Green Faith? Exploring the Complex Influence of Religiosity on Recycling Attitudes and Intention in Indonesia

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Abstract. Facing a global plastic waste crisis amplified in rapidly developing nations like Indonesia, this study examines the drivers of recycling intention within a corporate sustainability program. It extends the Theory of Planned Behavior (TPB) by integrating religiosity to explore culturally nuanced influences in a highly religious societal context. Data were collected from 184 consumers of Le Minerale in Greater Jakarta, recruited via purposive sampling based on product usage and awareness of the company's Recycle Point program, and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The results robustly validate the core TPB model, confirming that attitude, subjective norms, and perceived behavioral control significantly and positively influence recycling intention. However, the findings reveal a complex role for religiosity. It exhibited no significant effect on attitude and a small but significant negative direct effect on recycling intention, leading to an unsupported mediation hypothesis. This suggests that while universal psychological constructs are reliable predictors, the influence of religious values is not automatic and may be context-specific. The study provides practical recommendations for leveraging TPB levers in sustainability campaigns and calls for a more nuanced engagement with cultural-religious factors in behavioral models.

Keywords: TPB, Religiosity, Recycling Intention, Indonesia, PLS-SEM.

1 Introduction

Plastic waste has become one of the most visible symbols of the sustainability crisis and is now firmly embedded in the global development agenda. The global development framework calls on all countries to transform patterns of production and consumption, protect ecosystems, and reduce pollution. Over the past seven decades, global plastic production has risen dramatically from just a few million metric tons in the 1950s to around 400 million metric tons in recent years. Much of this plastic is used only once and then discarded, contributing to growing volumes of solid waste and long-lasting pollution. Several million metric tons of mismanaged plastic waste enter the oceans every year, threatening marine ecosystems and human livelihoods [1]. The information is presented comprehensively in Figure 1.

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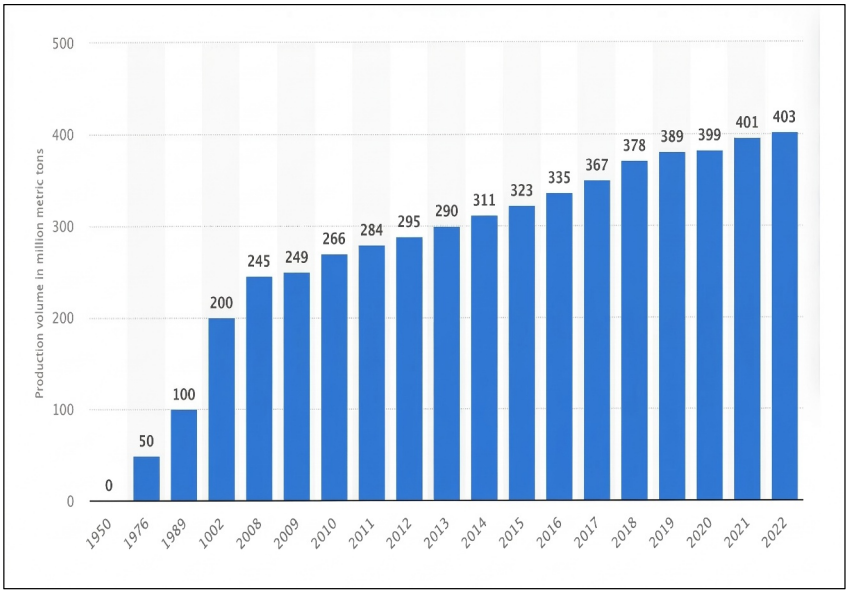

FIGURE 1. Global Plastic Production from 1950 to 2022

Indonesia, as a rapidly developing archipelagic nation, faces substantial challenges from escalating plastic waste, generating tens of thousands of tons daily, with a significant portion leaking into rivers and coastal waters placing the country among the world's largest contributors to marine debris. National sustainability roadmaps target major reductions in plastic waste and outline key policy directions under sustainable consumption and production goals, including improved waste reduction standards, stronger governmental coordination, and increased investment in waste services [2]. In the medium term, the roadmap prioritizes community participation, acceleration of the principles of reduce, reuse, and recycle (3R), and circular-economy strategies such as waste-to-energy, creative reuse, and extended producer responsibility [3]. These initiatives underscore that behavioral change, particularly in recycling practices, is essential for achieving national sustainability commitments.

