

Green Transformation of MSMEs as Secondary Resource Suppliers in a Circular Economy: A Triple Bottom Line Approach

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Abstract

This study examines the green transformation of micro, small, and medium enterprises (MSMEs) as suppliers of secondary resources through the Triple Bottom Line (TBL) approach in supporting the circular economy in Kendari City. An exploratory qualitative multiple-case study design was employed. Empirical evidence was obtained from three focal cases in the processed-food and food-service subsectors that generate or handle production and operational residues. Data were collected through field mapping, observation, interviews/discussions, and document review. Data analysis involved familiarization, thematic coding, cross-case comparison, and interpretation of findings through the People, Planet, and Profit dimensions. Secondary-resource supplier readiness was assessed through availability, quality, continuity, and partnership/network readiness. The findings show that potentially recoverable residues can be identified across the focal cases, but residue presence alone is insufficient to establish secondary-resource supplier readiness. Material quality, supply consistency, economic-value information, and relationships with processors or users are critical conditions that determine whether residues can become credible secondary-resource flows. The study proposes a phased conceptual framework linking material visibility, conditioning, reliability, connectivity, and value realization to integration into local circular value chains. The findings provide a context-specific empirical basis for strengthening MSME circular practices and informing local circular-economy policy.

INTRODUCTION

The transition toward a circular economy has become increasingly important because the linear economic model encourages the extraction of virgin resources, the generation of waste, and the loss of material value after a single use cycle. Circular-economy principles seek to reduce waste and pollution, keep products and materials in use for longer periods, and reduce dependence on new resource extraction (Kirchherr et al., 2023). Value-retention strategies such as reuse, repair, refurbishment, and remanufacturing can extend product life while avoiding environmental impacts (Russell & Nasr, 2023).

At the small-business level, circular transition does not always rely on complete formal systems. MSMEs often operate with limited data, time, human resources, knowledge, and sustainability-measurement tools. Small firms may be interested in the Triple Bottom Line but still face constraints in knowledge, skills, resources, and time (Depken & Zeman, 2018). More recent evidence also shows that small circular enterprises balance economic, social, and environmental objectives through flexible practices and informal controls (Silvennoinen et al., 2026).

MSMEs are strategically important to the circular economy because they are close to flows of raw materials, process by-products, packaging, residual materials, and post-consumer waste. MSMEs can contribute to green-economy performance, but implementation remains constrained by resources, technology, policy, market access, competence, and stakeholder relationships (Chakraborty et al., 2025; Pangarso et al., 2022). Therefore, generating residues is not sufficient;

MSMEs must be able to transform residues into materials that can be accepted and used by other actors.

This issue becomes more critical when secondary resources are positioned as part of a supply chain. Circular supply chains face financial, organizational, technological, social, policy, market, and logistics barriers (Kazancoglu et al., 2021). At the local level, a credible secondary-resource supplier needs to provide material in sufficient quantities, at acceptable quality, with relatively stable continuity, and through relationships with actors that can process or use the material.

Kendari City provides a relevant local setting. Research at Anduonohu Market identified organic-waste generation of 103.44 kg per day and a potential compost output of approximately 67.24 kg per day (Akmal et al., 2024). Although the context is a traditional market, the finding demonstrates that local organic-material flows have practical recovery potential. The next managerial question is whether MSMEs can identify, maintain, consolidate, and deliver such materials in a form that can be used economically.

This study uses the Triple Bottom Line as the main analytical lens. The TBL framework integrates People, Planet, and Profit as social, environmental, and economic dimensions of sustainability (Elkington, 1998). In this study, People includes worker involvement, knowledge, occupational safety, role distribution, and networks; Planet includes residue reduction, sorting, reuse, resource efficiency, and contamination control; and Profit includes cost savings, the economic value of residues, investment capacity, and market feasibility. These dimensions are treated as interpretive lenses rather than causal variables.

The novelty of this study lies in positioning MSMEs as potential suppliers of secondary resources rather than merely as targets of green programs or generators of waste. The empirical focus addresses how green-transformation practices emerge across People, Planet, and Profit, how secondary-resource supplier readiness can be assessed through availability, quality, continuity, and partnership/network readiness, and what factors facilitate or hinder the integration of secondary materials into local circular value chains. Secondary-resource supplier readiness is therefore treated as a bridge between internal green practices and external circular-value-chain integration.

