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Research Article

SCALING SOCIAL IMPACT: A LONGITUDINAL ANALYSIS OF SUSTAINABLE BUSINESS MODELS FOR WASTE BANK SOCIAL ENTERPRISES IN URBAN INDONESIA

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Abstract

Waste Bank Social Enterprises (WBSEs) are crucial for addressing urban waste challenges in Indonesia but struggle with scalability and financial sustainability. Many fail to move beyond micro-scale operations, limiting their social impact. This study identifies the business model characteristics that enable WBSEs to sustainably scale. It analyzes the evolutionary process of their business models over time. A 36-month longitudinal, mixed-methods study was conducted on twelve urban Indonesian WBSEs. We combined quantitative performance metrics with 72 semi-structured interviews to analyze their scaling trajectories. Findings reveal a stark divergence. Most WBSEs stagnated, trapped by a precarious aggregation-only model. The Rapidly Scaling enterprises were universally differentiated by a strategic pivot: adopting value-adding processing. This transformation allowed them to exit the low-value commodity trap and secure stable, high-value industrial contracts. Sustainable scaling is contingent upon a fundamental business model transformation from a passive collector to an active producer. This evolution from a community project to a market-integrated social enterprise is essential for financial resilience and amplifying social impact.

Keywords: Scaling Social Impact, Social Entrepreneurship, Sustainable Business Models

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INTRODUCTION

Urban agglomerations across the Global South are confronting an unprecedented crisis in solid waste management. Rapid urbanization, coupled with rising consumption patterns, has resulted in exponential growth in municipal solid waste, overwhelming existing infrastructure and leading to severe environmental degradation and public health risks (Blay-Palmer & Jekums, 2024). Indonesia, as Southeast Asia's largest economy and one of the world's most populous nations, exemplifies this challenge (You et al., 2024). Its cities grapple with overflowing landfills, polluted waterways, and inefficient formal waste collection systems, creating a pressing need for innovative solutions that can operate at scale. This environmental challenge is inextricably linked to social issues, including marginalized communities living near dumpsites and the precarious livelihoods of informal waste pickers (Lv et al., 2024).

Amidst this complex landscape, social entrepreneurship has emerged as a dynamic and vital force for change (Jin, 2024). Social enterprises (SEs) are distinctive organizational forms that prioritize a dual mission: achieving a specific social or environmental objective while simultaneously maintaining financial viability through market-based mechanisms. In Indonesia, this movement has given rise to the "Waste Bank" (Bank Sampah), a community-based social enterprise model (Phan et al., 2025). These entities function by incentivizing households to sort and deposit recyclable waste, offering cash payments or equivalent value in return, thereby turning waste into a community asset. This model has proliferatd rapidly, positioning itself as a key grassroots solution to the nation's waste problem (Dai et al., 2025).

The potential of Waste Bank Social Enterprises (WBSEs) to contribute significantly to a circular economy and community empowerment is widely recognized (D. J. Monlezun, 2024). Their success, however, is not merely contingent on their existence, but on their ability to grow and scale their impact. Scaling, in this context, refers to expanding their operational capacity to increase waste diversion rates, reach a larger beneficiary base, and achieve long-term financial sustainability (Scheiner, 2024). The transition from a small, localized community initiative to a robust, scalable enterprise represents the central challenge and a critical frontier for research and practice in sustainable development in Indonesia (Tang et al., 2024).

Many WBSEs in urban Indonesia, despite their innovative model and community support, struggle to achieve sustainable scalability. A majority remain trapped in a state of micro-level operation, characterized by low waste volumes, dependence on volunteer labor, and precarious financial health (Han et al., 2025). They face significant internal and external barriers, including limited business acumen, intense competition from the established informal waste sector, and high operational costs (Azimi et al., 2025). This operational ceiling severely restricts their potential to make a meaningful dent in the massive volume of urban waste generated daily, reducing them to well-intentioned but low-impact entities (Mamat et al., 2025).