Furthermore, the upward trend in global plastic production mirrors the growing pressure on Indonesia's waste management system. Plastic output has increased almost continuously over recent decades, with especially steep growth since the early 2000s. When such global supply dynamics are combined with rapid urbanization and rising incomes, they amplify domestic consumption of packaged goods, including bottled water, and intensify local plastic waste problems [4]. Consequently, companies in plastic-intensive sectors such as the bottled water industry are increasingly expected to align their business models with sustainability principles by reducing packaging footprints, supporting recycling systems, and engaging consumers in sustainable practices [5].

At the same time, Indonesia is one of the most religious societies in the world. A large portion of its population identifies as Muslim, making Indonesia the country with the largest Muslim population globally. Survey evidence shows that a majority of Indonesian Muslims are aware of climate change and believe that environmental degradation is a serious moral issue, even though concern about environmental problems often competes with worries about crime and economic insecurity [6]. This context suggests that religiosity understood as the salience of

religious beliefs, practices, and moral commitments may play an important role in shaping everyday environmental behavior, including recycling.

Islamic teachings provide a rich normative basis for environmental stewardship. Classical concepts such as humans as stewards of the earth and the prohibition of wastefulness are interpreted as clear guidance to avoid pollution and over-consumption. Sharia-based environmental jurisprudence links these principles to concrete obligations: individuals are encouraged to keep public spaces clean, prevent harm to others, and use natural resources prudently as part of moral responsibility. Widely cited sayings of the Prophet such as the teaching that cleanliness is part of faith and that removing harmful objects from the road is an act of charity are often used in sermons and educational materials to frame waste reduction and proper disposal as expressions of faith and social responsibility. In Indonesia, initiatives such as “Green Islam” and “eco-pesantren” illustrate how religious institutions are beginning to translate these values into environmental campaigns, including recycling and zero-waste programs.

Empirical research increasingly supports the idea that religiosity can motivate pro-environmental behavior. Studies have shown that Islamic environmental ethics can be associated with public-sphere environmental actions and that religiosity can strengthen the relationship between environmental concern and environmentally responsible consumer behavior. Research extending the Theory of Planned Behavior further suggests that religiosity can influence environmental attitudes, perceived social expectations, and perceived behavioral control, thereby shaping pro-environmental intentions. More recent evidence also indicates that religiosity can be a significant predictor of pro-environmental behavior among Indonesian individuals, suggesting that religious values can be mobilized to support sustainability efforts.

While previous research has demonstrated the relevance of religiosity across different environmental behaviors, its specific role in shaping recycling intention particularly in relation to household plastic waste has received limited attention. Addressing this gap, the study applies an extended behavioral model to explore how religiosity shapes recycling decisions within Indonesia’s bottled water consumption context.

To fill these gaps, this study adopts an extended behavioral framework to examine how religiosity influences recycling intention both directly and indirectly. The model incorporates several key pathways grounded in established theories and informed by prior empirical findings. First, it evaluates how religiosity shapes individuals’ attitudes toward recycling and how religiosity directly contributes to the intention to recycle. Second, it examines the established predictors of behavioral intention attitude, subjective norms, and perceived behavioral control to understand how each factor supports the formation of recycling intention. Building on studies showing that religiosity can influence environmental decision-making through internal psychological processes, the analysis also investigates an indirect relationship in which religiosity strengthens recycling intention through its effect on attitudes toward recycling. By integrating these direct and indirect pathways within the national policy setting outlined in Indonesia’s sustainability roadmap particularly its waste reduction and circular-economy strategies this study provides a holistic understanding of how faith-based values can motivate practical environmental actions and contribute to national sustainability goals.

2 Method

This research employs a quantitative methodological approach to investigate psychological determinants shaping recycling intentions among Indonesian consumers [7]. The study is anchored in an extended Theory of Planned Behavior model that integrates religiosity as a contextual antecedent variable. Information was gathered through a structured questionnaire and processed using Partial Least Squares Structural Equation Modeling (PLS-SEM), a statistical technique appropriate for examining predictive associations within multifaceted conceptual frameworks.

