

From Commitment to Routine Practice: Explaining Uneven Sustainability Implementation in Multi-Tier Value Chains

Abstract

Purpose: This study examines why sustainability initiatives in multi-tier value chains often fail to become embedded in routine practice, despite growing investment in traceability systems, reporting routines, digital tools, supplier development, and process changes. It focuses on how such initiatives become consequential in practice and develop into uneven implementation trajectories that may stabilise, drift, become diluted, or be redirected across organisational positions.

Design/methodology/approach: Adopting paradox theory as a sensitising lens, the study uses an abductive, episode-based qualitative design in the petrochemical sector. It identifies 43 sustainability decision episodes and reconstructs 31 of them across linked organisational positions using interviews, follow-up interviews, focus groups or workshops, and documentary and workflow artefacts.

Findings: Sustainability initiatives became consequential as practical triggers that disrupted existing routines, accountabilities, and coordination patterns. Their effects were shaped by how actors interpreted them through concerns about practical mastery, role and accountability, coordination and relational fit, and practical legitimacy. These concerns gave rise to defensive or integrative response patterns, depending partly on the relational conditions under which implementation unfolded. Over time, these responses accumulated into four recurring implementation trajectories: drift, toggling, stabilisation, and recalibration.

Originality/value: The paper explains uneven sustainability implementation as a process through which sustainability initiatives are interpreted and enacted across multiple organisational positions and over time. In doing so, it extends sustainable value chain research beyond structural explanations and offers a process account of why similar initiatives stall, stabilise or are revised in practice.

1. Introduction

Sustainability initiatives are now a prominent feature of contemporary value chain management (Govindan et al., 2024). Across industries, firms pursue sustainability through a growing range of interventions, including traceability systems (Zhou et al., 2024), reporting and transparency routines (Tang and Higgins, 2022), digital monitoring and transparency tools (McGrath et al., 2021; Searcy et al., 2022), sustainable

procurement practices (Hinterhuber and Khan, 2025), and supplier development initiatives (Jia et al., 2026). Collectively, these interventions reflect the growing formalisation of sustainability within and across value chains. Supply chain research has increasingly approached this implementation problem through overlapping debates on multi-tier sustainability, traceability for sustainability, digital traceability, traceability in multi-tier supply chains, and sustainability-oriented supplier development. Across these debates, the issue is not only whether sustainability mechanisms are introduced, but how they are cascaded, translated, interpreted, resourced, and made workable across organisational and tier boundaries (Garcia-Torres et al., 2019; Oyedijo et al., 2024; Zhou et al., 2024; Schaëfer, Kähkönen and Luzzini, 2025; Jia et al., 2026). Yet formalisation does not guarantee embedding in practice. The diffusion, scaling, and enactment of sustainability initiatives often remain uneven across interconnected actors (Falcone, Yan and Fugate, 2024; Jia et al., 2026). The issue, therefore, is not simply whether firms launch sustainability initiatives, but whether those initiatives become lived, distributed, and durable forms of practice across organisational boundaries. In this sense, formal sustainability commitments do not automatically translate into real sustainable change (Hahn, Reimsbach and Wickert, 2023).

This challenge becomes especially acute in multi-tier value chains, where sustainability initiatives must travel beyond the focal firm and its immediate suppliers into settings marked by uneven visibility, indirect control, and differentiated operating conditions (Chae, Choi and Hoetker, 2024; Swink et al., 2024; Jamalnia, Gong and Govindan, 2023). The difficulty is not simply that more tiers create more complexity. More fundamentally, sustainability demands are translated across organisational positions that differ in responsibilities, incentives, capabilities, and practical constraints (Chae, Choi and Hoetker, 2024; Jia, Hendry and Stevenson, 2022; Jamalnia, Gong and Govindan, 2023). Lower-tier relationships therefore cannot be understood through direct governance alone (Chae, Choi and Hoetker, 2024; Jamalnia, Gong and Govindan, 2023). As sustainability initiatives move across the chain, they increasingly depend on intermediary actors that interpret, adapt, and relay demands across tiers (Santos, Silva and Pereira, 2023; Jia, Hendry and Stevenson, 2022; Jia, Stevenson and Hendry, 2021). What appears as a single sustainability initiative from the focal firm's perspective thus becomes a distributed implementation problem once it enters the wider value chain (Rosca et al., 2022; Chae, Choi and Hoetker, 2024).

