship between personal values and PEB. Tourists with stronger spiritual and cultural motivation also showed a higher tendency to PEB, in contrast to weakly motivated tourists (Rivetti et al., 2025). The awe experience evoked by the religious atmosphere of the destination encourages pro-environmental behavior through affective mechanisms (A. Yan & Jia, 2021). In addition, the ethical compensation model explains how religious beliefs influence the time preferences and environmental behavior of tourists, both through moral licensing and moral cleansing (C. Liu et al., 2025).

Furthermore, intrinsic religiosity has been shown to directly encourage PEB, while extrinsic religiosity works indirectly through the awareness of frugality and connection with nature (Wang et al., 2020). Recent studies confirm the role of religion in encouraging the involvement of religious tourists in PEB, where religious teachings and spiritual leadership can be effective means of environmental education (Islam et al., 2025). Theoretical frameworks such as the awe-habitual model also validate that religious emotional experiences, habits, and contextual factors interact in forming PEB in religious destinations (Y. Zhang et al., 2024). Social norms, both injunctive and descriptive, encourage tourists to adapt their behavior to collective expectations (Wang et al., 2023). Furthermore, the provision of financial or social incentives can increase the effectiveness of internal factors by creating a space for tourists to collaborate on environmental issues (Y. Zhang et al., 2017).

Although the study of PEB in tourism has grown rapidly, most studies still emphasize internal factors such as personal values, moral norms, and religiosity as the main determinants of environmentally friendly behavior. In contrast, the influence of external factors—including policy support, regulations, incentives, social norms, and green infrastructure—is still relatively under-reported, even though these factors are very important in collective contexts such as religious tourism destinations. In addition, empirical evidence on PEB in religious tourism destinations is still limited and focuses more on Western contexts or non-Muslim destinations. The lack of studies that explicitly test the interaction of external drivers with sustainability practices in eco-halal destinations in Indonesia creates an academic and practical gap. Therefore, this research is important to understand how external drivers can be a strategic path in the development of sustainable religious tourism. Three research questions need to be solved in this study, namely:

RQ1. How does government support affect the pro-environmental behavior (PEB) of tourists in the context of sustainable religious tourism in Indonesia?

RQ2. How does advanced technology contribute to the formation of PEB tourists?

RQ3. Does PEB act as a mediator between external factors (government support and advanced technology) and sustainable tourism development?

This study aims to analyze the role of external drivers in the form of government support and advanced technology in encouraging PEB tourists, as well as testing the mediation function of PEB on the

development of sustainable religious tourism in green eco-halal destinations in Indonesia. Theoretically, this study expands the understanding of PEB by emphasizing the influence of external factors that are relatively underexplored in the literature. In practice, the research findings provide policy recommendations for governments and destination managers to design effective regulatory interventions, technologies, and green infrastructure in strengthening sustainable religious tourism practices.

## 2. LITERATURE REVIEW

### *2.1. Sustainable Religious Tourism: An Overview*

Sustainable religious tourism is a concept of spiritual value-based tourism development managed with the principle of sustainability, so that it not only provides economic benefits but also maintains the preservation of the environment, culture, and social welfare of the local community. Srivastava et al. (2024) explained that religious tourism can be a driver of development through job creation, local economic improvement, and strengthening social cohesion. This concept emphasizes a balance between the interests of pilgrims and the local community through management that values cultural, spiritual, and environmental values (Revila & Moure, 2020).

From an environmental perspective, the application of environmentally friendly practices in religious destinations contributes to the preservation of cultural heritage, waste reduction, and strengthening ecospiritual awareness among tourists (Kumari & Thakur, 2024). Success models such as those at the Shri Mata Vaishno Devi Temple show that eco-friendly practices can drive social entrepreneurship and community transformation (Khan et al., 2025). However, the risk of environmental degradation also remains, so a change in tourist behavior towards pro-environmental action is urgently needed (Kala & Chaubey, 2024).

Economically, religious tourism is seen as a form of sustainable tourism that can serve as a model for other tourism sectors, while encouraging cultural exchange and innovation (Chauhan, 2013). To ensure sustainability, key principles include the accessibility of sacred sites, the protection of cultural values, the participation of local communities, and quality-based destination management systems (Oliva & Trono, 2023). The integration of religious tourism into broader sustainable development plans is also important, as it is closely linked to traditions, local identities, and long-term prospects (Varnavas et al., 2018). Thus, sustainable religious tourism can be a strategic path that unites spiritual, ecological, economic, and social interests in one framework of sustainable tourism development.

### *2.2. Stimulus-Organism-Response (S-O-R) Theory*

The Stimulus-Organism-Response (S-O-R) Theory, developed by Mehrabian and Russell (1974), is an important framework in environmental psychology and consumer behavior. This theory emphasizes that human behavior is influenced by external stimuli (stimuli), which are then processed in the internal state of the individual (organism), before producing a behavioral reaction (response) (Mehrabian & Russell, 1974). Stimulus includes environmental factors and external triggers such as information quality, brand image, promotion, or service atmosphere (Huynh et al., 2024). Organisms represent cognitive and emotional responses, such as beliefs, value perceptions, memory, and positive and negative emotions (Ittefaq et al., 2024; Manthiou et al., 2017). The final stage, Response, is manifested in tangible behaviors such as purchase intent, brand loyalty, avoidance, or word-of-mouth communication (Banerjee et al., 2025). This framework not only explains the stimulus-behavior relationship but also emphasizes the mediated role of emotions and cognition in the decision-making process.

The application of Stimulus-Organism-Response (S-O-R) Theory in tourism studies provides an in-depth understanding of how destination stimuli affect tourist experiences, emotions, and sustainable behaviors. In the context of sustainable tourism, stimuli in the form of environmental quality, cultural atmosphere, and heritage site management have been shown to trigger emotional responses such as awe, which then encourage environmentally responsible behavior (Y. Jiang & Balaji, 2022; Juan, 2025). Longitudinal studies show that stimuli in the form of green destination experiences can increase tourists' environmental awareness and shape revisit intentions (Chakraborty et al., 2024).

In religious tourism, stimuli in the form of destination attributes and spiritual values influence perception, attachment to place, and satisfaction, which ultimately result in behavioral intentions such as positive word-of-mouth or revisits to sacred sites (Bano et al., 2024; Nguyen-Viet & Van Nguyen, 2023). In addition, digital innovations such as AI-enhanced virtual tourism are also a new stimulus that mediates tourists' attitudes towards pro-environmental behavior (Wu & Wang, 2025). Thus, S-O-R provides

a robust theoretical framework to understand the complex interactions between destination stimuli, emotional experiences, and tourist behaviors in driving tourism sustainability, both in ecotourism and religious contexts.