A growing body of work in Southeast Sulawesi also indicates that sustainability transitions cannot be separated from the behavior and capabilities of local actors. Roslan and Akbar (2024) found that economic, social, and environmental dimensions of a green economy were positively associated with zero-waste behavioral intention in Wakatobi. Although that study examined community behavior rather than supplier readiness, it is relevant to the present research because it demonstrates that environmental change in the region is more likely to be sustained when economic and social considerations accompany ecological goals. This supports the use of the Triple Bottom Line as an integrated lens rather than treating residue reduction as an isolated environmental activity.

The present study also builds on an earlier synthesis that explicitly linked MSME green transformation, the Triple Bottom Line, and the circular economy. Roslan (2025) argued that MSME transformation should be interpreted as a multidimensional process in which environmental practices, social capacity, and economic viability must converge before circular practices can become durable. The current study advances that conceptual discussion by moving from synthesis to field-oriented analysis and by introducing secondary-resource supplier readiness as a distinct analytical layer. In this sense, the contribution is not merely to restate the three TBL

dimensions, but to explain how they may support the transition from internally managed residues to externally credible secondary-resource supply.

Organizational capability is particularly important because most MSMEs do not possess dedicated sustainability units, environmental specialists, or sophisticated information systems. Evidence from SMEs in Kendari shows that managerial and digital capabilities can strengthen business performance and adaptation (Asraf et al., 2026). This insight is relevant to the People dimension of the present study: the capacity to record material flows, communicate with potential partners, coordinate collection schedules, and respond to quality requirements depends on people who can organize information and adapt routines. Consequently, secondary-resource supplier readiness should be understood not only as a physical condition of materials but also as an organizational capability embedded in daily management.

Network formation is equally central. Circularity cannot be achieved by a single MSME acting in isolation because one firm's residue must become another actor's input, requiring communication, trust, knowledge exchange, and repeated coordination. Research on voluntary co-creation highlights the importance of knowledge resonance and interaction among actors in creating shared value (Moonti et al., 2023). In the context of secondary resources, this logic suggests that partnership/network readiness is more than the existence of a buyer's contact number; it reflects whether actors can exchange information about material specifications, negotiate responsibilities, coordinate timing, and solve problems when supply conditions change.

Accordingly, this study addresses three research questions: (1) How are green-transformation practices reflected across the People, Planet, and Profit dimensions among the focal MSMEs? (2) To what extent do the focal MSMEs demonstrate readiness as suppliers of secondary resources in terms of availability, quality, continuity, and partnership/network readiness? and (3) What factors facilitate or constrain the integration of MSME secondary resources into local circular value chains?

Figure 1 **Triple Bottom Line and secondary-resource supplier readiness of MSMEs**

METHODS

This study employed an exploratory qualitative approach with a multiple-case study design. A case-study strategy is suitable when a phenomenon must be understood in its natural setting and when the boundaries among practices, actors, and institutional conditions cannot be separated clearly (Yin, 2018). The multiple-case design also enables comparison of common and contrasting patterns across focal enterprises.

The study was conducted in Kendari City. The unit of analysis comprised MSMEs that generate or handle by-products, production residues, and post-consumer residues with the potential to become inputs for other economic activities. Consistent with the exploratory multiple-case design, this article focuses on three purposively selected, information-rich cases representing observable residue-generating activities: one processed-food enterprise and two food-service enterprises, anonymized as F1, F2, and F3. The cases were selected to enable close examination of material flows, handling practices, organizational conditions, and early indicators of supplier readiness within routine business operations.

Primary data were derived from field-visit notes, direct observation, and interviews/discussions with the focal enterprises, complemented by relevant documentary information. F1 represents a processed-food enterprise and was examined in relation to production processes, raw-material use, outputs, and production residues. F2 and F3 represent food-service enterprises and were examined in relation to raw materials, food processing, service activities, food residues, and operational residues. The evidence from these cases was used for within-case description and cross-case comparison rather than for statistical representation of all MSMEs in Kendari City.

