

Circular Procurement in Construction: Drivers, Practices, Performance

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ABSTRACT

The construction sector accounts for over one-third of global carbon emissions, making procurement a critical lever for advancing circular economy (CE) practices. However, there is limited understanding of how organizations apply CE criteria - such as material reuse, life-cycle assessment, low-carbon product selection, and waste minimization - within practical procurement processes across diverse institutional and organizational contexts. This exploratory qualitative study draws on 11 semi-structured interviews with Finnish small and medium-sized enterprises (SMEs) and public or large client organizations. Using the Drivers–Practices–Performance (DPP) framework, it examines how institutional signals shape procurement behavior and influence outcomes. Findings show that CE criteria are occasionally introduced during specification but rarely affect evaluation or contracting decisions. Weak and inconsistent regulatory and client pressures mean that internal motivation often serves as the primary enabler. However, fragmented responsibilities and limited organizational capacity constrain effective implementation. The study contributes to a deeper understanding of how institutional drivers and organizational practices jointly shape circular procurement performance and identifies key leverage points for aligning policy, stimulating client demand, and strengthening competences within fragmented construction markets.

Keywords: Circular procurement, Drivers–practices–performance (DPP), Construction sector

INTRODUCTION

In 2022, the construction sector generated about 37% of global energy- and process-related CO₂ emissions, accounting for roughly 21% of total greenhouse gas (GHG) emissions, highlighting its substantial environmental footprint (GlobalABC, 2025; United Nations Environment Programme UNEP). Procurement is often recognized as a critical driver of circular transition because it translates design and client requirements into purchasing decisions and influences environmental performance (Xu et al., 2022).

European evidence shows that construction-sector actors face recurring barriers to CE adoption, including cost pressures, capability gaps, and fragmented supply chains (Dey et al., 2022; Giorgi et al., 2022). Institutional pressures, such as regulation and client demand, can encourage the use of circular criteria (Arranz et al., 2022), but weak enforcement and inconsistent

policy signals often prevent these ambitions from translating into concrete procurement outcomes. As a result, a persistent “decision–outcome gap” remains in sustainable and circular procurement practices (Varnäs et al., 2009).

Public procurement has been widely recognized as a key lever for advancing circular practices in the construction sector (Walker & Brammer, 2009). Consequently, existing research has primarily focused on public-sector mechanisms, while the role of private-sector organizations - particularly SMEs - has received far less attention (Owojori & Okoro, 2022; Sajid et al., 2024; Witjes & Lozano, 2016). Yet SMEs account for roughly 99% of construction firms, with approximately 94% having fewer than 10 employees (Eurostat, 2023; Fédération de l’Industrie Européenne de la Construction FIEC, 2023a; 2023b). Their procurement practices are therefore central to scaling CE solutions. At the same time, large contractors and public clients play a key role in setting market expectations and regulatory standards that shape SME behavior (Arranz et al., 2022; Calzolari et al., 2023). Despite growing awareness, studies in the construction sector indicate that the implementation of circular procurement across both private and public sectors remains limited, fragmented, and highly context dependent (Giorgi et al., 2022; Sajid et al., 2024).

Given these research gaps, an exploratory qualitative approach is appropriate, as circular procurement remains an emerging and under-theorized field, consistent with the conditions for early-stage research outlined by Edmondson and McManus (2007). To address these gaps, this study investigates the following research question:

How do institutional and organizational pressures shape the adoption and implementation of circular procurement practices in the Finnish construction sector?

Drawing on institutional theory, the study examines how external signals are translated into procurement routines and outcomes through the Drivers–Practices–Performance (DPP) framework. It focuses on organizations representing different phases of the building life cycle - design, construction, and end-of-life - where procurement and design decisions most strongly influence material flows and circular performance (Giorgi et al., 2022; Munaro et al., 2020). These phases involve distinct institutional and technical constraints that shape how circular criteria are interpreted and applied in practice.

The following section outlines the theoretical foundations of circular procurement and institutional theory, followed by the applied DPP framework.

THEORETICAL FRAMEWORK

In construction, procurement and design decisions determine material choices, supplier networks, and contractual incentives that shape environmental outcomes (Giorgi et al., 2022; Munaro et al., 2020). However, circular criteria, although often introduced at early specification stages, rarely persist through evaluation or contracting (Giorgi et al., 2022;

Varnäs et al., 2009). While several frameworks have been proposed to integrate CE principles into procurement, their practical uptake remains limited, particularly in construction, due to regulatory, organizational, and capability constraints (Sönnichsen & Clement, 2019; Witjes & Lozano, 2016).