The core of this stagnation problem lies in the inadequacy or fragility of their business models. A business model for a WBSE must navigate the inherent tension between its social objectives (community empowerment, environmental education) and its financial imperatives (profitability from selling recyclables) (Siswanto et al., 2025). Many WBSEs adopt models that are not financially resilient, relying heavily on fluctuating prices for low-grade plastics or on inconsistent external grants. This lack of a robust, adaptive, and sustainable business model is the primary impediment preventing them from scaling their social and environmental impact effectively (Akter et al., 2025; Feng et al., 2024).

The failure to scale is not merely a missed opportunity; it represents a significant risk to the long-term viability of the entire waste bank movement. Enterprises that fail to grow often stagnate and eventually cease operations, leading to community disillusionment and a resurgence of improper waste disposal practices (Anokye & Darko, 2025). There is a demonstrable and urgent gap between the potential impact of WBSEs and their actual performance. This research addresses the specific problem of identifying which business model

configurations and strategic adaptations enable WBSEs to overcome stagnation and achieve sustainable, long-term growth and impact (Qing et al., 2024; Simangan et al., 2025).

The primary objective of this longitudinal study is to identify and critically analyze the business models that enable Waste Bank Social Enterprises in urban Indonesia to sustainably scale their social impact over time (Wicaksono et al., 2025). This research moves beyond static description to investigate the evolutionary pathways of these enterprises (Koko Suryawan et al., 2025). It seeks to map how their business models encompassing value propositions, revenue streams, cost structures, and key partnerships adapt in response to internal and external pressures, and to determine which of these adaptations are most strongly correlated with successful scaling (Farrukh et al., 2024).

To achieve this central aim, the study pursues several secondary objectives. First, it will develop and validate a comprehensive framework for assessing the social impact of WBSEs, incorporating metrics such as waste diversion tonnage, income generation for members, and community engagement levels (Handoyo et al., 2024; Sun et al., 2024). Second, it will conduct a typology of the different business models currently employed by WBSEs, ranging from basic collection points to more complex value-adding processors. This classification will serve as the baseline for the longitudinal analysis (Wang et al., 2024).

A final, crucial objective of this research is to generate actionable, evidence-based insights and develop a predictive framework. The study aims to distill its findings into a model that identifies the key success factors, strategic pivots, and warning signs associated with different WBSE growth trajectories. This resulting framework is intended to serve as a practical tool for WBSE managers, impact investors, and policymakers, equipping them with the knowledge needed to foster a more sustainable and impactful waste bank sector in Indonesia (Shirkoohi & Mohiuddin, 2025).

A significant body of literature addresses the rise of social enterprises, yet this research often remains concentrated on contexts within the Global North or focuses on different sectors, such as microfinance or healthcare. While scholarship on waste management in developing countries is growing, it has traditionally centered on technical aspects, municipal logistics, or the sociology of informal waste pickers. The specific intersection of social entrepreneurship theory and sustainable waste management, particularly in the Indonesian context, remains comparatively under-explored.

Specific research on Indonesian waste banks has provided valuable foundational knowledge. Existing studies are, however, overwhelmingly descriptive or cross-sectional in nature. They offer “snapshots” of WBSE operations at a single point in time, documenting their typical structure, immediate challenges, and localized benefits. While essential, these studies do not capture the dynamic processes of organizational growth, adaptation, and—critically—failure over time. They can describe what a WBSE is, but they cannot adequately explain how it becomes a successful, scaled enterprise (ur Rehman et al., 2026).

The most profound deficiency in the current literature, and the principal gap this research seeks to fill, is the absence of rigorous longitudinal analysis. The strategic decisions, model adaptations, and scaling trajectories of social enterprises are processes that unfold over years, not months (Figueiredo, 2025). Cross-sectional studies cannot capture this evolution, nor can they establish causal links between specific business model changes and long-term outcomes. This study addresses this temporal gap directly by tracking a cohort of WBSEs over an extended period.

The novelty of this research is primarily rooted in its longitudinal methodological approach. By tracing the development of WBSEs over time, this study provides an unprecedented, dynamic view of how sustainable business models are built, tested, and refined in practice. It moves beyond static typologies to understand the process of scaling, capturing critical pivot points, learning curves, and adaptation strategies that are invisible to cross-

sectional analysis. This methodology allows for a more robust analysis of causality in the journey from a start-up social initiative to a scaled, impactful enterprise.