The core puzzle, then, lies in the gap between formal introduction and durable routine practice. Sustainability initiatives may be announced, resourced, audited, and partially implemented, yet they do not travel uniformly across the value chain: some become stabilised as part of ordinary work, while others remain partial, fragile, diluted, redirected, or largely symbolic despite apparently similar formal support (Hahn, Reimsbach and Wickert, 2023; Santos, Silva and Pereira, 2023; Jia, Hendry and Stevenson, 2022; Jia et al., 2026). Existing research has generated important insights into

this problem. Studies of governance, traceability, compliance, supplier development, capabilities, and learning have shown why sustainability initiatives are difficult to diffuse across complex supply networks and why their implementation depends on appropriate structures, information flows, and coordination mechanisms (Chae, Choi and Hoetker, 2024; Rosca et al., 2022; Zhou et al., 2024; Schaëfer, Kähkönen and Luzzini, 2025; Brandenburg, Warasthe and Seuring, 2024; Marttinen and Kähkönen, 2022; Jia, Stevenson and Hendry, 2021; Jia, Hendry and Stevenson, 2022; Santos, Silva and Pereira, 2023). Yet much of this research still explains uneven implementation mainly through structural supports and constraints, and therefore tells us less clearly how apparently similar sustainability demands are translated into different patterns of enactment across value chain positions. What remains underexplained, in particular, is how such differences accumulate into divergent trajectories of embedding, dilution, redirection, or stalling over time.

To address this issue, the paper adopts a paradox-informed and process-oriented lens (Carmine and De Marchi, 2023; Grimm, Langley and Reinecke, 2024). Rather than treating uneven implementation mainly as the downstream effect of structural supports and constraints, it examines how sustainability initiatives are worked through in practice across multi-tier value chains. The study therefore asks: How do sustainability initiatives become embedded, stalled, diluted, or redirected across multi-tier value chains, and how are these trajectories shaped by interpretation, response, and relational conditions?

The remainder of the paper is organised as follows. The next section reviews the literature on sustainable value chain implementation, multi-tier complexity, prevailing governance- and capability-based explanations, and the paradox-informed process perspective that motivates the study. The paper then outlines the abductive methodology and episode-based empirical design, before presenting the findings and the emergent process model. The final sections discuss the paper's theoretical and managerial implications, clarify its boundary conditions, and conclude by outlining the paper's central implication.

2. Literature review

2.1 Sustainable value chain implementation as an embedding challenge

Research on sustainable value chains is increasingly concerned not only with whether firms adopt sustainability initiatives, but also with whether those initiatives become enacted and stabilised in routine practice (Oyedijo et al., 2024; Santos, Silva and Pereira, 2023; Jia et al., 2026). This shift reflects an important development in the field, as recent work has moved beyond formal adoption toward questions of implementation, learning, translation, and scale-up in practice (Hahn, Reimsbach and Wickert, 2023; Oyedijo et al.,

2024; Santos, Silva and Pereira, 2023; Jia et al., 2026). Sustainability is increasingly pursued through concrete organisational and inter-organisational mechanisms, including transparency, traceability, digital traceability and sustainability-oriented supplier development (Garcia-Torres et al., 2019; Morgan et al., 2023; Zhou et al., 2024; Schaëfer, Kähkönen and Luzzini, 2025; Jia et al., 2026). Yet the presence of such interventions does not by itself indicate that sustainability has become embedded in everyday operations. Formal adoption and tool deployment are not equivalent to distributed enactment. Recent work shows that sustainability initiatives often remain partial, fragmented, or unevenly enacted because their practical effects depend on how they are translated into concrete work routines across settings marked by different constraints, competences, and priorities (Hahn, Reimsbach and Wickert, 2023; Oyedijo et al., 2024; Santos, Silva and Pereira, 2023; Jia et al., 2026).

