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Obstacles to Embrace Circular Economy

in the Irish Construction Sector

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Executive Summary

This report examines the main obstacles to adopting Circular Economy (CE) principles in the Irish construction sector. Drawing on international literature and evidence from a stakeholder workshop held at Maynooth University on 9 June 2025, the report identifies, categorises, and prioritises the barriers that limit the transition from linear construction practices toward more circular models.

The findings show that barriers to CE adoption are not isolated technical problems. Instead, they form an interconnected system of economic, regulatory, infrastructural, organisational, cultural, data-related, and design-related constraints. While stakeholders identified a wide range of obstacles, the most critical barriers were structural in nature. These included lack of investment, weak economic viability of secondary materials, fragmented policy and regulation, certification and recertification challenges, supply chain limitations, and limited collaboration in procurement and design.

A key finding is that certification and recertification act as a major bottleneck in the Irish context. Reused and recovered materials may be physically available, but they often struggle to re-enter the market because current approval systems are costly, complex, and oriented toward new materials. This affects market confidence, insurance, cost, and perceptions of material quality.

The report also highlights the importance of national context. In Ireland, barriers are shaped by planning delays, regional infrastructure gaps, limited reuse markets, import dependency, policy fragmentation, and weak circular material supply chains. These findings suggest that generic international CE frameworks are insufficient unless adapted to Ireland's institutional, market, and infrastructural conditions.

Based on these findings, the report recommends a coordinated set of actions: investing in circular infrastructure and regional reuse hubs; reforming certification and recertification processes for reused materials; developing viable markets for secondary materials; improving policy coordination and implementation; reforming procurement to support early contractor involvement and lifecycle collaboration; strengthening skills, awareness, and practical guidance; and developing standardised data systems, material tracking, and sectoral KPIs.

Overall, the report concludes that advancing CE in the Irish construction sector requires systemic reform rather than isolated technical solutions. Circular Economy adoption should not be treated only as a waste management issue, but as a broader transformation of how buildings are designed, procured, constructed, used, deconstructed, and valued across their lifecycle.

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1. Introduction

The construction sector plays a central role in economic development, infrastructure provision, and social progress, yet it is also one of the most resource-intensive and environmentally impactful industries globally. Construction activities account for substantial raw material consumption, waste generation, and greenhouse gas emissions, making the sector a critical focus for sustainability transitions (Adams et al., 2017; Hart et al., 2019). Across Europe and internationally, increasing concern over resource depletion, climate change, and environmental degradation has intensified efforts to move beyond traditional linear economic models of "take, make, use, and dispose" toward more sustainable systems (Kirchherr et al., 2018; Giorgi et al., 2022). In this context, the Circular Economy (CE) has emerged as a prominent framework for restructuring production and consumption systems around resource efficiency, material retention, and regenerative design.

Within construction, CE extends beyond waste reduction and recycling to encompass broader systemic strategies such as design for disassembly, material reuse, modularity, lifecycle extension, digital material passports, reverse logistics, and circular business models (Charef, Morel, and Rakhshan, 2021; Purchase et al., 2022). These approaches are increasingly recognised as essential for reducing environmental impact while improving long-term economic resilience and resource security (Hossain et al., 2020; Giorgi et al., 2022). Consequently, CE has become a growing priority within international and European policy agendas, including the European Green Deal and Circular Economy Action Plan, which position the built environment as central to sustainability and decarbonisation goals.

Despite this growing momentum, the practical implementation of CE in construction remains uneven and limited. A substantial body of literature demonstrates that CE adoption is constrained by a wide range of barriers, including high upfront costs, weak economic incentives, fragmented policy frameworks, supply chain limitations, certification challenges, knowledge deficits, and entrenched industry norms (Wuni, 2022; AlJaber et al., 2023; Ferriz-Papi et al., 2024). More recent scholarship increasingly argues that these barriers should not be viewed as isolated technical issues but as interconnected systemic constraints operating across institutional, market, technological, and cultural dimensions (Oluleye et al., 2022; Ababio & Lu, 2023).

This systemic perspective is particularly important in the Irish context. Ireland's construction sector is under significant pressure to simultaneously address housing demand, infrastructure expansion, climate obligations, and sustainability commitments. However, the transition to CE is likely shaped by nationally specific conditions, including planning complexity, regulatory structures, regional infrastructure disparities, and reliance on imported materials. While Circular Economy principles are increasingly referenced within Irish policy and sustainability discourse, there remains limited context-

specific empirical research examining how Irish stakeholders perceive and prioritise barriers to CE implementation.

This report addresses that gap by combining an international literature review with stakeholder-led empirical research to examine the obstacles to Circular Economy adoption in the Irish construction sector. Through a co-creation workshop involving policymakers, industry actors, academics, and professional organisations, the report identifies and analyses the barriers perceived as most significant within the Irish construction ecosystem.

The objectives of this report are threefold:

1. To review international and construction-specific literature on barriers to Circular Economy adoption;
2. To identify and categorise barriers perceived by stakeholders in the Irish construction sector;
3. To analyse how these barriers are prioritised and how they interact as part of a broader systemic challenge.

By doing so, this report contributes to both policy and academic debates. It provides practical evidence to inform the development of more effective Irish CE strategies while also contributing to wider literature by demonstrating how Circular Economy barriers are shaped by local institutional, market, and infrastructural conditions. Ultimately, the report argues that achieving Circular Economy transition in Irish construction will require coordinated systemic reform across governance, markets, infrastructure, supply chains, and stakeholder practices rather than isolated technical or policy interventions alone.

2. A Review of Obstacles to Circular Economy in Construction

This section reviews the major barriers identified in the literature that hinder Circular Economy (CE) adoption in the construction sector. Drawing from international and construction-specific studies, it examines these barriers not as isolated issues but as interconnected systemic challenges operating across economic, political, cultural, supply chain, and technological dimensions..

2.1. Understanding Circular Economy Barriers as a Interconnected Systems

Recent literature increasingly demonstrates that barriers to Circular Economy (CE) adoption in construction are not isolated obstacles but interconnected and systemic constraints embedded across the wider construction ecosystem. While earlier CE scholarship in construction largely concentrated on technical issues such as construction and demolition waste (CDW) management, recycling, and material recovery (Adams et al., 2017; Hart et al., 2019; Purchase et al., 2022), more contemporary research argues that these technical concerns represent only one part of a broader system of mutually reinforcing barriers.