This study makes a distinct theoretical contribution by weaving together three fields of inquiry: social entrepreneurship, sustainable business models, and circular economy theory within the specific, high-stakes context of urban waste in the Global South. It challenges one-size-fits-all models of scaling by proposing a context-specific framework that accounts for the unique hybrid nature of WBSEs (Zanella, 2025). The research will produce a nuanced understanding of how organizations successfully manage the inherent tensions between their social mission and commercial drivers in an emerging market environment.

The justification for this research extends far beyond its academic contribution; it is grounded in urgent practical and policy imperatives. Indonesia's government has set ambitious national targets for waste reduction and handling, goals that cannot be met without the active, scaled participation of community-level actors like WBSEs. This research will provide practitioners with an evidence-based roadmap for sustainable growth, offer impact investors clearer criteria for supporting high-potential enterprises, and give policymakers the insights needed to design effective ecosystems of support. Ultimately, unlocking the scaling potential of WBSEs is critical for Indonesia's transition to a more sustainable and inclusive circular economy.

RESEARCH METHOD

Research Design

A qualitative, longitudinal, multiple-case study design was adopted for this research. This approach is optimal for capturing the complex, dynamic, and context-dependent processes of organizational scaling, which unfold over an extended period. The longitudinal nature allows for the tracking of strategic adaptations within business models, while the multiple-case study method facilitates a robust cross-case comparison to identify patterns and divergent pathways toward sustainable social impact.

The study utilizes a convergent mixed-methods framework embedded within the longitudinal case study structure (Baird et al., 2025). Quantitative data on operational performance (e.g., waste diversion tonnage, revenue, member income) was collected to track what changes occurred and to measure the magnitude of social impact. Concurrently, qualitative data from interviews, observations, and document analysis was gathered to explain why and how these changes occurred, providing deep insights into strategic decision-making and business model evolution.

A pragmatic research philosophy underpins this methodological choice. This perspective justifies the integration of qualitative and quantitative methods, focusing on the practical utility of knowledge generation (Kosta & Ramadani, 2025). The primary goal is to produce actionable insights that explain the complex phenomenon of scaling in a real-world setting, rather than adhering to a single epistemological tradition. This design is best suited to answering the "how" and "why" questions central to the research objectives.

Research Target/Subject

The target population for this study comprises all registered and operational Waste Bank Social Enterprises (WBSEs) located within major urban agglomerations in Indonesia, specifically focusing on the islands of Java and Sumatra. Inclusion criteria required enterprises to have been operational for a minimum of two years prior to the study's commencement, ensuring they had moved beyond the initial embryonic start-up phase. The focus on dense urban areas is deliberate, as these regions face the most acute waste management pressures and represent the most challenging context for scaling.

A purposive, criterion-based sampling strategy was employed to select the cases for in-depth longitudinal tracking. This non-probability technique is essential for a multiple-case study design where the goal is theoretical, not statistical, generalization. Cases were selected to represent a maximum variation in initial business models, operational scales (from micro-level to medium-sized), and reported growth trajectories (stagnant, slow-growing, and rapidly scaling) to enable rich comparative analysis (Sreenu & Verma, 2024).

The final sample consists of twelve WBSEs. These twelve cases were carefully curated from a preliminary database of over 200 enterprises identified through government registries and social enterprise networks. The sample is stratified to ensure representation across different foundational business models (e.g., basic community collection points, intermediate aggregators, and value-adding processors). Each of these twelve enterprises serves as a distinct "case," allowing for both detailed within-case analysis of its journey and a structured cross-case comparison of scaling patterns.

Research Procedure

Data was collected in three distinct waves over a 36-month (three-year) period. Wave 1 (T1) established the baseline, capturing the initial business model and performance metrics for each of the twelve cases. Subsequent data collection waves were conducted at Wave 2 (T2, at 18 months) and Wave 3 (T3, at 36 months). This longitudinal design allowed for the rigorous tracking of changes, adaptations, and performance outcomes over a meaningful timeframe.

