

## Extending the Theory of Planned Behavior: From Behavioral Intention to Collective Action

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### ABSTRACT

This study addresses the growing environmental challenges associated with waste management in Bali, Indonesia, where increasing tourism and urbanization contribute significantly to plastic pollution and ecological degradation. Despite the implementation of digital waste bank initiatives, limitations persist in understanding how individual behavioral intentions translate into sustained collective environmental actions. Therefore, this research aims to extend the Theory of Planned Behavior (TPB) by integrating cultural and social dimensions to better explain pro-environmental behavior in a collectivist context. A qualitative case study approach was employed, focusing on the digital waste bank social enterprise Griya Luhu. Data were collected through in-depth interviews, participant observation, and document analysis, and were analyzed using thematic analysis supported by NVivo software. This method enabled a comprehensive exploration of the interaction between behavioral intention, cultural values, and digital platforms. The findings reveal that while attitudes, subjective norms, and perceived behavioral control significantly influence behavioral intention, they are insufficient to ensure long-term participation. The cultural value of *ngayah* emerges as a key mediator, transforming individual intentions into collective commitments, while social reinforcement sustains participation through shared practices and community engagement. In conclusion, the study demonstrates that integrating cultural values and social mechanisms into TPB provides a more comprehensive framework for understanding and promoting sustainable collective action in environmental management.

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## INTRODUCTION

The escalating waste crisis in Bali, characterized by significant environmental degradation and public health concerns, necessitates urgent and innovative solutions. This challenge is exacerbated by the island's burgeoning tourism industry, which contributes substantially to the daily waste generation, estimated at 10,266.4 m<sup>3</sup> per day (Jacob & Dwipayanti, 2022). A substantial portion of this waste, particularly plastic, ultimately pollutes marine ecosystems, contributing to Indonesia's unfortunate distinction as the second-largest marine plastic polluter globally (Fatliana et al., 2021). This environmental catastrophe

underscores the critical need for effective waste management strategies, particularly in coastal regions where resource limitations and behavioral challenges often hinder progress (Vorontkova et al., 2025). The persistent issue of marine plastic pollution, a direct consequence of inadequate waste reduction and disposal, threatens not only ecological stability but also the economic vitality of tourism-dependent island communities (Nguyen et al., 2025). Moreover, the sheer volume of waste overwhelms existing infrastructure, leading to overflowing landfills and widespread illegal dumping, further contaminating soil and water resources. The urgency of this situation is highlighted by recent reports indicating that global oceans are projected to receive an estimated 17.5 million tonnes of mismanaged plastic waste annually from coastal cities by 2025 (Oduro-Appiah et al., 2024).

This dire projection underscores the immediate necessity for robust, community-level interventions to mitigate the pervasive impact of plastic waste. Concurrently, in Indonesia, the emergence of digital waste banks offers a promising, technology-driven approach to addressing this crisis by formalizing waste collection and incentivizing community participation (Rakhmawati et al., 2023). These initiatives leverage digital platforms to facilitate waste segregation, collection, and recycling, thereby transforming waste into economic value and fostering pro-environmental behaviors (Widayat et al., 2025). Despite these advancements, the effective management of solid waste remains a critical concern, particularly in Indonesia where rapid urbanization and population growth exacerbate existing challenges (Salsabila et al., 2023). Indeed, a systematic review of solid waste management in Indonesia reveals fragmentation in research, often focusing on specific regions or singular aspects such as waste generation or household practices, thereby underscoring a gap in comprehensive understanding and integrated approaches (Fasya et al., 2025). Indonesia's substantial contribution to global plastic waste, with 3.2 million tons of unmanaged plastic waste annually 1.29 million tons of which enters the ocean, further emphasizes the urgency of developing and implementing robust waste management strategies (Manullang et al., 2022; Najhalidi & Rosilawati, 2023). This situation highlights the imperative for innovative and culturally resonant approaches to waste management, moving beyond conventional methods to address both infrastructural deficiencies and behavioral determinants of waste generation (Budiman & Jaelani, 2023).