A central shift in the literature is the move from viewing CE barriers as discrete technical problems toward understanding them as multidimensional challenges spanning institutional, economic, regulatory, organisational, cultural, and technological domains (Kirchherr et al., 2018; Charef, Morel, and Rakhshan, 2021). This perspective emphasizes that barriers interact across different stages of the construction lifecycle and across multiple stakeholder groups, meaning that challenges in one area often trigger or intensify barriers in others.

Wuni (2022) provides one of the clearest articulations of this systemic perspective by identifying 95 barriers across 11 categories and arguing that these barriers create “push effects” and chain reactions that collectively undermine CE implementation. For example, weak regulatory frameworks can discourage financial investment, which in turn limits technological innovation and reduces stakeholder willingness to adopt circular practices. Similarly, Oluleye et al. (2022) conceptualize barriers in construction and demolition waste management as a “web of barriers,” demonstrating causal links between institutional, organisational, technological, and informational challenges. Charef, Morel, and Rakhshan (2021) further reinforce this view by showing that many barriers are common across multiple circular strategies—including design for deconstruction, prefabrication, reverse logistics, and closed-loop systems—suggesting that CE obstacles often stem from shared structural weaknesses rather than isolated project-specific problems.

This systemic understanding is also reflected in Ababio and Lu’s (2023) multi-system framework, which positions barriers across micro (project and firm), meso (supply chain and stakeholder networks), and macro (policy and governance) levels. Their framework highlights that interventions targeting only

one level are unlikely to succeed unless supported by complementary changes across the broader system. Likewise, AlJaber et al. (2023) argue that overcoming barriers requires not only removing obstacles but simultaneously strengthening enabling factors such as governance structures, legislative reform, financial incentives, and technological capacity.

An important debate within the literature concerns which barriers are most foundational within this system. Construction-focused studies often prioritise financial, regulatory, and supply chain barriers due to the sector's cost sensitivity and compliance-driven nature (Wuni, 2022; AlJaber et al., 2023). In contrast, Kirchherr et al. (2018), in a broader EU-wide CE study, argue that cultural barriers—particularly low awareness, weak consumer interest, and hesitant organisational culture—are more fundamental than technological constraints. Rather than representing a contradiction, this divergence suggests that systemic barriers may manifest differently depending on sectoral and geographical context. In construction, financial and regulatory barriers may appear most visible, but these may themselves be underpinned by deeper cultural resistance, such as conservative industry norms, low trust in secondary materials, and limited willingness to innovate.

Overall, the literature strongly suggests that the transition to CE in construction cannot be achieved through isolated technical or policy solutions alone. Instead, it requires coordinated systemic transformation involving policy reform, market restructuring, supply chain integration, stakeholder collaboration, behavioural change, and technological innovation. This systemic perspective is particularly relevant for the Irish construction sector, where barriers are likely to be interconnected across governance, industry culture, market incentives, and operational practices. Understanding these interdependencies is therefore essential for designing effective strategies to support CE adoption.

2.2. Economic and Market Barriers

Economic and market barriers are among the most frequently cited obstacles to Circular Economy (CE) adoption in the construction sector. Across the literature, high upfront costs, limited financial incentives, uncertain returns on investment, and underdeveloped business models are consistently identified as major constraints (Adams et al., 2017; Guerra & Leite, 2021; Wuni, 2022; AlJaber et al., 2023; Ferriz-Papi et al., 2024; Sajid et al., 2024). Recovered and recycled materials are often less competitive than virgin materials due to higher processing costs and limited economies of scale (Charef, Morel, and Rakhshan, 2021; Osei-Tutu et al., 2023).

A closely related challenge is the underdevelopment of markets for secondary materials. Weak demand, fragmented supply chains, and limited market confidence in reused materials reduce the economic viability of circular solutions (Ferriz-Papi et al., 2024; Osei-Tutu et al., 2023; Tavares et al.,

2023). The absence of mature circular business models further constrains investment, innovation, and broader market transformation (Giorgi et al., 2022).

Importantly, these economic barriers are not merely cost-related but reflect deeper structural issues within the construction market. As highlighted in the literature, the persistence of linear economic models and the prioritisation of short-term profitability over lifecycle value create disincentives for adopting circular practices (Munaro et al., 2023; Sajid et al., 2024). In this context, higher costs are often symptoms of markets, infrastructures, and policy systems that remain organised around linear production and consumption patterns.

This structural tension is reflected in the gap between the theoretical economic promise of CE and its perceived business viability in practice. While Hossain et al. (2020) and Giorgi et al. (2022) highlight CE's potential to reduce material consumption, improve resource efficiency, and generate long-term value, empirical studies show that many stakeholders continue to perceive circular practices as financially risky, uncertain, or insufficiently profitable. For example, Guerra and Leite (2021) found that in the United States, budget limitations and project deadlines frequently override sustainability priorities in construction decision-making. Similarly, Mahpour (2018) identifies the prioritisation of cost and time over waste management as a major barrier, demonstrating how short-term project efficiency often takes precedence over lifecycle considerations.

Overall, the literature indicates that economic and market barriers operate at both practical and systemic levels. Immediate financial constraints such as cost and investment risk are significant, but they are reinforced by broader market structures that continue to privilege linear construction practices. Understanding this distinction is essential, as it suggests that overcoming economic barriers requires not only reducing costs but also restructuring market systems, business models, and incentive frameworks to support circularity.

2.3. Political, Regulatory and Institutional Barriers

Politial, regulatory and institutional barriers are consistently identified as some of the most significant obstacles to Circular Economy (CE) implementation in the construction sector. A major challenge is the absence or insufficiency of CE-specific regulatory frameworks. AlJaber et al. (2023) identify the lack of specific CE regulations as one of the most significant global barriers in the building sector, alongside fragmented supply chains and high upfront investment costs. Similarly, Ferriz-Papi et al. (2024), through a PESTLE analysis, emphasise political and legal barriers—including lack or weak regulation and poor implementation—as key challenges in construction and demolition waste management. Munaro and Tavares (2023) further reinforce this by identifying the lack of regulatory instruments, lack of tax actions, and an absence of circular vision as recurring institutional barriers across existing studies.

However, the literature also suggests that the issue is not solely the absence of policy, but the structure and orientation of existing regulatory systems. Giorgi et al. (2022), in their comparative analysis of five European countries, found that fragmented implementation and limited coordination between national strategies significantly restrict CE progress. More critically, they argue that many existing frameworks prioritise recycling over more transformative circular strategies such as reuse, design for disassembly, and circular business models. This policy orientation can inadvertently sustain lower-value forms of circularity focused on waste recovery while neglecting higher-value strategies that preserve material utility and extend building lifecycles.

