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Integrating Social–Empathic Values and Religiosity into IPAL Management to Foster Environmentally Friendly Mosques: A Case Study in Jember

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Abstract
This study examines the roles of empathy, sympathy, and religiosity in shaping attitudes and actual behavior related to wastewater treatment plant (WWTP) management in efforts to establish environmentally friendly mosques in Jember Regency, Indonesia. A convergent parallel mixed-methods design was employed. Quantitative data were collected through a survey of 109 active congregants of Al-Hikmah Mosque at the University of Jember and analyzed using partial least squares structural equation modeling (PLS-SEM) with SmartPLS 3. Qualitative data were obtained through in-depth interviews, nonparticipant observation, and documentation and subsequently analyzed using NVivo 12. The findings indicate that sympathy has a positive and significant effect on attitude formation ($\beta = 0.512$; $p < 0.001$), as does religiosity ($\beta = 0.243$; $p = 0.007$). Empathy does not exert a statistically significant direct effect on attitudes ($\beta = 0.107$; $p = 0.261$). Attitude formation is the strongest predictor of actual behavior ($\beta = 0.792$; $p < 0.001$). The qualitative findings reveal that congregants' ecological concern develops through experiences of water scarcity, concern about wasteful water use, and the internalization of Islamic teachings concerning the stewardship responsibilities of the khalifah and the prohibition against environmental degradation. Integrating both datasets demonstrates that successful WWTP management depends not only on technological readiness but also on mosque administrators' capacity to translate psychological and spiritual values into collective attitudes and sustainable maintenance practices. This model positions the mosque as both a place of worship and a center for socio-ecological education.

Keywords: *Environmentally Friendly Mosque, IPAL, Social–Empathic Values; Religiosity; Ecotheology*

Introduction

Urban water challenges extend beyond the availability of clean water. The quality of water bodies, consumption patterns, and wastewater disposal practices also determine environmental carrying capacity. Research on the Bedadung River in Jember Regency highlights the importance of continuous water-quality monitoring, as domestic activities and land-use changes directly affect aquatic

conditions (Novita, Firmansyah, & Pradana, 2023). Under these circumstances, water conservation and reuse have become increasingly urgent priorities.

Mosques are public spaces with substantial water consumption, particularly for ablution, sanitation, and cleaning. Used ablution water generally contains relatively low levels of contaminants, yet it is often discharged directly into drainage systems. Consequently, water that could technically be reused for nonpotable purposes is discarded without treatment. However, green technological innovations and wastewater reuse have been recognized as important components of sustainable development strategies (Guo et al., 2020; Zziwa et al., 2023).

Efforts to establish eco-friendly mosques have also begun to receive institutional support. The Ministry of Religious Affairs of the Republic of Indonesia (2022) promotes the establishment of eco-mosque communities as a form of environmental participation by religious institutions. Nevertheless, installing technology does not automatically produce behavioral change. A WWTP may be constructed without being consistently maintained, and water-conservation messages may be communicated without becoming habitual practices. The critical issue lies in the process connecting knowledge, concern, beliefs, attitudes, and action.

Previous studies have tended to follow two separate trajectories. The first emphasizes technical aspects of sanitation and water treatment, whereas the second addresses religiosity or social behavior more broadly. Yet waste-disposal practices are also shaped by interactions among religious beliefs, cultural habits, and local environmental conditions (Alwi, 2025). Research linking empathy, sympathy, religiosity, attitude formation, and actual behavior in mosque-based WWTP management remains limited. This gap provides the rationale for the present study. The mosque is viewed not merely as a site for technological installation but as a social institution capable of translating religious values into ecological action.