The population under examination comprised users of Le Minerale products living in the Greater Jakarta metropolitan region, the country’s most densely populated urban cluster[8]. This location was deliberately chosen because of its pronounced waste management issues and the implementation of the Recycle Point program, a corporate initiative designed to collect used plastic bottles. Given the scale of the population, purposive sampling was adopted to select participants with relevant exposure to the subject matter. Respondents were required to satisfy three inclusion conditions: actively consuming Le Minerale products, residing in the Greater Jakarta area, and possessing awareness of the Recycle Point initiative. Such criteria ensured contextual relevance and alignment between collected data and research objectives.

Determining a sufficient number of observations is vital for ensuring the credibility of PLS-SEM outcomes. Recommendations for minimum sample size generally relate to the number of measurement indicators or structural

paths, with cautious guidelines proposing a ratio of five to ten respondents per indicator. Because the instrument contained 28 indicators, the minimum threshold calculated with the lower ratio of five required at least 140 participants [9]. A total of 184 complete and valid responses were obtained, surpassing this requirement and providing an adequate empirical foundation for dependable statistical examination.

Primary information was obtained through a self-administered online survey instrument. All constructs were operationalized using reflective measures on a five-point Likert continuum ranging from strong disagreement to strong agreement, a commonly accepted format for capturing attitudinal intensity in social science inquiry. Measurement items were developed by adapting validated instruments from earlier research to preserve content validity. Central constructs Attitude, Subjective Norm, Perceived Behavioral Control, and Recycling Intention were drawn from established scales addressing plastic waste behavior, while religiosity indicators were adapted from prior studies exploring the influence of religious orientation on environmentally responsible actions. Supplementary secondary sources were utilized to contextualize the investigation, including corporate sustainability disclosures issued by Le Minerale, governmental documents related to national plastic waste governance, and recent media reporting on public responses to the Recycle Point initiative.

Data processing was undertaken through PLS-SEM using SmartPLS software (Ramayah et al., 2021). This analytical strategy is suitable for predictive and exploratory research involving numerous latent constructs, particularly due to its flexibility regarding sample size and distributional assumptions. The procedure followed a structured two-phase evaluation. The first phase involved assessment of the measurement model to verify reliability and validity. The subsequent phase examined the structural model to test hypothesized interrelationships among variables.

3 Result and Discussion

3.1 Reliability and Validity Assessment of the Measurement Model

The first crucial step in PLS-SEM is to rigorously evaluate the measurement model. This step confirms that the questionnaire items accurately and consistently measure their intended theoretical constructs before any hypotheses are tested. The assessment focuses on reliability and validity criteria [10].

The reliability of the measurement model was confirmed by assessing both indicator reliability and internal consistency. All retained measurement items demonstrated strong indicator reliability, with outer loadings exceeding the recommended threshold, confirming that each item is a robust measure of its corresponding construct. Internal consistency was verified through composite reliability values that surpassed the acceptable level, indicating strong agreement among the items within each scale [11]. The detailed data regarding this analysis can be found in the Table 1.

TABLE 1. Reliability Values

Variable	Item	Loading	AVE	CR
Religiosity (Rel)	R2	0.875	0.689	0.815
	R3	0.783		
Attitude (ATT)	ATT1	0.925	0.727	0.930
	ATT2	0.847		
	ATT3	0.828		
	ATT4	0.826		
	ATT5	0.831		
Subjective Norm (SN)	SN1	0.847	0.724	0.913
	SN2	0.826		
	SN3	0.884		
	SN4	0.846		
Perceived Behavioral Control (PBC)	PBC1	0.876	0.804	0.961
	PBC2	0.910		

	PBC3	0.894		
	PBC4	0.918		
	PBC5	0.918		
	PBC6	0.863		
Intention To Recycle (ITR)	ITR1	0.841	0.741	0.919
	ITR2	0.828		
	ITR3	0.859		
	ITR4	0.912		

Construct validity was assessed through convergent and discriminant validity. Convergent validity was supported as the average variance extracted for each construct exceeded the recommended minimum value [12]. Discriminant validity was established using the Heterotrait-Monotrait (HTMT) ratio, with all values falling below the conservative threshold, confirming that each construct is empirically distinct from the others [13].

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TABLE 2. Correlation Among Major Constructs

	ATT	**ITR**	**PBC**	**Rel**	**SN**
ATT	0.852	0.346	0.232	0.069	0.069
ITR	0.325	0.861	0.249	0.134	0.331
PBC	0.222	0.239	0.897	0.071	0.25
Rel	0.016	-0.098	-0.043	0.830	0.118
SN	0.292	0.304	0.245	-0.080	0.851

Note: The bold numbers in the diagonal are the square root of AVE for each construct. Above the diagonal are the HTMT values. Below the diagonal are correlation between construct.