Data analysis followed an iterative process combining data-driven and theory-driven coding. The analysis began with familiarization, followed by coding of evidence related to People, Planet, Profit, and supplier readiness. Cross-case analysis was then used to identify similarities, differences, and evidence gaps. The resulting themes were interpreted using circular-economy, TBL, and supply-chain literature. Presence/absence coding was used only to organize the evidence matrix and was not used for statistical generalization.

Trustworthiness was strengthened through source and method triangulation, cross-case comparison, and an explicit separation between directly documented evidence and interpretive inference. Observational notes, interview/discussion evidence, and available documents were compared to identify convergent patterns as well as evidence gaps. This procedure helps prevent visible residue generation from being interpreted automatically as proof of green maturity or supplier readiness.

Case selection followed a purposive logic. The focal cases were not intended to statistically represent all MSMEs in Kendari City; rather, they were selected as information-rich examples in which residue generation could be observed within routine operations. Variation between processed-food and food-service activities provided an analytical basis for comparing differences in material type, handling practice, business routines, and potential recovery pathways. Such diversity was treated as an analytical resource for developing a context-sensitive understanding of secondary-resource supplier readiness.

The field protocol separates descriptive evidence from interpretive judgment. Descriptive evidence includes the type of business activity, point of residue generation, handling practice, storage condition, frequency of occurrence, and actors involved. Interpretive judgment is then used to relate these observations to People, Planet, Profit, and the four supplier-readiness dimensions. This separation reduces the risk of prematurely labeling a practice as 'green' or a firm as 'ready' merely because a residue is visible. It also creates an audit trail that supports transparent cross-case comparison and allows the basis of each interpretation to be traced back to the documented evidence.

The study did not seek statistical representativeness or claim saturation across the full population of MSMEs in Kendari City. Instead, analytical sufficiency was pursued through detailed examination of the focal cases, comparison of recurring and contrasting patterns, and explicit identification of evidence that remained unavailable or uncertain. This approach is appropriate for an exploratory multiple-case study whose purpose is to develop a grounded conceptual explanation of how supplier readiness can be interpreted under local MSME conditions.

The analytical strategy also emphasizes negative and incomplete evidence. In qualitative research, the absence of information can be meaningful when it appears consistently across cases. For example, when an enterprise cannot provide even approximate information on residue volume, this does not prove that supply is unavailable, but it indicates low material visibility and

weak supply reliability. Similarly, the absence of documented buyers does not demonstrate that networks are impossible; it indicates that partnership readiness cannot be substantiated from the available evidence. This cautious treatment of missing information helps prevent overstatement and keeps the interpretation aligned with the empirical scope of the multiple-case study.

RESULTS AND DISCUSSION

Focal Cases and Material Flows

Table 1
Focal Cases and Material Flows

Case	Subsector	Observation focus	Observed evidence	Evidence gap / assessment limitation
F1	Processed food	Production process, raw materials, products, production residues	Production residues and potential secondary material identified	Volume, quality, continuity, prospective users
F2	Food service	Raw materials, production/service, residues, management practice	Food-service residues and residue-management practice recorded	Quality specification, frequency, economic value, partners
F3	Food service	Business activity, food processing, operational residues	Potential operational residues identified	Material type, volume, continuity, delivery route

The focal cases show that food-related MSMEs provide a relevant empirical entry point because residues arise as a routine part of business operations. The key issue is not simply whether residues exist, but whether the available evidence is sufficient to treat them as credible secondary-resource supply. Across the focal cases, information on volume, quality, continuity, economic value, and receiving partners was uneven. The cases therefore reveal both material-recovery potential and the specific information gaps that constrain a stronger assessment of supplier readiness.

People: Management Capacity and Networks

Evidence related to People was less detailed than evidence related to material flows. Responsibility for residue handling, worker knowledge of sorting, occupational safety, role allocation, and routine relationships with collectors or processors were not documented consistently across the three cases. This should not be interpreted as evidence that the People dimension is weak across Kendari MSMEs; rather, it indicates that organizational capacity cannot be inferred from material observations alone. Small enterprises often rely on informal coordination and individuals who hold multiple responsibilities, making proportionate and practical control mechanisms more appropriate than complex reporting systems (Johnstone, 2021; Silvennoinen et al., 2026).