Al-Hikmah Mosque at the University of Jember was selected because it has implemented the treatment of used ablution water and rainwater harvesting for purposes not requiring ritually pure water. This setting provides an opportunity to examine ecological transformation comprehensively, encompassing physical design, congregants' perceptions, religious legitimacy, and participation in maintenance. The study aims to analyze the effects of empathy, sympathy, and religiosity on attitude formation; test the effect of attitudes on actual behavior; and explain how psychological and spiritual motivations interact in WWTP management practices. Its novelty lies in a social–empathic model that positions attitudes as a bridge between personal and religious values and the sustainability of environmental technology in mosques.

Theoretical Framework

Islamic Ecotheology and Environmentally Friendly Mosques

Islamic ecotheology situates the relationship between humanity and nature within the framework of entrusted responsibility (amanah). As khalifah, human beings are not authorized to exploit nature without limits; rather, they bear responsibility for maintaining balance (mizan). The prohibition against causing corruption, as emphasized in Qur'an 30:41 (Surah Ar-Rum), provides a normative basis for recognizing ecological consequences as a matter of moral responsibility. Accordingly, mosque-based water management concerns not only facility efficiency but also consistency between religious teachings and institutional practices.

In this context, an environmentally friendly mosque integrates resource efficiency, waste reduction, congregational education, and participatory governance. A WWTP constitutes one of the physical instruments for achieving these objectives. However, such technology functions sustainably only when congregants and administrators regard it as an expression of social worship rather than merely an infrastructure project.

Empathy, Sympathy, and Religiosity

Empathy refers to the capacity to understand the experiences and perspectives of others, including those affected by environmental degradation. This construct is multidimensional because it encompasses cognitive and affective processes (Davis, 1983; Cuff et al., 2016). In relation to water issues, empathy may arise when congregants recognize the difficulties faced by communities experiencing water scarcity or envision the consequences of pollution for future generations.

Sympathy differs from empathy in that it places greater emphasis on concern and the motivation to help. Whereas empathy enables individuals to understand another person's circumstances, sympathy encourages emotional solidarity with those affected. Religiosity provides a value framework that gives such concern moral significance. In this study, religiosity is understood through spiritual commitment, acceptance of moral teachings, and consistency between values and actions. All three constructs are expected to contribute to positive attitudes toward WWTP management, although the magnitude of their effects may differ.

Attitudes and Actual Behavior

An attitude is a positive or negative evaluation of an object and constitutes an important link between values and actions. Positioning attitudes as predictors of behavior is consistent with the Theory of Planned Behavior, which emphasizes the role of behavioral evaluations in shaping intentions and behavior (Ajzen, 1991). In this study, attitudes are reflected in acceptance of water recycling, willingness to support mosque policies, and perceptions of the benefits of the WWTP. Actual behavior encompasses participation, compliance with water-use rules, support for facility maintenance, and engagement in ecological activities. This framework positions attitude formation as a mediator that translates psychological and spiritual resources into observable actions.

Research Methods

This study employed a convergent parallel mixed-methods approach and was developed from a research report on social–empathic WWTP management in Jember (Al-Ahsani & Kurniawan, 2025). Quantitative and qualitative data were collected and analyzed in parallel, and their findings were integrated during interpretation. This design was selected because relationships among constructs require statistical testing, whereas congregants' motives, experiences, and interpretations require contextual explanation.

The quantitative population comprised active congregants of Al-Hikmah Mosque at the University of Jember. A total of 109 respondents were recruited through convenience (accidental) sampling. A Likert-scale instrument measured empathy, sympathy, religiosity, attitude formation, and actual behavior. Data were analyzed using partial least squares structural equation modeling (PLS-SEM) in SmartPLS 3. Model evaluation

covered both the measurement and structural models. Path significance was assessed using t-statistics and p-values at the 5% significance level.

Qualitative data were obtained from purposively selected informants, including the head of the mosque management committee, the technical facilities team, religious leaders, and students. Data were gathered through in-depth interviews, nonparticipant observation, and documentation. NVivo 12-assisted analysis involved data condensation, thematic categorization, presentation of interrelationships among themes, and conclusion drawing. Credibility was enhanced through source and methodological triangulation. Integration was conducted using a joint display to assess convergence, expansion, or divergence between the quantitative and qualitative findings.

