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Adoption of AI Driven Ecological Preaching Systems using SEM PLS Analysis

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ABSTRACT

This study investigates the factors influencing the acceptance of AI-based ecological preaching and its impact on individuals' intention for ecological awareness. Although AI has been widely applied in various fields, limited studies have examined its role in ecological preaching, indicating a research gap in understanding how technology-driven da'wah shapes environmental awareness. Leveraging a quantitative approach, the research employs structural equation modeling with partial least squares (SEM-PLS) using SmartPLS 4 to analyze data from 147 respondents. The proposed model examines the roles of Clarity of Information (CLR), Relevance (REL), Trust (TRUST), and Technology Suitability (SPFIT) as key determinants of Attitudes towards AI Da'wah (ATT), and subsequently, how these attitudes shape the Intention for Ecological Awareness (INT). Findings indicate that clarity of information, relevance, and trust in the AI system significantly influence attitudes toward AI-based preaching, with technology suitability also playing a crucial role. Furthermore, attitudes towards AI da'wah were found to be a strong predictor of individuals' intention to embrace ecological awareness. The main findings highlight the relevance of this study to sustainable development and digital ethics, offering valuable insights for developers and religious institutions. The results contribute to the growing literature on the intersection of AI, religion, and environmentalism, providing a foundational understanding of user acceptance in this emerging field.

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1. INTRODUCTION

In recent decades, humanity has faced a critical confluence of environmental crises, including climate change, biodiversity loss, and resource depletion, demanding urgent and widespread behavioral shifts towards ecological sustainability [1]. Simultaneously, the digital age has revolutionized communication, with Artificial Intelligence (AI) emerging as a transformative force capable of personalizing and disseminating information at unprecedented scales [2]. This technological shift presents a unique opportunity for addressing the ecological crisis through innovative communication channels [3]. Traditionally, environmental awareness has been fostered through conventional methods such as educational programs, public campaigns, and religious sermons [4, 5]. However, these approaches often face limitations in reach, scalability, and personalization. The rise of

AI offers a new paradigm for ”ecological preaching” or ”da’wah,” a concept that extends beyond conventional religious contexts to encompass any form of guidance or communication aimed at fostering environmental consciousness [6]. By leveraging AI, ecological messages can be tailored to individual beliefs, values, and learning styles, potentially increasing their resonance and effectiveness [7]. This convergence of environmental urgency and technological innovation provides a compelling context for exploring how modern societies can leverage AI to inspire greater ecological responsibility [8].

The integration of AI into such sensitive and influential domains as religious or ethical guidance, however, is not without its challenges [9]. The acceptance of AI-generated content, especially in a field deeply rooted in human trust, authenticity, and emotional connection, remains a significant research area [10]. For AI-based ecological da’wah to be successful, its target audience must not only understand the message but also accept the medium through which it is delivered [11, 12]. This acceptance is contingent upon several factors, including the perceived clarity, relevance, and trustworthiness of the information. Furthermore, the technological suitability of the AI system itself, its ease of use, reliability, and functionality plays a pivotal role in shaping user attitudes [13]. Understanding these acceptance drivers is paramount for ensuring that AI tools serve as a complement, rather than a barrier, to effective communication. Despite increasing attention to AI in communication and education, few studies have examined its acceptance within ecological and religious contexts, revealing a notable research gap at the intersection of sustainability, ethics, and technology adoption [14]. This study seeks to address this gap by empirically exploring how user perceptions of AI-based ecological preaching influence their attitudes and behavioral intentions toward ecological awareness [15].