## 3. HYPOTHESIS DEVELOPMENT

Through the framework of Stimulus-Organism-Response (S–O–R) from Mehrabian & Russell (1974), this study will examine how government support and the adoption of advanced technology as a stimulus of external factors can shape pro-environmental attitudes, values, and intentions in tourists (organisms) (Mehrabian & Russell, 1974). In the long term, these internal changes are expected to result in a tangible response in the form of more sustainable destination management practices—for example, integrated waste management, resource efficiency, and local community participation in decision-making.

Government support is a crucial determinant in the development of sustainable and competitive tourism. Government intervention not only covers fiscal and infrastructure policies, but also includes the dimensions of governance, technology, and integration of local values (Jokom et al., 2025; Mong & Thanh, 2024). Policy and governance involve the government's active role in encouraging community involvement, environmental conservation, and integrating religious and cultural values in destination planning (Glyptou, 2024; Iskandar, 2024; Rhama, 2022). This is in line with a participatory approach that builds public trust and increases public support for tourism (Hussain et al., 2024; Rodrigues et al., 2024). On the other hand, support in the form of advanced technology strengthens the fundamental function of ICT through the development of digital infrastructure, the application of environmentally friendly technology, and the development of smart tourism destinations in response to competitiveness and sustainability challenges (Allawi, 2022; Du, 2024; Shu et al., 2024). However, challenges such as bureaucracy, resistance to innovation, and environmental degradation still need to be addressed through collaborative governance and adaptive technology-based approaches (Rivera & Andrada, 2024; Ruhanen, 2013).

The relationship between government support and pro-environmental behavior emerges through the government's regulative, facilitative, and educational roles in shaping social norms and behavioral incentives. This support creates an environment conducive to the formation of awareness, responsibility, and active participation of tourists in maintaining the sustainability of the destination environment. Recent empirical studies show that government support has a significant influence on pro-environmental behavior in tourism. Regulations that support individual autonomy can motivate voluntary environmental behavior. (Susanto et al., 2024). A study of the intention of Bali turtle conservation visits found that the role of local governments has a significant effect on environmental care behavior, which has an impact on the intention of visiting. (Satrya et al., 2025). Several studies have found that the effectiveness of government governance contributes positively to environmental awareness and action, especially when public policies are able to balance economic and ecological interests. (Baloch et al., 2023). Research by Deng et al. (2024) shows that government intervention can reinforce tourists' pro-environmental behavior through persuasion approaches such as benefit appeals and goal framing. (Deng et al., 2024). However, a negative context was found by Ruan et al. (2020), which showed that the perception of government support actually lowered the intentions of international tourists' protective behavior in Beijing. (Ruan et al., 2020).

Building on this empirical foundation, it is reasonable to hypothesize that government support will similarly enhance pro-environmental behavior in sustainable religious tourism destinations, where community engagement and environmentally responsible practices rely heavily on institutional facilitation and policy frameworks.

Hypothesis 1: Government support has a significant positive effect on pro-environmental behavior in sustainable religious tourism destinations.

Advanced technology plays an important role in supporting tourism governance by increasing efficiency, transparency, and sustainability. Advanced Technology includes strengthening the fundamental functions of ICT, technological infrastructure, technology for sustainability, and the development of smart tourism destinations. (Allawi, 2022; Andrades, 2024; Diez Apolo et al., 2024; Musa et al., 2022). Technological infrastructure, such as blockchain, improves security and operational reputation, while artificial intelligence (AI) optimizes energy consumption and personalizes travel experiences, encouraging responsible tourism. (Kaakandikar et al., 2025; Pinandhika & Zaim, 2025). Technology for sustainability is realized through the Internet of Things (IoT), which regulates the flow of tourists and manages resources efficiently.

(Kharkhalis et al., 2025). Smart tourism destination development (DTI) integrates technology in destination governance, increasing innovation capacity and sustainable management. (Errichiello & Micera, 2021).

Various empirical studies show that government support through advanced technological policies and programs can significantly encourage pro-environmental behavior. Innovative technologies such as artificial intelligence (AI), renewable energy, and waste management systems have been shown to increase people's sustainability awareness and practices (Adeel et al., 2024; Takshe et al., 2023). In addition, the acceptance of technology influenced by trust and ease of use increases the intention to behave green ((Liao, 2025; Megawati et al., 2025). Government support is also important in developing large-scale environmental communication campaigns and ICT-based human resource development to strengthen sustainable behaviors (Loho Choudhury et al., 2025). In tourism studies, some literature has also found the role of advanced technology in encouraging pro-environmental behavior. For example, AI-based virtual tourism technology enhances tourists' positive attitudes towards the environment through increased accessibility, interactivity, and acquired knowledge, which ultimately drives Pro pro-environmental behavior (Wu & Wang, 2025). Augmented Reality (AR) technology also reinforces environmental values and travelers' awareness, thereby increasing their norms and responsibilities towards sustainability (Abu Elsamen et al., 2025). Virtual Reality (VR) used in museums and tourist destinations offers an eco-friendly alternative that reduces the carbon footprint while improving tourists' attitudes and environmental values (C. Jiang et al., 2025). In addition, innovative environmental technology in hotels and the use of digital-based chatbots have also encouraged sustainable practices through positive experiences that strengthen visitor motivation (Adeel et al., 2024; Singh & Kunja, 2025).

Building upon prior evidence of the role of institutional support in shaping sustainable practices, it is also reasonable to hypothesize that advanced technology will further strengthen pro-environmental behavior in the context of managing and promoting eco-halal tourism.

Hypothesis 2: Advanced technology has a significant positive effect on pro-environmental behavior in sustainable religious tourism destinations.

Pro-Environmental Behavior refers to the conscious actions of individuals who aim to minimize negative impacts on the environment, such as reducing waste, saving energy, and supporting environmentally friendly products. (Steg & Vlek, 2009). Personal values, social norms, and environmental awareness influence pro-environmental behavior. (Bamberg & Möser, 2007). In the social context, Pro-Environmental Behavior is also influenced by the perception of self-efficacy and moral responsibility for ecosystem sustainability. (Ajzen, 1991). Encouraging pro-environmental behavior is a strategic step in building a responsible environmental culture in modern society, including in high-impact sectors such as tourism. In the tourism industry, the implementation of pro-environmental behavior is important to maintain the preservation of natural and cultural resources, which are the main attractions of tourist destinations. Travelers who practice Pro-Environmental Behavior are more likely to choose eco-friendly accommodations, avoid destructive activities, and support local communities. (Dolnicar et al., 2015). This is in line with the principles of sustainable tourism that emphasize a balance between tourist satisfaction, environmental conservation, and the well-being of local communities. (Kálmán et al., 2024).

