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PERSPECTIVE

From Circular Systems to Circular Behavioural Regimes: Reframing Circular Economy Transitions

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Abstract

Circular economy research has prioritised technological innovation, business models, and policy frameworks to enable resource efficiency and closed-loop systems. Yet progress toward circularity remains limited, suggesting a persistent misalignment between system design and everyday practice. This perspective argues that circular transitions cannot be understood or achieved without recognising behaviour as a system-level condition rather than an individual outcome. Building on behavioural sustainability research and sustainability transitions theory, it introduces the concept of circular behavioural regimes: stable configurations of routines, norms, incentives, infrastructures, and value systems that reproduce patterns of resource use. It argues that linear and recycling economies persist because they are supported by behavioural regimes that favour convenience, throughput, and disposability. Circular transitions therefore require not only system redesign but also behavioural regime reconfiguration across individual, organisational, and societal levels. By framing friction reduction, capability-building, and social legitimacy as interacting mechanisms of regime change, this perspective positions behavioural sustainability as a foundational condition for circular transformation.

Keywords Circular Economy · Behavioural Sustainability · Behavioural Regimes · Sustainability Transitions · Circular Transition

1. Introduction

The circular economy is widely promoted as a pathway to reduce waste, retain material value, and decouple economic activity from environmental degradation (Geissdoerfer et al., 2017; Kirchherr et al., 2017). Policy frameworks, business models, and technological innovations have increasingly aligned around strategies such as reuse, repair, remanufacturing, and recycling. Despite this momentum, global circularity remains low and uneven, with many systems failing to progress beyond recycling-oriented participation (Kirchherr et al., 2018; Gomes et al., 2022). Recent work has also begun to position behavioural sustainability as a critical yet underdeveloped dimension of circular economy transitions, showing that misalignments between behavioural conditions and system design constrain progress beyond partial forms of circularity (Nkiko, 2026).

A dominant assumption in circular economy research is that improved system design will generate behavioural change. Infrastructure provision, regulatory incentives, and technological optimisation are expected to enable circular practices at scale. Yet evidence increasingly shows that circular options are often underused, misused, or abandoned, even when available (Tassell and Aurisicchio, 2023; Stangherlin et al., 2023). This suggests that behaviour is not simply an outcome of system design, but a structuring condition of transition.

The underemphasis on behaviour in circular economy research is not accidental. It reflects the disciplinary origins of the field. The circular economy concept emerged primarily from industrial ecology, engineering, and material flow analysis, disciplines that treat resource flows, system design, and technological substitution as the primary levers of change (Ghisellini et al., 2016; Corvellec et al., 2022). Within this framing, human

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behaviour was largely assumed to follow system redesign. If circular infrastructure and incentives were in place, behavioural change would occur as a downstream outcome. This hypothesis proved optimistic. Bibliometric analyses of CE scholarship confirm that research has remained heavily weighted towards techno-economic solutions, with social and behavioural dimensions consistently underrepresented (Corvellec et al., 2022). A secondary reinforcement came from policy, where CE frameworks such as the EU Circular Economy Action Plan have historically prioritised material targets, recycling rates, and production standards over demand-side behavioural conditions. The result is a field that has advanced technically whilst remaining behaviourally underdeveloped, producing systems that are circular in design but linear in practice.

This perspective therefore argues that circular transitions are limited by the behavioural regimes that stabilise patterns of production and consumption and that, without reconfiguring these regimes, circular systems remain misaligned with everyday practice.

2. From Circular Systems to Circular Behavioural Regimes.

Transition theory, particularly the Multi-Level Perspective, conceptualises socio-technical change as interactions between niches, regimes, and landscapes (Geels, 2002). Regimes represent relatively stable configurations of institutions, practices, and material arrangements that reproduce existing systems. However, behavioural dynamics within regimes remain under-specified. This matters because circular transitions depend not only on technological substitution or regulatory change, but on whether new patterns of action can become routine, legitimate, and durable.

To address this gap, this perspective introduces the concept of a behavioural regime, understood here as '*a stable configuration of routines, norms, incentives, infrastructures, and value systems that shape and reproduce patterns of behaviour within a socio-technical system*'. This builds on prior work that positions behavioural sustainability as the alignment of behavioural, social, and organisational conditions with circular strategies to enable sustained system-level outcomes (Nkiko, 2026). It also aligns with approaches in sustainable consumption and social practice theory that treat behaviour as socially embedded rather than purely individual (Jackson, 2005; Shove, 2010).

