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FISCAL INCENTIVES AND WASTE SORTING BEHAVIOR: A MIXED-METHODS ASSESSMENT OF POLICY READINESS IN URBAN INDONESIA

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ABSTRACT

Urban waste management remains a persistent challenge in Indonesia amid rising volumes and limited landfill capacity. This study explores the readiness of urban waste policy to adopt fiscal incentive schemes that promote household waste sorting in Makassar. Drawing on a mixed-methods approach, 552 household surveys and stakeholder interviews/FGDs were conducted across 15 districts. Findings reveal that while public awareness of sorting is high (85.9%), actual practices remain inconsistent, with only 33.3% regularly sorting waste. Most respondents (85.3%) view waste management as a shared responsibility. Qualitative insights highlight infrastructure gaps, verification system challenges, and inter-agency coordination as key barriers. However, opportunities exist in expanding waste bank networks and implementing incentive-based levies with transparent monitoring. This research contributes to discussions on circular economy governance in Southeast Asia by offering empirical evidence on community behavior and institutional readiness for policy innovation.

KEYWORDS: Waste Management, Fiscal Incentives, Waste Sorting, Circular Economy, Urban Governance, Community Behavior, Indonesia.

1. INTRODUCTION

Makassar, one of Indonesia's fastest-growing urban centers, is currently facing a solid waste crisis. Rapid urbanization has exacerbated waste generation in cities like Makassar due to higher population density and changing consumption patterns (Pian et al., 2025). The city's main landfill, Tamangapa, has exceeded capacity, now accumulating waste up to 50 meters in height, a stark indicator of the unsustainable nature of the current waste system. This problem is not unique to Makassar; across many developing cities, overburdened landfills and inadequate waste infrastructure have resulted in environmental degradation and public health hazards. Open dumping remains the dominant practice, leading to serious contamination of soil and water, and increased exposure to airborne pollutants that cause respiratory illnesses and other diseases (Saravanan et al., 2025; Mondragón-Zarza et al., 2025). These health disparities particularly affect urban poor communities, further entrenching vulnerability and inequality (Djomekui et al., 2025). Consequently, the need for innovative, community-driven solutions has become urgent (Aristizabal et al., 2025; Pambudi et al., 2025).

Despite the presence of community-based 3R (Reduce, Reuse, Recycle) programs and waste banks, these initiatives in Makassar remain fragmented and insufficiently integrated into municipal policy frameworks. Yet, studies from other developing regions show that such community-led efforts are effective in raising awareness, changing behavior, and improving waste recovery rates (Aristizabal et al., 2025; Pambudi et al., 2025). Engagement in these programs also fosters collective responsibility, which is critical for the long-term sustainability of waste systems (Teym et al., 2025). However, in the absence of supportive policy, clear incentives, and coordination across local government bodies, these efforts struggle to achieve citywide impact. Makassar exemplifies this pattern, with a dominant collect-transport-dump system that lacks source-level segregation and behavioral reinforcement mechanisms.

In response, several municipalities globally have adopted fiscal tools to incentivize household waste sorting. Notable examples include differential pricing or exemptions on waste levies for households demonstrating compliance with sorting requirements. These mechanisms fall under the umbrella of "green fiscal instruments" and are designed to align economic behavior with environmental goals (Teym et al., 2025). Their success hinges not only on the design of the incentive but also on the presence of enabling infrastructure (such as segregated bins and collection routes), verification mechanisms, and citizen trust in public services. For instance, Jakarta's phased implementation of a waste levy exemption policy set to begin in January 2025 offers a valuable reference for cities like Makassar.

These local efforts are part of a broader paradigm shift toward circular economy (CE) models that seek to embed sustainability principles in municipal systems. In Southeast Asia, the CE framework is reshaping urban governance by emphasizing waste reduction, resource recovery, and stakeholder collaboration (Peng et al., 2025; Gotowska & Jakubczak, 2025). It reframes waste not as a burden, but as a resource to be valorized, necessitating active engagement from communities, businesses, and governments. The literature further stresses that effective urban waste governance requires cross-sector partnerships, regulatory coherence, and the integration of informal actors—such as waste pickers—into formal value chains (Nikou & Sardianou, 2025). Nevertheless, the transition to CE faces institutional inertia and capacity challenges, particularly in medium-sized cities with limited resources.