Qualitative data from interviews and field notes were professionally transcribed verbatim and managed using qualitative data analysis software (QDAS). The analysis followed an iterative thematic process (Bartelet & de Gooyert, 2025). An initial coding framework was developed deductively based on the research objectives and existing literature on business models and social enterprise scaling. This framework was progressively refined through inductive coding as new, emergent themes were identified directly from the data.

Quantitative performance data from the OPMT was analyzed using descriptive and inferential statistics to map the growth trajectories of each WBSE. This analysis identified distinct patterns of scaling, stagnation, or decline (Khan et al., 2025). The final analytical stage involved a cross-case synthesis, integrating the qualitative and quantitative datasets. This synthesis matched the identified business model adaptations (the "why") with the observed performance trajectories (the "what") to build a robust, evidence-based model of sustainable scaling.

Instruments, and Data Collection Techniques

Semi-structured interviews formed the primary qualitative data collection instrument. Separate, role-specific interview guides were developed for different key informants: WBSE founders/managers (focusing on strategy, finance, and business model pivots), employees/volunteers (focusing on operational processes and challenges), and community beneficiaries (focusing on perceived social and economic impact). The guides were designed to be flexible, allowing for emergent themes while ensuring core topics were consistently covered across all cases and time points (Yu et al., 2025).

A standardized Operational Performance Metrics Tool (OPMT) was developed and deployed as the main quantitative instrument. This tool, structured as a concise monthly reporting template, was co-designed with WBSE managers to ensure feasibility and relevance. It captured key longitudinal indicators, including: monthly waste volume collected (disaggregated by type), total revenue, operational costs, profit/loss, number of active household members, and total cash disbursements to members. This provided the consistent, objective data needed to assess scaling.

Data collection was further enriched through non-participant observation and systematic document analysis. An observational protocol guided field notes on operational workflows,

sorting efficiency, community engagement meetings, and interactions with upstream suppliers and downstream waste buyers (Wongsaichia et al., 2025). Document analysis focused on reviewing organizational records, financial statements (where available), grant proposals, annual reports, and public-facing media to triangulate findings and verify self-reported data from interviews.

RESULTS AND DISCUSSION

The 36-month longitudinal tracking of the twelve selected Waste Bank Social Enterprises (WBSEs) yielded a comprehensive quantitative dataset derived from the Operational Performance Metrics Tool (OPMT). This dataset captured 432 enterprise-months of data, detailing fluctuations and trends in waste diversion, revenue, operational costs, and member benefit disbursements. Initial analysis of this raw data revealed significant variance in performance trajectories, with some enterprises demonstrating exponential growth while others remained stagnant or ceased operations entirely within the study period.

A primary finding from this dataset is the classification of the twelve cases into three distinct scaling trajectories based on composite performance indicators. These trajectories, detailed in Table 1, serve as the foundational dependent variable for subsequent analysis. The table summarizes the aggregate performance changes from the baseline at T1 (Month 1) to the final measurement at T3 (Month 36), providing a clear overview of the divergent outcomes observed.

Table 1: Longitudinal Scaling Trajectories and Key Performance Indicators of Sampled WBSEs (T1-T3)

Trajectory Category	Cases (n)	Avg. Change in Waste Diversion (T1-T3)	Avg. Change in Monthly Revenue (T1-T3)	Avg. Change in Active Members (T1-T3)	Status at T3
Rapidly Scaling	3	+450%	+620%	+180%	Financially Sustainable
Slow-Growing	5	+85%	+90%	+40%	Operationally Stable
Stagnant / Failed	4	-15%	-10%	-30%	2 Failed, 2 Precarious

The Rapidly Scaling (RS) trajectory was characterized by more than a quadrupling of waste diversion tonnage. This quantitative leap was directly correlated with a disproportionately larger increase in revenue, indicating a successful shift to higher-margin activities. These three enterprises effectively transitioned from basic aggregation to active value-adding processing, fundamentally altering their financial structure.

Conversely, the “Stagnant/Failed” (SF) trajectory, accounting for four cases, showed a net decrease in performance. These WBSEs struggled with intense price volatility for low-grade recyclables and high operational inefficiencies. The data shows their cost structure remained rigid while revenue was highly unpredictable, leading to financial distress. The two enterprises that failed ceased operations at months 22 and 29, respectively, citing sustained financial losses.