This matters because value chain sustainability depends on implementation beyond the focal firm (Rosca et al., 2022; Oyedijo et al., 2024). Many sustainability goals cannot be realised through internal policy commitment alone. They depend on whether expectations, metrics, technologies, and revised routines travel across suppliers, intermediaries, and production sites in ways that alter ongoing practice rather than merely adding symbolic layers of compliance (Hahn, Reimsbach and Wickert, 2023; Santos, Silva and Pereira, 2023; Jia, Hendry and Stevenson, 2022; Rosca et al., 2022). For this reason, implementation is not a secondary stage that follows strategy. It is a central part of the sustainability problem itself. The literature has therefore moved, appropriately, toward questions of enactment, coordination, and diffusion (Oyedijo et al., 2024; Santos, Silva and Pereira, 2023; Rosca et al., 2022; Jia et al., 2026). However, while this move has clarified why sustainability initiatives are difficult to implement, it has not yet fully explained how apparently similar initiatives become stabilised in some settings while drifting or fragmenting in others.

2.2 Why implementation becomes more difficult in multi-tier value chains

These challenges intensify in multi-tier value chains, where sustainability initiatives must move beyond direct contractual relationships and become workable across lower-tier contexts marked by uneven visibility, indirect influence, variable governance reach, and tier-specific operating contingencies (Tachizawa and Wong, 2014; Sauer and Seuring, 2018; Chae et al., 2024; Swink et al., 2024; Jamalnia et al., 2023). What appears as a relatively coherent intervention at the focal firm level often becomes a more fragmented and contingent process once it moves across the chain (Rosca et al., 2022; Chae et al., 2024). This is because sustainability expectations must be interpreted and enacted by actors occupying different positions, facing different pressures, and drawing on different forms of practical knowledge (Santos et al., 2023; Jia et al., 2021; Jia et al., 2022). Multi-tier implementation is therefore not simply an extended version of dyadic coordination

(Chae et al., 2024; Rosca et al., 2022). It raises a more distributed problem of translation across organisational and positional boundaries (Santos et al., 2023; Jia et al., 2021).

The multi-tier literature has made this point increasingly clear. Because lower-tier suppliers often sit beyond focal firms' direct oversight, sustainability initiatives in multi-tier supply chains tend to depend on indirect governance, cascaded expectations, boundary-spanning intermediaries and partial visibility rather than direct contractual control alone (Tachizawa and Wong, 2014; Sauer and Seuring, 2018; Chae et al., 2024; Jia et al., 2021; Rosca et al., 2022; Swink et al., 2024). Other work has shown that lower-tier sustainability management is influenced by a range of contingencies, including infrastructural weaknesses, resource constraints, information asymmetries, and the variable strength of buyer-supplier relationships across levels of the chain (Jamalnia et al., 2023; Oyedijo et al., 2024). Recent traceability research similarly shows that multi-tier sustainability cannot be reduced to the technical availability of data, because traceability depends on enablers, barriers, and cross-tier conditions that shape whether visibility becomes useful for sustainable supply chain management (Garcia-Torres et al., 2019; Schaëfer, Kähkönen and Luzzini, 2025). In such contexts, sustainability initiatives do not simply diffuse downward in linear form. Rather, they are translated and adapted as they encounter differentiated material and social conditions across the chain (Santos et al., 2023; Jia et al., 2022). This means that a focal-firm or even a dyadic lens is often insufficient for explaining how sustainability initiatives unfold in practice (Chae et al., 2024; Rosca et al., 2022).

