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EMBRACING CIRCULAR ECONOMY IN MALAYSIA'S CONSTRUCTION INDUSTRY: READINESS, CHALLENGES, AND STRATEGIC PATHWAYS

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Abstract

The construction sector in Malaysia is undergoing rapid urbanization, leading to increased resource consumption and environmental degradation. This paper aims to evaluate the readiness of Malaysia's construction industry to adopt Circular Economy (CE) principles, by examining existing regulatory frameworks, industry practices, and strategic barriers. This study offers grounded insights into how Circular Economy (CE) strategies can be operationalised in Malaysia's construction sector through a combination of stakeholder interviews, focus group discussions, and international benchmarking. The research investigates regulatory frameworks, industry practices, and existing barriers to CE adoption. A qualitative research approach, including policy analysis, local authority engagement, focus groups, and comparative framework analysis, was conducted. Findings contribute to policy recommendations and industry best practices, fostering a transition towards sustainability in Malaysia's built environment.

Keywords: Circular Economy, Sustainable Construction, Design Leadership, Malaysia, Built Environment

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INTRODUCTION

The construction industry in Malaysia is a key driver of the country's economic growth, contributing significantly to infrastructure development, job creation, and national GDP. However, it is also notably one of the largest consumers of raw materials and a major contributor to environmental issues such as resource depletion, waste generation, and carbon emissions. As urbanization and development pressures continue to rise, the built environment industry faces mounting challenges in balancing economic progress with environmental sustainability. Traditional linear construction practices—characterized by the "take, make, dispose" model—have led to excessive material wastage and inefficiencies, highlighting the urgent need for a more sustainable approach.

In response, the concept of a Circular Economy (CE) has gained traction worldwide as a transformative model that seeks to minimise waste and maximize resource efficiency through strategies such as material recycling, modular construction, and sustainable procurement. Countries with mature CE policies, such as the Germany and Japan, have demonstrated how integrating circular principles can enhance long-term resilience, reduce dependency on virgin resources, and lower carbon footprints. However, despite the growing global momentum, the Malaysian construction sector's readiness to embrace CE remains uncertain. The transition requires robust policy frameworks, industry-wide collaboration, and a fundamental shift in design leadership and project management strategies.

This paper seeks to evaluate the readiness of stakeholders within Malaysia's construction industry to integrate CE principles. It aims to identify key enablers, barriers, and strategic interventions necessary for a successful transition to a circular construction ecosystem. By examining regulatory frameworks, industry perceptions, and best practices from global benchmarks, this study aims to provide actionable insights that can drive Malaysia's construction sector toward a more sustainable and resource-efficient future.

CURRENT CIRCULAR ECONOMY PRACTICES AND CHALLENGES

Construction Waste Recycling Rates: Malaysia Vs. Other Countries

Recent data indicates that Malaysia's construction waste recycling rate was 30.67% in 2020, significantly lower than developed countries. Singapore achieves a recycling rate of 59%, while South Korea is at 49%, and Taiwan leads with 60% (MIDA, 2023). Germany and Japan implement rigorous recycling programs with material recovery rates exceeding 80%, largely due to Extended Producer Responsibility (EPR) policies and advanced waste separation systems (ASEAN Secretariat, 2022). Malaysia's construction waste recycling rate remains significantly lower than that of developed nations, largely due to structural and policy-related challenges. The country continues to rely heavily on landfilling, with 82.5% of solid waste disposed of in landfills as of 2021 (PwC,

2024). As shown in in Figure 1, Malaysia still has a long way to go to achieve the targeted quota of 40% that is suggested in new solid waste blueprint plan.