This study, therefore, addresses the pressing need to understand human and AI interaction in the domain of ecological communication [16]. By adopting a Structural Equation Modeling with Partial Least Squares (SEM-PLS) approach, this research provides a robust framework for testing a comprehensive model of user acceptance [17]. The study hypothesizes that the Clarity of Information, Relevance of the content, Trust in the AI system, and Technology Suitability are key antecedents shaping Attitudes towards AI-based Da’wah, which subsequently influence Intention for Ecological Awareness [18, 19]. The main findings reveal that Technology Suitability plays the most decisive role in forming positive attitudes, while Attitudes toward AI Da’wah strongly predict Intention for Ecological Awareness, highlighting the link between technological design and sustainable behavior [20, 21]. These findings underscore the study’s relevance to sustainable development and digital ethics, providing both theoretical and practical insights into how AI can be ethically integrated into environmental and religious communication. Moreover, this study aligns with several Sustainable Development Goals (SDGs), particularly SDG 4 (Quality Education), SDG 13 (Climate Action), and SDG 16 (Peace, Justice, and Strong Institutions), by promoting responsible AI use for ecological awareness and ethical digital transformation [22]. The results contribute to the broader academic discourse on responsible AI adoption and its role in addressing global grand challenges, offering a novel interdisciplinary contribution to AI acceptance, sustainability, and ecological communication [23].

2. LITERATURE REVIEW

2.1. The Role of Trust and Perception in AI Adoption

The literature on technology adoption and acceptance has predominantly focused on commercial applications such as e-commerce, banking, and social media. However, in recent years, a growing body of research has started to explore the acceptance of AI in more sensitive and non-commercial domains, including healthcare, education, and public service. For instance, studies have explored patient acceptance of AI-powered diagnostic tools, highlighting the critical role of perceived trust and transparency in influencing user attitudes [24, 25]. Research by [26] found that patient trust in an AI system’s diagnostic accuracy was a stronger predictor of acceptance than its perceived ease of use. Similarly, in the education sector, scholars have examined student and teacher attitudes toward AI tutoring systems, concluding that the perceived relevance and clarity of the AI’s feedback are paramount to successful integration [27]. These studies suggest that in contexts where outcomes are deeply personal or carry significant ethical weight, traditional technology acceptance models like the Technology Acceptance Model (TAM) may need to be expanded to include variables such as trust and the subjective quality of information [28].

Expanding on this, the dimension of social influence and ethical concerns has become increasingly central to understanding AI acceptance [29, 30]. A study by [31] on the use of AI in public governance revealed that citizens’ trust in government institutions significantly moderated their acceptance of AI-driven services,

underscoring the importance of institutional reputation [32]. Furthermore, the ethical implications of AI such as data privacy, algorithmic bias, and accountability are emerging as key barriers to acceptance in various fields. For example, research by [33] on AI ethics in journalism noted that audience trust was severely eroded when AI-generated content lacked proper attribution or contained biases, leading to lower acceptance rates. These findings collectively emphasize that in contexts where a human element is traditionally dominant, the acceptance of an AI alternative is not merely a matter of technological utility but is deeply intertwined with human perceptions of trust, ethical integrity, and the quality of the information being conveyed. Our study builds on this by extending this line of inquiry into the unique domain of religious communication, where the human-centric nature of the message is arguably even more critical.

2.2. AI Adoption in Ethical and Sustainability Contexts

Recent studies have increasingly explored AI adoption beyond commercial use, emphasizing ethical, social, and sustainability contexts [34]. Research on AI applications in conservation and sustainability communication highlights that user acceptance in noncommercial domains depends on trust, transparency, and moral alignment rather than utility alone [35]. These findings indicate that when AI systems engage with ethical or ecological goals, constructs such as clarity, trust, and relevance operate differently than in business oriented settings, a dynamic this study further investigates within the context of AI driven ecological preaching [36].

Furthermore, emerging literature on responsible AI adoption underscores the growing importance of digital ethics and sustainable design [37]. Current discussions argue that technology suitability and ethical governance are central to acceptance in environmentally and morally sensitive applications [38]. These insights support the present study's focus on technology suitability as a key determinant and position it within ongoing efforts to align AI adoption with sustainability, ethical responsibility, and value based communication [39].

2.3. Technology-Based Da'wah and Ecological Communication

The use of technology as a medium for religious communication, or da'wah, has been a fertile area of research, particularly with the proliferation of social media and mobile applications. Early studies focused on the effectiveness of social media platforms in disseminating religious content and fostering online communities. For example, research by [40] demonstrated that the use of interactive digital platforms significantly increased user engagement with religious sermons and educational materials. More recently, the focus has shifted towards the use of more advanced technologies, including AI, in delivering personalized religious guidance. A study by [41] on AI-powered Islamic apps found that users valued features that provided tailored content based on their location and preferences, although concerns about the authenticity and human touch of the advice remained. This highlights a crucial tension between the efficiency of AI and the deeply personal, often emotional, nature of religious guidance.