Building on institutional perspectives (e.g., Scott, 2014; Walker & Brammer, 2009), this study assumes that firms respond to coercive, normative, and mimetic pressures based on their internal capacities. The DPP framework (Zhu, Sarkis & Lai, 2007) extends this institutional logic by tracing how external drivers translate into organizational practices and performance outcomes.

In this study, drivers denote regulatory, client, and market pressures that either enable or constrain circular adoption. Practices represent how CE criteria are applied across specification, evaluation, and contracting stages (van Weele, 2018), while performance reflects resulting environmental, cost, and risk outcomes. The framework offers a process-oriented lens for identifying where institutional signals lose traction in practice and how procurement routines shape the practical adoption of circular principles.

Consistent with Oliver (1991), organizations may not only comply with external drivers but also selectively adapt, reinterpret, or avoid them within organizational constraints, helping to explain variation in CE implementation across procurement stages. This process-oriented view is particularly relevant in fragmented and resource-constrained construction settings, where short project cycles and multiple actors often dilute or reinterpret external circularity demands (Dey et al., 2022).

METHODOLOGY

The study focuses on organizations of varying sizes and ownership structures, reflecting the Finnish construction market, which is dominated by SMEs but influenced by large public clients. An exploratory qualitative approach was used to examine how public and private organizations integrate CE criteria into procurement decision-making.

In total, 11 semi-structured interviews were conducted between August and October 2025 in the Häme region of Finland. Participants represented seven large organizations, - including four municipalities, one foundation, and two construction firms, - as well as four SMEs from the construction sector. Organizations were purposefully selected to include actors actively engaged in circular procurement.

The selected participants represented different stages of the building lifecycle, including client-side project management, design, and construction. Interviewees were selected using elite sampling (Harvey, 2011), targeting individuals in strategic roles (e.g., Chief Executive Officers, sustainability experts, project managers) with in-depth knowledge of procurement practices. This ensured relevance and richness in relation to the research questions. Each interview lasted approximately 1.5 hours and was recorded with informed consent, transcribed, and anonymized in accordance with ethical research principles. Interview data were analyzed using a codebook-style thematic analysis (Braun & Clarke, 2021), guided by a predefined conceptual framework based on institutional theory. Coding followed the

DPP sequence and incorporated institutional categories coercive, normative, and mimetic pressures (Scott, 2014; Walker & Brammer, 2009) - alongside emergent themes, such as coordination, competence, and regulation.

FINDINGS AND DISCUSSION

This section presents how Finnish organizations respond to institutional and organizational pressures when integrating CE criteria into procurement decisions across different life-cycle stages. Findings are organized according to the DPP framework.

Drivers (D)

Weak Institutional Signals and Cost Dominance

Building on institutional theory, respondents described regulatory and client pressures as weak and inconsistent, while cost and time priorities continued to dominate procurement decisions. This view was widely shared among participants, as illustrated by the following interview extract: *“Nothing related to recycling gets done unless it turns out cheaper, that’s just the mindset.”*

Economic viability emerged as an absolute precondition rather than a competing goal. Respondents emphasized that circular solutions would only be adopted if they delivered cost savings or risk reduction. Together, these findings illustrate how economic rationality overrides environmental intent, reinforcing the power of financial control and risk-averse tendering. This reflects the coercive and normative mechanisms of institutional theory (DiMaggio & Powell, 1983; Scott, 2008), where economic norms outweigh emerging environmental expectations.

Fragmented Governance and Missing Coordination

Beyond price pressure, institutional inconsistencies also constrained implementation. Public clients and large contractors had circular objectives but struggled with fragmented responsibilities, outdated certification rules, and unclear permitting, which increased costs and discouraged experimentation: *“They [the authorities] should be more receptive and keep their ears open, because the real experience and insight come from outside the authorities.”*

This pattern reinforces earlier findings on institutional fragmentation in construction procurement (Calzolari et al., 2023), where unclear regulation and split accountability hinder innovation. Beyond firm-level constraints, respondents highlighted a structural coordination gap: the absence of intermediaries able to pool risks, verify material quality, and match supply and demand across projects. Interviewees suggested *“mass coordinators”* or similar roles to facilitate material exchange, echoing national findings.

