



INTEGRATING CIRCULAR ECONOMY STRATEGIES INTO CONSTRUCTION PROJECT WASTE MANAGEMENT IN SRI LANKA: BARRIERS AND ENABLERS

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Introduction

The construction industry is one of the largest global consumers of raw materials (~40%) and contributors to waste (>35%) (Crawford et al., 2022). Sri Lanka’s construction sector continues to follow a linear “take–make–dispose” model, generating vast Construction & Demolition (C&D) waste. The Circular Economy (CE) offers a transformative framework for resource efficiency through reduce–reuse–recycle–recover principles. However, CE adoption in developing contexts remains limited, fragmented, and under-researched.

Research Aim:
To explore how Circular Economy strategies can be integrated into construction project waste management in Sri Lanka, identifying the barriers, enablers, and practical pathways for adoption.

Research Objectives

- 🚀 To examine the current practices of waste management within Sri Lankan construction projects.
- 🚀 To identify the key barriers and enablers influencing CE adoption.
- 🚀 To assess how policy frameworks, stakeholder engagement, and technology impact CE implementation.
- 🚀 To propose strategies for embedding CE principles into project management processes.

Methodology

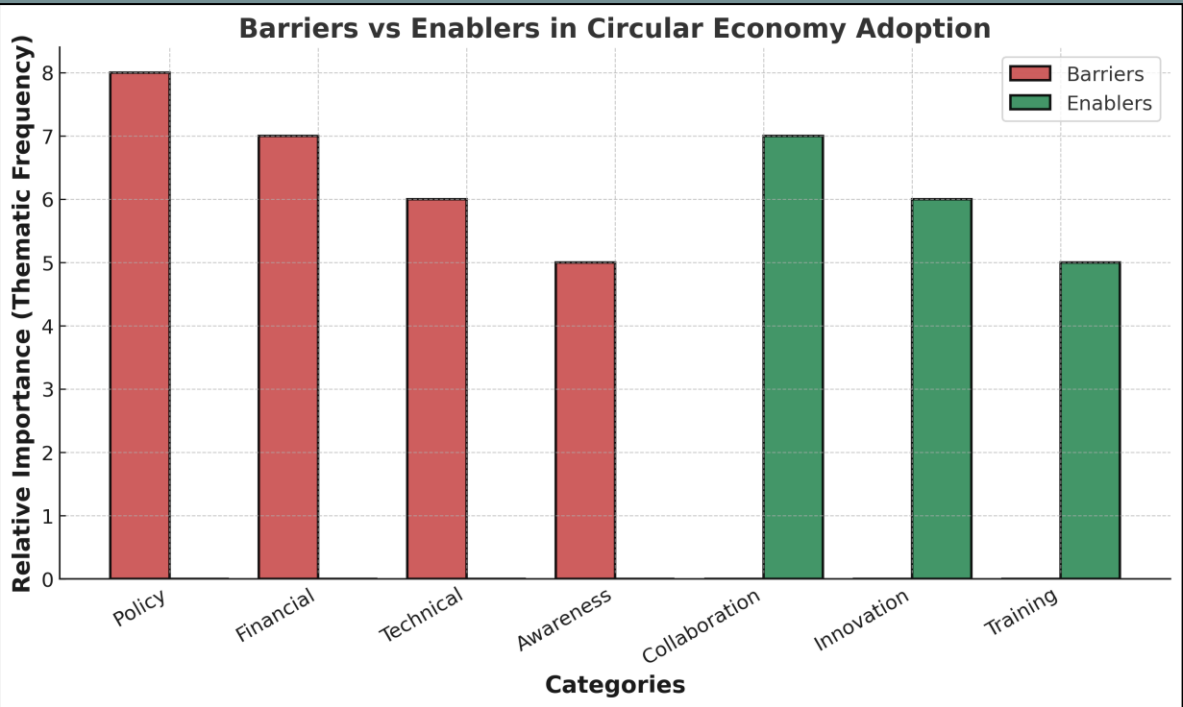
Approach: Qualitative, interpretivist research design.
Data Collection: 7 semi-structured interviews with senior project directors, engineers, and sustainability consultants.
Sampling Technique: Purposive – experts with ≥5 years’ experience in waste and project management.
Analysis: Thematic Analysis (Braun & Clarke, 2012), supported by NVivo for coding and theme mapping.
Ethical Clearance: Approved by DBS Ethics Committee; confidentiality and informed consent ensured.
Theoretical Lens: Integrated Stakeholder–Centred CE Model combining systems thinking, stakeholder theory, and implementation science.



Key Findings

- Barriers**
- ❌ Policy gaps – Absence of CE-specific regulation and enforcement.
 - ❌ Financial constraints – High cost of recycling processes and lack of incentives.
 - ❌ Technical limitations – Inadequate recycling infrastructure and innovation capacity.
 - ❌ Cultural barriers – Low awareness and preference for conventional disposal.

- Enablers**
- ✅ Policy support – Emerging environmental legislation and CE interest.
 - ✅ Stakeholder collaboration – Cross-sector partnerships and shared learning.
 - ✅ Innovation & Technology – BIM, digital material tracking, modular design.
 - ✅ Knowledge & Awareness – Sustainability training and university-led programs.