Unlike countries such as Germany and Japan, where strict Extended Producer Responsibility (EPR) frameworks and industrial waste reuse policies ensure high recovery rates exceeding 80%, Malaysia lacks a comprehensive circular construction policy that mandates material tracking and sustainable waste management (European Commission, 2019). Additionally, government-backed financial incentives for recycling and sustainable building materials remain limited, deterring private sector investment (Benchmarking Report, 2025). Addressing these gaps will require a multi-faceted approach, integrating policy reforms, financial incentives, and industry engagement to improve Malaysia's alignment with global CE practices. Malaysia's recycling rate lags behind due to:

1. Heavy reliance on landfills – 82.5% of solid waste was disposed in landfills as of 2021 (PwC, 2024).
2. Limited financial incentives – Unlike developed countries, few government-backed schemes exist to promote recycling in the construction sector (Benchmarking Report, 2025).
3. Lack of mandatory circular construction policies – Countries like Germany and Japan enforce strict material tracking and industrial waste reuse regulations (European Commission, 2019)

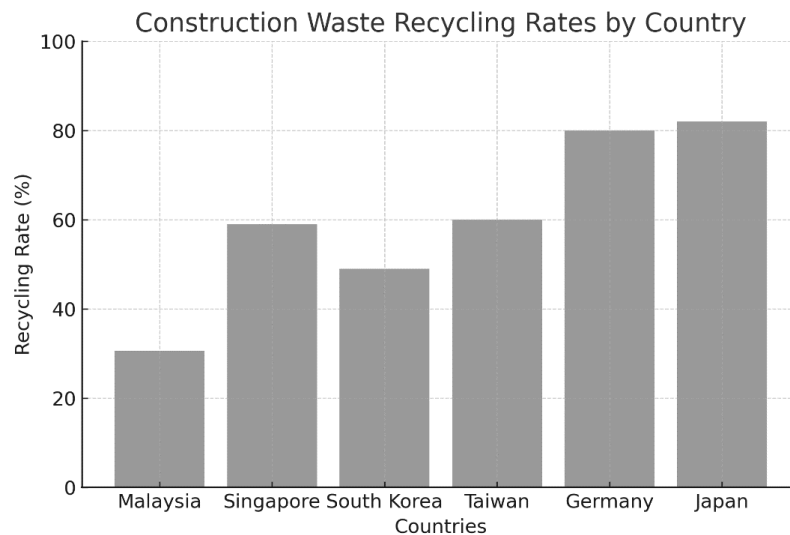


Figure 1: Comparison for Construction Waste between selected countries
Source: European Commission (2019), MIDA, (2023).

Adaptive Reuse in Circular Economy

Adaptive reuse is emerging as a vital strategy in Malaysia's shift toward a Circular Economy (CE), emphasizing the repurposing of existing buildings and materials to extend their lifecycle. This approach reduces demolition waste while decreasing reliance on virgin materials, aligning with the nation's sustainability goals. However, despite its potential, adaptive reuse in Malaysia remains underutilized, with limited incentives for retrofitting and repurposing older structures. The construction industry continues to favour new developments, often overlooking the environmental and economic benefits of reusing existing built assets (CIDB Malaysia, 2023). Studies indicate that Malaysia's building stock holds significant potential for adaptive reuse, yet the absence of clear regulatory frameworks and financial incentives has slowed its adoption (Malaysia Green Building Council, 2024). While awareness of adaptive reuse is growing, more structured policies and financial support are needed to encourage its widespread adoption.

The benefits of adaptive reuse within the Circular Economy framework are substantial. By repurposing existing structures, the need for new construction materials is reduced, helping to conserve natural resources and curb material extraction (UNEP, 2022). Likewise, this practice plays a crucial role in minimizing construction and demolition waste, easing the burden on Malaysia's landfills, which remain the dominant waste disposal method (PwC, 2024). Retrofitting also enhances the energy efficiency of buildings by improving insulation, ventilation, and overall operational performance, thereby lowering long-term carbon emissions (World Green Building Council, 2023). Beyond environmental gains, adaptive reuse supports the preservation of cultural and architectural heritage, ensuring that historical buildings can be revitalized while meeting modern sustainability standards (Think City, 2023). Heritage sites in Malaysia, particularly in cities like George Town and Kuala Lumpur, have demonstrated the economic and social value of adaptive reuse in strengthening community identity and tourism (National Heritage Department, 2024).