Academic and policy debates increasingly focus on how to operationalize CE and green governance through actionable policies at the local level. While infrastructure investment remains essential, behavioral and fiscal instruments are gaining recognition as levers for systemic change. However, empirical studies from Indonesia remain sparse, especially those that evaluate the effectiveness of incentive-based waste governance in diverse urban settings. Most existing literature focuses on technical interventions, leaving a knowledge gap in understanding citizen behavior, policy uptake, and localized governance dynamics.

This study addresses these gaps by analyzing the feasibility and potential impact of a sorting-based waste levy in Makassar. It draws from survey data (n = 552), key stakeholder interviews, and comparative policy analysis to examine (1) current household waste management practices and awareness; (2) public perceptions and participation in sorting; and (3) the readiness and challenges of implementing a green fiscal mechanism to promote sustainable waste behavior. The study builds on the hypothesis that a transparent, equitable, and verifiable incentive scheme can close the intention–behavior gap and shift urban waste systems toward circularity. Its novelty lies in integrating fiscal design, citizen behavior, and urban environmental governance in an

Indonesian context. By doing so, it contributes both theoretically and practically to ongoing efforts to localize the Sustainable Development Goals (SDGs), particularly Goal 11 (sustainable cities) and Goal 12 (responsible consumption and production).

This interdisciplinary approach offers important insights for cities in the Global South that are grappling with similar waste-related challenges. It also informs future research and policy by emphasizing the need for inclusive, participatory, and context-sensitive strategies to accelerate the green transition. Ultimately, the study advocates for a shift from top-down mandates to incentive-aligned, citizen-centered governance that mobilizes local capacities while embedding environmental accountability in everyday practices.

2. LITERATURE REVIEW

2.1. Waste Management Regulation And Institutional Framework

Since the enactment of Law No. 18/2008 on Waste Management, Indonesia's national policy direction has undergone a transformation toward a more integrated and sustainable system. This law emphasizes the application of the 3R principles (Reduce, Reuse, Recycle) and delegates waste management responsibilities to local governments (Pambudi et al., 2025). It also highlights the importance of environmental education and community participation in waste management. However, significant barriers remain in practice, such as limited infrastructure, weak inter-agency coordination, and insufficient funding and law enforcement capacity.

Several cities have begun adopting collaborative governance models that integrate community roles, the informal sector, and private actors through performance-based contracts or public–community partnerships. Waste banks, as one innovative instrument, are increasingly being adopted, although challenges in accountability and integration with official systems persist (Pambudi et al., 2025). Furthermore, mainstreaming upstream prevention and reduction has yet to be fully internalized in local policies, underscoring the need for strengthening institutional capacity and adaptive regulations in urban contexts like Makassar.

2.2. Circular Economy And Infrastructure/Value Chain

The circular economy (CE) framework has become central in shaping urban waste management strategies. This approach promotes the reuse of resources and waste reduction through value chain optimization (Peng et al., 2025). In the waste sector, CE encourages infrastructure such as Material Recovery Facilities (MRFs), Integrated Waste Processing Sites (TPST), and composting strategies as means to reduce landfill-bound residual waste.

Source separation is a key component, as it determines the success of recycling and downstream processing systems. The performance of collection–transport–processing systems is heavily influenced by logistics capacity, separate routing, and facility efficiency. Moreover, integrating informal actors especially waste pickers into the formal supply chain is considered crucial for social equity and systemic efficiency (Castellani et al., 2024). Some studies have shown that legal recognition and empowerment of waste pickers can enhance 3R program effectiveness and boost local economic impacts (Pambudi et al., 2025).