Islamic ethical principles provide a strong foundation that directly reinforces and mediated PEB. The Qur'an and Hadith emphasize stewardship (Khilafah), Tawhid (oneness of God), and Ihsan (excellence in conduct), which position humans as responsible guardians of nature (Kurbiyanto et al., 2024). Within the Maqasid Shariah framework, environmental preservation aligns with the protection of life, intellect, and wealth, thus strengthening the normative basis of Islamic PEB (Abdullah et al., 2024). Beyond doctrine, Islamic religiosity moderates the impact of moral education on ecological practices by enhancing psychological empowerment, making faith a catalyst for sustainable action (Begum et al., 2021). Empirical evidence further shows that religiosity in Muslim-majority contexts predicts stronger environmental concern compared to secular settings (Zafar & Abu-Hussin, 2025). Principles such as trustworthiness and moderation serve as ethical mediators that translate awareness into action (Muhammadi & Haftador, 2014). Thus, integrating Islamic values into education, community initiatives, and policy design can transform external enablers into tangible, environmentally responsible behavior in eco-halal tourism.

Recent evidence from the literature suggests that pro-environmental behavior contributes significantly to the development of sustainable

tourism. Xu et al. (2023) found that a sense of psychological ownership of a destination drives tourists' eco-friendly behavior through responsibility and perceptions of effectiveness. (Z. Xu et al., 2023). Li et al. (2025) emphasized the role of trust and emotional bonding in shaping Pro-Environmental Behavior intentions through norm activation theory. (Q. Li et al., 2025). Tang et al. (2022) identified environmental knowledge and participatory motivation as the main predictors, mediated by pro-environmental identity and commitment. (Tang et al., 2022). CSR also plays an important role through the eco-friendly behavior of employees and the identification of national park destinations (X. Li, 2022). Consistency of pro-environmental behaviour at home and while traveling reinforces its impact on sustainability. (F. Xu et al., 2020). Pro-Environmental Behavior also strengthens the effect of satisfaction and eWOM on destination sustainability. (Zulvianti et al., 2023), making it a strategic factor in sustainable tourism management and policy.

Other studies have also found the role of Pro-Environmental Behavior as a mediating variable in various mechanisms. Liu et al. (2024) found that PEB mediates the relationship between environmental policy perceptions and actual behavior through perceived attitudes and behavioral controls (M. Liu et al., 2024). Interaction with nature from childhood also contributes to future PEB, with the main mediation being by affection for the environment (Křepelková et al., 2020). Mago et al. (2024) affirm that environmental knowledge influences PEB through environmental attitudes and sensitivities (Mago et al., 2024). A study by Teng et al. (2025) shows that the use of the internet has an effect on PEB with environmental attention as a full mediator (Teng et al., 2025). In addition, Bouzari et al. (2022) found that environmental commitment is an important intermediary between environmental awareness and environmentally friendly behavior (Bouzari et al., 2022).

Extending this line of reasoning, it is plausible to expect that pro-environmental behavior itself will significantly contribute to the sustainable development of religious tourism, given its central role in fostering ecological preservation and cultural continuity. Moreover, beyond its direct impact, pro-environmental behavior is also likely to serve as a mediating mechanism, linking government support and advanced technology to the sustainable tourism development in eco-halal tourism by transforming external enablers into tangible, environmentally responsible practices.

Hypothesis 3: Pro-environmental behavior significantly contributes to sustainable tourism development.

Hypothesis 4 – Hypothesis 5. Pro-environmental behavior mediates the relationship between government support and advanced technology for sustainable tourism development.

Building on the development of the five hypotheses above, this study proposes the research model illustrated in Figure 1.

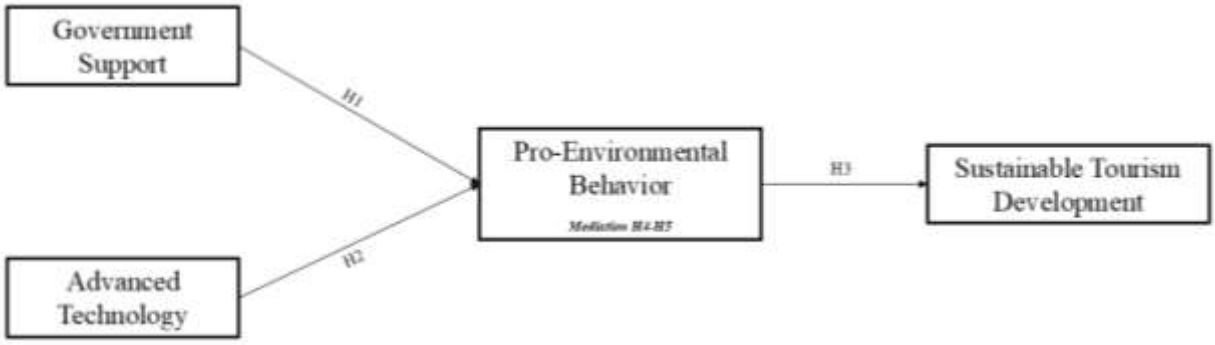


***Figure 1: Proposed Research Model.***

## 4. METHODOLOGY

The study used a quantitative approach with a cross-sectional survey design to examine the influence of external factors on pro-environmental behavior and their impact on the sustainable development of religious tourism. The unit of analysis in this study is tourists who visit green eco-halal tourist destinations in Indonesia, with a geographical focus on East Java Province. The selection of East Java is based on the characteristics of this region as a center of traditional Islamic religious tourism in Indonesia, which is characterized by the existence of large Islamic boarding schools, the tombs of wali songo, and various religious traditions that are still alive and well in the local culture. (Handriana et al., 2020). In addition, East Java also showed initiatives to develop environmentally sound and halal tourism as part of a sustainable development strategy. (Schlehe, 2017). Therefore, East Java Eco-

Halal Tourism destination tourists are very relevant and strategic in testing the model of linkages between external factors, pro-environmental behavior, and sustainable religious tourism development.

This study measured four main variables armed with questionnaire instruments, namely Government Support, Advanced Technology, Pro-Environmental Behavior, and Sustainable Tourism Development, which were adapted from various previous literature. Before the questionnaire instrument was widely used, an initial validation process was carried out through a Focus Group Discussion (FGD) with experts, consisting of marketing psychologists, halal business experts, tourism experts, and academics from the fields of public policy and sustainability The Government Support variables were measured by 10 indicators that included aspects of policy, regulation, community participation, and support for local values and environmental sustainability. (Glyptou, 2024; Setiawan et al., 2025; Sulong et al., 2024; Torres-Delgado et al., 2023). Meanwhile, Advanced Technology consists of 10 items that assess the availability of digital infrastructure, the readiness of destination technology, and the application of smart technology for sustainability. (Diez Apolo et al., 2024; Musa et al., 2022; Shu et al., 2024). Pro-Environmental Behavior reflects the environmentally conscious behavior of tourists, which includes awareness, attitudes, and environmentally friendly practices during travel. (Ermekbaeva & Kang, 2024; Jiao & Wang, 2024; Kala & Chaubey, 2024; Rao et al., 2022; H. Zhang et al., 2021). The Sustainable Tourism Development variable includes social, economic, and environmental indicators of destination sustainability. (Buckley, 2012; Draçi & Demi, 2023; Gutiérrez et al., 2024; Punzo et al., 2022). Each item in the questionnaire was measured using a five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), to measure the intensity of respondents' perception of each indicator studied.