The global solid waste production, projected to reach 2.59 billion tonnes by 2030 and exceed 3.40 billion tonnes by 2050, further intensifies the pressure on Indonesia's already strained waste management systems (Sembiring et al., 2024). This looming crisis, characterized by inadequate collection and a mere 15% recycling rate nationally, necessitates a shift towards more effective, community-centric waste management paradigms (Aboyitungiye & Gravitiani, 2021) and (Tyllianakis & Ferrini, 2021). Despite the 42.1 million tons of municipal solid waste generated annually in Indonesia, of which plastic is the second largest component, a significant 58% remains uncollected, contributing to substantial environmental leakage and greenhouse gas emissions (Zahrah et al., 2024). This situation is particularly critical given that only 60% of urban residents have access to waste collection services, resulting in significant public health and environmental concerns due to untreated urban solid waste (Maddi, 2024). Therefore, the development and implementation of effective and sustainable waste management strategies are paramount to mitigating these pervasive environmental and public health challenges (Fasya et al., 2025). Addressing this complex issue requires a dual approach that integrates advanced waste management systems with behavioral interventions to reduce waste generation at its

source, particularly within households and other primary waste generators (Widiyanto et al., 2025).

This necessitates a critical examination of behavioral theories that underpin pro-environmental actions, particularly the Theory of Planned Behavior, which, despite its widespread application, exhibits limitations in fully capturing the complexities of collective environmental engagement in diverse cultural contexts. Specifically, its individualistic focus often overlooks the powerful influence of shared cultural values and community-driven initiatives on pro-environmental behaviors. This gap highlights the necessity for theoretical extensions that incorporate communal and cultural factors, particularly within collectivist societies where group norms heavily influence individual actions. Therefore, an investigation into how culturally embedded cooperative practices, can bridge this gap by fostering collective action within digital waste bank initiatives is warranted. This study therefore aims to extend the Theory of Planned Behavior by integrating the cultural concept to better understand its role in motivating collective action within the context of digital waste banks in Bali, thereby contributing to a more nuanced theoretical framework for pro-environmental behavior in non-Western settings. This integration seeks to address the acknowledged limitations of TPB in explaining complex environmental behaviors, particularly in settings where social and moral factors, often neglected by purely rational frameworks, play a pivotal role in shaping intentions and actions (Mamun et al., 2022; Sajid et al., 2023). This approach acknowledges that while behavioral intentions and structural constraints influence waste disposal, an integrated framework incorporating cultural dimensions is essential for effective waste management in resource-limited environments (Tahulela et al., 2025).

Moreover, the TPB's original formulation often overlooks the dynamic interplay between individual cognition and contextual factors, such as community management and policy frameworks, which significantly shape waste separation and recycling behaviors (Hu et al., 2021). Indeed, while the TPB offers a robust framework for understanding individual behavioral drivers, its generalizability can be enhanced by considering how external factors, such as digital empowerment and local governance structures, mediate the relationship between intentions and actual pro-environmental outcomes (Fenitra et al., 2024). Furthermore, the individualistic bias inherent in the TPB often limits its utility in collectivist cultures, such as those prevalent in Indonesia, where community values and social obligations significantly shape individual choices and actions (Randall et al., 2023). Thus, integrating cultural moderators into the TPB framework can significantly enhance its predictive power and accuracy in explaining environmental behaviors in diverse cultural settings (Rakuša & Milfelner, 2025). This study proposes to bridge this theoretical gap by incorporating the concept of cultural moral, a form of communal, voluntary work deeply embedded in Balinese Hinduism, into an extended TPB model to explore its influence on participation in digital waste bank initiatives. This integration is crucial as the TPB, despite its widespread application in explaining various behaviors including those related to environmental conservation, has been critiqued for its overemphasis on individual cognitive processes and its limited capacity to account for social and moral obligations that are prevalent in collective action contexts (Amirudin et al., 2023; Morren & Grinstein, 2021).

## **METHOD**

This study employed a qualitative case study approach with an embedded single case design to explore how behavioral intention, as conceptualized in the Theory of Planned Behavior (TPB), transforms into collective action through the cultural practice. The research focuses on the digital waste bank social enterprise Griya Luhu as a bounded system, enabling an in-depth understanding of the interaction between individual behavior, cultural values, and digital platforms in the context of community-based waste management. A case study approach is particularly suitable for examining complex social phenomena within real-life contexts, especially when the boundaries between the phenomenon and its environment are not clearly defined (Hollweck, 2015).

Data were collected using multiple qualitative techniques to capture rich and contextual insights. These include in-depth semi-structured interviews conducted both online and offline to explore participants' motivations and experiences, participant observation to understand real-time interactions within the waste bank ecosystem, and document analysis of administrative records, digital platform activities, and relevant policy documents. The study utilizes both primary data (interviews, observations, and interaction records) and secondary data (academic literature, institutional reports, media publications, and government regulations) to ensure comprehensive coverage of the research context.