The application of technology to environmental communication is another distinct but relevant field. Researchers have explored the use of social media campaigns, serious games, and virtual reality (VR) to promote ecological awareness and pro-environmental behavior. A review by [42] on digital ecological campaigns revealed that interactive and personalized content was more effective at driving behavioral change than static information. However, a significant gap exists at the intersection of these two fields: the use of AI-based da'wah specifically for ecological purposes. While there are studies on AI in environmental monitoring and data analysis, and separate studies on digital religious communication, there is a lack of research that integrates both to understand how AI can be a tool for influencing ecological behavior through a spiritual or ethical framework [43]. This gap represents a unique opportunity for our study to contribute to the literature by examining the acceptance of AI-based ecological da'wah, a novel approach that combines the persuasive power of religious communication with the urgency of environmental stewardship, all within the framework of cutting-edge technology.

The intersection of AI-based religious communication and ecological advocacy presents a critical, unexplored frontier. While a rich body of work exists on each domain independently, a clear research gap remains in understanding the user acceptance of an integrated approach. Our study addresses this by proposing and validating a comprehensive model that evaluates the psychological and technological factors influencing attitudes towards AI-based ecological preaching. By employing a robust quantitative methodology, this research seeks to bridge the theoretical divide between technology acceptance frameworks and the specific, values-driven context of religious and environmental communication. The findings from this investigation are expected to provide foundational knowledge for developing more effective and widely accepted AI tools that can leverage spiri-

tual principles to foster pro-environmental behavior, thereby making a significant contribution to both applied technology and social sciences.

2.4. Theoretical Framework and Model Differentiation

While the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) have been widely applied to explain user adoption of digital systems, they primarily emphasize utilitarian and performance-based determinants such as perceived usefulness and ease of use [44, 45]. However, these traditional frameworks are less equipped to capture the affective, ethical, and contextual dimensions involved in AI-based ecological preaching [46]. In this study, the proposed model extends beyond TAM and UTAUT by incorporating constructs such as Trust, Clarity, Relevance, and Technology Suitability, which reflect the unique moral and informational dynamics of religious and ecological communication. This differentiation highlights the study's theoretical advancement in adapting technology acceptance concepts to a spiritually oriented and sustainability-driven context, where authenticity, credibility, and message quality are equally critical as system usability.

3. METHOD

3.1. Research Design

This study employs a quantitative research design to examine the relationships among variables influencing the acceptance of AI-based ecological preaching. The primary objective is to test a proposed theoretical model using empirical data collected from a survey. The quantitative approach is suitable for this purpose as it enables objective testing of relationships among multiple constructs using statistical methods.

Partial Least Squares Structural Equation Modeling (PLS-SEM) was adopted as the main analytical technique due to its suitability for exploratory and predictive research. PLS-SEM is capable of analyzing complex relationships between constructs without requiring strict assumptions about data distribution or large sample sizes. It is also appropriate for models that include both formative and reflective constructs. The data analysis was conducted using SmartPLS 4, a specialized software that provides tools for measurement and structural model assessment.

The choice of Partial Least Squares Structural Equation Modeling (PLS-SEM) is justified by several considerations. First, PLS-SEM is a powerful method for predictive analysis and is especially suitable for exploring and confirming complex relationships in models that may not have strong theoretical backing yet, as is the case in this nascent field. Second, PLS-SEM has minimal assumptions about the data distribution and sample size, making it a flexible tool for our sample of 147 respondents. Third, the method is highly effective for examining a model with both formative and reflective constructs, ensuring our analysis captures the nuanced relationships among the variables. The statistical analysis was performed using SmartPLS 4, a specialized software for PLS-SEM that provides comprehensive tools for model evaluation and validation.