The population in this study is local tourists who have visited Green Eco-Halal tourist destinations in East Java Province. The sample drawing technique was carried out by purposive sampling with the following criteria: (1) local tourists who have visited tourist destinations with the Green Eco-Halal concept in East Java for the past six months, (2) have knowledge or understanding related to halal attributes in tourism, (3) domiciled in or outside East Java but have an interest in sustainable halal tourism, and (4) at least 18 years old. The sample size was determined through two approaches: first, based on the number of research indicators, which is five times the total of 50 indicators. (Hair, Black, et al., 2019)So that a minimum of 250 respondents were obtained. Second, the statistical approach uses GPower with a significance of 0.05, power of 0.80, and effect size of 0.15 (Faul et al., 2009) Indicates a minimum number of 85 respondents. Taking both approaches into account, this study set a minimum sample count of 250 to guarantee the validity of the SEM analysis.

Data collection in this study was carried out in a hybrid manner, namely through the distribution of questionnaires in person and online. The direct distribution was carried out by independent enumerators who had received training in several leading Green Eco-Halal Tourism destinations in East Java, including Batu City (Jatim Park, Eco Green Park), Banyuwangi (Baluran National Park, Ijen Crater), Malang (Colorful Village, educational and nature tourism), Surabaya (Sunan Ampel Religious Tourism, Al-Akbar Mosque), Probolinggo (Mount Bromo), and Situbondo (White Sand Beach, Conservation Area). The online distribution was carried out through a digital survey platform to reach respondents who met the criteria but were outside the research location. The data collection process lasted for two full months, starting from mid-March 2025 to mid-May 2025. In its implementation, this study adheres to the principles of research ethics by ensuring the confidentiality of respondent data, obtaining informed consent from participants, and providing full freedom for respondents not to continue participation without any consequences.

This study uses the Structural Equation Modeling method based on Partial Least Squares (PLS-SEM) with the help of SmartPLS software version 4. This technique was chosen because it is able to accommodate complex models with latent indicators, moderate samples, and non-normal data distribution (Hair et al., 2017). Some of the sustainable tourism and business methodological literature recommends the use of PLS-SEM, especially reflective studies with measures of human psychological perspective. (Kock, 2018; Latan, 2018; Mikulić & Ryan, 2018). PLS-SEM is also suitable for exploratory and predictive research, such as this study. The analysis procedure includes two main stages: external model evaluation to test the validity and reliability of indicators, and internal model evaluation to test the relationships between latent variables and test hypothesis significance through bootstrapping. (Hair et al., 2021).

## 5. RESULTS

### *5.1. Characteristics Of Respondents*

The data collection process produced 311 East

Java Halal Green-Eco Tourist Respondents. The study's respondents were dominated by women (67.5%), and the majority were in the young age range of 18–25 years (75.6%), reflecting the high involvement of the younger generation in religious-based green tourism. Most of the respondents had a bachelor's degree (50.5%) and a student status (47.9%), showing potential demographic characteristics in shaping pro-environmental behavior. The highest frequency of travel was 1–2 times a year (58.8%), indicating moderate tourism behavior. Surabaya (18.3%), Bangkalan (16.4%), and Blitar (14.5%) are the most visited green eco-halal tourist destinations, showing a preference for locations that have religious value as well as ecotourism. Full details of respondent characteristics are presented in Table 1.

***Table 1: Respondent Characteristics.***

| | **Total** | **Percentage** |
|---|---|---|
| ***Gender*** | | |
| Man | 101 | 32.5% |
| Woman | 210 | 67.5% |
| ***Age*** | | |
| 18-25 Years Old | 235 | 75.6% |
| 26-35 Years Old | 61 | 19.6% |
| 36-45 Years Old | 8 | 2.6% |
| 46-55 Years Old | 3 | 1.0% |
| >55 Years Old | 4 | 1.3% |
| ***Last Education*** | | |
| High School/Equivalent | 115 | 37.0% |
| Diploma | 19 | 6.1% |
| Bachelor | 157 | 50.5% |
| Postgraduate | 20 | 6.4% |
| ***Occupation*** | | |
| Civil Servants | 19 | 6.1% |
| Private Employees | 94 | 30.2% |
| Entrepreneurial | 21 | 6.8% |
| Housewives | 3 | 1.0% |
| Students | 149 | 47.9% |
| Other | 25 | 8.0% |
| ***Green Eco-Halal Tourist Locations*** | | |
| Batu City (Jatim Park, Eco Green Park, Angkut Museum, etc.) | 15 | 4.8% |
| Banyuwangi (Baluran National Park, Ijen Crater, Red Island Beach, etc.) | 9 | 2.9% |
| Malang (Nature and Education Tourism, Jodipan Colorful Village, Coban Rondo, etc.) | 14 | 4.5% |
| Surabaya (Sunan Ampel Religious Tourism, Al-Akbar Mosque, Heroes Monument, etc.) | 57 | 18.3% |
| Probolinggo (Mount Bromo, Madakaripura Waterfall, etc.) | 10 | 3.2% |
| Situbondo (White Sand Beach, Baluran National Park on the east side, etc.) | 11 | 3.5% |
| Gresik (Sunan Giri's Tomb, Maulana Malik Ibrahim's Tomb, etc.) | 42 | 13.5% |
| Tuban (Sunan Bonang Tomb, Akbar Cave, Boom Beach, etc.) | 2 | 0.6% |
| Jombang (Tomb of KH. Hasyim Asy'ari, President of the Republic of Indonesia KH. Abdurrahman Wachid, Tebuireng Islamic Boarding School, etc.) | 38 | 12.2% |
| Bangkalan (Madura) (Syaikhona Kholil Tomb, Suramadu Bridge, Jaddih Hill, etc.) | 51 | 16.4% |
| Kediri (Mount Kelud, Lirboyo Islamic Boarding School, Simpang Lima Gumul Monument, etc.) | 13 | 4.2% |
| Blitar (Karno's Tomb, Penataran Temple, etc.) | 45 | 14.5% |
| Pasuruan (Cheng Ho Pandaan Mosque, Tretes, Grandpa Bodo Waterfall, etc.) | 4 | 1.3% |
| ***Frequency of Tourist Trips in the Last 1 Year*** | | |
| 1-2 Times | 183 | 58.8% |
| 3-5 times | 99 | 31.8% |
| >5 times | 29 | 9.3% |

### 5.2. Measurement Outer Model

This study assessed the measurement model by evaluating indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. Indicator reliability was confirmed through outer loadings, with all items exceeding the minimum threshold of 0.7 (Hair, Risher, et al., 2019), as shown in Table 2. Convergent validity was assessed using Average Variance Extracted (AVE), where all constructs surpassed the recommended cutoff value of 0.50, indicating adequate convergence (Hair et al., 2021). Internal consistency reliability was also demonstrated, with Cronbach's alpha (CA) and Composite Reliability (CR) values above 0.7 for all constructs, confirming strong reliability (Hair, Risher, et al., 2019). Details of the variable indicator statements are provided in more detail in Appendix 1.