Applied to circular economy transitions, this lens distinguishes three regimes (Figure 2). A linear behavioural regime is organised around convenience-driven consumption, disposability, and low perceived responsibility for resource use. A recycling behavioural regime reflects partial engagement, where participation is concentrated at end-of-life stages while upstream practices remain largely unchanged. A circular behavioural regime, by contrast, is characterised by sustained practices of reuse, repair, return, refill, remanufacture, and value retention, supported by aligned infrastructures, incentives, and social norms. The persistence of linear and recycling regimes suggests that many transitions stall not because circular solutions are absent, but because the behavioural regimes that support linearity remain intact.

Figure 1. Behavioural Regime Transition Framework in the Circular Economy

Recent work on circular ecosystems has advanced understanding of how actors coordinate around value flows, roles, and shared infrastructures to enable circular transitions (Bocken and Ritala, 2022; Adner, 2017). These frameworks usefully map the structural conditions for circularity, including platform governance, role differentiation between producers, users, and intermediaries, and the orchestration of resource loops. However, ecosystem frameworks largely treat the behavioural dispositions of actors as given or as outcomes of structural design. The concept of circular behavioural regimes extends this by specifying the internal behavioural conditions under which actors within ecosystems reproduce linear or circular patterns. Where ecosystem structures are circular but behavioural regimes remain linear, coordination fails at the level of everyday practice. Behavioural regime analysis therefore operates as a complementary lens, explaining the within-ecosystem dynamics that structural frameworks leave underspecified.

3. Why Circular Transitions Stall?

Circular transitions stall because behavioural regimes are reinforced across multiple levels. At the individual level, behaviour is shaped by convenience, habits, uncertainty, and perceived effort. Circular practices such as repair, return, or refill often involve higher friction costs than linear alternatives, which limits uptake even when attitudes are favourable (Kirchherr et al., 2018; Kollmuss and Agyeman, 2002). Behavioural economics illuminates why. Simon's (1955) bounded rationality explains why actors satisfice rather than optimise, relying on cognitive shortcuts that determine whether circular options are even perceived as viable. Kahneman and Tversky's (1979) prospect theory demonstrates that actors exhibit loss aversion and present bias, discounting future circular benefits against the immediate friction of effort and inconvenience. Thaler and Sunstein's (2008) choice architecture framework shows how the framing and sequencing of options shapes decisions independently of their objective merits, while Cialdini's (1984) social norms research confirms that peer behaviour and normative signals powerfully activate or suppress adoption. Together, these insights suggest that willingness alone rarely produces stable circular participation, and that regime reconfiguration must reshape not only attitudes but the decision environments, cognitive frames, and social signals within which circular choices are made.

At the organisational level, firms frequently operate under performance metrics that reward throughput, efficiency, and short-term returns. These logics favour linear production and consumption patterns and can constrain investment in circular strategies, particularly where firms face capability gaps or uncertain returns (Luthra et al., 2022; Eikelenboom and van Marrewijk, 2023). Circularity may therefore be endorsed rhetorically while remaining marginal operationally.

At the societal level, infrastructures, regulations, and cultural norms often favour disposal over retention. Weak repair ecosystems, fragmented return systems, inconsistent policy signals, and limited social legitimacy for reuse practices reinforce non-circular behaviour (Stangherlin et al., 2023; Tan and Yeoh, 2024). Taken together, these reinforcements produce behavioural lock-in, where linear practices persist despite the availability of circular alternatives. The implication is that many circular economy interventions underperform not because the underlying idea is weak, but because they confront stable behavioural regimes with isolated tools.

Table 1 below provides a structured overview of these three levels, clarifying the key actors at each level, their behavioural roles in circular transitions, and the specific types of behavioural change required.

Table 1. Actor Levels, Behavioural Roles, and Types of Behavioural Change Required in Circular Economy Transitions

Level	Key Actor(s)	Behavioural Role in Linear/Recycling Regimes	Type of Behavioural Change Required for Circular Regime
Individual	Consumers, citizens, end-users	Shaped by convenience, habits, uncertainty, and perceived effort. Circular practices such as repair, return, or refill often involve higher friction costs than linear alternatives, limiting uptake even when attitudes are favourable.	Shift from convenience-driven consumption and low perceived responsibility toward sustained practices of reuse, repair, return, and value retention. Requires reduction of friction costs, increase in perceived capability and skill, and elevation of social legitimacy and peer support.