2.3. Fiscal Instruments And Behavioral Change

Fiscal instruments play a strategic role in shaping public behavior toward waste management. Schemes such as pay-as-you-throw (PAYT), waste levy discounts, and performance-based incentives have been implemented in many global cities with promising results (Gotowska & Jakubczak, 2025). For example, some cities provide collection fee waivers to households that actively sort and deposit waste in waste banks, resulting in significant increases in recyclable material volumes (Pambudi et al., 2025).

The effectiveness of these incentives depends greatly on transparent and fair verification mechanisms. Household labeling, QR codes, and random audits have been employed to prevent moral hazard (Teym et al., 2025). In addition, knowledge, attitudes, and practices (KAP) among citizens are key determinants. Educational interventions and public campaigns have proven effective in increasing compliance with sorting policies (Aristizabal et al., 2025; Gibovic & Bikfalvi, 2025). However, inclusivity and equity principles must be considered to ensure incentives do not exclude vulnerable households.

2.4. Best Practices, Gaps, And Research Agenda

International precedents suggest that successful integration of fiscal policies and 3R systems is strongly influenced by institutional capacity, data quality, and multi-stakeholder engagement. Cities with successful incentive systems often share key characteristics: visionary leadership, active citizen engagement, performance indicator–based monitoring systems, and public data transparency (Gotowska & Jakubczak, 2025).

In Indonesia, empirical studies on the effectiveness of sorting-based levies remain scarce. Quasi-experimental evaluations of policy impacts on citizen behavior and cost–benefit analyses of green fiscal policies are rarely found (Nikou & Sardianou, 2025). Moreover, there is no standardized indicator framework to measure the long-term impact of incentives on residual waste reduction, increased participation, or informal sector integration.

Therefore, future research agendas should focus on: (1) developing efficient and adaptive verification models for sorting; (2) conducting longitudinal studies on behavioral change; and (3) exploring cross-sector collaboration to support circular economy governance more holistically. Research conducted in urban contexts such as Makassar can make strategic contributions in addressing evidence gaps and enhancing transformative policy approaches in the waste sector.

3. METHODS

3.1. Research Design And Approach

This study adopts a mixed-methods research design, combining both quantitative and qualitative approaches to assess household waste management behavior and the policy readiness for incentive-based sorting fees in Makassar City. This approach is suitable for thoroughly examining the dynamics of individual behavior and policy contexts through data triangulation (Naujokas & Bobinaitė, 2025; Burrell et al., 2025).

The quantitative component consists of a survey administered to 552 households across 15 districts, designed to evaluate knowledge, attitudes, practices (KAP), and perceptions regarding fiscal incentive schemes. The qualitative component includes in-depth interviews and focus group discussions (FGDs) with environmental agency officials, waste bank managers, 3R community leaders, business actors, and residents.

3.2. Location, Timing, And Data Sources

The research was conducted in Makassar City between May and June 2025, covering 15 districts selected based on population density, high daily waste generation (over 900 tons/day), the overcapacity of the Tamangapa landfill (exceeding 50 meters), and the active dynamics of local waste bank communities. These areas are considered representative for assessing the readiness of incentive-based sorting policies in the context of rapid urbanization.

The study draws on both primary and secondary data. Primary data were collected through household surveys and qualitative methods (interviews and FGDs) involving stakeholders such as the Environmental Office (DLH), waste bank managers, environmental NGOs, and local businesses. Secondary data included national and local policy documents, performance reports from public agencies, and archival records from waste bank and community initiatives.

The respondent characteristics reflected a demographically diverse profile. Women accounted for 55.3% of the sample and played a dominant role in household waste management. In terms of education, 37.3% had completed high school, while 58.2% held higher education degrees, contributing to a heightened level of environmental awareness. While 85.9% reported being aware of the importance of waste sorting, only 33.3% practiced it regularly. Notably, 85.3% of respondents believed that waste management was a shared responsibility between government institutions and local communities. The spatial distribution of respondents and governance actors is depicted.