Without such intermediaries or shared data infrastructures, even well-intentioned reuse initiatives may eventually *“collapse under their own complexity.”* Consistent with recent research on CE adoption in construction, meso-level coordination and supply chain integration are critical for scaling innovations (Ahmed et al., 2024; Calzolari et al., 2023). In

summary, weak institutional signals, cost-dominant logic, and missing coordination mechanisms jointly constrain systemic circular procurement. These weaknesses set the stage for the fragmented organizational practices discussed next.

Lack of Incentives

All respondent groups emphasized that current certification and permitting rules make reuse economically unviable without incentives, such as tax reductions, tender bonus points, or subsidies. As one participant explained: *“I really think that in the detached housing sector we’d need both the stick and the carrot... Taxation is always one way for society to influence things.”* Additionally, contract bundling and strict guarantee requirements often exclude SMEs, reducing competition and innovation. A similar policy gap, where market signals still fail to reward sustainability-oriented behavior, has also been noted in recent analyses of circular procurement barriers (Ahmed et al., 2024; Sajid et al., 2024).

Practices (P)

Circular Criteria Specified but not Sustained

CE criteria were often introduced at the specification stage but rarely influenced later evaluation or contracting. Cost remained decisive, and environmental clauses were inconsistent. Public clients struggled to translate goals into tenders, while SMEs lacked guidance and bargaining power. As one public client stated: *“In my own work, they remain rather abstract, more like strategic-level goals that are being measured, without anything very concrete.”* This “implementation gap,” where policy-level objectives fail to translate into consistent operational practice, has been widely recognized in circular procurement research (Ahmed et al., 2024).

Capability and Data Barriers

Competence gaps were often described as technical, relating to material verification, carbon accounting, and regulatory interpretation. Respondents reported missing or unreliable data on material properties: *“We lack reference values for leaching, frost resistance, or strength for reused materials.”*

However, several interviewees also highlighted attitudinal and cultural barriers -such as risk aversion, cost dominance, and lack of experimentation - that often underlie or reinforce these limitations. This suggests that skill shortages in circular procurement are twofold, combining the need for specific technical expertise with broader shifts in culture and client expectations. Such dual capability barriers (Calzolari et al., 2023; Tura et al., 2019) combine know-how gaps with - cultural resistance to change and limited organizational learning (Ahmed et al., 2024). Digital systems also had limited implementation. Building Information Modelling (BIM) environments often lacked life-cycle or carbon data or relied on unverified databases, making comparisons difficult and discouraging circular options: *“For every single piece of pipe, there should be information on*

what structural component it is... If it's just on paper drawings somewhere, you can't transfer that information anywhere." Consistent with previous studies, data traceability and interoperability remain key enablers of circular procurement (Calzolari et al., 2023; Giorgi et al., 2022).

Procedural and Collaboration Barriers

Respondents described procurement as a series of "gates"—specification, evaluation, and contracting—in which circular criteria tend to be excluded in later stages under time or cost constraints. Recognizing these gates clarifies where institutional signals lose traction. Practitioners emphasized that overly complex guidance discourages adoption: *"We don't need a book, just one page."*

This procedural friction (Calzolari et al., 2023) illustrates how administrative overload and unclear accountability reduce the uptake of CE criteria. Some clients experimented with partnership-based procurement to integrate CE goals, but limited capacity often caused ambitions to fade before contracting. Consistent with collaborative procurement theory (Eriksson, 2017) and recent findings on circular construction (Calzolari et al., 2023; Sajid et al., 2024), early-stage dialogue and shared risk allocation remain underdeveloped due to limited capacity and fragmented responsibilities (Calzolari et al., 2023).

Overall, CE practices remain fragmented and dependent on individual champions, hindered by data gaps, capability limits, and weak alignment between strategic goals and procurement procedures. Fragmented routines illustrate why circular goals rarely yield measurable results.

Performance (P)

Limited Reuse Despite Progress

Reported outcomes varied across SMEs, contractors, and public clients. SMEs and contractors noted better waste sorting and reduced site losses, yet reuse gains were often offset by verification, logistics, and permitting costs. The findings reveal a clear gap between waste management and higher-level reuse, linked to rigid schedules, limited storage, and inconsistent permits that raise costs and deter experimentation: *"...it's a logistical challenge to manage the site, and then there's this extra piece, the material would have to be dismantled this week and taken directly by truck to the next site... so making such a change would require massive investments."* Circular progress therefore remains largely confined to the waste-management level (Adams et al., 2017; Giorgi et al., 2022).