Data analysis was conducted using thematic analysis supported by NVivo software, allowing systematic coding and interpretation of key patterns and meanings. The analysis focuses on identifying themes related to TPB constructs, attitudes, subjective norms, and perceived behavioral control and examining how *ngayah* functions as a cultural mediator in transforming individual intentions into sustained collective action. To ensure the rigor and credibility of the findings, the study applies triangulation of data sources, member checking, and iterative analysis, enabling a more robust and trustworthy interpretation of the results.

## **RESULT AND DISCUSSION**

### **TPB Constructs in Digital Waste Management: Attitudes, Subjective Norms, and Perceived Behavioral Control**

The findings confirm that behavioral intention to participate in digital waste management is shaped by the three core constructs of the Theory of Planned Behavior (TPB), namely attitudes, subjective norms, and perceived behavioral control (Icek Ajzen, 1991; Maskari, 2015). Empirically, participants demonstrate positive attitudes toward waste management, driven by increasing environmental awareness and the perceived environmental and economic benefits of waste sorting. The use of the Griya Luhu application further strengthens this perception through its rating system, which evaluates waste sorting quality and directly influences economic value. As one informant explained, "rating reflects the quality of waste sorting... and that relates to the value of the waste." This aligns with previous findings that pro-environmental attitudes significantly predict behavioral intention (Suryawan et al., 2023). In addition, the system's transparency and incentive mechanisms enhance perceived usefulness, as reflected in another participant's statement: "the application makes waste management feel easier and more rewarding because everything is recorded and visible." These findings indicate that digital technology not only facilitates operational efficiency but also shapes behavioral beliefs and outcome evaluations.

Subjective norms emerge as a dominant influencing factor, particularly within the collectivist structure of Balinese society. Social expectations from community leaders, family members, and banjar institutions significantly encourage participation in waste management practices. Interestingly, normative pressure is not enforced through formal sanctions but through informal social control mechanisms embedded in digital communication practices. For instance, improper waste disposal is often documented and shared within community groups, as highlighted by an informant: “there are no formal sanctions, but people take pictures and share them in the group.” This reflects how normative beliefs are socially constructed and reinforced through collective monitoring and communication. Such findings are consistent with prior research indicating that subjective norms exert stronger influence in collectivist cultures, where social approval and community expectations play a central role in shaping behavior (Sawang et al., 2014).

Perceived behavioral control is influenced by technological accessibility, system transparency, and user experience. Informants reported that initial difficulties in using the application gradually diminished as familiarity increased, highlighting the importance of experience and technical support in enhancing user confidence. Features such as standardized pricing, automated tracking, and clear operational procedures contribute to higher levels of trust and usability. This supports prior studies emphasizing that perceived ease of use and technological support significantly affect user engagement in digital systems (Venkatesh et al., 2002). However, despite strong behavioral intention, the findings reveal a persistent intention-behavior gap, where not all individuals consistently translate intention into sustained action. This limitation suggests that TPB alone is insufficient to fully explain long-term participation, thereby reinforcing the need to extend the model by incorporating additional sociocultural factors that mediate the transition from intention to collective and sustained behavior (More & Phillips, 2022).

While the findings confirm that behavioral intention is shaped by the core constructs of the Theory of Planned Behavior, the persistence of participation cannot be fully explained by cognitive factors alone. This limitation highlights the need to explore culturally embedded mechanisms that strengthen and sustain behavioral commitment. In this context, *ngayah* emerges as a critical mediator that bridges individual intention with collective moral obligation.

### ***Ngayah* as a Cultural Mediator Bridging Intention and Action**

A central finding of this study is that *ngayah* functions as a cultural mediator that not only strengthens, but also transforms behavioral intention into collective commitment. Empirically, this is reflected in the structure of participation within the Griya Luhu ecosystem, where a significant number of actors are involved on a voluntary basis. Informants explicitly highlighted that participation is not driven by economic incentives, but by intrinsic motivation rooted in local values. As one informant stated, “most of our team are volunteers... in Balinese, we call it *ngayah*... working without expecting payment”. This collective action, driven by an ingrained sense of communal responsibility, transcends individualistic considerations of utility or direct personal gain, a finding consistent with studies on long-term orientation and sustainable values in collectivist societies (Nguyen et al., 2025). This integration of spiritual values and community-based frameworks into established behavioral theories such as the TPB

offers a more nuanced understanding of pro-environmental actions within specific cultural contexts (Tamsah & Nurung, 2025).