*Table 2: Convergent Validity And Reliability.*

| Variable | Factor Loadings | AVE | CA | CR |
|---|---|---|---|---|
| *Government Support* | | | | |
| GS1 | 0.791 | 0.624 | 0.933 | 0.943 |
| GS2 | 0.806 | | | |
| GS3 | 0.840 | | | |
| GS4 | 0.804 | | | |
| GS5 | 0.761 | | | |
| GS6 | 0.766 | | | |
| GS7 | 0.785 | | | |
| GS8 | 0.847 | | | |
| GS9 | 0.796 | | | |
| GS10 | 0.795 | | | |
| *Advanced Technology* | | | | |
| AT1 | 0.716 | 0.606 | 0.928 | 0.939 |
| AT2 | 0.786 | | | |
| AT3 | 0.775 | | | |
| AT4 | 0.780 | | | |
| AT5 | 0.826 | | | |
| AT6 | 0.813 | | | |
| AT7 | 0.815 | | | |
| AT8 | 0.762 | | | |
| AT9 | 0.772 | | | |
| AT10 | 0.735 | | | |
| *Pro-Environmental Behavior* | | | | |
| PEB1 | 0.783 | 0.564 | 0.901 | 0.920 |
| PEB2 | 0.767 | | | |
| PEB3 | 0.706 | | | |
| PEB4 | 0.738 | | | |
| PEB5 | 0.775 | | | |
| PEB6 | 0.798 | | | |
| PEB7 | 0.751 | | | |
| PEB8 | 0.780 | | | |
| PEB9 | 0.823 | | | |
| *Sustainable Tourism Development* | | | | |
| STD1 | 0.773 | 0.577 | 0.918 | 0.931 |
| STD2 | 0.820 | | | |
| STD3 | 0.762 | | | |
| STD4 | 0.776 | | | |
| STD5 | 0.752 | | | |
| STD6 | 0.700 | | | |
| STD7 | 0.756 | | | |
| STD8 | 0.773 | | | |
| STD9 | 0.841 | | | |
| STD10 | 0.819 | | | |

Discriminant validity was examined using both the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio. The square roots of AVE (diagonal values) were greater than the inter-construct correlations. (Fornell & Larcker, 1981) (Table 3), satisfying the Fornell-Larcker criterion. Additionally, HTMT values remained below the conservative threshold of 0.90, supporting adequate

discriminant validity. (Henseler et al., 2015). Overall, the measurement model meets all required reliability and validity standards.

*Table 3: Discriminatory Validity.*

| Fornell-Larcker | | | | |
|---|---|---|---|---|
| Variable | Advanced Technology | Government Support | Pro-Environmental Behavior | Sustainable Tourism Development |
| *AT* | 0,779 | | | |
| *GS* | 0,741 | 0,790 | | |
| *PEB* | 0,495 | 0,620 | 0,751 | |
| *STD* | 0,747 | 0,753 | 0,737 | 0,759 |
| *Heteotrait Monotrait* | | | | |
| *AT* | | | | |
| *GS* | 0,799 | | | |
| *PEB* | 0,534 | 0,665 | | |
| *STD* | 0,818 | 0,816 | 0,791 | |

## 5.3. Inner Model Structural

To examine the structural model and test the hypotheses, this study employed a direct effect analysis using Partial Least Squares Structural Equation Modeling (PLS-SEM). Bootstrapping with 5,000 resamples was conducted to assess the significance of path coefficients, following the guidelines. (Streukens & Leroi-Werelds, 2016). This non-parametric resampling technique estimates the precision of the model by generating standard errors and t-values for each relationship. The analysis evaluated the strength and significance of direct effects between latent variables, where path coefficients with t-values > 1.96 and p-values < 0.05 were considered statistically significant, thus supporting the proposed hypotheses. (Hair, Risher, et al., 2019).

As illustrated in Figure 2 and detailed in Table 4, the structural model was assessed to evaluate the direct and indirect relationships among constructs. Following Hair et al. (2019a, b), the structural model results reveal that Government Support has a strong and significant influence on Pro-Environmental Behavior ($\beta = 0.562^{**}$, $t = 7.036$, $p < 0.001$), with a large effect size ($f^2 = 1.232$), underscoring the pivotal role of institutional support in encouraging tourist environmental actions. Conversely, Advanced Technology does not exhibit a significant effect on Pro-Environmental Behavior ($\beta = 0.078$, $t = 1.104$, $p = 0.270$), with a small effect size ($f^2 = 0.104$), indicating that technological availability alone may not drive behavioral change. Pro-Environmental Behavior significantly predicts Sustainable Tourism Development ($\beta = 0.737^{**}$, $t = 17.065$, $p < 0.001$), with a large effect size ($f^2 = 1.192$), confirming its essential role in sustainability and religious tourism outcomes. Mediation analysis further reveals a significant indirect effect of Government Support through Pro-Environmental Behavior on Sustainable Tourism Development ($\beta = 0.414^{**}$, $t = 5.895$, $p < 0.001$), while the indirect effect of Advanced Technology is not statistically supported ($\beta = 0.058$, $t = 1.083$, $p = 0.279$).