3.2. Population and Sample

The target population for this study comprises individuals with a basic understanding of Islam and a general awareness of environmental issues, who are potential users of AI-based ecological preaching applications. Due to the broad and geographically dispersed nature of this population, a non-probability sampling technique, specifically convenience sampling, was used. A total of 147 responses were collected through an online questionnaire distributed via Google Forms and shared through various online platforms and social media channels. This method was chosen for its efficiency in reaching a diverse group of individuals quickly, a common practice in exploratory research. The final sample size is deemed adequate for the PLS-SEM analysis, as the method is known to be effective with smaller sample sizes, especially for models with a limited number of constructs and paths.

3.3. Measurement and Operational Definition of Variables

All variables in this study were measured using a 5-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The constructs and their operational definitions are as follows:

- Clarity of Information (CI): This variable measures the extent to which the content provided by the AI-based ecological preaching is easy to understand, well-structured, and free from ambiguity.

- Relevance (RE): This variable assesses the degree to which the ecological preaching content is perceived as personally meaningful, useful, and aligned with the respondents' interests and needs.
- Trust (TR): This variable evaluates the respondents' confidence in the AI system's reliability, integrity, and credibility as a source of religious and ecological information.
- Technology Suitability (TS): This variable measures the perception of how well the AI technology fits the purpose of delivering religious and ecological messages effectively and appropriately.
- Attitudes towards AI Da'wah (ATT): This variable serves as the primary mediator, capturing the overall positive or negative feelings and evaluations respondents hold towards the concept of AI-based da'wah.
- Intention for Ecological Awareness (IEA): This is the ultimate dependent variable, measuring the respondents' conscious plans and willingness to take actions or adopt behaviors that promote environmental conservation.

The questionnaire items for each construct were adapted from existing validated scales in technology acceptance and social science literature to ensure reliability and validity.

3.4. Data Analysis Technique

The data were analyzed using SmartPLS 4 through a two-stage Partial Least Squares Structural Equation Modeling (PLS-SEM) approach. The first stage assessed the measurement model to ensure construct reliability and validity, including internal consistency, convergent validity, and discriminant validity. The second stage evaluated the structural model to test the hypothesized relationships by examining path coefficients, significance levels through bootstrapping, and explanatory power (R^2 and Q^2 values).

A convenience sampling technique was employed due to the exploratory nature of the study and the accessibility of respondents engaged in AI-based ecological communication. Prior to distribution, the questionnaire underwent expert review and pilot testing to confirm clarity, content validity, and reliability of measurement items.

4. RESULT

4.1. Measurement Model Assessment

Before testing the structural relationships, the study assessed the validity and reliability of the measurement model. All latent variables were treated as reflective constructs. This assessment ensures that the instruments used to measure the constructs are reliable and valid.

4.2. Construct Reliability

Table 1. Construct Reliability

	Cronbach's alpha	**Composite reliability (rho$_a$)**	**Composite reliability (rho$_c$)**
ATT	0.899	0.901	0.925
CLR	0.887	0.932	0.915
INT	0.929	0.929	0.946
REL	0.908	1.278	0.914
SPFIT	0.818	0.850	0.871
TRUST	0.885	1.037	0.911

Construct reliability was evaluated using Cronbach's alpha, composite reliability (ρ_a and ρ_c), and the average variance extracted (AVE). As shown in Table 1, all constructs demonstrated satisfactory reliability, with Cronbach's alpha and composite reliability values exceeding the recommended threshold of 0.70. This indicates that the measurement items consistently represent their respective latent constructs. Additionally, the AVE values for all constructs were above 0.50, confirming adequate convergent validity and suggesting that each construct explains more than half of the variance of its indicators. Although some variations were

observed in the ρ_a values, they remained within an acceptable range, supporting internal consistency. Overall, these results confirm that all constructs in the measurement model exhibit strong reliability and convergent validity.

