Scholars Journal of Economics, Business and Management
OPEN ACCESS
Abbreviated Key Title: Sch J Econ Bus Manag
ISSN 2348-8875 (Print) | ISSN 2348-5302 (Online)
Journal homepage: https://saspublishers.com

# Circular Economy Business Models in Sustainable Entrepreneurship: A Comparative Analysis of Resource Efficiency and Social Impact in Emerging Markets

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**DOI:** https://doi.org/10.36347/sjebm.2026.v13i02.002 | **Received:** 15.12.2025 | **Accepted:** 03.02.2026 | **Published:** 06.02.2026

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**Abstract** **Review Article**

This review paper examines how circular economy (CE) business models enable sustainable entrepreneurship in emerging markets, comparing their performance on resource efficiency and social impact. Synthesizing peer-reviewed research and practitioner frameworks, we analyze six archetypes product-as-a-service, product life extension, resource recovery, sharing platforms, circular inputs, and industrial symbiosis and assess how they conserve materials and energy while shaping livelihoods, equity, and well-being. We find that life-extension and industrial symbiosis consistently deliver strong material productivity gains, while product-as-a-service and sharing models achieve variable efficiency depending on design choices and rebound effects (Bocken *et al*., 2014; Geissdoerfer *et al*., 2017). Social outcomes hinge on inclusion and formalization: recycling and repair can create large numbers of jobs, yet may also concentrate health and safety risks when activity remains informal (UNEP, 2009; Murray *et al*., 2017). Enabling policies such as extended producer responsibility, quality standards for secondary materials, and social procurement amplify positive spillovers and mitigate trade-offs (Tura *et al*., 2019). We propose a comparative framework that aligns resource efficiency metrics (e.g., material circularity indicators, energy and water intensity) with social performance measures (e.g., job quality, income stability, and distributional effects) to guide entrepreneurs and investors. A synthesized table benchmarks archetypes across mechanisms, risks, and contexts, and a graph visualizes efficiency and social performance. The review concludes with design principles for inclusive, context-aware CE ventures and a research agenda on informality, gender, and just transition in low- and middle-income settings. These insights support founders and funders in scaling circular innovation both materially lean and socially fair and resilient.

**Keywords:** Circular economy; Sustainable entrepreneurship; Emerging markets; Business models; Resource efficiency; Social impact; Product-as-a-Service; Industrial symbiosis.



## INTRODUCTION

Emerging markets face a double imperative: lift incomes and living standards while sharply reducing material and energy footprints. Circular economy (CE) business models are often presented as a way to do both, by slowing, narrowing, and closing resource loops through design, services, and collaboration (Stahel, 2016; Geissdoerfer *et al*., 2017). At the same time, sustainable entrepreneurship seeks to create economic value by solving environmental and social problems, especially where markets are incomplete and institutional capacity is still developing (Cohen & Winn, 2007; Dean & McMullen, 2007). This review integrates these perspectives and examines how specific CE business model archetypes perform on two outcomes that matter most for inclusive, sustainable development in low- and middle-income contexts: resource efficiency (how much material, energy, and water are saved for a given unit of service) and social impact (who benefits, under what working conditions, and with what distributional consequences). Because infrastructure, informality, access to finance, and regulatory enforcement differ widely across emerging economies, the same CE model can look quite different and perform differently than it does in high-income settings (Murray, Skene, & Haynes, 2017). We therefore synthesize evidence across the literature to compare archetypes, identify context- specific risks and enablers, and propose practical design principles for entrepreneurs.