From a management perspective, the People dimension can be interpreted as the human infrastructure of circularity. A sorting rule has little practical value if workers do not understand it,

if responsibility changes from shift to shift, or if no one records what happens to the material after collection. The minimum organizational requirement is therefore not a complex sustainability department, but clarity regarding who handles residues, who checks quality, who communicates with external partners, and who records recurring problems. This interpretation is consistent with the finding that SME performance and adaptation are strengthened when managerial capability complements technical capability (Asraf et al., 2026).

The People dimension also extends beyond the boundary of the firm. Relationships with collectors, processors, community groups, local government, and prospective users constitute a social network through which secondary resources can move. Such relationships are likely to be informal at the beginning, especially in local MSME ecosystems. Informality is not necessarily a weakness, but it becomes a risk when expectations regarding quality, collection frequency, ownership of storage containers, or payment are unclear. The development of supplier readiness therefore requires gradual formalization of essential information while preserving the flexibility that characterizes small enterprises.

Planet: Residues as the Entry Point for Green Transformation

Planet-related evidence was the most visible across the focal cases because each enterprise had operational processes that generated residues. The relevant issues included the point of residue generation, sorting, storage, reuse, resource efficiency, and contamination control. The greater visibility of Planet reflects the nature of the available field evidence and should not be interpreted as proof that the environmental dimension is more mature than People or Profit. Measurement barriers, limited data, time, and tools are common when firms attempt to assess environmental impacts in circular-business settings (Das et al., 2022).

For food-related enterprises, material quality can change rapidly after generation. Moisture, mixing, contamination, exposure to heat, and storage time may determine whether an organic residue remains suitable for composting, animal feed, or other forms of recovery. This means that Planet should not be reduced to the quantity of waste diverted from disposal. In supplier terms, environmental practice also includes preserving the properties that allow a material to retain value for the next user. The analytical emphasis on quality therefore connects environmental management directly with circular-market feasibility.

This interpretation is particularly relevant for Kendari because local recovery opportunities may depend on short-distance networks and frequent collection rather than centralized industrial processing. The study by Akmal et al. (2024) demonstrates that organic material can have measurable recovery potential in a local market setting, but transferring this potential to MSMEs requires information at the source. Recording approximate volume, timing, handling method, and contamination risk may be sufficient at an early stage to make previously invisible material flows legible to processors or aggregators.

Profit: From Residues to Economic Value

Profit is not yet strongly demonstrated in the available focal-case records. There is no consistent evidence regarding revenue from residue sales, disposal-cost savings, material prices, or investment required for sorting and storage. The study therefore does not claim that the identified residues already create profit. However, economic feasibility remains essential because circular practices are difficult to maintain when materials have no user, do not reduce costs, or require handling costs that exceed their benefits (Chakraborty et al., 2025).

Economic feasibility should be interpreted broadly. A secondary resource does not need to generate direct sales revenue to create value; it may reduce disposal costs, lower purchases of certain inputs, create reciprocal exchange with another actor, or reduce operational risk associated with poor waste handling. Conversely, even a material with a market price may not be economically attractive when sorting, cleaning, storage, and transport costs are high. The Profit dimension therefore requires comparison between gross material value and the transaction costs needed to realize that value.

The regional green-economy evidence reported by Roslan and Akbar (2024) also suggests that environmental transitions are more likely to be accepted when economic considerations are visible. Applied to MSMEs, this implies that owners need a clear managerial reason to sustain additional sorting or recording routines. Demonstrating small but tangible gains - such as reduced waste-disposal frequency, predictable pickup by a partner, or modest revenue from recovered material - may be more influential than abstract sustainability messages. Profit, in this interpretation, acts as a mechanism of continuity rather than as a narrow measure of short-term financial return.