This finding indicates that *ngayah* reinforces subjective norms within the TPB framework by embedding them into a moral and cultural system. Unlike externally imposed norms, the normative pressure observed in this study is internalized and value-driven. Participation in waste management is framed as a form of responsibility toward the community, rather than a purely environmental or economic activity. Another informant emphasized that “*ngayah* is a task from the heart, not driven by financial reward”, illustrating that behavior is guided by moral commitment rather than instrumental reasoning. This underscores the limitations of purely cognitive-based models like the TPB in fully capturing the complex motivational drivers in culturally rich environments (Chen et al., 2025). Furthermore, *Ngayah* provides a culturally specific mechanism that bridges the intention-behavior gap by transforming individual intentions into a collectively reinforced and sustained action through an inherent cultural obligation (Hilser et al., 2023).

Furthermore, the findings suggest that *ngayah* operates as a stabilizing mechanism that sustains participation even in conditions where material incentives are limited. This supports the argument that environmental behavior in the Balinese context is deeply embedded in local cultural frameworks. In this sense, *ngayah* extends TPB by providing a sociocultural layer that explains how intention is maintained and translated into consistent action through internalized values rather than external control. This integration addresses the TPB's individualistic bias by demonstrating how collective moral obligations, such as those embodied in “*ngayah*”, significantly influence pro-environmental actions (Sajid et al., 2023). This nuanced understanding is crucial for developing effective interventions that resonate with local cultural sensitivities and promote sustainable environmental practices. Although *ngayah* provides a strong moral foundation for participation, the transformation of intention into sustained collective action requires more than internalized values. It is through social interaction and networked relationships that these values are continuously enacted and reinforced, enabling the emergence of collective environmental practices.

### **From Behavioral Intention to Sustained Collective Action through Culturally Embedded Social Reinforcement**

The transformation from behavioral intention to sustained collective action is shaped by continuous social reinforcement that is deeply embedded in cultural values. The findings indicate that participation is not solely an individual decision, but develops through shared practices, repeated engagement, and collective responsibility within the community. In this context, social reinforcement does not operate as an independent construct, but rather as the practical manifestation of culturally embedded values, particularly *ngayah*. This mechanism transforms individual pro-environmental intentions into consistent group-level engagement, where the collective performance of waste management activities reinforces individual commitments (Ly, 2024).

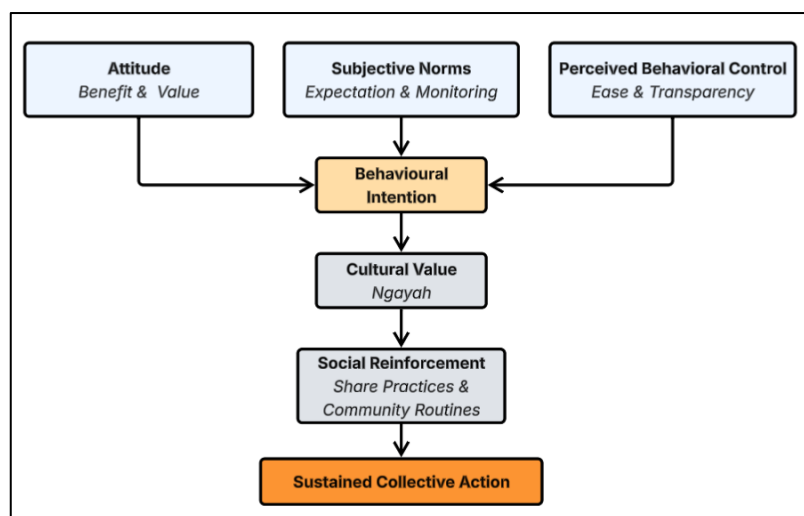
Empirically, the study shows that community members engage in waste management not only because of intention, but because such behavior is continuously reinforced through everyday social practices. Activities such as household waste sorting, regular participation in waste collection, and involvement in community-based programs gradually become

normalized routines. These practices reflect how *ngayah* as a cultural value translates into observable social behavior. In other words, while *ngayah* provides the moral foundation, social reinforcement operationalizes these values through repeated collective actions. This constant re-affirmation through collective action strengthens personal norms and sense of responsibility, thereby solidifying the intent-behavior link (Mamun et al., 2022). This continuous reinforcement through community engagement further mitigates the typical intention-behavior gap often observed in individualistic contexts by fostering a collective identity centered around environmental stewardship (Thùy et al., 2025; Zaini et al., 2023).