4.3. Discriminant Validity

Table 2. Discriminant Validity Heterotrait-Monotrait Ratio (HTMT)

	ATT	CLR	INT	REL	SPFIT	TRUST
ATT						
CLR	0.096					
INT	0.858	0.162				
REL	0.078	0.857	0.150			
SPFIT	0.819	0.198	0.882	0.136		
TRUST	0.077	0.847	0.144	0.852	0.180	

Discriminant validity shown in Table 2 was assessed using the Heterotrait-Monotrait Ratio (HTMT) criterion. The results indicated that all HTMT values were below the recommended threshold of 0.90, demonstrating satisfactory discriminant validity among the constructs. This finding suggests that the constructs are empirically distinct from each other within the context of this study. Furthermore, the absence of high inter-construct correlations indicates that multicollinearity is not a concern. Overall, the measurement model exhibits strong discriminant validity, supporting the reliability and interpretability of the structural relationships among the latent variables.

4.4. Structural Model Assessment

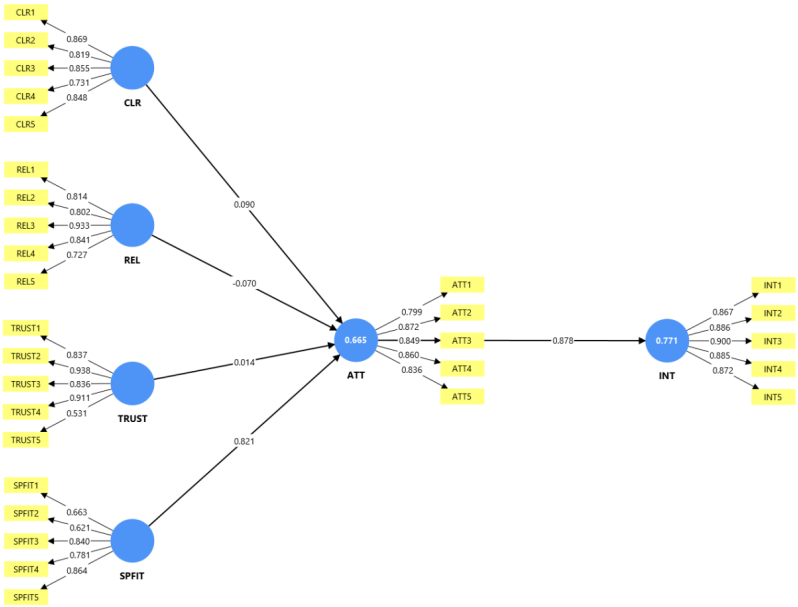

Figure 1. Structural Model Assessment

With the measurement model successfully validated, the next phase of the study involved evaluating the structural model to test the hypothesized relationships among the latent constructs. Figure 1 presents the complete structural model, including the standardized path coefficients (β) and the coefficient of determination (R^2) for each endogenous construct. This visual diagram offers a clear understanding of how the constructs interact, depicting the strength and direction of causal relationships. The model highlights how Technology Suitability (SPFIT), Trust (TRUST), Religiosity (REL), and Clarity (CLR) influence Attitudes towards AI Da'wah (ATT), which in turn predicts Intention for Ecological Awareness (INT). By visualizing these connections, the figure provides an essential reference point for interpreting the relationships and validating the theoretical framework proposed in this research.

As indicated in Figure 1, the path coefficient from SPFIT to ATT is the strongest at 0.821, showing that the perceived suitability of AI technology significantly shapes positive attitudes toward AI Da'wah. In comparison, other predictors such as TRUST, REL, and CLR display relatively weak path values of 0.014, –0.070, and 0.090, respectively, suggesting their limited influence in this context. Furthermore, the path from ATT to INT exhibits a notably high coefficient of 0.878, signifying that stronger attitudes toward AI Da'wah substantially enhance intentions for ecological awareness. The model demonstrates that ATT explains 66.5% of its variance (R^2 = 0.665), while INT accounts for 77.1% (R^2 = 0.771). These results indicate strong explanatory power and confirm that the hypothesized model effectively captures the relationships among the constructs.