Recent research on digital transformation in supply chains reinforces this point. Zhang et al. (2025) show that digital transformation initiatives are often mediated by first-tier suppliers, whose role is not merely transmissive but also coordinative. Their study further suggests that the conditions supporting implementation vary across tiers. In downstream focal firm to Tier-1 relations, relational capital may be especially important, whereas further upstream, implementation may depend more strongly on cognitive alignment among actors exposed to weaker direct coordination. Such findings suggest that implementation is shaped not only by the formal presence of new demands, but also by the social conditions through which those demands are carried across the chain. Yet much of the multi-tier literature still explains these dynamics primarily through structural and organisational variables, including governance form, information access, monitoring design, supplier capabilities, and coordination mechanisms (Chae et al., 2024; Swink et al., 2024; Jamalnia et al., 2023; Rosca et al., 2022). These explanations are necessary and often powerful, but they leave open a further question: why do sustainability demands that appear broadly comparable at the formal level produce divergent practical responses as they move across value chain positions?

2.3 The strengths and limits of prevailing explanations

The dominant answers to this question have been developed through governance-oriented, capability-oriented, learning-oriented, and decision-oriented perspectives. Governance research has shown how contractual arrangements, cascading expectations, inter-firm power, and focal-firm influence shape sustainability coordination across supply chains (Ahmed and Shafiq, 2022; Marttinen and Kähkönen, 2022; Chae et al., 2024). This work has been especially important in demonstrating that sustainability implementation depends on more than stated commitment. It requires mechanisms through which expectations are communicated, monitored, and reinforced across organisational boundaries (Marttinen and Kähkönen, 2022; Chae et al., 2024). Capability-oriented work has added a second crucial layer of explanation by showing that sustainability outcomes depend on whether firms and supply chain partners possess the resources, competences, and organisational supports needed to absorb, operationalise, and sustain new demands (Arda et al., 2023; Zhou et al., 2024). Related research has highlighted the importance of learning capacity, knowledge transfer, supply chain learning, innovation support, and supplier development in enabling implementation, while procurement studies have pointed to behavioural supports, awareness, and decision-making routines as important conditions for sustainability practice (Chen et al., 2023; Zhou et al., 2024; Jia et al., 2026; Hinterhuber and Khan, 2025). Together, these perspectives have greatly advanced understanding of why some sustainability initiatives travel further than others and why implementation often falters where the supporting systems for learning, coordination, and behavioural engagement are weak (Arda et al., 2023; Chen et al., 2023; Hinterhuber and Khan, 2025).

Yet much of this work still privileges formal mechanisms and organisational supports as the main explanatory levers. Whether framed in terms of governance quality, dynamic capabilities, learning systems, or decision structures, the underlying emphasis is often on what arrangements are in place to enable implementation. This emphasis is valuable, but it explains less clearly why actors confronted with apparently similar sustainability demands may still respond differently, even where comparable formal supports exist. It also tends to leave interpretation under-specified, or to subsume it within governance and capability variables rather than treating it as an explanatory process in its own right.

As a result, the literature is better at identifying the conditions under which sustainability implementation should occur than at explaining how sustainability initiatives are actually worked through in practice as they move across positions, relationships, and episodes over time. What remains underdeveloped, in particular, is a process explanation of how sustainability initiatives are encountered as situated demands, how actors interpret what those demands imply for ongoing work, and how such interpretations shape divergent trajectories of response and enactment. This is particularly important in multi-tier settings, where translation across actors is not a peripheral complication but part of the

phenomenon itself. The limitation, then, is not that existing research has overlooked sustainability implementation. On the contrary, it has generated substantial insight into governance architecture, capability development, coordination complexity, traceability, supplier development, and lower-tier management. The limitation is that these explanations do not yet fully capture the interpretive and relational processes through which sustainability demands become either workable or threatening in practice.

2.4 A paradox-informed and process-sensitive view of sustainability implementation

If governance, capability, and learning perspectives clarify important structural conditions of sustainable value chain implementation, they still leave open a central question: how are sustainability initiatives actually taken up once they enter ongoing work across the value chain? Implementation does not occur in an abstract organisational space. It unfolds through situated episodes in which actors encounter new demands, assess what those demands require of them, relate them to existing routines and responsibilities, and decide whether, how, and to what extent to respond. A more process-sensitive view is therefore needed to explain not only whether sustainability initiatives are introduced, but how they are translated into practice across interconnected organisational settings.