Table 1 (cont.). Actor Levels, Behavioural Roles, and Types of Behavioural Change Required in Circular Economy Transitions

Level	Key Actor(s)	Behavioural Role in Linear/Recycling Regimes	Type of Behavioural Change Required for Circular Regime
Organisational	Firms, supply chain actors, business leaders, operational managers	Operate under performance metrics that reward throughput, efficiency, and short-term financial returns. These logics favour linear production and consumption patterns and constrain investment in circular strategies, particularly where firms face capability gaps or uncertain returns.	Shift from throughput-oriented performance metrics and linear business logic toward circular business models and regenerative value creation. Requires organisational learning, capability-building in reverse logistics and cross-functional coordination, and alignment of incentive structures with circular strategies.
Societal	Policymakers, infrastructure providers, cultural institutions, regulatory bodies, waste management systems	Infrastructures, regulations, and cultural norms systematically favour disposal over retention. Weak repair ecosystems, fragmented return systems, inconsistent policy signals, and limited social legitimacy for reuse practices reinforce non-circular behaviour at scale.	Shift from waste-focused to resource-retention governance and cultural framings. Requires coordinated infrastructure investment, consistent regulatory signals, cultural norm-shifting through social visibility and narrative change, formalisation of circular practices into standard institutional arrangements, and recognition of informal circular economies where they already exist.

4. Reconfiguring Behavioural Regimes

Transitioning to a circular behavioural regime requires coordinated change across three interacting mechanisms, illustrated in Figure 2: friction reduction, capability-building, and social legitimacy. These should not be treated as separate levers, but as a configuration through which circular practices become easier to enact, more feasible to sustain, and more legitimate to adopt.

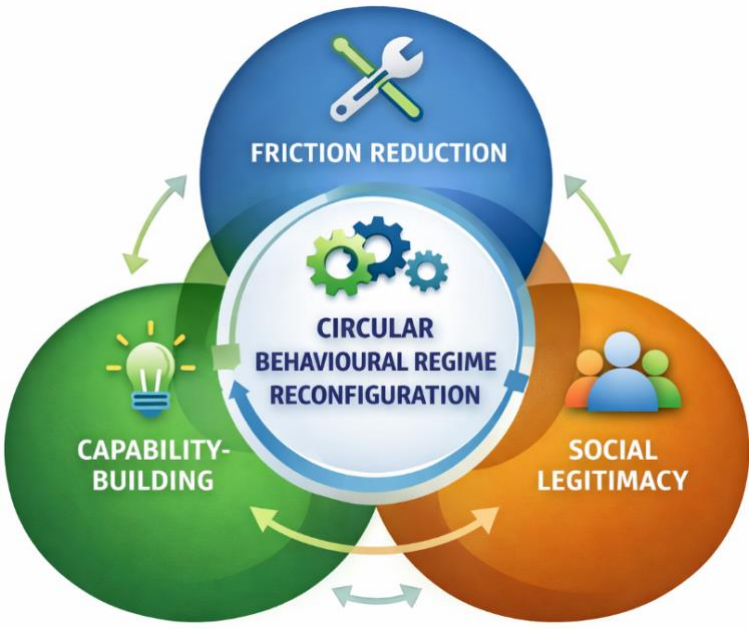

Figure 2. Configurational Mechanisms for Reconfiguring Circular Behavioural Regimes.

First, friction reduction is critical. Circular options must become easier, faster, and more reliable than linear alternatives. Evidence from refill and reuse systems shows that uptake improves when effort and uncertainty are minimised at the point of action (Tassell and Aurisicchio, 2023; Clark, 2020). Sweden's deposit-refund system for beverage packaging, which achieves return rates consistently above 85 per cent, illustrates how

default infrastructure can normalise circular participation at scale by making return easier than disposal (Kremel, 2024). Similarly, the EU's right-to-repair legislation, which came into force in 2024, reduces friction at the regulatory level by requiring manufacturers to provide spare parts and repair information, directly lowering the effort costs that have historically favoured replacement over repair. Where such frictions are not addressed, the linear option retains its practical advantage regardless of consumer attitudes.