Outdated Design and Professional Routines

Respondents emphasized that losses stemmed not only from design flaws but also from weak coordination and unclear responsibility. Reusable materials were often discarded under time pressure. They also pointed to outdated design practices that ignore reuse. As one interviewee noted, despite growing awareness, *"buildings are still not designed for deconstruction."*

The lack of continuing education among senior professionals was seen as a key barrier: *“The initial investments and the whole principle of planning are extremely important, because that’s where we define how much material is procured, where it comes from, and whether it might already be possible to make use of some kind of reused material.”* This reflects a capability trap frequently noted in circular construction research, where outdated routines persist and continuous learning mechanisms are lacking (Ahmed et al., 2024; Tura et al., 2019).

Path Dependency and Limited Diffusion

Circularity was often perceived as an extra task rather than a norm. New employees frequently adopted non-circular habits from veterans: *“We have designers from very different backgrounds: some are near the end of their careers without any further training, while... less experienced designers learn their working methods from them.”* This indicates a form of path dependency in construction-sector CE practices, where linear routines and cultural inertia continue to dominate behavior (Calzolari et al., 2023; Giorgi et al., 2022). Firms reported learning, collaboration, and reputational benefits, but these remained local and project specific. Progression from design-oriented actions to actual reuse remained rare: *“To be honest, you really can’t use any recycled materials in construction these days.”*

Consistent with transition research on circular procurement and construction, many initiatives remain confined to pilot projects with limited institutional diffusion and scaling capacity (Calzolari et al., 2023; Giorgi et al., 2022).

Table 1: Identified behavioral patterns across Finnish construction procurement, categorized under the Drivers–Practices–Performance (DPP) framework.

DPP Stage	Behavioral Pattern	Interview Quote
Drivers (D)	Weak institutional signals and cost dominance	“Nothing related to recycling gets done unless it turns out cheaper, that’s just the mindset.”
	Fragmented governance and missing coordination	“They [the authorities] should be more receptive and keep their ears open, because the real experience and insight come from outside the authorities.”
	Lack of incentives	“...in the detached housing sector we’d need both the stick and the carrot... Taxation is always one way for society to influence things.”
Practices (P)	Circular criteria specified but not sustained	“...in my own work, they remain rather abstract, more like strategic-level goals that are being measured, without anything very concrete.”

Continued

Table 1: Continued

DPP Stage	Behavioral Pattern	Interview Quote
Performance (P)	Procedural and collaboration barriers	"We lack reference values for reused materials."
	Digital and data-related limitations	"...there should be information on what structural component it is... If it's just on paper drawings somewhere, you can't transfer that information anywhere."
	Limited reuse despite progress	"... the material would have to be dismantled this week and taken directly by truck to the next site... so making such a change would require massive investments."
	Outdated design and professional routines	"Buildings are still not designed for deconstruction."
	Path dependency and limited institutional diffusion	"We have designers from very different backgrounds: some are near the end of their careers without any further training, while... less experienced designers learn their working methods from them."

Overall, Finnish CE procurement shows fragmented progress: Strategic awareness is growing, yet implementation remains constrained by institutional weaknesses, capability gaps, and limited coordination.

CONCLUSION AND FUTURE RESEARCH

Building on the DPP framework (Zhu, Sarkis & Lai, 2007), the findings reveal that weak institutional signals, the dominance of cost efficiency, and the absence of a meso-level coordination layer jointly constrain the scaling of circular procurement in Finland's construction sector. Circular criteria are often specified but rarely influence evaluation or contracting, reflecting a loss of traction between external drivers and internal routines. The lack of intermediaries capable of pooling risks, verifying material quality, and matching supply and demand across projects reinforces fragmentation and prevents economies of scale. Strengthening regulatory coherence, client requirements, and competence-building could help circular criteria persist across procurement stages. A regional or sectoral coordination platform could align incentives, pool verified data, and reduce transaction costs. Ultimately, circular procurement is likely to expand only when institutional drivers, organizational practices, and performance feedback form reinforcing loops that drive system-level change.

This study is limited by its small, qualitative sample and focus on Finnish construction organizations, which may restrict generalizability to other national contexts. The findings capture perceptions and practices at

a specific point in time rather than long-term change. Future research should extend these insights through longitudinal, comparative, and cross-country studies to explore how platforms, data systems, and incentives can scale circular practices. Practically, this calls for concise CE checklists, shared data infrastructures, and piloted procurement models linking clients and SMEs in real projects.

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