As Malaysia moves towards greater sustainability in its built environment, adaptive reuse must be reinforced through targeted policies and incentives. The introduction of financial benefits for retrofitting projects, such as tax rebates and green building grants, could significantly drive industry adoption (Malaysia Investment Development Authority, 2024). Moreover, mandated material audits and lifecycle assessments would ensure that repurposed buildings align with national sustainability objectives (Construction Industry Transformation Programme, 2025). Integrating adaptive reuse strategies into urban planning and green building frameworks would position it as a mainstream solution rather than an exception. Comparative benchmarking provides additional context for Malaysia's policy position. To situate Malaysia's adaptive reuse efforts within a broader policy context, it is useful to compare them with

international approaches. Table 1 presents a benchmarking overview of selected countries, illustrating how regulatory frameworks, material recovery strategies, and industry participation have been structured to advance CE adoption.

Table 1: Different ways of adopting Circular Economy between selected benchmarking countries.

Country	Key Policies & Strategies	Material Recovery	Circular Design Adoption	Industry Participation
China	Circular Economy Promotion Law, Urban Mining, Prefabrication Mandates	High – 30% prefabrication target	Moderate – Green Building Rating System	Government-led incentives
Singapore	Zero Waste Masterplan, Built Environment Transformation, Waste-to-Energy System	Moderate – WTE system reduces landfill use	High – Circular material adoption	Industry collaboration in resource recovery
Japan	3R Framework, Circular Material Passports, Industrial Waste Tracking	High – Digital tracking of materials	High – Mandatory material reuse policies	Strict industry compliance
Germany	KrWG Act, Extended Producer Responsibility, Deposit Return System	Very High – 90% recycling rate	High – Extensive prefabrication and sustainable design	Strong producer responsibility enforcement

Source(s): Authors' synthesis based on data from European Commission (2019), ASEAN Secretariat (2022), PwC Japan Group (2024), CIDB Malaysia (2023), and national CE frameworks.

Existing Malaysian research underscores the need for practical CE interventions. For instance, Ali et al. (2024) identify infrastructure-related barriers to CE in project design and propose targeted countermeasures. Earlier, Salleh et al. (2022) developed guidance for CE in construction and demolition waste management, emphasizing actionable strategies relevant to local councils and industry players.

This comparative lens underscores that while Malaysia has taken initial steps, stronger integration of regulatory mandates, digital monitoring, and industry-driven compliance is needed to close existing gaps. Lessons from these frontrunner countries provide a roadmap for aligning adaptive reuse policies with wider Circular Economy goals.

Existing Guides and Blueprint Strategies

The Construction Industry Development Board (CIDB) Malaysia has introduced several guidelines to support the transition to Circular Economy (CE) practices in the construction sector. The CIDB Sustainable Construction Strategy emphasizes the adoption of low-carbon building materials, waste reduction strategies, and life cycle assessments. Additionally, the Construction Industry Transformation Programme (CITP) 2021–2025 highlights CE as a key component for achieving sustainable infrastructure goals. These efforts align with global best practices, yet challenges persist in policy enforcement, industry awareness, and financial incentives for sustainable material adoption. Globally,

CE practices have been widely implemented across various sectors, including construction. The European Union's Circular Economy Action Plan (2019) has led to the widespread adoption of recyclable materials, modular construction, and digital waste tracking. China has enforced urban mining policies to reclaim building materials, while Japan and Germany have introduced strict material recovery and waste segregation laws (European Commission, 2019). However, key challenges persist, including financial constraints, regulatory gaps, lack of industry awareness, and limited infrastructure (ASEAN Secretariat, 2022). Malaysia faces similar obstacles, requiring policy intervention, technological advancement, and industry engagement to support CE implementation.

METHODOLOGY

This study adopts a qualitative research design structured in four stages: (1) policy document analysis, (2) local authority engagement, (3) focus group discussions, and (4) international benchmarking. Interviews and focus groups were conducted with different tiers of municipal authorities, industry stakeholders such as manufacturers, professional consultants and building experts. Key questions were structured under three themes: (i) awareness and readiness, (ii) perceived barriers, and (iii) strategies for implementation. For the data analysis, several methods including descriptive analysis by using frequency are presented in this paper. Comparison between number of charts and description should be able to reflect the current state of the CE practice in Malaysia in comparison to the selected benchmarking countries. The methodology components include:

Policy Analysis

A comprehensive review of national policies was conducted to evaluate their effectiveness in facilitating CE adoption in the construction industry. Key policies analysed include the Green Technology Master Plan, National Policy on Climate Change, and Malaysia's Solid Waste Circular Economy Blueprint (2025–2035). The analysis focused on identifying policy gaps, regulatory barriers, and implementation challenges that affect the transition to CE-based construction practices.