Secondary-Resource Supplier Readiness: From Residue Presence to Credible Supply

Secondary-resource supplier readiness is interpreted through four analytical dimensions. Availability concerns whether material exists in sufficient quantity. Quality concerns cleanliness, homogeneity, contamination, and fit with user requirements. Continuity concerns the stability of material supply over time. Partnership/network readiness concerns the ability to establish relationships with collectors, aggregators, processors, buyers, government agencies, or other users. These dimensions are consistent with research on SME readiness for eco-innovation and industrial symbiosis, waste-quality management, supplier integration, and interorganizational networks (King et al., 2020; Pigosso et al., 2018; Prosman & Waehrens, 2019).

Across the focal cases, the evidence supports the interpretation of potential supply rather than fully demonstrated secondary-resource supplier readiness. Availability could be observed at the level of material presence, whereas quality, continuity, and network readiness were documented less consistently. This distinction is conceptually important because a circular economy depends on predictable flows between actors, not only on internal sorting or waste-reduction practices (Wiebe et al., 2023).

The four readiness dimensions also interact in practice. Availability without quality may produce material that no user accepts; quality without continuity may create a one-off transaction but not a stable supply relationship; continuity without network readiness may leave the MSME with repeatedly generated material but no channel for use. Partnership readiness, in turn, depends on whether the parties can communicate the first three dimensions with sufficient clarity. The framework therefore treats readiness as a configuration rather than a checklist in which one strong dimension can compensate for all others.

A practical implication is that MSMEs can progress incrementally. At an early stage, the appropriate objective may simply be to make the material visible through basic records. Once approximate quantity and frequency are known, attention can shift to condition and contamination. Only after these attributes become sufficiently predictable does it become reasonable to negotiate regular collection or sale. This incremental logic reduces the administrative burden on small firms and aligns with Roslan's (2025) argument that green transformation in

MSMEs should be proportionate to organizational capacity while still integrating social, environmental, and economic considerations.

Cross-Case Evidence Matrix

Table 2
Cross-Case Evidence Matrix of TBL Dimensions and Secondary-Resource Supplier Readiness

Dimension	Cross-case finding	Evidence gap	Priority
People	Business-actor interaction exists; worker roles and networks remain informal	Responsibility, knowledge, safety, routine partners	Role clarification, training, partner mapping
Planet	Residues and potential secondary materials are visible across focal cases	Volume, quality, contamination, consistency of sorting	Material recording and simple standardization
Profit	Economic value of residues is not yet documented consistently	Prices, savings, handling costs, buyers	Economic-feasibility assessment and market validation
Supplier readiness	Potential supply exists; ready supply is not yet demonstrated	Availability, quality, continuity, network readiness	Aggregation, user validation, supply relationships

Emerging Drivers and Barriers

Within the scope of the three focal cases, several conditions emerged as potential drivers of green transformation and secondary-resource supply. These included recurrent generation of recoverable materials within routine business activities, relatively simple decision structures that may permit operational adjustments to be introduced quickly, and existing interactions with other local business actors that could support material exchange. These findings are interpreted as cross-case analytical patterns rather than as population-level conclusions for all MSMEs in Kendari City.

The principal barriers identified across the focal cases were incomplete information on material volume and frequency, uncertain quality and contamination conditions, limited evidence of continuity over time, weak documentation of economic value, and fragmented relationships with collectors, aggregators, processors, buyers, or prospective users. These barriers reinforce the distinction between the mere presence of residues and credible supplier readiness. Their relative importance may vary by sector and material type; therefore, the study treats them as context-specific constraints derived from the focal-case evidence and supported by relevant circular-economy and SME literature.

The third research question is therefore answered at the exploratory cross-case level. The evidence indicates that secondary-resource supplier readiness is strengthened when recoverable materials are recurrent, handling responsibilities are sufficiently clear, material characteristics can be communicated, and relationships with potential users can be established. Conversely, readiness is constrained when quantity, quality, continuity, economic value, or partner information remains uncertain. These findings provide an analytically coherent explanation of the drivers and barriers observed in the focal cases while remaining appropriately bounded by the study's multiple-case scope.