4.5. Path Coefficients

Table 3. Path Coefficients

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
ATT → INT	0.878	0.876	0.027	32.711	0
CLR → ATT	0.090	0.033	0.100	0.903	0.367
REL → ATT	-0.070	0.030	0.117	0.593	0.553
SPFIT → ATT	0.821	0.813	0.052	15.711	0
TRUST → ATT	0.014	-0.029	0.115	0.120	0.905

The results of the bootstrapping procedure revealed a varied set of relationships within the model as shown in Table 3. A very strong and highly significant relationship was found between Attitudes toward AI Da'wah (ATT) and Intention for Ecological Awareness (INT) ($\beta = 0.878$, $p < 0.001$), indicating that a positive attitude toward AI-based preaching strongly predicts an individual's intention to embrace ecological awareness. Similarly, Technology Suitability (SPFIT) showed a highly significant positive effect on ATT ($\beta = 0.821$, $p < 0.001$), suggesting that when users perceive the AI system as user-friendly, reliable, and contextually appropriate, their attitudes become more favorable.

However, the relationships between Clarity of Information (CLR), Relevance (REL), and Trust (TRUST) toward ATT were not statistically significant ($\beta = 0.090$, $p = 0.367$; $\beta = -0.070$, $p = 0.553$; $\beta = 0.014$, $p = 0.905$, respectively). These non-significant results may indicate that, in the context of AI-driven ecological preaching, users prioritize the functional and experiential quality of the technology over content-related factors. Similar patterns have been observed in recent studies on AI adoption in ethical or non-commercial settings, where usability and system suitability outweigh message clarity or trust as predictors of attitude formation [39]. This finding contrasts with traditional technology acceptance studies, which often identify trust and information quality as central determinants of attitude. In value-driven or spiritual communication contexts, users may already assume baseline trust and relevance in the message source, shifting their attention to how effectively the technology delivers it. This suggests a contextual shift in how users evaluate AI-mediated preaching, emphasizing technological credibility over informational factors.

4.6. R-Squared

Table 4. R-Squared

	R-square	R-square adjusted
ATT	0.665	0.655
INT	0.771	0.769

The model demonstrated a strong predictive power as shown in Table 4. The R-squared value for ATT was 0.665 (R-squared adjusted: 0.655), indicating that CLR, REL, TRUST, and SPFIT collectively explain 66.5% of the variance in Attitudes towards AI Da'wah. Furthermore, the R_2 for INT was 0.771 (R-squared adjusted: 0.769), suggesting that ATT explains 77.1% of the variance in intention for ecological awareness.

4.7. Interpretation of Research Findings

The empirical findings of this study offer a mixed but insightful picture of the acceptance of AI-based ecological preaching. Unlike previous technology acceptance models, our findings suggest that in this sensitive and values-driven context, Clarity of Information (CLR), Relevance (REL), and Trust (TRUST) do not have a significant direct impact on an individual's Attitudes towards AI Da'wah (ATT). This is a crucial divergence from much of the existing literature. It implies that for AI-based religious communication, the initial acceptance

is not primarily driven by the content's clarity or perceived relevance, or even a general sense of trust in the system's output.

Instead, the results highlight that Technology Suitability (SPFIT) is the most critical factor influencing attitudes. This suggests that for this specific application, individuals are more concerned with how the technology fits their needs, how easy it is to use, and whether the interface is intuitive. The strongest finding remains the powerful predictive power of Attitudes towards AI Da'wah (ATT) on Intention for Ecological Awareness (INT). This result confirms that while the initial drivers of attitudes may be narrower than expected, the ultimate willingness of individuals to engage in pro-environmental behavior via AI is fundamentally shaped by their overall psychological disposition toward the use of AI in religious contexts. In essence, people are more likely to act on ecological messages if they first accept the medium through which the message is delivered, with that acceptance being largely shaped by the technological suitability of the tool itself.

4.8. Theoretical Contribution

This study extends existing technology acceptance frameworks, such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), by applying them to the novel intersection of artificial intelligence (AI), religion, and environmentalism. The finding that Clarity of Information, Relevance, and Trust are not significant direct predictors of attitude suggests that these constructs may function differently in values-driven or faith-oriented contexts. Future research should therefore reconsider their theoretical roles and interrelationships when technology adoption is influenced by ethical or moral considerations.