Portugal provides a clear example of these broader governance challenges. Tavares and Pedroso (2023) identify political and regulatory barriers as among the most critical obstacles to CE implementation, stressing the need to simplify regulatory frameworks and better align construction governance with circular objectives. Their findings illustrate how institutional complexity and governance misalignment can slow CE adoption even where sustainability ambitions are present.

One of the clearest manifestations of regulatory misalignment is found in certification and recertification systems. Existing standards are primarily designed around new materials and conventional production models, making it difficult for reused or recovered materials to legally re-enter the construction market. Charef, Morel, and Rakhshan (2021), Sajid et al. (2024), and AlJaber et al. (2023) all demonstrate that reused materials face significant barriers related to compliance, testing, quality assurance, and certification. While these challenges are often framed as technical, they are fundamentally institutional and regulatory because they determine market legitimacy.

2.4. Cultural, Knowledge and Awareness Barriers

Alongside economic and regulatory challenges, the literature increasingly identifies cultural, behavioural, and knowledge-related barriers as critical obstacles to CE adoption in the construction sector. These barriers are often rooted in limited awareness of CE principles, insufficient expertise, resistance to change, and deeply embedded industry norms that favour conventional linear practices.

A central barrier identified across studies is the widespread lack of awareness, education, and understanding of CE among construction stakeholders. Munaro and Tavares (2023) describe insufficient awareness and weak communication of circular principles as core interconnected barriers across the construction value chain. Similarly, Guerra and Leite (2021) identify limited education and poor understanding of CE benefits as major challenges in the United States, while Osei-Tutu et al. (2023) emphasise broader deficits in stakeholder knowledge, awareness, and education regarding CE strategies. Adams et al. (2017) further highlight that actors such as clients and designers often possess limited understanding of how circular principles can be integrated into decision-making and project delivery, thereby constraining practical implementation.

Beyond knowledge deficits, behavioural resistance and entrenched industry culture also emerge as major barriers. Several studies describe the construction sector as highly conservative, risk-averse, and resistant to change, characteristics that inhibit the adoption of circular approaches. Ababio and Lu (2023) identify resistance to change, combined with limited interest, knowledge, awareness, and engagement across the value chain, as a major constraint that can stall CE progress if left unaddressed. Osei-Tutu et al. (2023) similarly highlight sectoral inertia, including distrust of reclaimed materials and persistent perceptions that reused products are inferior or substandard. Kanters (2020) reinforces this argument by identifying industry conservatism as a major barrier to circular building design, particularly where reluctance to adopt alternative approaches is shaped by perceived financial risks. Wuni (2022) further expands on these behavioural barriers, identifying hesitant company cultures, stakeholder risk aversion, resistance to innovation, low interest in recycled and remanufactured products, and concerns about the perceived quality of refurbished materials.

The broader CE literature suggests that these cultural barriers may, in some contexts, be even more significant than technological limitations. Kirchherr et al. (2018) argue that within the European Union, cultural barriers—including low awareness, hesitant organisational cultures, and limited consumer interest—can outweigh technological barriers. Hart et al. (2019) extend this perspective to construction, arguing that technological and regulatory interventions alone are insufficient because CE implementation also requires substantial transformations in business models, stakeholder behaviours, and professional attitudes.

At the same time, construction-specific studies generally position cultural and knowledge barriers as deeply interconnected with economic and regulatory conditions rather than as isolated challenges. Munaro and Tavares (2023), Osei-Tutu et al. (2023), and Wuni (2022) all suggest that awareness alone is insufficient to drive circular transition without supportive institutional frameworks and viable market structures. Guerra and Leite (2021) similarly argue that while education and awareness are essential, they must be supported by economic incentives, consumer demand, and organisational readiness to produce sustained change.

Overall, the literature indicates that cultural, behavioural, and knowledge barriers are foundational to CE adoption because they shape how stakeholders perceive, value, and respond to circular practices. These barriers are particularly significant because they influence whether regulatory reforms, economic incentives, and technological innovations are accepted and implemented in practice.

2.5. Supply Chain Barriers

Supply chain barriers concern the structural relationships, coordination, and collaboration between stakeholders across the construction value chain. The literature consistently identifies fragmented supply chains as one of the most critical barriers to CE adoption, given that circular construction

requires coordinated action from designers, contractors, suppliers, clients, demolition teams, and policymakers.

AlJaber et al. (2023) identify fragmented supply chains as one of the three most significant barriers globally, noting that disconnected actors often operate within isolated stages of the building lifecycle, making circular coordination difficult. This fragmentation reduces opportunities for material reuse and incorporating circular principles into building projects. Similarly, Wuni (2022) identifies supply chain barriers as one of the "vital few" categories undermining CE implementation due to poor integration between construction phases.

A key challenge is the absence of reverse logistics systems. Circular construction depends on the ability to recover, transport, sort, and redistribute materials for reuse, yet Sajid et al. (2024) highlight the lack of reverse logistics infrastructure as a major obstacle in circular procurement. Without effective systems to return materials into productive use, CE principles remain theoretical rather than operational.

The literature also points to weak collaboration and information-sharing between stakeholders. Adams et al. (2017) found that different supply chain actors—particularly clients, designers, and subcontractors—often possess uneven awareness of CE principles, resulting in inconsistent priorities. Charef, Morel, and Rakhshan (2021) further argue that organisational fragmentation prevents coordinated adoption of sustainable end-of-life approaches.

Business models within current supply chains also tend to reinforce linear practices. Traditional procurement systems prioritise lowest upfront costs over lifecycle value, discouraging circular partnerships (Giorgi et al., 2022). In many cases, contractors lack incentives to source reclaimed materials, and suppliers lack confidence in demand for circular products.

2.6. Technological Barriers

Although technological barriers are not always identified as the single most significant obstacle to Circular Economy (CE) adoption, the literature consistently demonstrates that they remain a substantial constraint to implementation in the construction sector. Technological barriers primarily relate to limitations in design practices, digital systems, material innovation, and technical processes required to enable circularity throughout a building's lifecycle.

A major issue highlighted in the literature is the continued dominance of conventional construction methods that do not support circular strategies such as design for disassembly, modularity, adaptability, or material recovery. Charef, Ganjian, and Emmitt (2021) argue that current building practices often fail to account for end-of-life asset recovery because buildings are not designed for easy deconstruction or component reuse. This creates technical lock-in, where demolition remains more feasible than disassembly.