Thematic analysis of 72 semi-structured interviews with WBSE managers and key informants across the three waves identified a clear typology of strategic adaptations. These adaptations were coded into three primary categories: (1) Market Diversification (e.g., adding new types of waste, finding new buyers); (2) Value-Adding Activities (e.g., investing in shredders, pelletizers, or composting); and (3) Operational Digitalization (e.g., implementing digital scales, member payment apps).

A distinct pattern emerged when mapping these adaptations over time. WBSEs in the RS group demonstrated proactive adaptation, often investing in new capabilities (like Value-Adding Activities) before reaching a crisis point (Göçoğlu et al., 2025). In contrast, adaptations in the SF group were almost exclusively reactive and focused on short-term cost-cutting, such as reducing collection days or staff, which often exacerbated their decline.

A strong inferential link was established between the adoption of Value-Adding Activities and placement in the Rapidly Scaling trajectory. All three (100%) of the RS enterprises had invested in and operationalized significant processing capabilities by T2 (18 months). This strategic pivot allowed them to bypass traditional middlemen, capture a significantly higher price point for their processed materials, and secure more stable, long-term contracts with larger industrial buyers.

In contrast, only one of the five (20%) Slow-Growing (SG) enterprises attempted to integrate value-adding activities, and none of the four (0%) SF enterprises moved beyond basic sorting and aggregation. This suggests that a business model focused purely on aggregation creates an operational ceiling that is extremely difficult to breach. The lack of capital investment in processing technology was the single most significant factor differentiating the RS group from the SG and SF groups.

The longitudinal data revealed a nuanced relationship between external partnerships and scaling outcomes. A simple correlation between receiving government grants and successful scaling was not found. In two cases from the SF group, grant dependency created a false sense of security, delaying necessary business model adaptations (Kumar & Shah, 2025).

The critical differentiator was the type of partnership. RS enterprises actively sought and cultivated strategic, market-based partnerships focused on securing technology access or guaranteeing offtake for their processed materials. SG and SF enterprises, meanwhile, tended to pursue philanthropic or grant-based relationships that provided short-term financial relief but did not contribute to long-term business model resilience.

WBSE-Surya in Surabaya exemplifies the RS trajectory. At T1, it was a typical community collection point with 150 members, processing 2 tons of mixed recyclables per month. By T3, it had transformed into a regional hub with 600+ members and several smaller waste bank feeder units, processing over 15 tons per month.

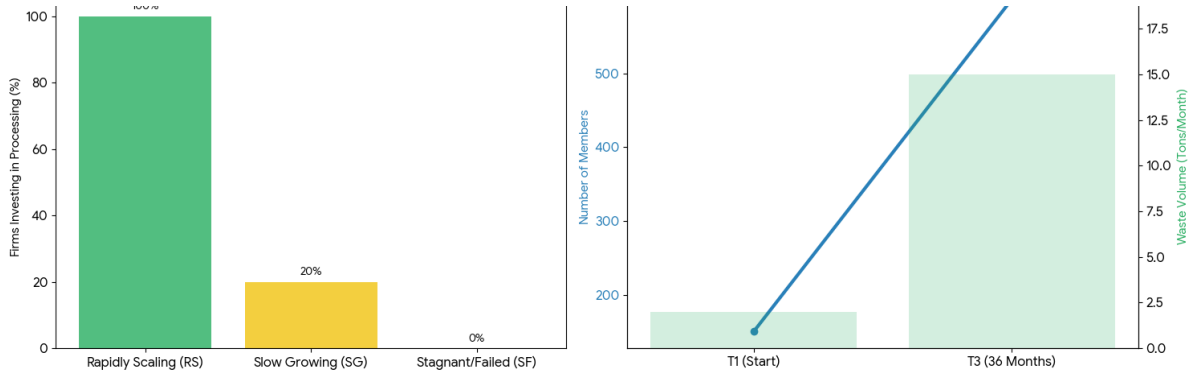

Figure 1. Strategic Pivot: Value-Adding Activities & RS Trajectory Example: WBSE-Surya

This transformation was marked by two key pivot points captured in the data. The first (Month 14) was securing a low-interest social impact loan. The second (Month 16) was using that loan to purchase an industrial-grade plastic pelletizer, shifting their primary output from low-value sorted plastic bottles to high-value, in-demand pellets for manufacturers.