Furthermore, participation is strengthened through integration with existing social structures such as banjar and PKK groups, as well as through ongoing education and community engagement. These structures function as spaces where cultural values are enacted and reproduced, ensuring consistency in behavior over time. The findings therefore suggest that sustained collective action emerges not directly from intention, but from a socially embedded process in which cultural values are continuously reinforced through shared practices and routines. This dynamic interplay between cultural values and social reinforcement thus establishes a durable framework for fostering pro-environmental behaviors, differentiating it from approaches reliant solely on individual agency or external incentives. This nuanced understanding highlights the critical role of cultural values, such as *ngayah*, in transforming individual intentions into consistent collective action, underscoring the limitations of purely cognitive models in explaining complex pro-environmental behaviors (Irawan et al., 2022).

### Extending TPB: Integrating *Ngayah* and Social Reinforcement

Based on the findings, this study extends the Theory of Planned Behavior by positioning *ngayah* as a cultural foundation and social reinforcement as its operational manifestation. Although TPB accounts for how attitudes, subjective norms, and perceived behavioral control shape behavioral intention, the findings reveal that translating intention into sustained collective action demands culturally grounded mechanisms beyond individual cognition.



**Figure 1. Extended TPB Model: From Behavioral Intention to Sustained Collective Action**

The resulting conceptual model operates as follows: attitudes, subjective norms, and perceived behavioral control drive behavioral intention, which *ngayah* then mediates by embedding moral obligations and collective orientation into action. These cultural values, in turn, are enacted and sustained via social reinforcement manifesting as shared practices, routines, and community engagement. Thus, social reinforcement serves not as a distinct variable but as the observable expression of cultural values in daily life. This expanded framework posits that without the integration of such cultural and social mechanisms, intentions frequently fail to translate into consistent pro-environmental actions, especially in collectivistic societies (Bangkara et al., 2023). Digital empowerment further enables this process. Platforms like Griya Luhu enhance transparency, coordination, and participation, bolstering culturally driven practices. Meanwhile, communication tools such as WhatsApp groups and social media reinforce collective norms through ongoing interaction and monitoring.

This study's novelty lies in integrating behavioral theory with cultural and technological elements into a unified framework. By differentiating *ngayah* as the cultural root from social reinforcement as its practical expression, the model eliminates redundancy and offers deeper insight into the formation and maintenance of collective environmental behavior. Ultimately, this extension provides a context-sensitive lens on pro-environmental actions in collectivist societies, advancing culturally attuned behavioral models. This refined TPB framework, enriched with indigenous cultural constructs and digital enablement, offers a more robust explanation for behavioral persistence and collective impact, particularly in contexts where communal values supersede individualistic motivations. This nuanced understanding addresses existing limitations of the TPB, which often fails to fully capture the variance in behavior and intention due to its individualistic bias and lack of explicit motivational drivers, particularly in collectivistic settings (Savari & Khaleghi, 2025; Ubaidillah & Zulkarnain, 2025).

## CONCLUSION

This study examines how behavioral intention, as conceptualized in the Theory of Planned Behavior (TPB), evolves into sustained collective action in the context of digital waste management in Bali. Based on a qualitative case study of Griya Luhu, the findings confirm that attitudes, subjective norms, and perceived behavioral control significantly influence participation intention. However, these cognitive factors alone are insufficient to explain long-term behavioral sustainability. The study identifies *ngayah* as a cultural-moral foundation that transforms individual intention into collective commitment, while culturally embedded social reinforcement ensures the continuity of behavior through shared practices and community routines. In addition, digital empowerment plays a critical enabling role by enhancing transparency, coordination, and participation. By integrating these dimensions, this study extends TPB into a more context-sensitive framework that better explains pro-environmental behavior in collectivist societies. Despite its contributions, this study is limited to a single qualitative case, which may restrict generalizability across different contexts. Future research is therefore recommended to test and validate the proposed extended TPB model using quantitative or mixed-method approaches across multiple communities or regions. Further studies may also explore the comparative role of cultural values similar to *ngayah* in other cultural settings, as well as examine the long-term impact of digital empowerment on

behavioral sustainability. Additionally, investigating the integration of policy interventions and institutional support with culturally grounded approaches could provide deeper insights into scaling community-based environmental initiatives. Such directions will strengthen the theoretical robustness and practical applicability of culturally embedded behavioral models in sustainability research.

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