Digitalisation also represents a major technological challenge. Building Information Modelling (BIM), material passports, and digital twins are widely regarded as critical enablers for CE because they can improve lifecycle tracking, material transparency, and asset management. However, the literature indicates that such tools remain underdeveloped or poorly integrated across the full construction lifecycle. Charef, Morel, and Rakhshan (2021) emphasize that BIM is still primarily concentrated in design phases and rarely extends effectively into demolition, reuse, or circular asset management. Similarly, Giorgi et al. (2022) identify insufficient digital platforms, traceability systems, and lifecycle assessment tools as barriers across multiple European countries.

Material-related technological limitations are also significant. Sajid et al. (2024) note that the lack of standardization in circular design and production systems constrains confidence in reused or secondary materials. This includes uncertainty around material quality, certification, and performance, which discourages widespread industry adoption. Purchase et al. (2022) similarly emphasize technological limitations in waste dismantling, segregation, and material recovery systems, particularly for smaller firms lacking technical capacity.

3. Methodology

3.1. Research Design

This study adopts a participatory qualitative research design, integrating stakeholder engagement with structured analytical techniques to identify, interpret, and prioritise barriers to CE adoption in the Irish construction sector. The research is centred on a co-creation workshop, which enabled the collection of both rich qualitative insights and collective prioritisation of barriers across stakeholder groups. Co-creation workshops can function as rigorous research instruments when they are systematically designed, facilitated, documented, and evaluated rather than treated as informal engagement activities (Vázquez-Mendoza, Stapleton, & Galván, under revision).

The analytical approach combines thematic analysis to identify and categorise barriers and comparative ranking analysis to assess their relative importance. This design allows for a comprehensive understanding of both the nature of barriers and their perceived significance within the sector.

3.2. Stakeholder Engagement and Workshop Design

A research-informed, interactive workshop was conducted at Maynooth University on 9 June 2025. The workshop brought together 40 stakeholders representing a broad cross-section of the Irish construction ecosystem, including policymakers, industry practitioners, academics, and professional organisations.

The final cohort included representatives from:

- Government and regulatory bodies (e.g., DECC, EPA, OPW, Enterprise Ireland);
- Industry (architects, engineers, contractors, and material specialists);
- Academia and research institutions;
- Non-profit and representative organisations.

Participants were organised into six groups and engaged in facilitated discussions structured around the identification and prioritisation of barriers to CE adoption. Each group was asked to:

- Identify key barriers to CE implementation;
- Discuss and elaborate on these barriers;
- Rank the ten most significant barriers through collective agreement.

3.3. Data Collection

Multiple data sources were collected to ensure a rich and triangulated dataset, including:

- Audio recordings of all group discussions;

- Facilitator notes and observational records;
- Visual artefacts produced during workshop activities (e.g., annotated templates, A4 sheets, post-its);
- Photographic documentation of group outputs.

The primary dataset consisted of the barrier lists and rankings produced by each group on A4 sheets. These captured both the barriers identified and their prioritised importance.
In total, approximately 36 hours of recorded discussions were collected and transcribed using AI-assisted tools and subsequently manually reviewed for accuracy.

3.4. Data Analysis

The analysis was conducted in sequential stages, combining data consolidation, thematic coding, and ranking analysis.

1. Data Systematisation

First, all barriers identified across the six groups were extracted and compiled into a unified dataset, preserving both the original wording used by participants and the ranking assigned by each group. Since many barriers were recorded as short phrases or keywords, the workshop transcripts were systematically reviewed to interpret their meaning in context.
Where necessary, barrier labels were refined to ensure conceptual accuracy; disaggregated where multiple concepts were combined; and standardised to reduce ambiguity while remaining grounded in participant language.
Barriers across groups were then merged and deduplicated, reducing the initial set of 79 barriers to a consolidated list of 56 unique barriers.

3.4.1. Development of the Coding Framework

The final set of barriers was organised into an analytical coding framework consisting of eight categories:

1) Economic and market viability
2) Policy, regulation and certification
3) Supply chain, infrastructure and logistics
4) Knowledge, skills and awareness
5) Cultural and behavioural
6) Data, digital and measurement
7) Collaboration, procurement and lifecycle integration

8) Technical and design constraints

This framework was developed through a hybrid approach, combining inductive insights from the workshop data and deductive alignment with existing literature on CE barriers

The coding framework enabled systematic organisation of barriers (Section 4.1); the identification of patterns across categories and comparison between empirical findings and existing research.

3.4.2. Analysis of Barrier Prioritisation

To assess the relative importance of barriers, the rankings provided by each group were analysed using a comparative aggregation approach, rather than a formal scoring method.

The analysis focused on the frequency of occurrence of each barrier across groups; the highest rank achieved by each barrier; and the consistency of ranking across tables.

Barriers that were mentioned by multiple groups and ranked among the top positions were interpreted as priority barriers, reflecting strong stakeholder consensus.

In contrast, barriers that were discussed but not ranked were treated as contextual or supporting barriers. These provide insight into the broader system but are not interpreted as immediate priorities.

This distinction enables a more nuanced interpretation of the data, differentiating between core constraints (ranked barriers) and underlying conditions (unranked barriers)

Finally, an interpretive synthesis was conducted to analyse patterns in barrier distribution across categories, relationships between high-priority barriers and the extent to which barriers reinforce one another.

This stage supported the identification of systemic dynamics, highlighting how economic, regulatory, and organisational barriers interact to constrain CE adoption.

3.4.3. Validity and Reliability

To enhance the robustness of the analysis, several strategies were employed: 1) Data triangulation across A4 sheets, transcripts, notes, and visual artefacts; 2) Use of transcripts to validate and interpret barrier meanings; 3) Systematic coding using a structured framework; 3) Transparent aggregation of ranking data.

These measures ensure that findings are grounded in participant input while maintaining analytical rigour.

3.5. Methodological Limitations

Several limitations should be acknowledged.

First, the study is based on a single workshop, representing a specific moment in time. While participants were selected to reflect diverse perspectives, the findings are not statistically generalisable.

Second, the interpretation and refinement of barrier labels involved a degree of researcher judgement. Although grounded in workshop transcripts, some level of subjectivity is inherent in qualitative analysis.

Finally, the ranking process reflects group-level prioritisation and may be influenced by group dynamics.

3.6. Ethical Considerations

The study adhered to the ethical guidelines of Maynooth University and received formal approval from the University's Research Ethics Committee prior to data collection.

Participants were provided with an information sheet outlining: the purpose of the research the use of audio recordings, and data handling procedures.

Written informed consent was obtained prior to participation.

All data were anonymised during transcription and analysis and stored securely in accordance with institutional data protection policies and GDPR requirements.

This research was supported by funding from the Environmental Protection Agency (EPA), Ireland. The funding body had no role in the design, data collection, analysis, interpretation, or dissemination of the research.