Second, capability-building is necessary. Circular practices require skills, knowledge, organisational competences, and service ecosystems. Without these, individuals and firms tend to revert to familiar routines. Capability-building therefore includes not only user literacy and repair competence, but also organisational learning, reverse logistics competence, and cross-functional coordination (Eikelenboom and van Marrewijk, 2023; Terzioğlu, 2021). Patagonia's Worn Wear programme demonstrates this at the firm level: by integrating repair services, trade-in logistics, and resale infrastructure, the company has reconfigured the organisational routines and consumer competences required to sustain circular participation, with an estimated 120,000 repurposed items resold through the platform (Bocken and Short, 2016). At the community level, repair café networks across the Netherlands, UK, and Germany build hands-on repair skills whilst simultaneously normalising maintenance as a social practice rather than a specialist activity (Terzioğlu, 2021).

Third, social legitimacy matters because behaviour becomes durable when it is publicly recognised, normalised, and positively valued. Repair networks, sharing platforms, and community-based circular practices show how peer support, identity alignment, and normative endorsement can stabilise circular participation (Stangherlin et al., 2023; Tan and Yeoh, 2024).Singapore's freecycling movement, documented by Tan and Yeoh (2024), illustrates how community-based reuse platforms generate social legitimacy by framing circular participation as an expression of shared values and local identity rather than sacrifice or inconvenience. In policy terms, France's repairability index, introduced in 2021 and requiring manufacturers to display a repairability score on electronics and appliances, creates normative visibility for repair as a legitimate consumer choice, shifting social expectations around product longevity. Where circular action remains socially ambiguous or stigmatised, adoption is likely to remain weak or temporary.

These mechanisms are most effective when configured together. Reducing friction without building capability may improve access but not persistence. Building capability without legitimacy may create competence without uptake. Legitimacy without friction reduction may generate support without action. In this sense, behavioural regime change depends less on isolated interventions than on the coordinated redesign of the conditions under which action occurs. This extends prior conceptual work by reframing behavioural sustainability from a foundational condition into a regime-level construct that explains how circular practices are stabilised or constrained across socio-technical systems (Nkiko, 2026).

5. Conclusion and Directions for Circular Economy Research and Practice

Circular economy transitions will not be achieved through any single intervention. Technological innovation, regulatory frameworks, business model redesign, and infrastructure investment remain necessary conditions for circularity. However, they are insufficient without the concurrent reconfiguration of the behavioural regimes that shape how resources are produced, consumed, and valued. This perspective does not position behavioural change as a substitute for structural reform. Rather, it argues that structural and behavioural conditions must be aligned. Where regulation mandates circularity but behavioural regimes favour disposal, compliance will remain shallow. Where infrastructure enables reuse but social legitimacy is absent, uptake will remain fragile. Without reconfiguring behavioural regimes alongside technical and policy systems, circular options risk remaining viable in design but unviable in everyday practice. By introducing the concept of circular behavioural regimes, this perspective provides a meso-level lens for explaining why transitions stall and how they may be stabilised. For circular economy research, this means moving beyond individual behaviour models toward the analysis of regime conditions that structure action. For policy, it means designing not only infrastructures and standards, but also the behavioural conditions that make circular participation normal, easy, and credible. For industry, it means recognising firms as behavioural architects whose design choices, service systems, and performance metrics actively shape the prospects of circular transition.

The concept of circular behavioural regimes also carries important geographical limits that warrant acknowledgement. The framework developed here draws primarily on evidence from Western consumer

contexts, where linearity is the dominant regime and circularity requires deliberate intervention. This framing does not translate universally. Across much of the Global South, repair, reuse, and material recovery are already embedded practices sustained by economic necessity, community organisation, and informal sector activity rather than by policy design (Korsunova et al., 2022; Ranta et al., 2018). In India, informal waste pickers process over 70 per cent of recyclable materials; in South Africa, end-of-life products are routinely repaired and reused through active informal markets. These contexts do not lack circular behavioural regimes. What they frequently lack is formal recognition, infrastructure investment, and institutional support for the circular practices that already exist. For circular economy research, this distinction matters. The policy implication in Western contexts is to build circular behavioural regimes where linear ones dominate. In many Global South contexts, the implication is different: to strengthen, formalise, and support circular behavioural regimes that are already operating but remain precarious and undervalued. A truly global circular economy framework must account for both starting points.

Behavioural sustainability should therefore be treated not as a complementary concern, but as a foundational condition of circular economy transition. The field now needs to ask not only whether circular systems are technically possible, but whether they are behaviourally governable.

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Declarations

Competing Interests The authors declare no competing interests.

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