3.3. Data Collection Procedures

Data collection employed three main approaches. First, household surveys were conducted using structured questionnaires designed to assess public knowledge, attitudes, practices (KAP), and perceptions of fiscal incentive schemes. A stratified random sampling technique was used, stratifying respondents by administrative zones and socioeconomic status to ensure representative coverage (Jou et al., 2024).

Second, in-depth interviews and FGDs were conducted using semi-structured guides to explore systemic barriers, the effectiveness of 3R program implementation, and institutional readiness to support incentive-based policies. This method provided qualitative insights to complement survey results and deepen understanding of the policy context (Burrell et al., 2025).

Third, document analysis was carried out on both national and local waste management regulations, annual reports from the Environmental Office, and internal archives from waste banks and community organizations. The goal was to assess how the current regulatory framework supports sorting-based incentives and how on-the-ground practices reflect these policies.

Table 1: Data Collection Techniques and Objectives.

Data Collection Technique	Primary Objective
Household survey	To measure knowledge, attitudes, practices (KAP), and perceptions of fiscal incentives
In-depth interviews	To explore institutional perceptions, policy challenges, and the role of local actors
Focus Group Discussions	To map community dynamics, actor collaboration, and local institutional readiness
Document analysis	To evaluate regulatory frameworks and alignment between policy and practice

3.4. Data Analysis Techniques

Quantitative data were analyzed using descriptive statistics to profile respondent characteristics and household sorting behavior. Logistic regression was applied to determine the influence of socio-demographic factors on participation in waste sorting. Meanwhile, qualitative data from interview and FGD transcripts were analyzed using a thematic approach to uncover community perceptions, institutional barriers, and narratives of participation.

Analysis was conducted in stages, considering the alignment of data with policy indicators for sorting-based incentives. Triangulation was employed as a validation strategy, cross-checking quantitative results, qualitative findings, and documentary sources to ensure consistency and provide richer interpretation (Gyeduaah et al., 2025). The detailed techniques and purposes of each data type are presented in Table 2.

Table 2: Data Analysis Techniques and Purposes.

Data Type	Analysis Technique
Quantitative data	Descriptive statistics
	Logistic regression
Qualitative data	Thematic analysis (NVivo coding)
Mixed data	Method and source triangulation

3.5. Validity, Reliability, And Ethics

Instrument validity was enhanced through pilot testing conducted in two neighborhoods to test linguistic clarity, contextual appropriateness, and item interpretation. The reliability of the survey instrument was assessed using Cronbach's alpha, with a minimum threshold of 0.7 to ensure internal consistency across items measuring perception and attitude scales (Fadhullah et al., 2022). Result consistency was further strengthened through triangulation across quantitative, qualitative, and document-based sources, minimizing interpretation bias and enhancing accuracy.

Ethical standards were upheld through a participatory approach that valued respondents as informed and respected contributors. All participants received full explanations regarding the study's purpose, benefits, and their rights, including the option to withdraw. Informed consent was obtained either in writing or verbally. Confidentiality and anonymity were strictly maintained throughout the data collection and reporting processes. The research findings were also intended to be disseminated back to local communities as part of accountability and mutual learning (Selimi, 2023; Zainal et al., 2025). Table 3 summarizes the strategies used for ensuring validity, reliability, and ethical compliance.

Table 3: Validity, Reliability, And Ethical Principles.

Aspect	Strategy Employed
Instrument validity	Pilot testing in two locations with local participant feedback
Scale reliability	Cronbach's alpha > 0.7 for internal consistency
Result validation	Triangulation of methods and sources (quantitative, qualitative, documents)
Informed consent	Written/oral consent with detailed explanation
Data protection	Anonymity of respondents, data confidentiality, restricted file access
Transparency & outreach	Explanation of study goals and results dissemination to communities

4. RESULTS

4.1. Respondent Profile And Area Distribution

A total of 552 respondents participated, drawn from 15 districts in Makassar, with the highest concentrations in Tallo, Panakkukang, Biringkanaya, and Rappocini. The gender composition was 55.3% female (≈305) and 44.7% male (≈247). Educational attainment showed 37.3% had completed high school (≈206) and 58.2% held higher education degrees (≈321), indicating a promising foundation for targeted interventions.

