

The Long and Winding Loop: Barriers to Recycling in Urban Waste Management

RESUMO

Introdução

Circular Economy (CE) reduces waste through closed material loops and supports resource recovery (Geissdoerfer et al., 2017; Kirchherr et al., 2017). In urban contexts, CE depends on recycling systems that divert waste from landfills and reintegrate materials into productive flows. This study examines municipalities in Paraíba, Brazil, where recycling initiatives exist but remain constrained by governance and institutional conditions. The research contributes by linking local evidence to ongoing debates on CE in urban waste systems.

Problema de Pesquisa e Objetivo

Brazil's National Solid Waste Policy (PNRS) and Planares (2022) establish recycling and reverse logistics targets, but municipal implementation remains fragmented. Weak coordination among governments, private actors, and cooperatives undermines recycling chains (Ghisellini et al., 2016; Bocken et al., 2016). This raises the question: What barriers prevent the integration of CE principles into urban recycling systems? The study aims to identify these barriers in Paraíba and analyze their implications for governance, material flows, and social participation.

Fundamentação Teórica

Research on CE emphasizes the role of reverse logistics, eco-design, and governance mechanisms in closing material loops (Lewandowski, 2016; Bocken et al., 2016). In Brazil, waste picker cooperatives are central to recycling systems but frequently face unstable conditions and limited institutional recognition (Gutberlet, 2015). Studies add that infrastructure gaps and fragmented governance hinder CE adoption (Kirchherr et al., 2017). These perspectives provide the conceptual basis for interpreting how recycling systems operate and where barriers emerge.

Metodologia

The research applies a qualitative, exploratory design using documentary analysis and secondary data on solid waste in Paraíba municipalities. Indicators included recovery rates, disposal practices, and socio-economic characteristics of cooperatives. Data were structured into three analytical categories: (1) material flows and recovery capacity, (2) governance and institutional frameworks, and (3) social participation. This design enabled a systematic examination of recycling chains and facilitated the identification of barriers that restrict the incorporation of CE principles in urban context.

Análise e Discussão dos Resultados

Municipalities in Paraíba generate more than 300 tons of waste daily, while recovery rates often remain below 5% (ABRELPE, 2022). Barriers include infrastructure deficits, dependence on intermediaries, and limited environmental education (Kirchherr et al., 2017). Waste picker cooperatives contribute to recovery and social inclusion but face difficulties in accessing markets and obtaining institutional support (Gutberlet, 2015). These findings correspond to obstacles reported in CE literature (Bocken et al., 2016), which emphasize governance and coordination as essential for recycling systems.

Considerações Finais

Recycling chains in Paraíba remain constrained by governance and operational barriers that limit the adoption of CE practices. The study is restricted by reliance on secondary data and its regional scope, which hinders generalization. Future research could extend comparisons to other municipalities, investigate governance mechanisms, and evaluate socio-economic effects of recycling initiatives. By situating the analysis in a regional case, the study advances understanding of the potential and limits of CE in urban waste management systems.

Referências

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Palavras-Chave: Circular Economy / Governance / Social Inclusion