3.2 Results of testing hypotheses 1 to 6

The analysis confirmed the strong applicability of the core Theory of Planned Behavior constructs in predicting recycling intention. Attitude demonstrated a significant and positive effect on recycling intention, indicating that a more favorable personal evaluation of recycling strengthens an individual's intention to participate [15].

Subjective norm also had a positive and significant influence on recycling intention, highlighting the role of perceived social expectations. This suggests that individuals are more likely to intend to recycle when they believe important others expect them to do so [16].

Perceived behavioral control showed a significant positive relationship with recycling intention. This indicates that individuals who feel capable of recycling having the necessary resources, opportunities, and knowledge are more likely to form strong recycling intentions [17]. The detailed data regarding this analysis can be found in the Table 3.

TABLE 3. Hypothese Testing

Hypotheses	**Relationship**	**Std. Beta**	**t-value**	**p-values**	**Supported**
	Direct Relationship				
H1	R -> ATT	0.016	0.170	0.865	No
H2	R -> ITR	-0.080	3.300	0.001	No
H3	ATT -> ITR	0.239	3.091	0.002	Yes
H4	SN -> ITR	0.195	2.434	0.015	Yes

H5	PBC -> ITR	0.135	2.417	0.016	Yes
	Indirect Relationship				
H6	R -> ATT -> ITR	0.004	0.160	0.873	Yes

However, the results for religiosity presented more complex insights. The effect of religiosity on attitude was positive but not statistically significant, suggesting that religious beliefs did not directly translate into a more positive attitude toward recycling. Furthermore, the direct effect of religiosity on recycling intention was negative and statistically significant, indicating a slight inverse relationship between religiosity and recycling intention when considered independently.

The proposed indirect effect of religiosity on recycling intention through the mediation of attitude was not statistically significant. This is consistent with the non-significant direct relationship between religiosity and attitude, as a meaningful mediation requires an initial significant link between the predictor and mediator. The information is presented comprehensively in the Figure 2.

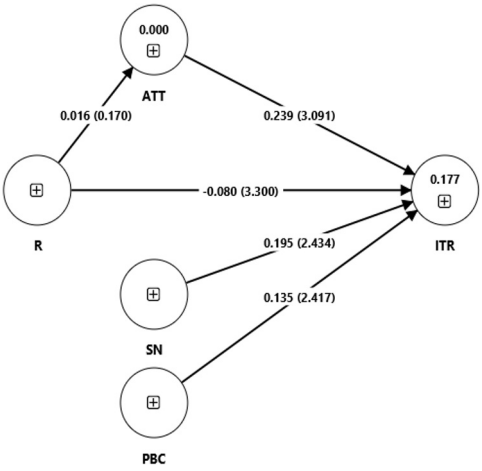

FIGURE 2. Bootstrapping result

3.3 Result Research

This research sought to examine the determinants affecting recycling intentions within the context of a particular corporate initiative by expanding the Theory of Planned Behavior (TPB) framework to include religiosity as an additional construct. The results both reaffirm previously established theoretical linkages and uncover unforeseen complexities, thereby generating meaningful contributions for theoretical development as well as practical application.

3.4 Validation of the Core Theory of Planned Behavior

The most consistent and clear-cut results of this research concern the core TPB constructs. The data strongly support the fundamental premise that an individual's intention to recycle is positively shaped by their attitude, subjective norms, and perceived behavioral control. The significant positive effects of attitude and subjective norm align with a substantial body of prior research, reinforcing the established understanding that a favorable evaluation of recycling and the influence of social expectations meaningfully enhance intention [18]. Furthermore, the

significant effect of perceived behavioral control underscores a critical practical point: intentions are not merely motivational but are shaped by a person's sense of capability [19]. This highlights that perceived barriers such as lack of access, limited knowledge, or logistical challenges can significantly hinder pro-environmental action. The confirmation of these three hypotheses solidifies the TPB's robustness as a predictive framework for recycling behavior in the studied urban Indonesian context.