Table 4: Respondent Profile.

Indicator	Percentage	Number (n)
Total respondents	–	552
Area coverage	15 subdistricts	–
Female	55.3%	≈305
Male	44.7%	≈247
High school education	37.3%	≈206
Higher education	58.2%	≈321
Other education levels	4.5%	≈25

4.2. Awareness Of Waste Sorting

Approximately 85.9% of respondents (≈474) reported being aware of the concept of waste sorting, while 14.1% (≈78) indicated limited or no knowledge.

Table 5: Awareness Of Waste Sorting.

Category	Percentage	Number (n)
Aware of sorting	85.9%	≈474
Not/less aware	14.1%	≈78

4.3. Household Waste Sorting Practices

In terms of practice, 33.3% (≈184) claimed they always or often sort their household waste, 48.9% (≈270) reported doing it occasionally, while 17.8% (≈98) never sort waste at home.

Table 6: Household Waste Sorting Frequency.

Frequency	Percentage	Number (n)
Always/often	33.3%	≈184
Occasionally	48.9%	≈270
Never	17.8%	≈98

4.4. Perceptions Of Waste Management Responsibility

When asked about responsibility for waste management, 85.3% (≈471) viewed it as a shared duty between government and community, 10.7% (≈59) thought it was solely the government's role, and 4.0% (≈22) had other opinions.

Table 7: Perceptions Of Waste Management Responsibility.

Option	Percentage	Number (n)
Shared responsibility	85.3%	≈471
Government responsibility	10.7%	≈59
Other	4.0%	≈22

4.5. Qualitative Summary

Key challenges included limited source separation, inadequate infrastructure for separate waste storage and collection, unclear incentives, and weak inter-agency coordination. However, opportunities were identified in strengthening waste banks, continued education campaigns, and implementing waste-sorting-based levy systems with simplified verification (labeling, QR codes, and sample audits).

Table 8: Main Qualitative Themes.

Theme Category	Sub-Themes / Key Findings	Illustrative Insights (Interviews/FGDs)
Challenges		
Limited source separation	Households often mix organic and inorganic waste; lack of standardized sorting practices	"We know sorting is important, but bins are limited and not separated at home."
Inadequate infrastructure	Insufficient multi-fraction bins; absence of separate collection routes	"Even if we sort, the truck mixes everything again."
Weak verification system	No clear monitoring of sorting compliance; risk of moral hazard	"There is no feedback or checking, so people don't stay consistent."

Unclear incentives	Lack of awareness about benefits or cost reductions linked to sorting	"If there are incentives, they must be clear and communicated properly."
Inter-agency fragmentation	Poor coordination between DLH, waste banks, and sub-district units	"Programs differ by area; coordination is still weak."
Opportunities		
Strengthening waste banks	Potential for expansion; trusted by communities	"Waste banks motivate people because they see the direct value."
Education campaigns	High public willingness to learn about sorting and environmental practices	"With continuous education, more people will participate."
Incentive-based levy system	Strong public receptiveness to transparent, fair incentive schemes	"People will sort more if incentives are real and monitored transparently."
Simplified verification	Labeling, QR codes, and sample audits can operationalize monitoring efficiently	"QR codes or stickers make it easier to verify without checking every house."
Multi-stakeholder synergy	Growing interest from communities, NGOs, and private sector in collaborative governance	"Partnerships can help strengthen both awareness and logistics."

4.6. Systemic Urban Context

Makassar generates over 900 tons of waste daily, with only 65–70% being collected. The Tamangapa landfill has exceeded a 50-meter waste pile height and continues to operate under open dumping conditions.

Table 9: Systemic Urban Waste Indicators.