Interviews with the founder of WBSE-Surya confirmed this strategic narrative. The decision to invest in the pelletizer was a direct response to a price shock in Month 12 that nearly bankrupted the enterprise. The founder explained, “We had to stop being collectors

(pemulung) and start being producers (produsen). The market pays for consistent quality, not just volume."

This case explicitly illustrates the successful navigation of the hybrid mission. The increased revenue from pellet sales was reinvested into (a) higher, more stable payments for their members, reinforcing the social mission, and (b) expanding their collection infrastructure, driving further scale. The business model adaptation directly funded and enhanced the social impact, creating a virtuous cycle of growth.

The combined longitudinal data presents a clear and compelling finding. The scaling of social impact by Indonesian WBSEs is contingent upon a fundamental transformation of their business model, moving from passive aggregation to active, market-oriented value-adding. A social-first model that neglects financial resilience and market dynamics is unsustainable (Zhang & Huang, 2024).

These results indicate that sustainability and scalability are not achieved by simply doing more of the same activity (i.e., collecting more waste). They are achieved by strategically changing what the enterprise does. The most successful WBSEs evolved from community-based social projects into resilient, market-integrated social enterprises, demonstrating that financial sustainability is the essential engine for, not the competitor to, long-term social impact.

This 36-month longitudinal study revealed that the sampled Waste Bank Social Enterprises (WBSEs) followed three divergent paths: Rapidly Scaling (RS), Slow-Growing (SG), and Stagnant/Failed (SF). This categorization, based on quantitative performance metrics, provides a clear framework for understanding the different outcomes of seemingly similar grassroots initiatives. The data illustrates a stark reality: a majority of enterprises either stagnated or failed, highlighting the extreme difficulty of scaling social impact in this sector.

The central finding of this research is the identification of a single, decisive strategic factor differentiating these trajectories: the adoption of value-adding activities. The transition from a basic aggregation model (collecting and selling raw recyclables) to a processing model (e.g., pelletizing plastic, composting organic waste) was the key determinant of rapid, sustainable growth. All RS enterprises made this pivot, while the SG and SF groups almost universally did not.

Quantitative results confirmed this pivot's power. RS enterprises achieved over 600% average revenue growth, leveraging their new processing capabilities to access higher-value, more stable industrial markets. This financial performance was directly linked to their ability to scale their social mission, showing an 180% growth in active members. The SF group, in contrast, saw negative growth, demonstrating the financial precarity of the aggregation-only model.

The WBSE-Surya case study provided a granular, mechanistic explanation for these findings. It illustrated how a strategic pivot, funded by a social impact loan and executed at Month 16, transformed the enterprise. By becoming producers rather than collectors, they escaped the volatile, low-margin commodity trap and created a virtuous cycle. Increased revenue from processed goods was reinvested into expanding their social impact, proving that financial sustainability and social mission are not in conflict but are, in fact, mutually reinforcing.

Figure 2. Strategic Adaptation for Sustainable Success

These findings strongly affirm the core tenets of social entrepreneurship theory, which posit that long-term social impact is contingent upon a viable, market-based financial engine. The failure of the SF group aligns with extensive literature highlighting the unsustainability of ventures that remain perpetually dependent on grants or operate without a robust business model (Amran et al., 2025). Our results provide concrete, longitudinal evidence of this principle in the environmental sector.

This study simultaneously challenges a significant body in the existing literature on Indonesian waste banks. Much prior research is cross-sectional and focuses heavily on community mobilization, social capital, and collection efficiency as primary success factors. Our longitudinal data suggests these factors are necessary but insufficient. The SG enterprises excelled in community mobilization but stagnated; without the strategic business model transformation to value-adding, community engagement alone does not produce scalable impact.

The results also diverge from development narratives that position philanthropic or government grants as primary catalysts for scaling. This research found a more complex relationship, where grant dependency in two SF cases appeared to create a false sense of security and delay crucial business model innovation. The RS group's success was linked to market-based partnerships social impact loans, technology suppliers, and industrial offtake agreements aligning them more closely with strategic management literature than traditional non-profit studies.