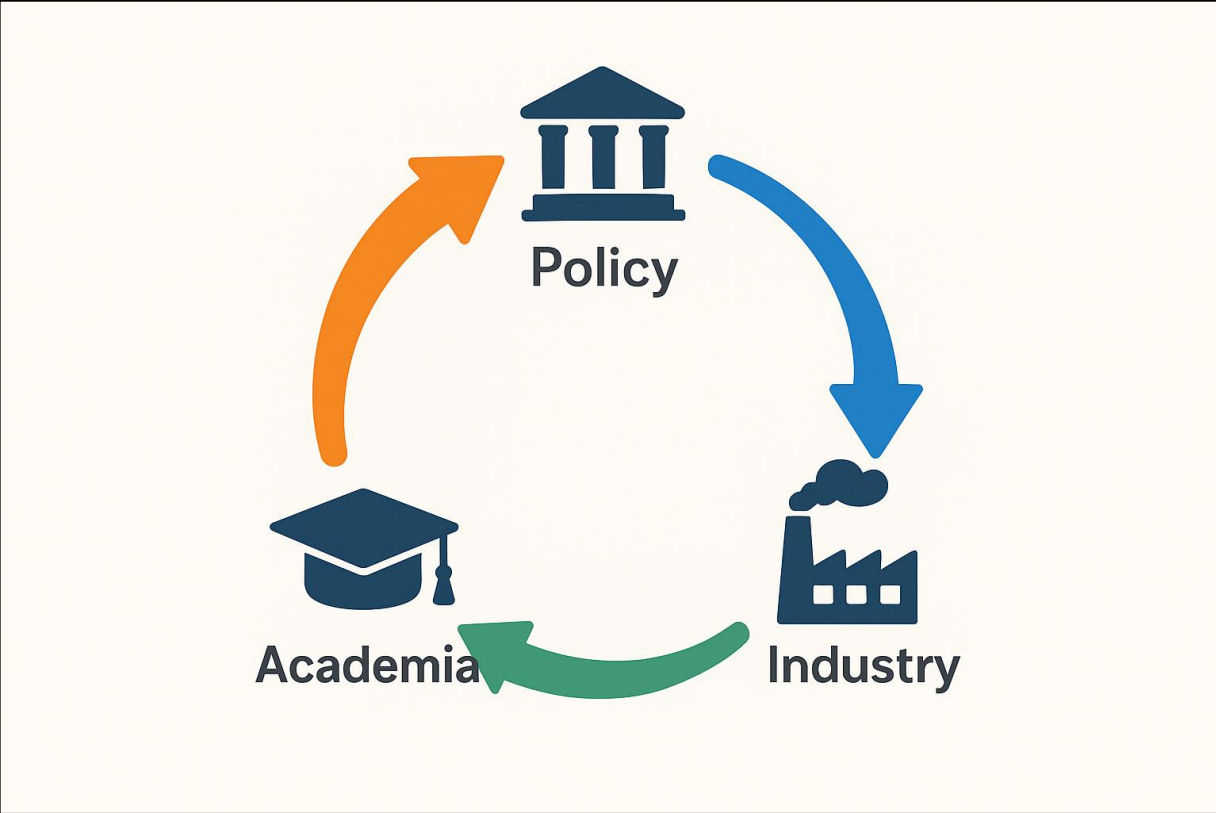


Key Takeaways

- ✅ Circular Economy is essential for sustainable growth in the construction sector.
- ✅ Stakeholder collaboration and policy alignment are central to success.
- ✅ Technology-driven data management enhances transparency and waste traceability.
- ✅ CE adoption creates cost savings, environmental value, and brand reputation gains.
- ✅ Leadership advocacy is more influential than regulatory enforcement in early adoption stages.

Discussion

CE adoption in Sri Lanka is still in its nascent phase, hindered by structural, regulatory, and financial challenges. However, institutional readiness is emerging — supported by global pressure and sustainability awareness. Stakeholder collaboration acts as a bridge between theory and practice, creating micro-level successes despite policy gaps. The research highlights that a multi-level governance approach — combining policy, project management, and innovation — is required to scale CE adoption effectively.



Conclusion

CE integration is vital but underdeveloped in Sri Lankan construction waste management. The barriers are systemic, requiring top-down and bottom-up alignment. The study provides a context-specific road map linking CE theory with project management practice. Adopting CE improves resource efficiency, reduces waste, and enhances project value. Overall, the research contributes to sustainable development discourse in low-resource economies.

Recommendations

- Policy Reform:** Develop comprehensive CE frameworks, mandates, and tax incentives.
- Capacity Building:** Establish CE training programs for project managers and contractors.
- Public-Private Partnerships:** Support shared recycling and recovery facilities.
- Digital Innovation:** Adopt digital twins and blockchain-based material tracking.
- Awareness Campaigns:** Educate industry professionals and clients on CE benefits.

Future Research

- Quantitative evaluation of CE adoption outcomes in construction projects.
- Comparative studies across South Asian developing economies.
- Longitudinal analysis of policy impacts on CE integration.
- Assessment of CE-readiness models in public infrastructure development.
- Exploration of economic circularity metrics (ROI, material recovery rates).

References

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