**Circular economy and sustainable entrepreneurship: concepts and archetypes**

The CE concept has been defined in many ways, but most converge on restorative and regenerative design that maintains the value of materials, components, and products for as long as possible (Kirchherr, Reike, & Hekkert, 2017; Geissdoerfer *et al*., 2017). Sustainable entrepreneurship, meanwhile, frames market imperfections such as environmental externalities or information asymmetries as opportunities for ventures that internalize costs and deliver public benefits (Cohen & Winn, 2007; Dean & McMullen, 2007). Linking the two, CE business model archetypes describe the logics through which firms create, deliver, and capture value while improving environmental performance (Bocken, Short, Rana, & Evans, 2014; Lewandowski, 2016). We focus on six widely cited archetypes:
product-as-a-service (PaaS), product life extension (repair, refurbishment, remanufacturing), resource recovery (recycling and upcycling), sharing platforms, circular inputs (renewable and recycled materials), and industrial symbiosis (cross-industry by- product exchanges). Each archetype can be implemented through multiple revenue models (e.g., subscriptions, performance contracts, deposit-refund) and organizational forms (from social enterprises to corporate ventures).

**Review approach and comparative framework**

We undertook a narrative review drawing on peer-reviewed articles and cornerstone frameworks in the CE and sustainability literature. To compare business models, we align resource efficiency metrics with social impact measures. For efficiency, we consider material circularity indicators, relative material productivity, energy and water intensity, and lifetime utilization rates (Ellen MacArthur Foundation, 2015; Lieder & Rashid, 2016). For social performance, we emphasize job quantity and quality (including wages, health and safety, and stability), access and affordability for underserved users, and distributional effects across genders, ages, and informality status (UNEP, 2009; Ebrahim & Rangan, 2014). We summarize mechanisms, expected outcomes, and risks by archetype in Table 1 and visualize an indicative comparison in Figure 1. While the figure uses a simple 1–5 scale for clarity, the framework is designed to be populated with empirical metrics by entrepreneurs and policymakers.

**Comparative analysis: resource efficiency across archetypes**

Product life extension typically shows the strongest direct material savings because it retains high-value components and embedded energy, particularly when combined with modular design and access to spare parts (Stahel, 2016; Bocken *et al*., 2014). Industrial symbiosis systems such as eco-industrial parks can achieve major absolute reductions by diverting large waste streams into inputs for nearby processes, though gains depend on matching quality and steady flows (Murray *et al*., 2017). Resource recovery delivers substantial improvements when collection and sorting infrastructure are reliable, but leakage and downcycling can erode benefits (Lieder & Rashid, 2016). PaaS models narrow resource flows by boosting utilization and incentivizing durability, yet poorly designed contracts can create rebound effects if they stimulate excess use or premature upgrades (Geissdoerfer *et al*., 2017). Sharing platforms also raise utilization of underused assets; however, logistical inefficiencies, maintenance, and induced demand can offset some gains, making their performance highly context-specific. Circular input models reduce virgin extraction by substituting renewable or recycled feedstocks, but system-level benefits hinge on land-use, energy mixes, and supply chain traceability (Kirchherr *et al*., 2017). Overall, our synthesis suggests that life extension and industrial symbiosis usually rank highest on resource efficiency in emerging markets, followed by resource recovery and PaaS; sharing platforms and circular inputs show more variable results.

**Comparative analysis: social impact across archetypes**

Social outcomes depend on inclusion, formalization, and power asymmetries along value chains. Repair, refurbishment, and remanufacturing can create dense networks of local microenterprises and skilled jobs, often accessible to workers with varied education levels; nonetheless, informal workshops may present occupational hazards without appropriate standards and training (UNEP, 2009; Murray *et al*., 2017). Recycling and upcycling can generate large employment multipliers in collection and sorting, but if left informal they may concentrate health risks among vulnerable groups; conversely, cooperatives and extended producer responsibility (EPR) schemes can professionalize work and raise incomes (Tura *et al*., 2019). PaaS and sharing platforms improve affordability and access to services from mobility to appliances but can risk precarious work in gig-like arrangements without labor protections. Circular inputs can enhance rural livelihoods where bio-based feedstocks are involved, yet land tenure and biodiversity trade-offs must be actively managed. Industrial symbiosis typically creates fewer direct jobs than distributed repair or collection networks but can stabilize quality employment in supplier ecosystems when embedded in local clusters. In sum, life extension models tend to score highest on inclusive job creation; resource recovery offers high job quantity with variable quality; PaaS, sharing, circular inputs, and industrial symbiosis deliver significant user benefits but require deliberate safeguards and social procurement to ensure equitable outcomes (Ebrahim & Rangan, 2014; Tura *et al*., 2019).