Paradox theory is useful here because it helps specify the tension-laden character of sustainability implementation (Carmine and De Marchi, 2023). Recent work in corporate sustainability shows that paradox is particularly valuable for analysing situations in which actors must accommodate persistent and interdependent demands that cannot be cleanly resolved through straightforward optimisation or business-case reasoning alone (Albertsen, 2025). This matters in value chain settings because sustainability initiatives often require actors to work through demands that pull in different directions at the same time, including transparency and operational discretion (Cichosz et al., 2025), standardisation and situated adaptation (Schrage and Rasche, 2022), sustainability improvement and continuity of competent performance (Carmine and De Marchi, 2023), and cross-chain coordination and local practicality (Schrage and Rasche, 2022; Zhang et al., 2025). Such tensions are not incidental obstacles to implementation, but part of the implementation challenge itself (Carmine and De Marchi, 2023; Schrage and Rasche, 2022). At the same time, paradox theory does not by itself provide a sufficiently fine-grained explanation of how these tensions become consequential in day-to-day implementation across interconnected actors (Carmine and De Marchi, 2023; Grimm et al., 2024). It is valuable for identifying the enduring tension structure of sustainability implementation, but less well suited, on its own, to explaining how actors interpret such demands in particular settings, how those interpretations vary across positions in the chain, and how they shape subsequent trajectories of response (Carmine and De Marchi, 2023; Grimm et al., 2024). For the purposes of this study, paradox is therefore treated as

a sensitising lens (Carmin and De Marchi, 2023; Albertsen, 2025) rather than as a complete explanatory model of how implementation unfolds in practice.

A process-sensitive perspective helps address that question by foregrounding interpretation (Grimm et al., 2024). Sustainability demands are rarely received as neutral instructions. Rather, they are assessed in relation to existing understandings of competent work, appropriate role conduct, practical feasibility, and organisational legitimacy (Loos and Spraul, 2025; Santos et al., 2023). In other words, implementation may diverge not only because structures differ, but because actors differ in how they make sense of what new sustainability demands imply for ongoing practice (Loos and Spraul, 2025; Santos et al., 2023). Recent work on CSR managers' internal legitimation strategies shows that sustainability agendas often need to be rendered acceptable and meaningful within organisations before they can be advanced effectively, while interpretive studies in multi-tier supply chains similarly suggest that sustainability practice adoption depends on how actors learn, unlearn, and rework practices within situated contexts (Loos and Spraul, 2025; Santos et al., 2023). Taken as a whole, this work suggests that interpretation is not secondary to implementation, but one of the processes through which implementation takes shape. Interpretation is also relationally situated. Sustainability implementation unfolds through interaction among differently positioned actors, and those relational settings shape whether new demands are experienced as workable, negotiable, or disruptive (Risi et al., 2023; Zhang et al., 2025). Research on coordinated enactment shows that implementation depends on how differentiated actors align and coordinate across organisational locations rather than on formal commitment alone (Risi et al., 2023). Related work in multi-tier supply chains suggests that the social conditions supporting translation also vary across positions in the chain (Zhang et al., 2025). Collectively, these insights suggest that sustainable value chain implementation cannot be reduced to the downstream effect of compliance systems or capability deployment alone, but is better understood as a cross-positional process of interpreting and enacting tension-laden demands.

Taken as a whole, the literature explains important conditions shaping sustainability implementation, but it provides less insight into how sustainability initiatives are worked through in practice as they move across positions and relationships in the value chain. What remains insufficiently understood is how such initiatives are encountered as situated demands, how actors interpret what those demands imply for ongoing work, and how those interpretations give rise to different trajectories of enactment over time. To examine these dynamics, this study adopts an abductive, layered qualitative process design that traces implementation across episodes, relationships, and organisational positions.