4. Results: Mapping Barriers to Circular Economy in the Irish Construction Sector

4.1. Barriers to Circular Economy Identified by Stakeholders

The workshop findings reveal that stakeholders perceive the transition to a circular economy (CE) in the construction sector as constrained by a complex and interrelated set of barriers. These barriers span economic, regulatory, technical, organisational, and cultural dimensions, confirming the systemic nature of challenges highlighted in the literature. Based on the analytical framework developed, eight main categories of barriers were identified (see Table 1).

4.2.1. Economic and Market Viability Barriers

Economic and market-related barriers emerged as one of the most prominent categories. Stakeholders consistently emphasised the lack of investment as a fundamental constraint, affecting infrastructure development, innovation, and the scaling of circular practices. Closely linked to this is the limited economic viability of secondary materials, which are often more expensive, inconsistently available, and less competitive than virgin materials.

High upfront costs, combined with uncertain financial returns, discourage stakeholders from adopting circular solutions. This is further reinforced by industry practices such as value engineering, where cost and programme considerations systematically override environmental objectives. Participants also highlighted cost uncertainty as a key issue, driven by immature supply chains, fluctuating material availability, and additional requirements such as testing and transport.

Perceptions also play a significant role: reuse is widely perceived as more expensive, even where evidence may be limited. At the same time, end-user demand remains weak, with affordability prioritised over sustainability. Finally, stakeholders noted the absence of robust and proven circular business models, contributing to financial risk and limiting broader adoption.

4.2.2. Policy, Regulation and Certification Barriers

Policy and regulatory barriers were identified as critical constraints. Stakeholders pointed to a lack of uniform policy, standards, and regulation, characterised by fragmented frameworks, inconsistent messaging, and poor alignment across initiatives. This creates uncertainty and weakens implementation.

A particularly significant issue is certification and recertification, which was repeatedly highlighted as a major obstacle. Existing certification systems are seen as rigid, costly, and biased towards new materials, effectively preventing the reuse of materials. This is compounded by restrictive building regulations, which are often prescriptive and limit innovation.

Stakeholders also emphasised the gap between policy and practice, noting that regulations are often poorly implemented or not aligned with industry realities. The planning system was another major concern, with delays, bureaucracy, and unrealistic targets slowing down innovation and project delivery. Additionally, administrative burdens associated with compliance were seen as resource-intensive and detrimental to innovation.

Finally, insurance barriers and broader geopolitical and regulatory instability contribute to risk and uncertainty, further discouraging investment in circular solutions.

4.2.3. Supply Chain, Infrastructure and Logistics Barriers

Barriers related to supply chains and infrastructure were also strongly represented. Stakeholders described the current system as linear, fragmented, and poorly suited to circular material flows. Limited availability of circular materials and reliance on imports further constrain the development of closed-loop systems.

A major issue identified was the lack of infrastructure, including recycling and treatment facilities, as well as broader utilities such as energy and water. These challenges are particularly pronounced outside major urban centres, highlighting regional disparities.

The absence of a functioning market for secondary materials was also emphasised, with stakeholders noting a lack of demand, outlets, and centralised hubs. Even when materials are recovered, they often cannot be reused due to these systemic gaps. Additional constraints include limited storage capacity, weak waste management pathways, and a lack of economic operators capable of supporting circular processes at scale.

4.2.4. Knowledge, Skills and Awareness Barriers

Knowledge-related barriers were widely discussed. Stakeholders highlighted a lack of awareness and understanding of circular practices, materials, and technical standards across the sector. Although some educational initiatives exist, they are not sufficiently widespread or developed to support a systemic transition.

A shortage of skilled labour was also identified, particularly in relation to modern and circular construction methods. This skills gap limits the ability of organisations to implement circular solutions effectively. Furthermore, stakeholders noted a lack of practical guidance, meaning that even where there is willingness, there is uncertainty about how to apply circular principles in practice.

Finally, terminology uncertainty was identified as a barrier, with inconsistent definitions and language leading to confusion and miscommunication across stakeholders.

4.2.5. Cultural and Behavioural Barriers

Cultural and behavioural factors were identified as deeply embedded barriers. A dominant theme was the persistence of a linear economy mindset, with strong attachment to traditional construction

practices. This is reinforced by risk aversion, where stakeholders prefer familiar and proven solutions over innovative or circular alternatives.

Resistance to change and broader industry conservatism further hinder adoption, with engineers, contractors, and supply chain actors often defaulting to standard approaches. Stakeholders also highlighted issues of social acceptance, noting that public and client preferences for conventional materials and designs can limit the uptake of circular solutions.

Perceptions play a crucial role, particularly regarding the quality and durability of reused materials, which are often viewed as inferior or riskier. Additionally, aesthetic considerations, such as the perception of beauty, can influence material choices and act as a subtle but important barrier.

4.2.6. Data, Digital and Measurement Barriers

Data-related barriers were identified as a key enabler of circularity that is currently lacking. Stakeholders pointed to the absence of reliable data on material inflows and outflows, limiting visibility and preventing effective planning for reuse and deconstruction.

There is also a significant lack of lifecycle data and material tracking systems, which are essential for circular decision-making. More broadly, data are often described as delayed, fragmented, and of poor quality, with no centralised platforms for exchange.

Challenges related to data management were also highlighted, including unclear responsibilities, weak infrastructure, and increasing data burdens on professionals. Finally, the absence of standardised metrics and KPIs makes it difficult to measure progress and incentivise circular performance, while the lack of standardised data structures limits comparability and evaluation.

4.2.7. Collaboration, Procurement and Lifecycle Integration Barriers

Barriers related to collaboration and integration were strongly emphasised. Stakeholders highlighted the lack of collaboration in the design phase, where key actors such as designers, contractors, and demolition teams are not engaged early enough to enable circular solutions.

Procurement processes were identified as a major constraint, particularly the lack of early contractor involvement, which limits innovation and increases perceived risk. More broadly, the sector is characterised by working in silos, with poor coordination between stakeholders and across lifecycle stages.

This fragmentation leads to a lack of systems thinking, where decisions are made independently rather than considering the full lifecycle. Project timing was also identified as a barrier, with fast construction schedules and delayed data undermining opportunities for reuse and selective demolition. Finally, stakeholders noted that circular solutions are often perceived as more complex and less convenient, further discouraging adoption.

4.2.8. Technical and Design Constraints

Technical and design-related barriers were also identified, particularly in relation to the built environment itself. A key issue is that materials and products are not designed for circularity, limiting their potential for reuse, repair, or disassembly.