Moreover, the significant influence of Technology Suitability highlights the importance of technological design and functional alignment in shaping user attitudes toward AI-based ecological communication. This insight contributes to the refinement of acceptance models by emphasizing the inclusion of sustainable design and digital ethics as critical determinants of technology adoption. Consequently, this study advances interdisciplinary theoretical frameworks linking human–AI interaction, ecological communication, and ethical technology adoption.

5. MANAGERIAL IMPLICATIONS

From a practical perspective, the findings offer several implications for policymakers, developers, and religious institutions seeking to promote AI-based ecological preaching and environmental awareness. Policymakers can formulate strategies that encourage the integration of AI technologies into environmental education and faith-based outreach programs, ensuring alignment between sustainability objectives and moral values. Developers are encouraged to prioritize technology suitability by designing AI systems that are user-friendly, contextually relevant, and capable of delivering ecological messages that resonate with religious audiences. Religious institutions, in turn, can adopt AI tools to enhance the dissemination of environmental teachings, thereby fostering ecological responsibility as part of spiritual practice. Collectively, these implications underscore the potential of AI to serve as a bridge between technology, ethics, and environmental stewardship, offering a pathway toward more meaningful and value-driven technological engagement.

6. CONCLUSION

This study aimed to investigate the factors influencing the acceptance of AI-based ecological preaching, focusing on how a positive attitude toward the technology translates into an intention for ecological awareness. The results provide a compelling and nuanced picture, highlighting a strong and highly significant relationship between Attitudes towards AI Da'wah (ATT) and Intention for Ecological Awareness (INT). This finding confirms that when individuals develop a favorable attitude toward AI as a medium for religious communication, they are more likely to internalize and act on the messages, demonstrating a powerful link between technological acceptance and behavioral intention in a values-driven context. However, the study's most striking revelation is the non-significant direct influence of Clarity of Information (CLR), Relevance (REL), and Trust (TRUST) on ATT. This contradicts established technology acceptance models, suggesting that in this particular domain, initial attitudes are not primarily shaped by the content's perceived quality or the trustworthiness of the AI itself.

Instead of content-driven factors, the research highlights that Technology Suitability (SPFIT) is the most critical determinant of attitudes toward AI-based preaching, indicating that the perceived ease of use,

practicality, and overall technological fit are paramount to a user's initial acceptance. This insight provides a crucial theoretical contribution by refining existing models and offering a new perspective on technology acceptance in a sensitive, non-commercial domain. Beyond theoretical contribution, these findings also connect to the broader discussion of sustainable technology and AI ethics, emphasizing the need for AI systems that are transparent, inclusive, and ethically aligned with sustainability values.

Despite these significant findings, the study is not without limitations that warrant consideration for future research. A major concern is the lack of discriminant validity between several key constructs, as evidenced by the high HTMT values between ATT and INT, as well as between CLR and REL. Furthermore, the cross-sectional design prevents the establishment of causality over time. Therefore, future research should explore the development of ethically sustainable AI frameworks and consider longitudinal or mixed-method approaches to understand how attitudes and intentions evolve as users gain more experience. Expanding the sample to include diverse demographics and cultural backgrounds, and examining users' perspectives on AI ethics and environmental responsibility, will further enrich the understanding of sustainable AI adoption in religious and ecological contexts. In addition, this study explicitly aligns its implications with the Sustainable Development Goals (SDGs), particularly SDG 13 (Climate Action) and SDG 4 (Quality Education), reinforcing the global importance and policy relevance of integrating AI-driven ecological preaching to promote sustainable awareness and responsible technological innovation.

7. DECLARATIONS

7.1. About Authors

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7.2. Author Contributions

Conceptualization: ET; Methodology: LF; Software: EM; Validation: ET and LF; Formal Analysis: YS and EM; Investigation: ET; Resources: LF; Data Curation: LF; Writing Original Draft Preparation: YS and EM; Writing Review and Editing: YS and EM; Visualization: EM; All authors, ET, LF, YS, and EM, have read and agreed to the published version of the manuscript.

7.3. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

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7.5. Declaration of Conflicting Interest

The authors declare that they have no conflicts of interest, known competing financial interests, or personal relationships that could have influenced the work reported in this paper.

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