Local Authority Engagement

To explore the role of municipal governance in advancing Circular Economy (CE) practices, three local authorities (*Pihak Berkuasa Tempatan (PBTs)*) — Johor Bahru City Council (MBJB), Shah Alam City Council (MBSA), and Hang Tuah Jaya Municipal Council (MPHTJ) — were engaged between October 2024 and February 2025. These cities were strategically selected to reflect diverse urban typologies and institutional tiers within Malaysia's local governance system: Johor Bahru represents a dynamic southern growth corridor; Shah Alam, a mature industrial municipality in the Klang Valley; and MPHTJ represents an emergent administrative and institutional township with smart infrastructure ambitions.

The selection also aimed to capture insights across different tiers and capacities of local government *PBTs* at various administrative levels — including city councils, municipal councils, and planning officers — to reflect differing capacities in CE implementation and enforcement. Outreach efforts were also extended to other local authorities in Kuala Lumpur, Kota Bharu, Penang, Sabah, and Sarawak, but these entities were either unable to commit or did not respond within the study window.

Semi-structured interviews were conducted to examine each *PBT's* policy orientation, enforcement approach, compliance mechanisms, and infrastructure support for CE initiatives. Thematic focus areas included regulatory alignment, organisational capacity, and practical pathways for mainstreaming CE at the local level.

Focus Groups

Structured discussions were conducted with selected industry stakeholders in construction sector including architect, green building specialists, members of construction agency and material suppliers. The focus group discussions was aimed to explore the awareness of CE at the basic level, and probe into industry readiness, as well as highlight practical implementation challenges. Key discussion points included knowledge, policy effectiveness, infrastructure gaps, and availability of cross-sector collaboration. Findings from the session provided a broader understanding of CE readiness beyond the construction industry, highlighting potential synergies between different economic sectors.

Comparative Framework Analysis

A benchmarking exercise was conducted from December 2024 to January 2025 to compare Malaysia's CE implementation with global best practices in sustainable construction. The analysis focused on China, Singapore, Japan, and Germany, examining key indicators such as:

- **Policy Effectiveness:** Evaluating how government regulations facilitate CE adoption.
- **Material Recovery Rates:** Measuring the efficiency of waste recycling and reuse.
- **Adoption of Circular Design Principles:** Assessing the extent of integration of circular design methodologies in the construction sector.
- **Industry Participation:** Analysing the level of engagement from private sector stakeholders in CE practices.

LIMITATION OF STUDY

While this study offers valuable insights into Malaysia's readiness for Circular Economy (CE) adoption in construction, several limitations must be acknowledged. First, the analysis is based on literature, industry reports, and qualitative data from interviews and focus groups; as such, the themes presented reflect interpretive coding and may be influenced by researcher bias. Although triangulation with benchmarking mitigated this risk, a broader mixed-methods approach would strengthen validity (Braun & Clarke, 2006; Creswell & Plano Clark, 2018).

Second, the study emphasises perspectives from design and local authority actors, with limited engagement from suppliers, contractors, and end-users who also shape CE implementation. Broader stakeholder coverage would provide a more holistic view (Yin, 2018). Third, regulatory and economic conditions in Malaysia are evolving rapidly, which may render certain findings time-bound. The absence of comprehensive quantitative data on CE adoption rates, material recovery, and financial impacts further constrains generalisability (UNEP, 2023; Ellen MacArthur Foundation, 2020).

Despite these limitations, the study establishes a foundation for future research, which should include longitudinal surveys, broader stakeholder engagement, and comparative analysis across sectors and countries to identify best practices that can accelerate Malaysia's CE transition.

FINDINGS AND DISCUSSION

The findings are organised into thematic sections derived from the qualitative analysis of interview and focus group data, triangulated with policy benchmarking. Using a thematic coding approach, recurring ideas were grouped into higher-order themes that directly reflect the barriers, enablers, and pathways toward CE adoption. Four themes emerged from this process: (i) regulatory and policy gaps, (ii) industry readiness, (iii) local authority enforcement and capacity, and (iv) lessons from international benchmarking. These themes provide the structural headings that follow and allow the findings to be interpreted systematically against the study's aims.