Table 1. Research Data Convergence Design

Component	Quantitative	Qualitative	Integration Point
Data source	109 active congregants	Mosque administrators, technical team, religious leaders, students	WWTP users and management stakeholders
Method	Likert-scale questionnaire	Interviews, observation, documentation	Comparison of statistical patterns and lived experiences
Analysis	PLS-SEM; SmartPLS 3	Thematic coding; NVivo 12	Joint display and meta-inferences
Focus	Relationships among constructs	Motives, meanings, and practices	Explanation of social–empathic mechanisms

Results and Discussion

Context of WWTP Management at Al-Hikmah Mosque

Al-Hikmah Mosque at the University of Jember serves not only as a place of worship but also as a space for interaction among members of the academic community. Its WWTP collects and treats used ablution water, while the flower-crown-inspired roof design facilitates rainwater harvesting. The treated water is directed toward uses that do not require ritually pure water, thereby reducing pressure on freshwater resources, particularly during the dry season.

Observations indicate that the innovative value of the WWTP lies in integrating building design, water-use management, and educational messages. Congregants can observe that water does not simply become waste after ablution; instead, it enters another cycle of use. This visual experience is important because it makes the abstract concept of conservation easier to understand.

Qualitative Findings: From Awareness to Collective Responsibility

Thematic analysis revealed that the terms WWTP, environment, mosque, water, and responsibility were among the most frequently interconnected themes in informants' accounts. Congregants did not view the WWTP merely as a technical facility. Rather, they understood it as an expression of care through which individual action could be aligned with institutional responsibility.

One congregant explained, "After learning that the water we use for ablution can be treated and reused without polluting the environment, I began to feel personally responsible. This is how I express my concern for the environment, because I realize that

discarded water can have serious consequences if it is not properly managed." This statement illustrates a shift from knowledge to a sense of ownership. Awareness of the consequences of wasteful water use generates motivation to support the operation and maintenance of the facilities.

The head of the mosque management committee stated, "We want this mosque to demonstrate that a place of worship can also lead efforts to protect the environment. This WWTP shows that Islam teaches a balance between worship and socio-ecological responsibility." This account provides religious legitimacy for the technology. The WWTP is not separate from Islamic outreach (da'wah); rather, it becomes a medium of outreach through concrete action.

The qualitative findings also show that experiences of water scarcity during the dry season heighten congregants' sensitivity. Empathy emerges as an ability to understand the effects of water shortages, whereas sympathy is expressed through concern and a desire to maintain the facilities. Religiosity connects both to the normative understanding that preventing waste and preserving ecological balance are entrusted responsibilities.

The word cloud indicates that WWTP management is the most prominent theme in the NVivo 12 analysis. Other salient terms, including social, management, community, environmental, mosque, participation, and sustainability, demonstrate that WWTP management involves not only the technical dimensions of wastewater treatment but also social relationships, environmental concern, community participation, and sustainability. Word size reflects the frequency of occurrence in the research data: the larger the word, the more frequently the term appears. These findings underscore the importance of community engagement and shared environmental concern in social–empathic WWTP management to achieve environmentally friendly mosques.

Quantitative Findings: Measurement and Structural Models

Measurement-model evaluation showed that most indicators had outer loadings above 0.70 and that the average variance extracted (AVE) for each construct exceeded 0.50. The composite reliability of all constructs also exceeded 0.70. Thus, the instrument met the convergent validity and internal reliability criteria required for structural-model testing.