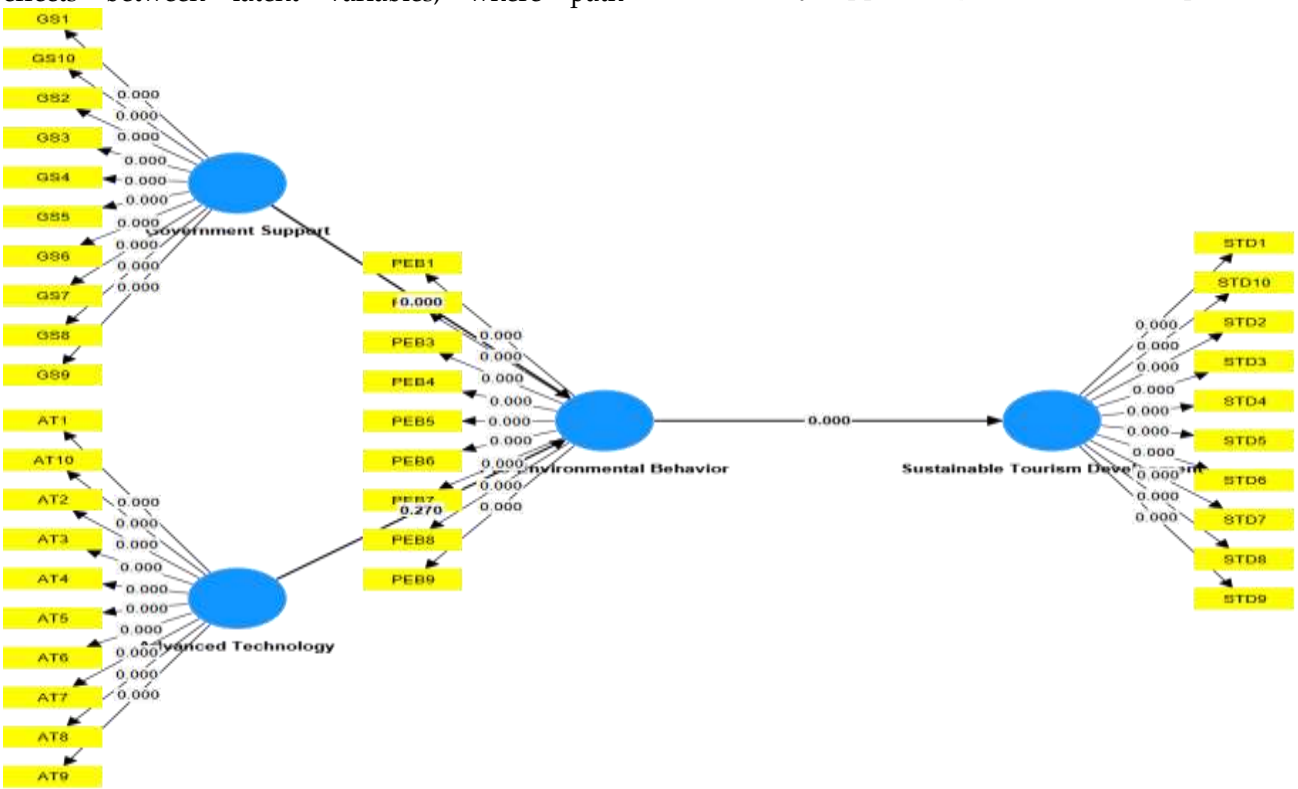


*Figure 2: Structural Model Relationship Model.*

*Table 4: Path Hypothesis Results*

| Hypothesis | Path Coefficient | T-Test | P-Value | Decision | F-Square |
|---|---|---|---|---|---|
| Government Support → Pro-Environmental Behavior | 0.562 | 7.036 | 0.000 | Accepted | 1,232 |
| Advanced Technology → Pro-Environmental Behavior | 0.078 | 1.104 | 0.270 | Decline | 0,104 |
| Pro-Environmental Behavior → Sustainable Tourism Development | 0.737 | 17.065 | 0.000 | Accepted | 1,192 |
| Government Support → Pro-Environmental Behavior → Sustainable Tourism Development | 0.414 | 5.895 | 0.000 | Accepted | |
| Advanced Technology → Pro-Environmental Behavior → Sustainable Tourism Development | 0.058 | 1.083 | 0.279 | Declined | |

The assessment of the quality of the structural model is carried out through two main indicators, namely R-Square ($R^2$) and Q-Square ($Q^2$). $R^2$ describes how much endogenous variables are affected by other variables in the model, with benchmarks of 0.25 (low), 0.50 (medium), and 0.75 (high) (Hair, Risher, et al., 2019; Ozili, 2023). On the other hand, $Q^2$ is used to measure the predictive ability of the model using the blindfolding technique, where a positive value indicates that the model has sufficient predictive power. (Geisser, 1974).

Referring to Table 5, the $R^2$ value for Pro-Environmental Behavior was recorded at 0.387, which means that the model has a moderate ability to explain this behavior. Meanwhile, the $R^2$ value of 0.544 in Sustainable Tourism Development indicates a stronger level of explanation. The $Q^2$ values of 0.471 and 0.590, respectively, indicate that this model has good predictive relevance to both variables.

*Table 5: R-Square And Q-Square Results.*

| | R-Square | R-Square Adjusted | Q-Square |
|---|---|---|---|
| Pro-Environmental Behavior | 0.387 | 0.383 | 0.471 |
| Sustainable Tourism Development | 0.544 | 0.542 | 0.590 |

## *5.4. Plspredict Analysis*

PLSPredict is a technique to assess the predictive ability of models in Partial Least Squares Structural Equation Modeling (PLS-SEM). This method works by separating the data into training and testing sets, then comparing the model's predictive results with actual data using metrics such as RMSE or MAE (Shmueli et al., 2019). This approach allows researchers to evaluate the predictive validity of the model against data outside the sample, making the model more trustworthy for practical use. PLSPredict is widely used in the fields of marketing, management, and social sciences because it provides information on how well the PLS-SEM model can predict real phenomena beyond the data used for model construction.

Based on Table 6, the results of PLSPredict show that all indicators have a positive $Q^2$predict value, indicating that the PLS-SEM model has adequate out-of-sample predictive capabilities. In general, the RMSE and MAE values for PLS-SEM are slightly lower than those for the Linear Model (LM), which indicates that the PLS-SEM model is more accurate in predicting new data. Some indicators, such as STD10, show significant differences between PLS-SEM and LM, indicating that PLS-SEM is able to capture data patterns better. These results reinforce the predictive validity of the model, confirming that PLS-SEM can be relied upon to project behavior or outcomes beyond the study sample.

*Table 6: PLSPredict Result.*

| Item | $Q^2$predict | PLS-SEM_RMSE | PLS-SEM_MAE | LM_RMSE | LM_MAE |
|---|---|---|---|---|---|
| PEB1 | 0.199 | 0.650 | 0.510 | 0.676 | 0.524 |
| PEB2 | 0.281 | 0.647 | 0.522 | 0.654 | 0.518 |
| PEB3 | 0.203 | 0.720 | 0.560 | 0.747 | 0.584 |
| PEB4 | 0.131 | 0.860 | 0.680 | 0.888 | 0.720 |
| PEB5 | 0.193 | 0.760 | 0.550 | 0.769 | 0.555 |
| PEB6 | 0.199 | 0.690 | 0.540 | 0.694 | 0.552 |
| PEB7 | 0.203 | 0.800 | 0.620 | 0.807 | 0.632 |
| PEB8 | 0.155 | 0.710 | 0.520 | 0.717 | 0.525 |
| PEB9 | 0.234 | 0.700 | 0.540 | 0.724 | 0.559 |
| STD1 | 0.253 | 0.710 | 0.540 | 0.718 | 0.552 |
| STD10 | 0.329 | 0.646 | 0.523 | 0.583 | 0.451 |
| STD2 | 0.329 | 0.660 | 0.520 | 0.668 | 0.523 |
| STD3 | 0.272 | 0.720 | 0.570 | 0.727 | 0.573 |
| STD4 | 0.310 | 0.690 | 0.520 | 0.697 | 0.529 |
| STD5 | 0.285 | 0.640 | 0.520 | 0.669 | 0.527 |
| STD6 | 0.248 | 0.630 | 0.480 | 0.631 | 0.486 |
| STD7 | 0.229 | 0.740 | 0.580 | 0.742 | 0.589 |
| STD8 | 0.299 | 0.630 | 0.510 | 0.638 | 0.493 |
| STD9 | 0.285 | 0.640 | 0.500 | 0.646 | 0.508 |