Stakeholders expressed uncertainty about material performance, particularly in terms of durability and compliance, which reduces confidence in circular solutions. This is compounded by the lack of clear standards and quality assurance frameworks, making it difficult to validate and compare alternatives.

Certification requirements, such as CE marking, further complicate the use of reused materials. Additionally, there is strong design inertia, with professionals defaulting to familiar materials and methods. Finally, stakeholders highlighted challenges related to the scalability of innovations, as well as the additional complexity introduced by climate adaptation requirements.

Table 1. Barriers to CE Adoption in the Construction Sector Identified by Stakeholders.

Category	***Barrier***	***Why is an obstacle for CE?***
Economic and Market Viability	Lack of investment	Insufficient financial support for circular practices, infrastructure, treatment facilities, reuse markets, and innovation.
	Economically viable secondary materials	Secondary materials are often costly, scarce, inconsistently available, and not yet competitive with virgin materials.
	Cost / financial viability	High upfront costs, lack of incentives, infrastructure delays, and weak financial returns make circular options less attractive.
	Value engineering prioritising cost	Project decisions prioritise short-term cost and programme efficiency over environmental value.
	Commercial viability / business model	Circular practices are not always seen as profitable and lack consistent, proven business models.
	Cost uncertainty	Circular practices are difficult to price due to inconsistent supply, testing requirements, transport costs, and limited experience.
	Perceived cost of reuse	Reuse is widely perceived as more expensive than new build or virgin materials.
	End-user demand and affordability	Consumers prioritise affordability over sustainability, so the market does not strongly reward circularity.
Policy, Regulation and Certification	Lack of uniform policy, standards and regulation	Fragmented governance, unclear messaging, and inconsistent policy alignment create confusion and weak implementation.
	Certification and recertification	Reused materials face costly, complex, and rigid certification processes that favour new products.
	Restrictive building regulations and control	Prescriptive technical guidance and regulatory systems restrict innovation and reuse.
	Regulation gap / implementation gap	Policies exist but are poorly implemented, weakly aligned with industry realities, or too general.
	Planning system constraints	Planning delays, restrictions, bureaucracy, weak execution, and unrealistic targets slow circular innovation.

	Administrative burden	Reporting and compliance requirements are resource-intensive and divert attention from innovation.
	Insurance barriers	Insurance frameworks are not adapted to circular or non-standard construction, increasing perceived financial risk.
	Geopolitical / regulatory instability	Changing EU, national, or international political priorities create uncertainty and reduce momentum.
Supply Chain, Infrastructure and Logistics	Supply chain limitations	Current supply chains are linear, fragmented, import-dependent, and not designed for circular material flows.
	Infrastructure gaps	Lack of recycling, treatment, utilities, and regional infrastructure limits circular implementation, especially outside Dublin.
	Market for secondary materials	Lack of demand, outlets, hubs, and local markets prevents recovered materials from being reused.
	Waste management limitations	Limited reuse and recycling pathways exist for specific materials.
	Infrastructure and storage issues	Lack of storage for reclaimed materials weakens reuse potential.
	Self-sufficiency / import dependency	Reliance on external materials, such as timber, weakens local circular material loops.
	Lack of economic operators	There are too few actors able to supply, process, certify, store, or deliver circular materials and services.
	Material availability / resource constraints	Limited resource availability and finite material stocks constrain both current construction and circular transition.
Knowledge, Skills and Awareness	Lack of knowledge and awareness	Stakeholders lack understanding of circular practices, available materials, technical standards, and implementation routes.
	Existing education and current knowledge lack	Education exists but is not widespread or sufficiently developed to support sector-wide transition.
	Skills and labour shortages	There is a shortage of workers with skills in circular, modern, and alternative construction methods.
	Lack of practical guidance	Even where willingness exists, actors lack clear guidance on how to apply circular principles.
	Terminology uncertainty	Lack of shared definitions and language creates misunderstanding and slows adoption.
Cultural and Behavioural	Linear economy mindset	Strong attachment to linear construction practices limits willingness to adopt reuse and circular approaches.
	Risk aversion	Industry actors avoid uncertainty, innovation, recycled materials, and non-standard approaches.
	Resistance to change	Cultural inertia and preference for business-as-usual practices hinder circular transition.
	Industry culture and resistance to innovation	Engineers, contractors, and supply chain actors often prefer standard solutions over circular alternatives.
	Social acceptance / behavioural resistance	Lack of social buy-in and public preference for conventional solutions slow adoption.
	Perception of beauty	Aesthetic preferences for conventional materials and appearances can hinder alternative circular materials.
	Perception of recertification / durability	Reused materials are perceived as less durable, less certifiable, or riskier than new materials.
Data, Digital and Measurement	Lack of data on material inflows/outflows	Limited visibility of material stocks and waste streams prevents circular planning.

Data, Digital and Measurement	Available data / lifecycle data gaps	Lack of lifecycle data and material tracking prevents planning for reuse and deconstruction.
	Data-related barriers	Data are delayed, inaccessible, fragmented, poor quality, or unsupported by exchange platforms.
	Technology and data management	Unclear responsibility for data, weak infrastructure, and increasing data burdens limit implementation.
	Lack of sectoral metrics / KPIs	Absence of agreed indicators makes it difficult to measure and incentivise circular performance.
	Lack of standards for data and comparison tools	No standardised data structures, comparison tools, or sustainability assessment frameworks.
Collaboration, Procurement and Lifecycle Integration	Lack of collaboration in design phase	Designers, demolition teams, contractors, and suppliers are not integrated early enough to enable reuse.
	Procurement / lack of early contractor involvement	Procurement structures prevent early collaboration, increasing risk pricing and reducing innovation.
	Working in silos	Poor collaboration between stakeholders and sectors limits systems thinking and circular coordination.
	Fragmented system / lack of systems thinking	Circularity requires lifecycle integration, but decision-making remains fragmented across actors and phases.
	Project timing	Fast construction schedules and delayed waste statistics undermine selective demolition, reuse, and planning.
	Complexity / convenience	Circular solutions involve more stakeholders, planning, and coordination effort, making them less convenient.
Technical and Design Constraints	Material design constraints	Products are not designed for reuse, repair, disassembly, or circularity.
	Uncertainty about material performance	Lack of confidence in durability, compliance, and performance of circular materials discourages adoption.
	Lack of standards / quality assurance	Absence of clear quality assurance and technical standards prevents confident circular implementation.
	New material certificate / CE marking issues	Certification requirements make approving reused or reclaimed materials difficult.
	Design inertia / conventional methods	Designers and project teams default to familiar materials and methods, such as concrete and masonry.
	Innovation scalability constraints	Circular innovations are difficult to scale due to limited R&D funding, technical validation, and market readiness.
	Climate adaptation constraints	Climate-related requirements add complexity and new technical demands to construction projects.