Discussion

The evidence shows that green practices and secondary-resource supplier readiness are related but not identical. Sorting or reducing waste is primarily an internal environmental practice, whereas supplier readiness requires credible information and relationships that allow materials to move to another actor. Availability, quality, continuity, and network readiness therefore function as a practical bridge between internal sustainability practices and external circular-value-chain integration.

The TBL framework explains why this bridge depends on more than material recovery alone. Organizational capacity, environmentally sound handling, and economic feasibility must work together if residues are to become usable and dependable inputs for other actors. In this sense, TBL provides the internal sustainability conditions, while secondary-resource supplier readiness captures whether those conditions are sufficiently developed to support an external circular flow.

The study proposes five analytical stages in the formation of a secondary-resource supplier: visibility, referring to the ability to identify and record materials; conditioning, referring to sorting, storage, and contamination control; reliability, referring to demonstrated availability and continuity; connectivity, referring to relationships with processors, aggregators, buyers, or users; and value realization, referring to economic benefits sufficient to sustain the practice. The sequence is presented as a context-derived heuristic rather than a universal linear model and provides a basis for validation and refinement in future studies across broader sectors, material types, and locations.

For local policy, the findings suggest that early circular-economy interventions should prioritize material mapping, simple recording systems, quality guidance, aggregation mechanisms, and facilitation between MSMEs and prospective users. Technology investment alone may be premature when supply data and user demand have not yet been established. A proportionate management approach is therefore more suitable for MSMEs than the direct adoption of complex sustainability-control systems (Beusch et al., 2022; Solovida & Latan, 2021).

The proposed distinction between green practice and secondary-resource supplier readiness also helps clarify why some well-intentioned waste initiatives fail to develop into circular business relationships. An enterprise may separate residues consistently but still lack information about volume, quality, or potential users. In such a situation, the environmental practice is real, yet the economic loop remains open. Secondary-resource supplier readiness provides an intermediate concept that explains what must happen between internal waste management and external circularity. This intermediate layer is especially useful for MSMEs because it translates broad sustainability goals into observable managerial tasks.

The findings further suggest that local circular-economy policy should be ecosystem-oriented. Support directed only at individual firms may improve sorting or awareness but may not solve fragmentation. Aggregators, digital directories, cooperative collection arrangements, shared storage points, and regular supplier-user forums can reduce search and coordination costs. The co-creation perspective developed by Moonti et al. (2023) is relevant here because value emerges through interaction and knowledge exchange rather than through isolated action. For secondary resources, co-created value may take the form of agreed quality specifications, synchronized pickup schedules, shared logistics, or collaborative experimentation with new uses for residues.

Information capability is another policy priority. Simple digital tools can help MSMEs record material type, approximate quantity, frequency, and recipient without introducing

burdensome reporting systems. Evidence from SMEs in Kendari indicates that digital skills can improve adaptability and business performance when supported by effective management (Asraf et al., 2026). In the present context, digital capability is not treated as an independent research variable, but it provides a practical mechanism for strengthening the People and network-readiness dimensions. Even a basic spreadsheet, messaging group, or mobile form can increase visibility and reduce information asymmetry between small suppliers and potential users.

The theoretical contribution is therefore not simply an additional description of People, Planet, and Profit. Rather, the analysis links TBL to a concrete interorganizational outcome by showing how internal sustainability conditions can be translated into credible material exchange. Secondary-resource supplier readiness serves as the connecting mechanism, moving TBL from a general sustainability vocabulary toward a context-specific analytical framework for small-enterprise circularity.

The proposed five-stage sequence - visibility, conditioning, reliability, connectivity, and value realization - should therefore be read as a heuristic rather than as a universal linear model. MSMEs may move backward or forward depending on market changes, seasonality, worker turnover, or changes in buyer requirements. A firm may have a stable buyer but experience deterioration in quality, or it may achieve good quality while struggling with insufficient volume. The value of the sequence lies in diagnosing the current bottleneck and identifying the next manageable step, not in assuming that every enterprise follows an identical pathway.