Indicator	Value
Daily waste generation	>900 tons/day
Collection coverage	65–70% of total
Tamangapa landfill condition	>50 m, open dumping

5. DISCUSSION

5.1. Interpreting The Intention–Behavior Gap

The findings reveal a significant intention–behavior gap among households in Makassar. While 85.9% of respondents report awareness of waste sorting, only 33.3% regularly practice it, and 48.9% do so inconsistently. This discrepancy is consistent with global research highlighting that awareness alone does not drive behavioral change in environmental practices (Castellani et al., 2024). The gap emphasizes the need for targeted behavioral interventions, particularly economic incentives that can serve as consistent motivators. Fiscal mechanisms, such as waste collection fee reductions or pay-as-you-throw schemes, have proven effective in converting environmental intentions into action by making environmental behaviors economically rational (Castellani et al., 2024).

Another finding relates to household perceptions of responsibility. A substantial majority (85.3%) agree that waste management is a shared responsibility, rather than solely that of the government. This norm provides a favorable foundation for implementing participatory policies and community-based systems of verification and compliance. The data suggest that community readiness exists, but policy mechanisms must operationalize this readiness into structured action.

5.2. Institutional And Infrastructural Preconditions

While fiscal incentives can nudge behavior, their effectiveness is conditional upon infrastructure and institutional capacity. Areas lacking sufficient waste management infrastructure including bin availability, separate collection routes, and processing facilities often experience lower compliance and participation rates (Teym et al., 2025). This is also true in Makassar, where separate collection systems are not yet operational at scale. Without logistics to support household sorting, fiscal incentives alone cannot guarantee desired outcomes.

Institutional readiness is equally crucial. For example, the absence of transparent monitoring, weak inter-agency coordination, and inconsistent enforcement undermines the credibility and impact of fiscal instruments. Studies suggest that in contexts where institutional frameworks are strong, waste-sorting participation is significantly higher (Han et al., 2024). Thus, strengthening the capacity of municipal bodies to implement and monitor incentive-based policies is essential.

5.3. Socioeconomic Variables And Policy Responsiveness

Demographic variables also mediate responsiveness to incentives. In Makassar, the survey sample shows that 58.2% of respondents have tertiary education a group often associated with higher environmental literacy and greater likelihood

of compliance. Conversely, lower-income households may prioritize short-term economic needs, thus responding more strongly to tangible financial incentives (Baaki et al., 2025). These insights suggest that incentive designs should consider differentiated strategies, including targeting subsidies or support toward lower-income households while leveraging normative campaigns for higher-education demographics.

Moreover, gender composition 55.3% of respondents were women—implies that women may play a central role in household waste management. Designing gender-sensitive policies and messaging may further improve participation rates and reinforce inclusive governance.

5.4. Circular Economy Governance Models

The findings resonate with the broader transition to circular economy (CE) governance in urban waste management. Source separation is a foundational principle of CE, ensuring that material flows are channeled back into production cycles (Peng et al., 2025). However, CE implementation requires systems thinking: integrating fiscal incentives, infrastructure, and public engagement under a unified policy framework. Effective CE policies involve multiple stakeholders' municipal governments, informal waste workers, civic organizations, and residents collaborating toward resource recovery (Herrera-Godina et al., 2025). The Makassar case study provides early evidence that CE-oriented governance can be cultivated when incentives, logistics, regulatory clarity, and community participation are aligned. Households demonstrate a readiness to adopt sorting behaviors, yet the effectiveness of these efforts ultimately depends on the systemic coherence illustrated in Figure 1.