4.2. Prioritisation of Barriers by Stakeholders

During the workshop, stakeholders were asked to identify and rank the ten most important barriers to the adoption of circular economy (CE) practices in the construction sector. While ranking provided a prioritised view of key constraints, participants also discussed additional barriers that were not formally ranked. These unranked barriers are included to provide contextual depth but are not interpreted as priority constraints.

4.2.1. Most Critical Barriers Identified

The ranking results indicate a clear prioritisation of economic and regulatory barriers, followed by supply chain and organisational constraints. Across groups, several barriers emerged as consistently high-priority.

Foremost among these is the lack of investment in the transition to a circular economy, which was ranked as the most critical barrier by stakeholders. This reflects concerns about insufficient financial support for circular practices, including infrastructure development, treatment facilities, and innovation. Closely linked to this is the challenge of achieving economically viable secondary materials, which remain costly, inconsistently available, and uncompetitive compared to virgin materials.

Regulatory barriers were also highly prioritised. In particular, stakeholders identified the lack of uniform policy, standards, and regulation as a major obstacle, highlighting fragmented governance frameworks, inconsistent messaging, and weak alignment across policies. Similarly, certification and recertification processes were ranked among the most significant barriers, with participants emphasising the cost, complexity, and structural bias of certification systems towards new materials. These constraints effectively limit the reuse of materials and restrict circular practices.

At a systemic level, supply chain limitations were also ranked as a key barrier. Stakeholders described the current construction supply chain as linear, fragmented, and poorly equipped to support circular material flows, with limited availability of reusable materials and weak recovery pathways. Related to this, the lack of early collaboration in procurement and design processes, including the absence of early contractor involvement, was identified as a critical constraint, reducing opportunities for innovation and reuse.

Economic decision-making processes further reinforce these barriers. The practice of value engineering, where cost and programme considerations override environmental objectives, was identified as a key factor undermining circular solutions. This reflects a broader prioritisation of short-term financial efficiency over long-term sustainability outcomes.

4.2.2. Secondary but Significant Barriers

In addition to the highest-ranked barriers, several other constraints were identified as important, although less consistently prioritised across tables. These include cost uncertainty, which reflects difficulties in pricing circular solutions due to immature markets and supply chains, and commercial viability concerns, linked to the lack of established circular business models.

Barriers related to the planning system, including delays, regulatory restrictions, and bureaucratic processes, were also highlighted as significant impediments to circular innovation. Similarly, insurance barriers were identified as contributing to risk aversion, as existing insurance frameworks are not well adapted to non-standard or circular construction approaches.

4.2.3. Cross-Cutting Patterns in Barrier Prioritisation

Several important patterns emerge from the ranking exercise.

First, the results demonstrate a clear dominance of structural and systemic barriers, particularly those related to economic viability and regulatory frameworks. This suggests that stakeholders perceive CE implementation primarily as an institutional and market challenge rather than a technological one.

Second, certification-related barriers emerge as a critical bottleneck. These barriers are not only regulatory but also influence economic feasibility, risk perception, and market dynamics, highlighting their systemic importance.

Third, many of the highest-ranked barriers are interconnected and reinforce one another. For example, the lack of investment is closely linked to weak market demand, regulatory uncertainty, and risk-averse behaviour, illustrating the systemic nature of constraints to CE adoption.

4.2.4. Ranked and Unranked Barriers

Although some stakeholders formally ranked barriers while others did not, several issues were consistently identified across stakeholder groups, providing important context for understanding the broader constraints surrounding Circular Economy adoption. These commonly discussed barriers include knowledge and skills gaps, data limitations, and cultural and behavioural factors such as resistance to change and risk aversion.

While these barriers were not identified as immediate priorities, their repeated mention suggests that they function as underlying or enabling conditions that shape the broader system within which higher-ranked barriers operate.

5. Discussion and Key Findings

This study set out to identify and prioritise the major barriers to Circular Economy adoption in the Irish construction sector through a stakeholder-led empirical approach. The findings confirm that CE barriers in Ireland are not isolated technical constraints but interconnected systemic challenges. Stakeholders identified obstacles across all eight analytical categories, demonstrating that CE adoption is constrained not by one dominant issue but by interactions between market structures, governance systems, supply chain fragmentation, technical limitations, and behavioural conditions. This aligns strongly with recent literature that conceptualises CE barriers as embedded within wider socio-technical systems rather than as standalone obstacles (Wuni, 2022; Oluleye et al., 2022; Ababio & Lu, 2023).

However, the results also demonstrate that while stakeholders acknowledged a broad range of barriers, they consistently prioritised economic and regulatory barriers above others. This finding provides important context-specific insight into the Irish construction sector and both supports and challenges existing international literature.

5.1. Economic and Regulatory Barriers as Dominant Priorities in Ireland

One of the clearest findings of this study is that Irish stakeholders prioritised lack of investment, weak market viability, fragmented regulation, and certification barriers above all others.

This strongly aligns with construction-focused literature that identifies financial and regulatory constraints as dominant barriers (AlJaber et al., 2023; Ferriz-Papi et al., 2024; Sajid et al., 2024). However, the Irish findings deepen this literature by showing how these barriers are experienced in a national context characterised by: 1) Planning delays, 2) Certification rigidity, 3) Limited regional infrastructure, and 4) Weak markets for secondary materials

The prominence of lack of investment as the top-ranked barrier suggests that Irish stakeholders perceive CE transition primarily as an issue of structural underdevelopment rather than conceptual resistance alone. Circularity is seen as financially constrained by insufficient infrastructure, immature reuse markets, and uncertain returns.

Similarly, lack of uniform policy and standards reflects not only policy gaps but governance fragmentation. Stakeholders repeatedly emphasised confusion created by overlapping roadmaps, weak implementation, and unclear strategic direction. This supports Giorgi et al.'s (2022) critique that fragmented governance can inhibit CE even when sustainability agendas exist.

5.2. Certification as a Structural Bottleneck

A particularly significant finding is the centrality of certification and recertification barriers. While literature often discusses certification within broader regulatory or technical categories (Charef,

Morel, & Rakhshan, 2021; AlJaber et al., 2023), Irish stakeholders positioned it as one of the most critical practical barriers.

This suggests that certification in Ireland functions as a structural bottleneck, linking: 1) Regulation, 2) Market access, 3) Insurance, 4) Cost and 5) Perceptions of quality.