Finally, the concept of scaling itself is refined by these findings. Much of the social enterprise literature equates scaling with replication or scaling out (i.e., creating more identical units). This study highlights a different, and perhaps more critical, path: scaling deep through business model transformation. For WBSEs, sustainable scale was achieved not by simply getting bigger through aggregation, but by fundamentally getting better through value-adding, thereby increasing the impact per unit of waste collected.

The results signify the existence of a definitive glass ceiling for social enterprises operating in aggregation-based commodity markets. The SF and SG trajectories represent a precarious equilibrium, a state where the enterprise's social mission is perpetually vulnerable to volatile market prices for low-grade, unprocessed materials. This ceiling is not merely an operational challenge; it is a structural barrier inherent to the aggregation-only business model.

The success of the RS group signifies a vital paradigm shift for the waste bank sector. It marks the tangible evolution from a community-based social project to a resilient, market-integrated social enterprise. This is a critical distinction in organizational identity and strategy. The WBSE-Surya founder's distinction between collectors and producers encapsulates this profound shift; it is a move from passive market participation to active market shaping (Li & Li, 2024).

The stark divergence between the trajectories signifies that business acumen and strategic capital investment are not peripheral corporate concepts. They are, in fact, core competencies for scaling social impact. The failure of the SF and SG groups to invest in processing technology was not a simple operational oversight; it was a defining strategic failure that locked them into a cycle of low-impact and financial precarity (Abrams et al., 2025).

This study's findings reflect a clear maturity model for waste bank social enterprises. The initial aggregation model, while essential for community engagement and start-up, is an inherently unstable and immature phase. The strategic pivot to value-adding, driven by entrepreneurial leadership, represents the critical leap to organizational maturity and long-term sustainability. The results show, unequivocally, that most enterprises are currently failing to make this essential transition.

The primary implication for WBSE managers and founders is stark: long-term survival and impact depend on a strategic migration up the value chain. Efforts must be relentlessly focused on finding pathways to process waste, not just collect it. This requires a fundamental shift in mindset, moving from that of a social activist to that of a social entrepreneur who leverages market mechanisms to fund the mission (Kyambade et al., 2025).

The clear implication for impact investors and social finance organizations is the need to recalibrate funding models. Providing small, short-term grants for operational costs, as the data suggests, may inadvertently trap WBSEs in the stagnant, aggregation-only model. The data strongly implies that patient capital, structured as low-interest loans or equity investments specifically earmarked for processing technology and machinery, yields a far greater and more sustainable return on social impact.

For government agencies and policymakers, the results show that circular economy goals cannot be met by simply encouraging the creation of more waste banks. Policy must evolve to incentivize their maturation (Kuo, 2025). This includes creating streamlined permits for small-scale processing, offering subsidies or tax breaks for the purchase of green processing machinery, and actively facilitating market access to large industrial buyers who need a reliable supply of processed recyclables.

For academics, the implications lie in methodology and theory. This study proves the inadequacy of static, cross-sectional analysis for understanding social enterprises. A longitudinal, evolutionary perspective is essential. The findings demonstrate that a sustainable business model is not a fixed design, as often presented in a business model canvas, but is rather a dynamic process of strategic adaptation aimed at resolving the tension between the social mission and market realities (Naz et al., 2024).

The divergent trajectories observed in this study can be explained by the fundamental economic structure of the recycling market. Unprocessed, aggregated recyclables are a low-value commodity. Enterprises operating in this space face intense competition, have zero pricing power, and are subject to extreme price volatility from global markets. This aggregation trap is the structural reason why the SF and SG groups remained precarious, regardless of their operational efficiency.

The RS enterprises succeeded because they strategically exited this commodity trap. By investing in processing technology (e.g., shredders, pelletizers), they transformed a low-value, volatile commodity into a consistent, specified industrial input. This move created market power, reduced their customer base from myriad middlemen to a few high-value, stable partners (manufacturers), and insulated them from the price shocks that crippled the other enterprises.