Regulatory Gaps and Policy Challenges

This theme emerges consistently across engagement with all stakeholders as well as the policy benchmarking phase. While Malaysia has introduced various green (and blue) policies to encourage Circular Economy (CE) adoption, but enforcement remains weak due to inconsistent regulatory frameworks, limited incentives, and a lack of compliance monitoring (ASEAN Secretariat, 2022). Interviews with local authorities in Johor, Shah Alam, and Melaka revealed that while policies like the Green Technology Master Plan provide guidelines, their implementation remains fragmented. A recurring theme identified from both local authority interviews and policy review was that the stakeholders emphasized the need for better coordination between federal and municipal agencies, as well as clearer CE compliance standards for construction projects (KPKT, 2024).

Resource Management Challenges

This coded theme derived from focus group discussions with developers and engineers highlighted recurring concerns how the construction industry in Malaysia remains heavily reliant on virgin materials, with limited adoption of recycled aggregates and modular components (PwC, 2024). Findings indicate significant concerns regarding material availability, inconsistent quality, and the absence of financial incentives for sustainable material adoption. In contrast, countries like Germany and Japan have effectively implemented Extended Producer Responsibility (EPR) frameworks, which promote material reuse and recycling through regulatory enforcement and industry collaboration (CE Benchmarking Report, 2025). Without structured incentives and government-backed green procurement policies, Malaysia risks lagging behind in the transition toward a circular economy.

Moreover, the lack of standardized regulations for construction waste management exacerbates inefficiencies in resource utilisation. Studies have shown that fragmented policies and weak enforcement mechanisms contribute to a lower recycling rate, leading to excessive landfill waste and environmental degradation (DOE Malaysia, 2023). While some Malaysian developers have piloted green building initiatives, the absence of mandatory waste diversion targets limits widespread adoption. Lessons from Singapore's Zero Waste Masterplan suggest that integrating digital tracking systems and mandatory recycling quotas could significantly enhance material circularity in construction projects (NEA Singapore, 2024).

A shift in industry mindset and stakeholder collaboration is crucial to overcoming these barriers. Policymakers must align construction waste regulations with broader national sustainability goals while providing financial incentives such as tax rebates for sustainable material use (UNEP, 2023). Additionally, industry players can benefit from public-private partnerships to

develop supply chain solutions that ensure consistent quality and availability of recycled materials. Strengthening awareness campaigns and capacity-building programs will further encourage developers to prioritize circular economy principles in project planning and execution.

Opportunities for Private Sector Involvement

Industry interviews and benchmarking with Germany and Singapore revealed a theme of opportunities for the private sector to play a vital role in accelerating circular economy (CE) innovations, particularly in the construction industry. Singapore's Zero Waste Masterplan serves as a prime example of how public-private partnerships can drive sustainable practices by investing in waste-to-resource technologies and closed-loop construction approaches (Benchmarking Report, 2025). By fostering collaborations between government agencies, businesses, and research institutions, Singapore has successfully implemented policies that encourage resource efficiency, material reuse, and waste reduction. Such initiatives have led to significant improvements in the adoption of green building materials, modular construction, and advanced recycling techniques. The seamless integration of these elements has not only contributed to environmental sustainability but has also enhanced economic competitiveness by reducing dependency on virgin materials and lowering construction costs in the long run.

However, in Malaysia, industry stakeholders face several challenges in implementing similar CE strategies. Interviews with local construction firms and sustainability consultants reveal that the primary barriers include a lack of financial incentives, technical expertise, and awareness regarding the long-term benefits of circular supply chains. Many firms perceive sustainable construction practices as costly and complex due to limited access to funding and a lack of standardized guidelines. To overcome these challenges, experts suggest the introduction of tax incentives, government-backed grant programs, and mandatory green building certifications to encourage CE adoption. Additionally, industry-wide education and capacity-building initiatives are needed to equip professionals with the necessary skills and knowledge to implement CE principles effectively. By fostering a supportive policy framework and incentivizing sustainable practices, Malaysia can gradually transition towards a more circular construction industry, aligning with global sustainability goals and enhancing its economic resilience.