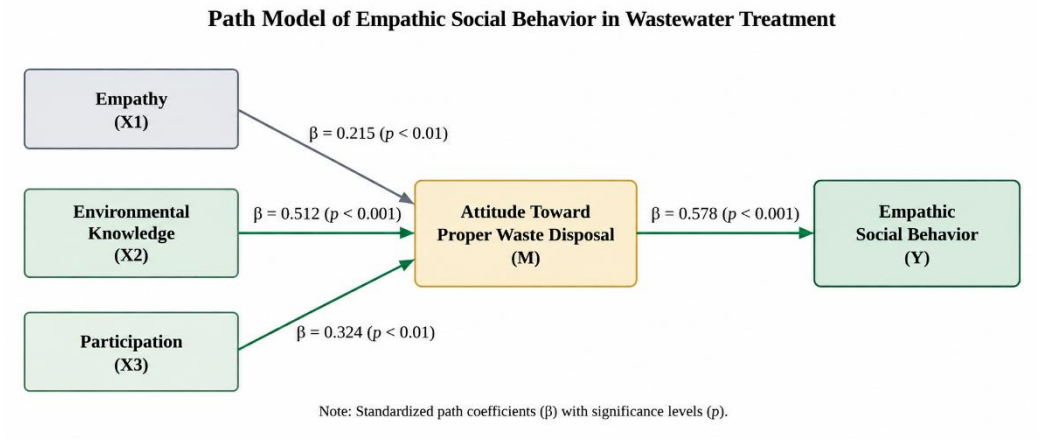
The R^2 value of 0.595 for attitude formation indicates that empathy, sympathy, and religiosity collectively explain 59.5% of the variance in attitudes. The R^2 value of 0.627 for actual behavior indicates that the model explains 62.7% of behavioral variance. This explanatory power ranges from moderate to substantial in social-behavioral research.

Table 2. Structural Model Testing Results

H	Path	β	t	p	Decision
H1	Empathy → Attitudes	0,107	1,123	0,261	Not significant
H2	Sympathy → Attitudes	0,512	5,140	< 0,001	Significant
H3	Religiosity → Attitudes	0,243	2,684	0,007	Significant
H4	Attitudes → Actual behavior	0,792	20,357	< 0,001	Significant

H	Path	β	t	p	Decision
H5	Sympathy → Attitudes → Behavior	0,405	5,118	< 0,001	Significant
H6	Religiosity → Attitudes → Behavior	0,193	2,602	0,009	Significant

Figure 1. Empirical Model of Social–Empathic WWTP Management



Source: Research data processed, 2026.

Sympathy and Religiosity as Drivers of Attitudes

Sympathy was the strongest predictor of attitude formation (β = 0.512). This finding indicates that concern about water wastage and the consequences of pollution is more closely associated with favorable evaluations of WWTP management than the cognitive understanding of environmental problems alone. Sympathy has an action-oriented dimension: individuals do not merely recognize a problem but are motivated to support solutions considered beneficial to others and to the environment.

Religiosity also had a significant effect on attitudes (β = 0.243). Although smaller than the effect of sympathy, this relationship provides important normative legitimacy. Teachings concerning entrusted responsibility (amanah), cleanliness, the prohibition against wastefulness (israf), and the responsibility of humans as khalifah provide moral grounds for accepting water-management technology.

These findings broaden the interpretation of religiosity. Religiosity should not be understood solely as religious identity or the intensity of ritual practice; it should also be evaluated in terms of its capacity to generate social consequences. At Al-Hikmah Mosque, these consequences are evident in acceptance of water recycling, willingness to maintain facilities, and the understanding of conservation as a religious responsibility.

Why Did Empathy Have No Significant Effect?

The path from empathy to attitudes was not statistically significant (β = 0.107; p = 0.261). This does not imply that empathy is entirely irrelevant. Indeed, the qualitative data indicate that understanding the difficulties caused by water scarcity can initiate awareness. However, when sympathy and religiosity are included simultaneously, empathy's unique contribution becomes small. Empathy may overlap conceptually with sympathy, whereas sympathy is more directly associated with motivation to act.