This expands existing literature by demonstrating that certification is not simply a compliance issue but a mechanism that can reproduce linearity by structurally favouring virgin materials over reused alternatives. In practice, reused materials may technically exist but remain commercially unusable if they cannot be legally recertified.

This finding is especially important because it highlights that policy reform alone may be insufficient unless regulatory systems governing material legitimacy are redesigned.

5.3. Supply Chain and Infrastructure: Beyond Waste Management

The findings also reinforce literature emphasising fragmented supply chains (Hart et al., 2019; Sajid et al., 2024), but they add important Irish-specific nuance. Stakeholders highlighted not only fragmentation but also: 1) Regional infrastructure inequalities, 2) Lack of storage facilities, 3) Import dependency, and 4) Weak local reuse hubs

This suggests that in Ireland, CE barriers are intensified by geographical and infrastructural conditions, particularly outside Dublin. While many international studies focus heavily on construction and demolition waste (CDW), Irish stakeholders framed supply chain barriers more broadly as systemic failures in logistics, market formation, and national infrastructure.

This indicates that CE transition in Ireland may require place-based infrastructure strategies rather than solely national-level policy.

5.4. Cultural and Knowledge Barriers: Important but Secondary Priorities

A notable divergence from Kirchherr et al. (2018) is that Irish stakeholders did not prioritise cultural barriers—such as linear mindset or resistance to change—as the most immediate barriers, despite discussing them extensively.

This does not mean cultural barriers are unimportant. Rather, it suggests that stakeholders perceive them as underlying enabling conditions rather than immediate structural constraints. This is an important distinction. In practical terms: economic and regulatory barriers are viewed as immediate blockers to Circular Economy adoption, while cultural and knowledge barriers are seen as background conditions that reinforce or sustain these more direct obstacles.

This distinction aligns with construction-specific studies (Munaro & Tavares, 2023; Osei-Tutu et al., 2023), which position awareness and behavioural challenges as deeply interconnected with broader structural systems rather than as standalone primary barriers. From this perspective, cultural and

behavioural change remains important, but it is often perceived as more difficult to achieve without first addressing the market, policy, and infrastructural conditions that shape stakeholder behaviour.

The Irish case therefore suggests that while transforming mindsets and improving awareness are essential for long-term Circular Economy transition, stakeholders may view reforms to markets, regulation, and infrastructure as more urgent prerequisites for enabling broader cultural transformation.

5.5. Data and Digital Barriers as Emerging Strategic Issues

The prominence of data-related barriers in stakeholder discussions—despite not being top-ranked—suggests that Ireland's CE transition may increasingly depend on digital governance. Stakeholders highlighted: 1) Lack of lifecycle data, 2) Missing material tracking, 3) Poor quality information, and 4) Absence of KPIs.

This aligns with Charef et al. (2021) and Giorgi et al. (2022), but the Irish findings suggest that digital barriers are particularly linked to governance and market maturity rather than technology alone.

This indicates that technologies such as BIM, digital product passports, and material databases may only become effective when integrated with policy reform, certification systems, and supply chain restructuring.

5.6. Irish Context: Why National Specificity Matters

A major justification for this study was the lack of context-specific evidence on CE barriers in Ireland. The findings clearly demonstrate that while international taxonomies are broadly relevant, local conditions significantly shape barrier prioritisation. For example: planning system constraints were especially prominent; regional infrastructure gaps were strongly emphasised; certification systems emerged as unusually central; policy fragmentation was framed through Irish governance structures.

This suggests that applying generic international CE frameworks without local validation risks overlooking nationally specific institutional barriers.

Therefore, this study contributes to the literature by demonstrating that CE barriers are not only systemic but also contextually configured. For Ireland, CE transition appears particularly constrained by governance coherence, infrastructure maturity, and market readiness.

5.7. Policy and Practical Implications

The findings suggest that policy interventions in Ireland should move beyond awareness campaigns or isolated technical solutions and instead focus on systemic reform.

Key priorities include:

- Investment in circular infrastructure and regional reuse systems
- Reform of certification and recertification frameworks

- Development of functioning secondary material markets
- Clearer policy coordination and implementation
- Procurement reform to encourage early lifecycle collaboration
- Standardised data systems and sectoral KPIs

Without addressing these structural barriers, circular initiatives may remain fragmented or symbolic.

6. Conclusions

This report has examined the key obstacles to embracing Circular Economy principles in the Irish construction sector. Drawing on both existing literature and stakeholder evidence from the workshop, the findings show that barriers to CE adoption are not isolated or purely technical. Instead, they form an interconnected system of economic, regulatory, infrastructural, cultural, organisational, data-related, and design-related constraints.

The study finds that the most urgent barriers in the Irish context are structural. Lack of investment, weak economic viability of secondary materials, fragmented policy and regulation, certification and recertification challenges, and supply chain limitations were identified as the most critical obstacles. These barriers directly affect whether circular practices can move from aspiration to implementation. In particular, certification emerges as a major bottleneck, as reused materials may be available but cannot easily re-enter the market without clear, affordable, and trusted approval processes.

The findings also highlight the importance of the Irish context. While international literature provides useful categories of CE barriers, the workshop results show that national conditions shape how these barriers are experienced. In Ireland, planning delays, regional infrastructure gaps, limited reuse markets, policy fragmentation, and reliance on imported materials intensify the difficulty of implementing circular practices. This confirms the need for context-specific strategies rather than generic CE frameworks.

Although cultural, knowledge, skills, and data barriers were not always ranked as the highest priorities, they remain essential to the wider transition. Limited awareness, risk aversion, lack of practical guidance, poor lifecycle data, and weak material tracking systems reinforce the dominant economic and regulatory barriers. Therefore, addressing financial and policy constraints alone will not be sufficient unless supported by skills development, data systems, collaboration, and changes in industry practice.

Overall, the report concludes that the transition to a Circular Economy in the Irish construction sector requires coordinated systemic change. Priority actions should include investment in circular infrastructure, reform of certification and regulatory systems, development of viable secondary material markets, improved procurement and early-stage collaboration, clearer policy coordination, and stronger data and measurement frameworks. Without these changes, circular construction is likely to remain fragmented, costly, and difficult to scale.

The central implication is that CE adoption in Ireland should be treated not simply as a waste management issue, but as a broader transformation of how buildings are designed, procured, constructed, used, deconstructed, and valued across their lifecycle. Meaningful progress will depend

on aligning governance, markets, infrastructure, skills, and stakeholder collaboration around a shared circular transition pathway.

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