3.5 The Complex and Unexpected Role of Religiosity

The most intriguing findings of this study revolve around the proposed extension of the TPB model. Contrary to the initial hypotheses, religiosity did not demonstrate a positive influence. Specifically:

1. The Non-Significant Path to Attitude (H1)
   The finding that religiosity had no significant effect on attitude suggests that, for this sample, religious beliefs did not directly translate into a more favorable personal evaluation of recycling. A potential explanation is that general religiosity may be too broad a measure; its environmental implications might only become salient when specific doctrinal principles such as stewardship or the moral obligation to avoid waste are made explicit rather than assumed.
2. The Significant Negative Direct Effect on Intention (H2)
   This unexpected result is particularly noteworthy. Although small in magnitude, the significant negative path suggests a complex relationship where higher religiosity, in this context, was associated with slightly lower recycling intention. This challenges the common assumption that religiosity uniformly encourages pro-environmental behavior. One possible explanation is that some individuals may prioritize other spiritual or social obligations over environmental programs, especially when these programs are perceived as secular or corporate-led rather than faith-driven. This finding aligns with scholarship noting that the relationship between religion and environmental concern is shaped by doctrinal interpretation, social norms, and contextual expectations.
3. The Absence of Mediation (H6)
   The non-significant indirect effect follows logically from the result of H1. Since religiosity did not significantly shape attitudes, it could not operate through attitudes to influence intention. This indicates that the theoretical pathway in which religious values enhance intention by first cultivating a positive attitude was not active in this context.

3.6 Theoretical and Practical Implications

These results carry important implications. Theoretically, they caution against simplifying religiosity as a universal positive predictor in behavioral models [20]. A more nuanced approach is necessary, potentially involving measures that capture environmental religiosity the degree to which individuals explicitly connect their faith to environmental duty rather than general religious commitment. The findings also reaffirm the strong explanatory power of the TPB's core constructs, suggesting that they remain the primary levers for behavioral change.

From a practical perspective, the results provide useful direction for managers of the Recycle Point program and similar corporate sustainability initiatives [21]. Organizations can enhance program effectiveness by leveraging the central mechanisms of the Theory of Planned Behavior: cultivating positive attitudes toward recycling by emphasizing its environmental and social benefits, strengthening subjective norms through community engagement and social proof strategies, and improving perceived behavioral control by ensuring that recycling facilities are convenient, accessible, and easy to use [22].

Additionally, rather than assuming that religiosity directly motivates recycling behavior, program designers may benefit from actively engaging religious leaders and communities to frame recycling as a meaningful expression of spiritual values, such as the obligation to avoid waste and care for the environment. By making these connections explicit, religiosity can shift from a background influence to a constructive normative force that encourages stronger participation in recycling initiatives [23].

3.7 Limitations and Future Research

This study is not without limitations. Its use of a purposive sample from Greater Jakarta may limit generalizability to other regions or cultural contexts. The cross-sectional design captures intention at one point in time rather than actual long-term behavior.

Future research should explore the nuanced pathways through which religiosity shapes pro-environmental behavior. One promising direction is to employ multi-dimensional measures of religiosity that differentiate between general religious commitment and specific beliefs that emphasize environmental stewardship. Such distinctions may help clarify how various facets of religiosity uniquely contribute to attitudes and intentions regarding recycling.

Future studies may also investigate potential moderating factors, such as religious community type, doctrinal emphasis, or the presence of faith-based environmental programs, which may influence when and how religiosity acts as a positive, neutral, or even negative driver of environmental behavior. Longitudinal or panel research designs would further allow scholars to observe how these relationships evolve over time and whether intentions ultimately translate into sustained recycling behavior. This would advance the literature beyond intention-based models and generate stronger insights into the long-term behavioral impact of religiosity in sustainability contexts.

4 Conclusion

This study demonstrates that recycling intention among urban consumers in Indonesia is strongly shaped by the core elements of the Theory of Planned Behavior. Attitude, subjective norms, and perceived behavioral control all show significant positive effects, highlighting the importance of fostering positive evaluations, strengthening social expectations, and reducing practical barriers to recycling.

The extended model, however, reveals that general religiosity does not enhance recycling attitudes and shows a small negative direct effect on intention. This suggests that religious commitment alone does not automatically lead to pro-environmental behavior unless its connection to environmental stewardship is explicitly communicated.

The findings imply that organizations should prioritize strengthening TPB components while collaborating with religious communities to contextualize recycling as a moral responsibility. Future research should adopt multidimensional measures of religiosity and longitudinal approaches to better understand how faith-based values interact with environmental behavior over time.

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