

Abstract

This thesis explores innovative approaches to optimize source-based solid waste management in Indonesia, focusing on Jakarta and Bali. The study addresses critical gaps in understanding citizen and waste collector perceptions, the effectiveness of non-financial interventions, and the application of system dynamics modeling to enhance waste management efficiency and sustainability. Guided by four research objectives, the research analyzes citizens' perceptions of waste segregation and composting, evaluates waste collectors' views on collection, transportation, and disposal processes, assesses the effectiveness of behavioral interventions, and develops a culturally tailored system dynamics model for Bali.

Analyzing citizens' perceptions of waste segregation and composting using logistic regression analysis revealed that providing free dustbins and ensuring reliable, non-remixed waste collection significantly motivate households to segregate waste, with composting incentives resonating strongly among lower-income groups. These findings underscore the need for decentralized composting systems that address economic constraints in developing nations. For evaluating waste collectors' perception, PLS-SEM analysis highlighted that tangibility, reliability, assurance, and empathy influence job satisfaction and environmental responsibility among waste collectors. This evaluation emphasizes improving working conditions and incorporating cultural considerations to enhance systemic efficiency.

The effectiveness of behavioral interventions assessment using an RCT framework demonstrated that non-financial interventions like nudges, rooted in behavioral theories such as the Theory of Planned Behavior and the Human of Motivation Theory, can effectively drive household waste segregation. Context-specific interventions that consider occupation and demographic diversity were particularly impactful. The system dynamics model developed for Bali integrated informal sector participation, temple-specific waste generation, and cultural elements. This model simulated feedback loops and policy scenarios, providing a replicable

framework for assessing long-term intervention impacts and optimizing waste management strategies.

The model evaluates dynamic policy measures, highlighting the most desired urban incentive: the guarantee of unmixing waste after collection and transportation. It also emphasizes the crucial role of formal waste collectors, showing that waste management service quality affects their environmental responsibility, mediated by job satisfaction. In the non-financial incentives trial, the study reveals that the residents' demographic characteristics significantly influence the effectiveness of non-financial nudges. Additionally, the study highlights the importance of cultural and religious practices in shaping waste management behaviors, ensuring a scalable and context-sensitive framework.

The findings emphasize the importance of trust, systemic reliability, cultural integration, and behavioral insights in fostering effective and sustainable waste management practices. This research contributes insights to global efforts to develop inclusive, cost-effective, and scalable waste management systems tailored to local contexts by combining quantitative methods with cultural and behavioral considerations.

Keywords: Source-based waste management, solid waste management, household waste, citizen's perception, segregation, composting, waste collector, waste management system, system dynamics, non-financial incentives, culture and religious practice.