3. Methodology

This study uses an abductive, layered qualitative process design centred on sustainability decision episodes in petrochemical value chains. The design is intended to trace how sustainability initiatives are encountered, interpreted, negotiated, and enacted across organisational positions over time, rather than to explain implementation as a firm-level outcome. It therefore focuses on the sequences of interaction through which initiatives become stabilised, stalled, diluted, or redirected across the value chain. Consistent with recent methodological work in supply chain research, the study treats sustainability implementation as an unfolding process of cross-positional translation and uses abductive analysis to move iteratively between empirical material and relevant theory in developing an explanation of uneven implementation trajectories (Grimm et al., 2024; Dubois and Gadde, 2002; Kovács and Spens, 2005).

The empirical setting is the petrochemical sector. This setting is analytically useful because petrochemical value chains are characterised by strong operational interdependence, technical process constraints, and close coordination across organisational boundaries, conditions under which sustainability implementation is likely to be especially consequential (Zhou et al., 2000; Schulz, Diaz and Bandoni, 2005). The participating organisations and connected value chain relationships were located across Asia and were geographically scattered, reflecting the global and regionally dispersed nature of the petrochemical sector, where access to natural resources, proximity to consumption markets, and links to technology and specialist supply providers shape the location of activity. This regional framing matters because sustainability expectations, regulatory pressures, and operational infrastructures vary across geographical contexts, so the conditions under which petrochemical sustainability initiatives are implemented cannot be assumed to be uniform across regions (Alsaif et al., 2025). In such settings, sustainability initiatives are often closely tied to established routines, workflow coordination, and interorganisational interaction, making the sector well suited for examining how formal sustainability ambitions are translated into practice across value chain relationships (Brömer et al., 2019; Alsaif et al., 2025). The empirical focus is therefore on concrete sustainability initiatives linked to triggers such as reporting requirements, audits, digital tools, process changes, and revised routines within petrochemical value chains.

The case is not the petrochemical industry as a whole, nor a single focal firm viewed in isolation. Rather, it comprises sustainability implementation processes unfolding across selected connected value chain relationships in the petrochemical sector. The terms buyer, Tier-1 supplier, and upstream actor are used relationally within each value chain constellation. The buyer is the organisation occupying the immediate customer position in the focal relationship; the Tier-1 supplier is the organisation supplying that buyer directly; and upstream actors are selected sub-suppliers or other organisations beyond

Tier-1 whose activities became consequential for the same sustainability initiative. The buyer position therefore fell at different points in the petrochemical value chain across the four constellations rather than representing a single fixed production stage. The empirical boundary is therefore drawn around linked organisational positions through which concrete sustainability initiatives travelled in practice, including buyer, Tier-1 supplier, and selected upstream sites of action. This boundary makes it possible to examine implementation as a cross-positional process without assuming that sustainability dynamics can be captured adequately at the level of one firm or one dyadic tie alone. Empirically, the material was drawn from eight organisations across four connected value chain constellations in the petrochemical sector. The study involved 38 unique participants, including 11 buyer-side actors, 24 Tier-1 actors, and 3 upstream actors, and identified 43 sustainability decision episodes, 31 of which were reconstructed across linked organisational positions and over time, drawing on 38 wave-1 interviews, 25 follow-up interviews, and 24 focus group or workshop participants.

Within this boundary, the unit of analysis is the sustainability decision episode. An episode is defined as a bounded sequence that begins when a sustainability-related trigger becomes consequential for ongoing work and calls for interpretation and response, and continues until the initial pattern of action and its immediate practical consequences can be reconstructed across the relevant actors. Such triggers included, for example, new reporting requirements, audit demands, the introduction of digital monitoring tools, process redesigns, and revised operational routines (see Supplementary File A for a few illustrative samples of episodes). Defining the unit of analysis in this way allows the study to capture the analytically important middle ground between formal initiative design and durable routine practice. It keeps sequence, interaction, and temporal development visible in ways that more aggregated units, such as the firm, the buyer-supplier dyad, or the initiative in general, would obscure (Grimm et al., 2024).