**Trade-offs, context, and design principles**

Resource efficiency and social impact do not automatically move together. Tightening material loops can, for instance, centralize processing in capital-intensive facilities that reduce per-unit resource use while limiting local employment. Conversely, decentralized repair ecosystems can maximize jobs but face uneven quality and safety. Entrepreneurs can navigate these tensions by (1) designing for durability and reparability to lift efficiency without displacing livelihoods; (2) integrating the informal economy through cooperative models, training, and safe equipment; (3) using pricing and contract design to avoid rebound (e.g., pay-per-performance with minimum lifetimes); (4) building open standards for parts and materials to unlock secondary markets; and (5) measuring distributional outcomes, not only averages (Bocken *et al*., 2014; Ebrahim & Rangan, 2014). Context matters: infrastructure reliability, digital connectivity, consumer trust, and regulatory capacity mediate model performance in emerging markets (Cohen & Winn, 2007; Murray *et al*., 2017).

**Policy and ecosystem enablers**

Public policy can tilt incentives toward high-impact models. EPR aligns producer responsibility with recovery outcomes and can fund safer collection networks (Tura *et al*., 2019). Standards for recycled content and secondary materials reduce quality uncertainty, while eco-design regulations mandate reparability and modularity (Lieder & Rashid, 2016). Green public procurement can create early demand for remanufactured components and recycled inputs. Cluster strategies and industrial symbiosis platforms match by-products to users, cutting transaction costs and supporting SMEs. Finance tools revenue- based lending for PaaS, guarantees for cooperative recyclers bridge risk gaps common in early CE markets (Cohen & Winn, 2007). Social procurement and worker protections ensure that job creation is matched by safety, stability, and inclusion. Together, these measures raise the odds that CE entrepreneurship delivers both material efficiency and social gains.

**Measurement, reporting, and learning**

Robust, decision-grade measurement links strategy to outcomes. On the efficiency side, material circularity indicators, lifetime utilization, and intensity metrics offer comparable baselines across archetypes (Ellen MacArthur Foundation, 2015). Environmental life cycle assessment complements these with impact categories like climate, water, and toxicity (Lieder & Rashid, 2016). For social performance, Social LCA provides a structured though still evolving approach to stakeholder-level impacts (UNEP, 2009). At the enterprise level, logic models and outcome maps help distinguish outputs from longer-run outcomes and impacts (Ebrahim & Rangan, 2014). We recommend combining these into compact dashboards that track both efficiency and equity, reviewed periodically with workers, users, and local authorities for course correction.

**Research agenda**

Future research should prioritize: (a) longitudinal evidence on job quality in CE value chains; (b) experimental and quasi-experimental designs to identify distributional effects of PaaS and sharing models; (c) integrated material-social accounting at cluster or city scales; (d) governance mechanisms for safe, fair formalization of informal sector roles; and (e) gender- and youth-responsive entrepreneurship pathways. Comparative studies across cities and sectors in emerging markets would refine the indicative rankings presented here and test which combinations of policy instruments and business model features reliably maximize joint efficiency and inclusion (Kirchherr *et al*., 2017; Tura *et al*., 2019).

**Table 1. Comparative view of circular economy business model archetypes**

| Archetype | Resource efficiency levers | Social impact levers | Key risks/mitigations | Typical contexts |
|---|---|---|---|---|
| Product-as-a-Service (PaaS) | Higher utilization, design for durability, maintenance loops | Access via lower upfront cost; potential local service jobs | Rebound and planned obsolescence risk; mitigate via performance- based contracts and minimum lifetimes | Mobility, appliances, productive assets in urban SMEs |
| Product life extension | Repair, refurbishment, remanufacturing retain embedded energy/materials | Skilled local jobs, microenterprise growth, affordability | Informal workshops and safety gaps; mitigate via standards, training, right-to-repair | Electronics, machinery, mobile devices, household goods |
| Resource recovery | Recycling/upcycling avoids landfill and virgin extraction | Large-scale collection and sorting jobs; cooperative models | Exposure to Hazards if informal; mitigate via EPR, PPE, formalization, traceability | Plastics, metals, organics, construction and demolition |
| Sharing platforms | Higher utilization of idle assets through pooling | Affordability and access to mobility, tools, spaces | Precarious work and rebound; mitigate via fair work policies and | Mobility, accommodation, equipment rental |