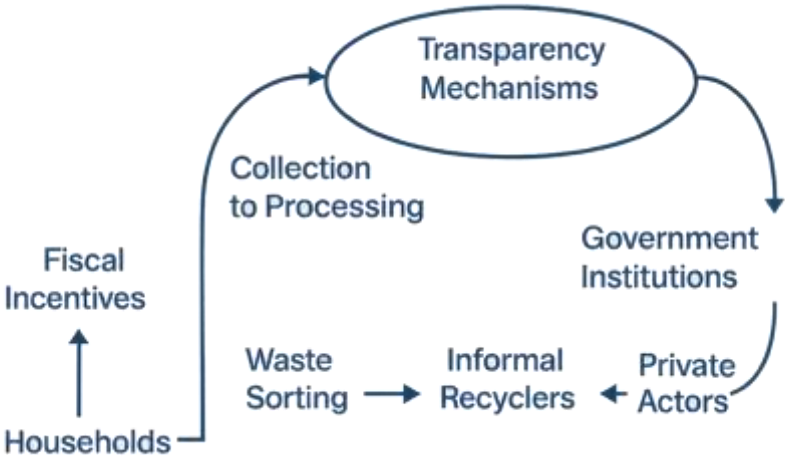

Figure 1: Integrated Circular Economy Governance Model.

5.5. Policy Implications And Design Principles

Translating empirical insights into actionable policy requires an integrated design approach that combines fiscal, infrastructural, governance, and community-oriented interventions. Sorting-based fiscal incentives such as fee exemptions or discounts for households that consistently sort waste can strengthen behavioral consistency when supported by transparent verification systems, including sticker labeling, QR codes, or random audits, as demonstrated in other contexts (Wilson et al., 2022). These financial mechanisms must be complemented by adequate infrastructure provision, including multi-fraction bins, dedicated collection routes, and investments in material recovery facilities or composting centers, ensuring that individual sorting efforts translate into systemic impact. Effective governance mechanisms, such as public dashboards that report tons sorted, participation rates, and verified compliance, enhance accountability and build institutional trust, while performance-based contracts can encourage service providers to meet quality standards. Community education and engagement remain essential, with targeted campaigns addressing knowledge gaps and reinforcing pro-environment norms through feedback loops such as community meetings or household-level performance reports (Baaki et al., 2025).

5.6. Theoretical Contributions

The study contributes to the intersection of behavioral economics and CE governance by empirically testing how fiscal signals can bridge the intention–behavior gap in a developing country

context. It also highlights that such signals are not standalone; their effectiveness is mediated by institutional credibility, logistical support, and sociocultural readiness. This triangulation offers a theoretical model for waste governance interventions.

In line with Nikou & Sardianou (2025), the integration of financial, psychological, and infrastructural drivers presents a comprehensive strategy for sustainable urban waste governance. The model emerging from this study positions household participation not merely as a behavioral outcome but as a governance lever in circular transitions.

5.7. Limitations And Future Research

This research is limited by its cross-sectional nature, which constrains causal inference. Longitudinal studies or quasi-experimental designs (e.g., difference-in-differences) could better assess how behavior evolves post-policy implementation. Social desirability bias may have inflated self-reported sorting behavior; triangulation with observed or verified behavior would mitigate this.

Another limitation is the lack of data on waste quality and sorting accuracy. Audits of waste composition could strengthen understanding of real impact. Future research should also explore informal sector dynamics and their integration into formal CE systems. Finally, while this study offers policy recommendations, it does not evaluate cost-effectiveness. Budgetary analysis and stakeholder cost–benefit perspectives are needed to ensure that interventions are not only effective but also economically sustainable.

6. CONCLUSION

This study confirms that while public awareness of waste sorting in Makassar is relatively high, there remains a considerable gap in behavioral consistency. The inconsistency is rooted in several interlinked factors, including infrastructure inadequacies, lack of enforcement, and absence of clear fiscal incentives. Nonetheless, the willingness of households to participate and the strong perception of shared responsibility present an enabling environment for implementing policy reforms.

Key findings suggest that a successful transition toward incentive-based waste management requires not only financial instruments but also supporting infrastructure, public education, and cross-sector collaboration. The qualitative evidence reinforces the notion that the integration of informal actors and trust in the system are crucial to achieving sustainable results.

Overall, the research underscores the importance of context-sensitive approaches to circular economy governance, highlighting how behavioral, institutional, and technical dimensions intersect. As urban waste challenges intensify, especially in rapidly growing cities like Makassar, the lessons from this study provide a timely foundation for developing effective, inclusive, and scalable waste policy interventions.

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