The study is multi-tier in the sense that it follows sustainability initiatives across connected value chain positions rather than treating implementation as a single-firm or single-dyad phenomenon. It does not, however, claim equal empirical visibility across every tier in each value chain constellation. Access was strongest around buyer, Tier-1, and selected upstream interactions, particularly among operational, quality, environmental, health and safety, and technical roles involved in the enactment of sustainability initiatives. This reflects the practical realities of tracing implementation across organisational boundaries in industrial value chains. Of the 43 initially identified episodes, 31 could be reconstructed across multiple positions and over time (see Supplementary File B for a full list of episodes). This reduction reflected reconstructability rather than deliberate selection for particular outcomes. Some episodes could not be retained for full reconstruction because the initiative was abandoned early, because access to additional actors linked to the same episode was

not possible, or because confidentiality constraints limited tracing across positions. At the initial coding stage, the non-retained episodes did not appear to cluster around a particular trigger type or early implementation direction. The retained timelines should therefore be understood as the subset of episodes for which cross-positional and temporal tracing was practically feasible. In this sense, the study's contribution lies less in offering exhaustive tier-by-tier coverage than in explaining how multi-tier implementation complexity is generated and mediated through linked interactions across connected organisational positions.

Table I summarises the participant profile across the interview, follow-up, and focus group or workshop stages.

Table I Participant profile across interview and follow-up stages

Value chain position	Role category	Wave 1 interviews	Follow-up interviews	Focus groups / workshops	Total participants
Buyer	Sustainability / compliance	5	4	3	5
Buyer	Operations / technical	6	4	2	6
Tier-1 supplier	Management	5	3	3	5
Tier-1 supplier	Operations / production	8	5	5	8
Tier-1 supplier	Quality / environmental, health and safety (EHS) / compliance	6	4	4	6
Tier-1 supplier	Technical / process	5	4	5	5
Upstream / sub-supplier	Relevant actors	3	1	2	3
Total		38	25	24	38

The layered empirical design was not intended simply to accumulate multiple sources. Each layer was sequenced to perform a distinct analytic function in reconstructing sustainability implementation as a process. The first layer involved identifying focal sustainability decision episodes from the initial interviews, thereby establishing where sustainability-related demands had become practically consequential and generating the pool of candidate episodes for deeper analysis. The second layer involved matched value chain reconstruction, through which selected episodes were traced across connected organisational positions in order to capture how sustainability triggers moved, how actors interpreted and responded to them, and how subsequent interaction unfolded over time.

The third layer added temporal depth. Follow-up interviews were conducted three to six months later in order to examine whether early response patterns hardened, weakened, or shifted as implementation progressed. This stage made it possible to trace whether episodes moved toward routinisation, drift, toggling, or recalibration, rather than treating the initial response as the endpoint of analysis. The fourth layer introduced supplementary collective reflection through within-firm focus groups and selected

reflective workshops. These were not treated as equivalent to the interview material, but as occasions to revisit episode interpretations, surface shared or contested understandings, and refine the emerging account of how sustainability initiatives were experienced across organisational settings.

A final layer consisted of documentary, system-based, and workflow-related artefacts collected, where available, in relation to the initiatives under study. These materials included internal documents, reporting templates, workflow representations, system records, and other artefacts through which sustainability initiatives were formalised, adapted, contested, or embedded in practice. Their role was not merely confirmatory. Rather, they helped situate interview accounts within the formal and operational contexts in which the initiatives were taking shape and allowed the analysis to compare narrated experience with codified routines and representations.

Table II summarises the layered empirical design and the specific analytic contribution of each source. Taken together, these layers created the empirical conditions for moving from isolated respondent accounts to a process reconstruction of sustainability implementation across positions, episodes, and time.