## *5.5. Importance Performance Mapping Analysis*

Importance Performance Mapping Analysis (IPMA) in PLS-SEM is an approach that expands the results of the path analysis by adding a performance dimension to the importance dimension (Hauff et al.,

2024). IPMA helps identify priority areas for improvement, i.e., indicators or constructs that have a large influence on the target variable but show low performance. Thus, the IPMA not only answers how strong the relationship between variables is but also provides practical recommendations for managerial or policy strategies. The study analyzed the IPMA at the indicator level, thus being able to dig into the details of the specific elements that most need intervention to improve the overall effectiveness of the model.

Based on the results of IPMA at the indicator level (Figure 3), it can be seen that the Pro-Environmental Behavior (PEB) construct has the highest level of importance compared to other indicators. The PEB9 indicator ("I choose Green-Eco Halal tourist destinations because I care about nature conservation and environmental sustainability") obtained the most importance value (0.127) with high performance (85,691). This shows that tourists' environmentally conscious behavior is the main factor that needs to be prioritized. In addition, PEB2, PEB5, and PEB6 also show high importance values with good performance, emphasizing the role of individual awareness in supporting the sustainability of halal tourism. In contrast, indicators in Advanced Technology (AT) tend to have low importance values (0.005–0.009) despite their moderate performance, such as AT7 (environmental monitoring-based technology) and AT9 (use of AI), which perform relatively lower (around 67). This indicates that technology is still considered a complement, not the main determinant of tourist satisfaction. In the Government Support (GS) construct, indicators GS5 (local community involvement) and GS10 (community-based approach) showed a combination of importance and high performance (>78), indicating the effectiveness of community-based government support.

As such, a strategic priority for policymakers is to strengthen tourists' pro-environmental behaviour through community-based government support priorities, while gradually improving technology infrastructure to support destination sustainability.

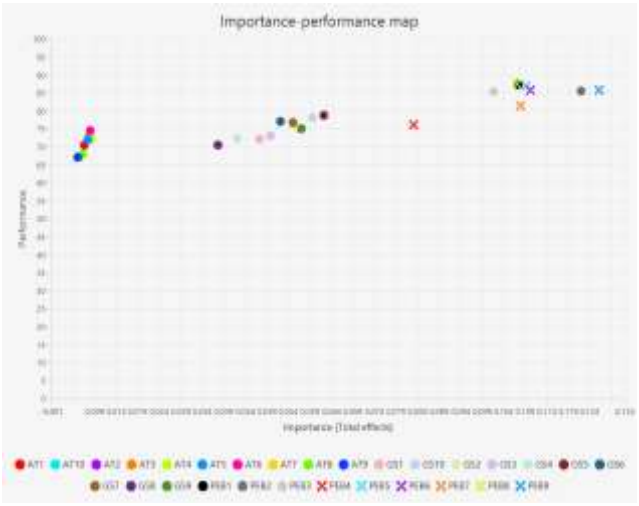


*Figure 3. IPMA-Indicator Stage Results.*

## 6. DISCUSSION AND IMPLICATION

### *6.1. Discussion*

The findings of the first hypothesis indicate that government support has a significant influence on shaping the pro-environmental behavior of tourists, especially in the context of sustainable religious tourism destinations such as Green Eco-Halal in Indonesia. These results are in line with previous findings that suggest that government support can encourage pro-environmental behavior through regulation, effective governance, and persuasive approaches (Susanto et al., 2024; Satrya et al., 2025; Baloch et al., 2023; Deng et al., 2024; Ruan et al., 2020). This reflects the importance of the state's role as a policy facilitator, regulator, and incentive provider that is able to strengthen public awareness and participation in sustainable tourism practices. In the context of religious tourism, the legitimacy of government support also adds confidence in the integration of religious values and environmental sustainability. Furthermore, government involvement can create a collaborative ecosystem between business actors, local communities, and tourists through inclusive and educational regulations. These findings confirm that sustainable tourism development strategies do not only rely on individual or community actors, but are also heavily influenced by strong structural interventions from public authorities. Therefore, the sustainability of religious tourism must be accompanied by long-term policy commitments and consistent institutional support.

Furthermore, advanced technology has not been proven to significantly encourage pro-environmental behavior among tourists in Green Eco-Halal destinations in Indonesia. This is contrary to most of the literature findings that show that advanced

technologies, especially those supported by government policies, are able to increase the awareness, attitudes, and pro-environmental intentions of tourists through digital innovation, immersive experiences, and ease of access to sustainable information and services (Adeel et al., 2024; Takshe et al., 2023; Liao, 2025; Loho Choudhury et al., 2025; Wu & Wang, 2025; Abu Elsamen et al., 2025; Jiang et al., 2025; Singh & Kunja, 2025). This shows that the existence of advanced technologies, such as environmentally friendly information systems, green tourism applications, or digital infrastructure, has not been able to drive behavior change without being supported by environmental awareness, digital literacy, and value-based motivation. In the context of religious tourism, tourists tend to be more influenced by spiritual values and social norms than by interest in technological aspects. The failure of technology as a key driver can also be caused by a lack of integration between digital innovation and sustainability narratives that are aligned with local wisdom and religiosity. In addition, limited technological infrastructure, such as internet access at religious tourist sites, is also an obstacle. Therefore, the use of technology in sustainable religious tourism areas must be designed in a contextual, communicative, and inclusive manner, with the revitalization of technology network infrastructure as a top priority.