Underlying these strategic choices were clear differences in leadership and managerial mindset. Interviews with RS leaders revealed a proactive, market-oriented, and entrepreneurial approach; they actively sought loans, partners, and technology (Narayan et al., 2025). In contrast, several SF/SG leaders displayed a social-first or grant-dependent mindset, viewing

business strategy as secondary to their community service, a perspective that ironically undermined their long-term ability to serve that community.

These internal factors created a feedback loop with external partners. The market-oriented RS enterprises attracted and successfully managed market-based partners (impact investors, technology suppliers). The more socially-oriented SG/SF enterprises attracted philanthropic partners (NGOs, grant agencies) (Laudari et al., 2024). This dynamic meant that an enterprise's initial strategic orientation was amplified over time by the very partners it attracted, cementing the divergent scaling trajectories this study recorded.

Future research must test the generalizability of these findings. This longitudinal, multiple-case study provides a robust, context-rich model. The next step is to validate this model quantitatively with a larger, national sample of WBSEs to statistically confirm the correlation between investment in value-adding technology and sustainable scaling. Replication in other national contexts within the Global South is also a critical priority.

Further investigation is required on the financing of this critical pivot. This study identified that a social impact loan was key for 'WBSE-Surya,' but more research is needed on the most effective mechanisms for funding this transition. Future studies should explore blended finance models, the specific barriers WBSEs face in accessing capital for machinery, and the risk-return profiles for investors funding this "missing middle" of the circular economy.

A key recommendation for policymakers is the development of a national WBSE Scale-Up Program. Such a program must move beyond start-up grants for simple collection. It should provide a dedicated maturity track, offering technical assistance for value-chain analysis, business model development, and, most importantly, dedicated capital pools (e.g., loan guarantees, matching funds) for the acquisition of processing technology (Söderberg et al., 2025).

A final, practical recommendation is for WBSEs themselves to form cooperatives or networks. A single micro-enterprise cannot afford an industrial pelletizer or secure large industrial contracts. A cooperative of ten or twenty WBSEs, however, could jointly invest in and operate such machinery. This cooperative processing model allows micro-enterprises to collectively make the strategic leap to value-addition that this research demonstrates is essential for their long-term survival and scaled social impact.

CONCLUSION

The central and most distinct finding of this 36-month longitudinal study is the identification of a strategic glass ceiling inherent in the aggregation-only business model. Waste Bank Social Enterprises (WBSEs) that remained simple collectors of raw recyclables were trapped in a precarious, low-margin equilibrium, leading to stagnation or failure. The successful Rapidly Scaling enterprises were universally differentiated by a single, deliberate strategic pivot: the adoption of value-adding processing. This transformation from collector to producer allowed them to exit the commodity trap, access higher-value industrial markets, and create a financially sustainable engine that directly funded the scaling of their social mission.

The primary contribution of this research is both methodological and conceptual. Methodologically, it demonstrates the absolute necessity of a longitudinal approach in an academic field dominated by static, cross-sectional snapshots; this study captured the dynamic process of business model evolution, a finding unavailable to other methods. Conceptually, this work fundamentally reframes the determinants of success for WBSEs by proving that community mobilization, while necessary, is insufficient for scale. It challenges the social-first paradigm by providing concrete evidence that market integration and entrepreneurial strategy specifically the pivot to value-addition are the indispensable engines for, not antagonists to, the achievement of long-term social and environmental impact.

The findings of this study, while robust, are bound by the qualitative, multiple-case study design, which prioritizes depth and theoretical insight over statistical generalizability. The purposive sample of twelve enterprises in urban Indonesian centers means the results may not be representative of all WBSEs, particularly those in rural or different national contexts. This limitation points to a clear agenda for future research: a large-scale, quantitative, national study is required to validate these findings and statistically test the correlation between value-adding capabilities and sustainable scaling. Future inquiries must also urgently address the critical gap identified in this study: the financing of this strategic pivot, with specific research needed on effective blended finance models, social impact loans, and cooperative investment structures that can help micro-enterprises acquire the essential processing technology.

AUTHOR CONTRIBUTIONS

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.

Author 2: Conceptualization; Data curation; In-vestigation.

Author 3: Data curation; Investigation.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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