Local Authority Role and Implementation Capacity

This theme emerged directly from interviews with Pihak Berkuasa Tempatan (PBTs) and triangulation with policy benchmarking. Johor Bahru, Shah Alam, and Hang Tuah Jaya were selected to represent diverse urban governance contexts, including high-growth southern corridors, industrialised Klang Valley

municipalities, and planned township administrations. The interviews consistently revealed barriers in enforcing CE regulations, including budget constraints, limited trained personnel, and inadequate monitoring mechanisms (Kementerian Perumahan dan Kerajaan Tempatan, 2024).

Findings further suggest that fragmented policy landscapes hinder effective CE implementation at the local level. Many councils lack a cohesive framework that aligns national CE goals with municipal enforcement strategies. While studies from the European Union highlight the benefits of integrated regulatory frameworks with clear jurisdictional roles (European Environment Agency, 2023), this has yet to be translated into Malaysian practice. International examples such as Japan's Industrial Waste Tracking System illustrate how digital material passports could strengthen monitoring and compliance. Local authorities recommended pilot programmes that integrate such tools into Malaysian municipalities, enabling better reporting on material recovery rates and encouraging higher industry participation in CE practices.

Public Awareness and Industry Readiness

This coded theme emerged from focus group data across construction, manufacturing, and waste sectors in September 2024 and again reinforced in March 2025 highlighted low awareness of CE principles and their economic benefits (PwC, 2024). Many industry stakeholders viewed CE as a costly compliance requirement rather than an opportunity for long-term cost savings and business resilience. Countries like China and Germany have successfully embedded CE education into university curricula and professional training programs, ensuring a skilled workforce familiar with circular construction practices (Benchmarking Report, 2025). Malaysian stakeholders highlighted the need for structured CE training programs, industry workshops, and knowledge-sharing platforms to improve awareness and adoption rates.

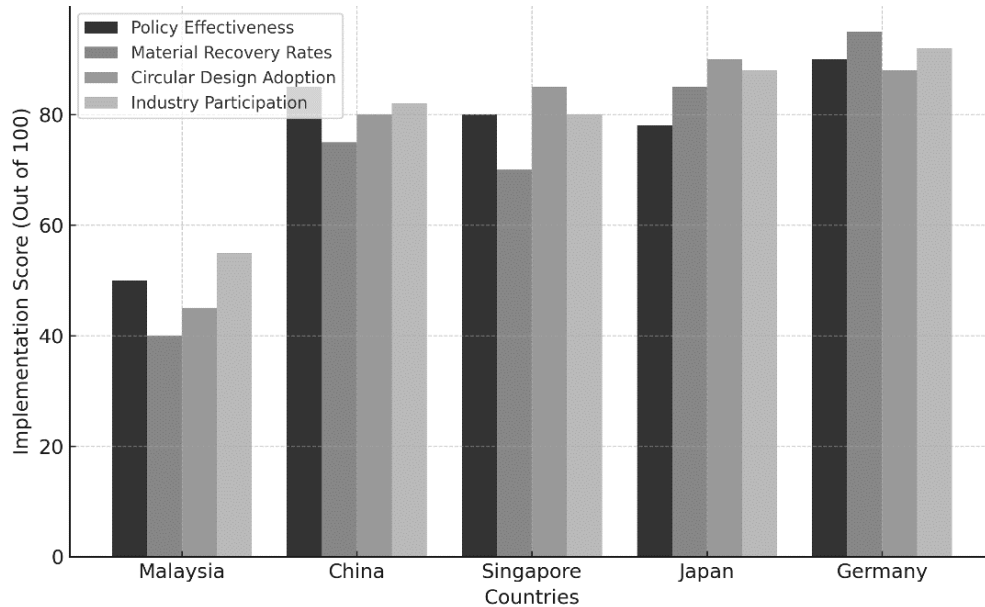


Figure 2: Percentage Distribution of Circular Economy (CE) Strategies Adopted in the Construction Sectors of Selected Countries (Germany, Japan, Singapore, China, and Malaysia).

Source: Percentage Distribution of Circular Economy (CE) Strategies Adopted in the Construction Sectors of Selected Countries (Germany, Japan, Singapore, China, and Malaysia).