The quantitative and qualitative results are complementary rather than contradictory. The statistical model identifies the variables that most strongly differentiate respondents' attitudes, whereas the interviews illuminate the sequence of experiences preceding those attitudes. Empathy may serve as an initial foundation but may be insufficient to generate acceptance without more active concern and binding religious norms.

Attitudes as a Key Mediator

The effect of attitudes on actual behavior was the strongest pathway in the model ($\beta = 0.792$). This suggests that knowledge, empathy, sympathy, and religious beliefs acquire practical implications when they are consolidated into positive evaluations of WWTP management. Attitudes encourage congregants to regard the technology as a solution worthy of support rather than an additional facility that is solely the administrators' responsibility.

The indirect effect of sympathy on behavior through attitudes was 0.405 and statistically significant, while the corresponding indirect effect of religiosity was 0.193 and also significant. This pattern reinforces the role of attitudes as a mechanism of translation. Environmentally friendly mosque programs therefore cannot rely solely on normative sermons or infrastructure development. Mosque administrators need to cultivate experiences through which congregants understand the benefits, feel engaged, and perceive the system as accessible and relevant.

Table 3. Joint Display of Integrated Findings

Dimension	Quantitative Findings	Qualitative Findings	Meta-inference
Empathy	No significant direct effect	Understanding water scarcity initiates awareness	Provides a foundation but is insufficient as an independent driver
Sympathy	Strongest predictor of attitude formation	Concern fosters support and a sense of ownership	Affective concern activates an orientation toward action
Religiosity	Positive and significant effect	Entrusted responsibility and the prohibition of harm provide moral legitimacy	Religious values transform concern into obligation
Attitudes	Strongest predictor of actual behavior	Acceptance of the WWTP is evident in participation and maintenance	Attitudes bridge values and collective practices

Implications of the Social–Empathic Model

Theoretically, this study suggests that the sustainability of environmental technology in religious institutions should be explained through the relationships among social affect, religious legitimacy, and attitude formation. This relationship aligns with the view that values and beliefs activate personal norms that support environmentally significant behavior (Stern, 2000). The social–empathic model does not treat technology and values as separate elements. Technology provides the means, whereas values shape how those means are accepted, used, and maintained.

In practical terms, mosque administrators can strengthen WWTP sustainability through three strategies. First, the treatment process and benefits of reclaimed water should be made visible so that congregants understand their impact. Second, religious messages should connect water conservation to the community's

concrete experiences rather than remain at the level of abstract prohibitions. Third, congregants should be involved in basic monitoring, maintenance, and greening activities so that support develops into collective habits.

This model can be replicated in other mosques with adjustments to technical capacity, congregational characteristics, and local water resources. Replication should not begin solely with the purchase of technology. Needs assessment, management readiness, water-use patterns, and educational strategies should be addressed from the outset to prevent installations from becoming merely symbolic projects.

Conclusion

WWTP management at Al-Hikmah Mosque, University of Jember, demonstrates that the transition toward an environmentally friendly mosque is shaped by interactions among technology, social concern, and religious values. Sympathy and religiosity have positive and significant effects on attitude formation, whereas empathy has no statistically significant direct effect. Attitudes are the strongest predictor of actual behavior and mediate the effects of sympathy and religiosity.

The qualitative data clarify that empathy continues to function as an entry point for awareness but requires active concern and religious legitimacy to develop into attitudes. Consequently, WWTP success cannot be assessed solely on the basis of operational performance. It is also reflected in a sense of ownership, participation in maintenance, and habits of responsible water use.

This study was limited to one mosque and used convenience (accidental) sampling; therefore, its generalizability should be considered cautiously. Future studies could compare multiple mosques, employ probability sampling, and incorporate environmental knowledge, social norms, organizational support, and perceived ease of technology use as additional variables. For mosque administrators, the principal recommendation is to integrate ecological education, religious narratives, transparency regarding WWTP benefits, and congregational participation into a unified and sustainable governance framework.

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