| | | | | |
|---|---|---|---|---|
| | | | usage caps | |
| Circular inputs | Renewable/recycled feedstocks lower virgin demand | Rural livelihoods, supplier development, import substitution | Land-use and biodiversity trade-offs; mitigate via certification and safeguards | Packaging, textiles, agriculture- linked materials |
| Industrial symbiosis | By-product exchanges, utility synergies, heat cascading | Stable jobs in clusters, SME supplier upgrading | Lock-in and dependency risks; mitigate via diversified exchanges and contracts | Eco-industrial parks, special economic zones, ports |

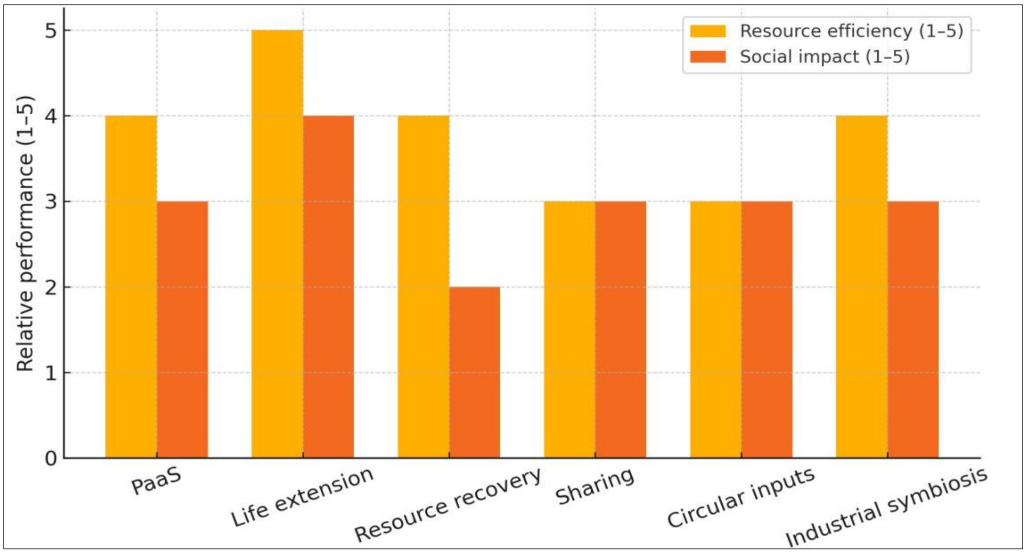


**Figure 1. Comparative performance by CE archetype (emerging markets)**

Notes: Scores (1–5) are synthesized from literature to visualize relative patterns and should be calibrated with local data (Bocken *et al*., 2014; Geissdoerfer *et al*., 2017; Tura *et al*., 2019; Stahel, 2016).

## CONCLUSION

Circular economy business models can be powerful engines of sustainable entrepreneurship in emerging markets, but their value depends on design and context. Our review suggests that product life extension and industrial symbiosis often deliver the greatest material efficiency, while inclusive repair, remanufacturing, and well-governed recovery networks offer strong social gains. PaaS, sharing platforms, and circular inputs can contribute meaningfully when designed to avoid rebound, protect workers, and broaden access. By aligning incentives, standards, and finance with fair outcomes and by measuring what matters entrepreneurs, policymakers, and investors can scale circular innovation that is both materially lean and socially just (Geissdoerfer *et al*., 2017; Ebrahim & Rangan, 2014).

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