Comparative Insights from China, Singapore, Japan, and Germany

This theme emerged from the benchmarking analysis, which was carried out between December 2024 and January 2025. Comparative findings highlighted key regulatory frameworks and practical implementations that have successfully integrated CE into the built environment in these countries. Table 1 shows Malaysia's position relative to advanced CE implementation, while Figure 2 illustrates the distribution of CE strategies adopted across the selected countries. Together, these comparative insights provide a reference point for evaluating Malaysia's readiness and identifying transferable lessons. In contrast, Germany and Japan demonstrate balanced advancement across policy, industry compliance, and digital monitoring

Key Lessons for Malaysia's Ce Readiness in Construction

The examination of Circular Economy (CE) implementation in established economies offers critical insights for enhancing sustainability within Malaysia's construction sector. A primary consideration is the necessity for robust regulatory frameworks and enforcement mechanisms. Countries such as Germany and Japan have effectively institutionalized stringent material recovery mandates and tracking systems to ensure widespread compliance across the construction

industry (European Commission, 2019). These measures not only mitigate waste generation but also foster a culture of responsible resource management. In Malaysia, while regulatory efforts are in place, the enforcement of construction and demolition (C&D) waste management remains an area requiring further enhancement (CIDB Malaysia, 2023). Strengthening legislative frameworks and embedding mandatory compliance measures would serve as a vital step toward achieving greater CE integration.

An equally significant aspect is the adoption of digital innovations in material tracking and waste management. Japan's Industrial Waste Tracking System and Germany's Digital Material Passports exemplify how technology can be leveraged to enhance the efficiency of CE initiatives through real-time data monitoring and improved accountability (PwC, 2024). Malaysia's construction industry stands to benefit from the implementation of similar digital platforms, which would facilitate better oversight of material flows and streamline resource recovery processes. Encouraging industry-wide adoption of blockchain-enabled material passports and smart waste segregation technologies would further contribute to enhancing transparency and efficiency in resource utilization. Furthermore, fostering collaborative partnerships between the public and private sectors has proven instrumental in countries that have successfully implemented CE frameworks. Singapore's Zero Waste Masterplan, for instance, underscores the benefits of synergistic engagements between governmental agencies and industry stakeholders in advancing sustainability goals (Singapore National Environment Agency, 2022). Establishing structured collaborations within Malaysia's construction sector—through incentives for firms that demonstrate excellence in material reuse and recycling, as well as through grants that support innovation in sustainable construction methodologies—can provide the necessary impetus for a broader transition to CE practices.

Findings strongly suggests that capacity building through education and workforce training plays an essential role in ensuring long-term CE readiness. In nations such as China and Germany, CE principles are systematically integrated into educational curricula, equipping future professionals with the requisite knowledge and skills to drive sustainability-oriented transformation within the construction industry (European Commission, 2019). In Malaysia, there remains significant potential to embed CE-oriented content into architectural and engineering programs, while also expanding vocational training opportunities tailored to builders, contractors, and other industry practitioners. Enhancing educational outreach in this manner would address existing knowledge gaps and encourage the widespread adoption of CE-aligned construction practices.

The Role of Government Agencies in Advancing CE in Construction

To effectively facilitate the transition toward a CE framework within Malaysia's construction industry, government agencies must adopt a proactive and

coordinated approach in shaping policy, fostering enforcement, and supporting capacity development. Several key ministries and regulatory bodies hold pivotal roles in this regard.

The Ministry of Housing and Local Government (KPKT) is well-positioned to spearhead efforts aimed at refining building regulations to incorporate CE principles. This may include the introduction of policies that encourage the use of recycled and repurposed materials in new developments, alongside enhanced guidelines for on-site waste segregation. Future strategies could focus on establishing a regulatory environment where sustainability-driven construction practices become a fundamental industry norm rather than an optional initiative.

The Construction Industry Development Board (CIDB), as the primary authority overseeing Malaysia's construction sector, has a critical role in promoting CE-centric building methodologies. By integrating CE principles into certification programs, CIDB can incentivize adaptive reuse, prefabrication, and modular construction, thereby reducing material waste and improving resource efficiency. Additionally, CIDB could introduce a dedicated CE performance rating system, akin to the Green Building Index (GBI), to assess and recognize projects that exemplify best practices in sustainable construction and material lifecycle management.