The results of hypothesis testing have succeeded in proving that pro-environmental behavior has a significant influence on sustainable tourism development in green-eco-halal tourism destinations in Indonesia. This is in line with various literature findings that show that tourists' pro-environmental behaviors contribute significantly to destination sustainability through personal responsibility, environmental knowledge, emotional bonding, and the role of CSR and eWOM in strengthening the long-term impact of sustainable tourism development (Z. Xu et al., 2023; Q. Li et al., 2025; Tang et al., 2022; X. Li, 2022; F. Xu et al., 2020; Zulvianti et al., 2023). These findings ultimately confirm that the actions of environmentally conscious tourists, such as waste reduction, the use of renewable energy, and the preservation of local culture, play an important role in strengthening the sustainability of religious tourism. In religious tourism, the motivation of tourists is not only driven by spiritual attraction but also by awareness of ecological responsibility. Alignment with halal values and environmental sustainability strengthens the position of pro-environmental behavior as a catalyst for the development of green and ethical tourism. The discourse on green-eco-halal religious tourism is increasingly leading to the need to integrate religious and spiritual values in pro-environmental behavior as a collective effort to maintain harmony between tourism activities, nature conservation, and local values. This supports a tourism development model that integrates religious and environmental principles and emphasizes the role of local social and cultural norms as the main drivers.

This study tested the role of pro-environmental behavior as a moderation variable between external support and sustainable tourism development. The results show that government support significantly encourages environmentally friendly behavior, which further strengthens the sustainable development of religious tourism. These findings affirm the importance of the state's presence in shaping ecological awareness through incentive policies, green regulations, and public education in sustainable religious tourism destinations. This kind of institutional intervention is not only normative but also forms a social context in which pro-environmental behavior becomes a collective practice internalized by tourism actors and local communities.

Conversely, but in line with the second hypothesis, the adoption of advanced technologies does not show a significant mediating pathway through pro-environmental behavior. These findings indicate that technology, without being supported by a strong normative, educational, or structural context, has not been able to shape ecological behavior automatically. It highlights the limitations of technological determinism in the value-based tourism sector, as well as the importance of socio-cultural approaches in the design of green technology interventions.

### *6.2. Theoretical Implication*

Conceptually, these results underscore the importance of institutional approaches and values in driving the transition to sustainable tourism destinations, especially in regions that integrate aspects of spirituality, ecology, and cultural identity, such as eco-halal tourism in Indonesia. This study reinforces the understanding that sustainable tourism development is determined not only by individual factors but also by the structural support and socio-cultural values that underlie tourist behavior. The finding that government support has a significant effect on pro-environmental behavior confirms the importance of an institutional perspective in sustainable behavior theory, particularly in religious contexts. Meanwhile, the

failure of technology as a driver of ecological behavior indicates the limitations of a deterministic technological approach, as well as raising the importance of mediating norms and values in bridging the adoption of green innovations. This study also expands the scope of Pro-Environmental Behavior theory by integrating religious and spiritual dimensions as important contextual variables. Thus, the theoretical model of sustainable tourism needs to reflect on the complex interactions between regulations, social norms, spiritual values, and ecological awareness, which collectively shape tourist behavior within the framework of value-based sustainability.

### *6.3. Practical Implication*

The practical implications of this study provide two strategic directions, namely at the managerial level and tourism policy. From the managerial side, Green Eco-Halal destination managers need to place the pro-environmental behavior (PEB) of tourists at the center of the sustainability strategy. This can be realized through experience-based education programs, environmentally friendly digital campaigns, and the provision of supporting facilities such as waste management systems, green transportation, and community-based services. Strengthening the communication of religious values that are in harmony with ecological awareness is also important to deepen the involvement of young tourists who dominate the visitor profile. Experience-based approaches, such as eco-learning tour programs or "green halal tourism" campaigns, can encourage active participation of tourists. In addition, the involvement of local communities should be expanded through environmentally-based community programs and green entrepreneurship training, so that they become not only beneficiaries, but also key actors in destination management.

In terms of policy, the results of the study confirm that government support is a key factor in moderating tourist behavior. Therefore, local and central governments need to design consistent regulations, such as incentives for destinations that implement green standards, halal-environmentally friendly certification, and policies to integrate religious values with sustainability. Policies should also include improving sustainability-based technology infrastructure, such as digital environmental monitoring systems and eco-friendly tourism applications.

In addition, cross-sectoral collaboration between governments, business actors, communities, and academia needs to be strengthened within the quadruple helix framework to ensure long-term sustainability. Thus, the integration of pro-environmental behavior, government structural support, and community empowerment is a core strategy that can bridge the gap between religious values, sustainability, and the competitiveness of halal tourism in Indonesia.

Beyond these strategies, future pathways for better technology adoption should also be emphasized to avoid leaving the role of digital tools inconclusive. Destination managers and policymakers can encourage gradual digital transformation by introducing eco-friendly mobile apps with gamification features that reward sustainable tourist actions, implementing smart waste management systems integrated with IoT sensors, and developing AI-driven eco-tourism dashboards to monitor carbon footprints in real time. At the community level, digital literacy training and capacity building for local entrepreneurs are crucial to ensure inclusive participation in technology adoption. Furthermore, public–private partnerships can accelerate innovation by providing funding schemes and pilot projects for green tech solutions. These steps ensure that technology not only complements policy but also becomes an enabler of systemic change toward sustainable Green Eco-Halal destinations, fostering measurable impacts and long-term competitiveness.

## 7. CONCLUSION

The study confirms that government support has a significant role in encouraging the pro-environmental behavior of tourists in Indonesia's Green Eco-Halal destinations, which further contributes to the development of sustainable religious tourism. Although advanced technology is thought to have the potential to drive ecological behavior, this study shows that technology has not had a significant impact without a strong normative and educational context. Pro-environmental behavior has proven to be a major catalyst in creating ethical, spiritual, and sustainable tourist destinations. Therefore, the sustainable development of religious tourism must be supported by holistic government policies, public education based on local and religious values, and contextual and inclusive technology integration. This study makes a theoretical contribution to integrating spiritual values with ecological behavior. It suggests a value-based tourism governance model as a long-term strategy for maintaining harmony between the environment, culture, and tourism activities in Indonesia.

This research has several limitations. First, the geographical scope is limited to Green Eco-Halal tourist destinations in East Java, so the results cannot be generalized to national or international contexts. Second, the focus on local tourists, with the dominance of the younger generation, limits the diversity of perspectives across ages and cultures. Third, the variable of advanced technology did not show a significant influence, which may be influenced by low digital literacy or technological infrastructure at the study site. Future studies should explore the dynamics of technology adoption in Green Eco-Halal tourism, focusing on how digital innovations such as IoT, AI, and mobile applications can enhance pro-environmental behavior. Comparative research across regions or countries may reveal best practices and cultural adaptations in integrating technology with religious-based sustainability values. For further research, it is recommended that the scope of the region be expanded to other provinces and that foreign tourists be included to enrich the findings. In addition, a longitudinal approach can be used to understand the dynamics of pro-environmental behavior change over time. Research also needs to dig deeper into the role of religious values, social norms, and the effectiveness of locally-based technologies in driving the adoption of sustainable behaviors.

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