From a behavioral perspective, the regional evidence on zero-waste intention reinforces the importance of connecting environmental practices with economic and social meaning (Roslan & Akbar, 2024). For MSME owners, routine behavior is more likely to persist when it is understandable, feasible, and linked to relationships or value. This suggests that circular-economy interventions should combine technical guidance with communication about benefits, role clarity, and visible examples of successful material exchange. Such an approach may also reduce the perception that green transformation is an external compliance burden rather than a managerial opportunity.

The study remains deliberately cautious about generalization. The focal cases provide sufficient evidence to identify analytical categories, cross-case patterns, and evidence gaps, but not to estimate the prevalence of particular practices among all MSMEs in Kendari City. The contribution is therefore conceptual and diagnostic: it establishes a structured way of assessing what evidence is required before a residue-generating MSME can reasonably be described as a credible secondary-resource supplier. Future research can test the transferability of the proposed readiness dimensions and five-stage heuristic across broader MSME sectors, material types, and geographic settings.

A further implication concerns the governance of secondary-resource information. In many local MSME settings, material data are dispersed among owners, workers, collectors, and informal buyers, so no single actor has a complete view of what is available. A basic local information architecture could reduce this fragmentation by recording the type of material, approximate quantity, frequency, location, handling condition, and preferred collection method. The purpose would not be to create a burdensome reporting obligation, but to make material flows searchable and comparable. Such visibility can reduce uncertainty for potential users and allow supporting institutions to identify where aggregation may be technically and economically feasible.

The governance challenge also includes the credibility of information. Prospective users need confidence that reported material characteristics are reasonably stable, while MSMEs need

assurance that buyers or processors will collect as agreed. Trust is therefore a practical component of network readiness. Repeated interaction, simple records, transparent communication, and clearly defined responsibilities can gradually substitute for the absence of formal contracts. This is consistent with co-creation logic in which value is produced through reciprocal interaction and knowledge exchange among actors rather than through isolated firm activity (Moonti et al., 2023). In a circular-economy setting, such interaction can convert fragmented residues into coordinated local supply.

Finally, the analysis highlights the importance of sequencing support interventions. Awareness campaigns may help firms recognize environmental issues, but awareness alone does not resolve material-quality problems or market uncertainty. Training can improve handling, but training without a recipient may not create a sustained circular flow. Likewise, a marketplace platform may fail when firms cannot provide reliable information about quantity and continuity. Effective support therefore needs to match the current readiness bottleneck. This staged approach is compatible with the multidimensional view of green transformation advanced by Roslan (2025), because social capacity, environmental practice, and economic feasibility are strengthened progressively and in relation to one another rather than as separate policy targets.

CONCLUSION

The exploratory evidence from food-related MSMEs in Kendari City shows that residue flows with potential as secondary resources can be identified, but the presence of residues alone is insufficient to establish secondary-resource supplier readiness. Readiness requires evidence of availability, quality, continuity, and partnership/network readiness and must be interpreted together with the People, Planet, and Profit dimensions.

The main contribution of the study is the distinction between green practices and credible secondary-resource supply. The proposed framework connects internal TBL conditions with supply-readiness dimensions and local circular-value-chain integration. Because the empirical evidence is derived from three purposively selected focal cases, the findings are intended for analytical rather than statistical generalization.

Future research should examine a wider range of MSME sectors and secondary materials, incorporate supply-chain stakeholders and prospective users, and test the transferability of the proposed readiness dimensions across different local contexts. Subsequent studies may also refine the supplier typology into categories such as potential, emerging, and ready suppliers and develop quantitative measurement scales once the constructs have been validated with broader empirical evidence.

Managerially, the study implies that the transition toward circularity can begin with modest routines rather than expensive technology. Identifying material, assigning responsibility, recording approximate quantity and frequency, protecting quality, and mapping potential partners are realistic first steps for small enterprises. These routines create the information base needed for later aggregation, contracting, and investment decisions.

Theoretically, the study positions secondary-resource supplier readiness as a meso-level bridge between firm-level TBL practices and value-chain-level circularity. This framing complements earlier work on MSME green transformation (Roslan, 2025) by specifying the conditions through which internal sustainability practices may become credible interorganizational material flows. It also provides a foundation for future qualitative validation and later quantitative scale development once the constructs have been grounded more fully in local evidence.

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