The Malaysian Investment Development Authority (MIDA) can play a strategic role in facilitating financial incentives and investment support for the adoption of circular construction practices. Offering tax incentives and targeted grants to companies that integrate CE methodologies—such as the production of low-carbon construction materials or advanced recycling technologies—would serve as a strong catalyst for industry-wide adoption. Furthermore, attracting foreign direct investment (FDI) in sustainable construction innovations could help accelerate Malaysia's progress toward achieving a more resource-efficient built environment.

The Ministry of Energy and Natural Resources (KeTSA) also has an important mandate in promoting resource conservation and energy-efficient practices within the construction industry. By advancing policies that support the incorporation of renewable energy systems, such as photovoltaic installations and energy-efficient building materials, KeTSA can contribute to reducing the environmental footprint of the built environment. Future strategies may also involve supporting research and development initiatives focused on alternative, sustainable construction materials and establishing a national database to monitor construction waste streams.

Moving forward, the establishment of an inter-ministerial task force dedicated to CE implementation in the construction sector would provide a structured approach to driving sustainable transformation. This task force could oversee the formulation of a comprehensive CE roadmap, integrating regulatory

advancements, technological adoption strategies, public-private partnership models, and workforce training programs. Furthermore, conducting periodic progress assessments would ensure that Malaysia remains aligned with its sustainability objectives and global best practices.

Strategic Recommendations for Local Authorities (PBTs) in Advancing CE

Effective operationalisation of Circular Economy (CE) in Malaysia's construction sector hinges significantly on the role of local authorities (*Pihak Berkuasa Tempatan*, or PBTs). However, enforcement capacity across PBTs remains limited, with no designated CE focal officers or embedded circularity criteria within standard planning and development approval processes. To address this, CE monitoring responsibilities should be formally assigned within existing technical departments—such as planning, licensing, or environmental health—supported by structured CE indicators integrated into OSC workflows. Parallel to this, efforts must be made to harmonise fragmented federal mandates. Agencies such as KPKT, CIDB, DOE, and MGTC should align CE-related KPIs and develop a unified CE implementation toolkit that translates high-level policy into actionable local guidelines. These efforts would provide clearer institutional direction and enable municipalities to act decisively on CE.

Equally important are awareness, incentives, and infrastructure. CE remains poorly understood among industry actors and local officers alike, often reduced to recycling or waste segregation. To build local capacity, simpler and modular training approaches—such as short courses, peer-learning workshops, or online toolkits—could empower municipal teams without overburdening existing workflows. PBTs are well-positioned to co-develop such programmes in partnership with universities, NGOs, and professional bodies. On the financial front, development charge waivers and localised CE pilot grants could incentivise the uptake of adaptive reuse, prefabricated systems, or material recovery in construction projects. To ensure long-term enforcement, investment in digital tracking tools—such as QR-tagged waste documentation or material passports—should be prioritised, drawing from international models like Japan's industrial waste system. Together, these efforts would help institutionalise CE at the local level through targeted, practical interventions.

CONCLUSION

Malaysia's construction sector stands at a pivotal juncture in its transition toward a more circular and resource-efficient model. This short study has shown that readiness for Circular Economy (CE) adoption is uneven but evolving, shaped by policy gaps, fragmented enforcement, and limited industry awareness. Through comparative benchmarking, local authority interviews, and industry focus groups, the research has highlighted key enablers—policy coherence, regulatory capacity, and CE literacy—while also surfacing persistent barriers such as weak incentives and the absence of robust monitoring systems. International examples reinforce that CE transitions are most effective when state-led mandates are matched by industry mobilisation and local implementation capacity.

Looking ahead, Malaysia's opportunity lies in translating policy ambition into measurable practice. National agencies such as KPKT, CIDB, KeTSA, and MIDA must work more closely with PBTs, professional bodies, and industry partners to embed CE into regulatory frameworks, procurement, and project delivery. Future research should evaluate the long-term outcomes of pilot initiatives, quantify embodied carbon reductions, and assess the scalability of innovations such as digital material passports. By combining coherent leadership with multi-stakeholder collaboration, Malaysia can accelerate its CE transition and position its construction sector as both a driver of sustainability and a model for regional resilience.

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