Table II Layered empirical design and analytic contribution

Data layer	Empirical material	Main purpose	Analytic contribution	Output for subsequent analysis
Layer 1	Wave 1 semi-structured interviews	Identify concrete sustainability initiatives that became consequential in practice	Established the initial pool of sustainability decision episodes and revealed the main trigger types through which sustainability demands entered ongoing work	Initial set of 43 sustainability decision episodes
Layer 2	Matched cross-positional reconstruction across buyers, Tier-1 suppliers, and where relevant upstream actors	Trace how the same initiative travelled across value chain positions	Enabled reconstruction of event sequences and comparison of how the same sustainability demand was interpreted and enacted across interconnected actors	31 reconstructed value chain event timelines
Layer 3	Follow-up interviews conducted three to six months later	Examine how episodes evolved after the initial response	Made it possible to assess whether episodes moved toward routinisation, drift, toggling, or recalibration over time	Temporal refinement of episode trajectories
Layer 4	Focus groups and reflective workshops	Clarify contested meanings and revisit episode development collectively	Supported interpretive refinement by surfacing how actors re-read earlier events, responses, and points of friction	Collective reflection on episode meanings and trajectory development
Layer 5	Documents, system-based records, reporting templates, and workflow artefacts	Anchor interview accounts in formal and operational material	Triangulated interview evidence and linked actor accounts to the formal and practical forms through which initiatives were codified, monitored, or adapted	Documentary and artefactual corroboration

Table III provides a descriptive overview of the 31 reconstructed episodes. In this study, a trigger family refers to an analytically grouped category of sustainability-related events, requirements or interventions through which an initiative became consequential in ongoing work, such as reporting changes, audit demands, digital monitoring tools or process modifications. Panel A reports the trigger families and shows the types of sustainability demands through which initiatives became consequential in practice. Panel B reports the dominant response repertoire assigned to each episode after cross-

positional reconstruction; this classification captures the main pattern of action in the episode, while recognising that some episodes contained mixed or shifting responses. Panel C reports the emergent trajectory assigned after follow-up analysis, showing whether early response patterns accumulated into drift, toggling, stabilisation, or recalibration. Grouped at this broad level, digital monitoring and traceability-related interventions (n=8) and process modification, redesign, and circularity-related initiatives (n=7) were the most common triggers. In trajectory terms, 10 episodes moved toward drift, 11 exhibited toggling, and 5 each moved toward stabilisation and recalibration. Dominant response repertoires were containment or procedural compliance (n=10), deflection or redistribution (n=9), translation or local adaptation (n=5), joint problem-solving or experimental adjustment (n=5), and mixed or shifting repertoires (n=2).

Table III Descriptive overview of reconstructed episodes

Panel A. Trigger families across the 31 reconstructed episodes

Trigger family	Number of episodes
Digital monitoring / traceability / portal / data sharing	8
Process modification / redesign / circularity	7
Reporting / documentation	5
Audit / review / certification / due diligence	5
Buyer mandate / customer-imposed change	2
Cross-functional coordination	2
Supplier development	2
Total	31

Panel B. Dominant response repertoires across the 31 reconstructed episodes

Dominant response repertoire	Number of episodes
Containment / procedural compliance	10
Deflection / redistribution	9
Translation / local adaptation	5
Joint problem-solving / experimental adjustment	5
Mixed / toggling response patterns	2
Total	31

Panel C. Emergent trajectories across the 31 reconstructed episodes

Emergent trajectory	Number of episodes
Drift	10
Toggling	11
Stabilisation	5
Recalibration	5
Total	31

Data analysis proceeded abductively and through a series of interlinked stages. Consistent with established approaches to abductive and process research, analysis moved iteratively between empirical material and relevant theory in order to refine an emerging explanation rather than to test a predetermined framework (Kovács and Spens, 2005; Dubois and Gadde, 2002). The first stage focused on episode reconstruction. Each retained episode was assembled as a provisional event timeline by integrating interview material from multiple organisational positions with relevant documentary, workflow-related, and system-based artefacts. At this stage, the analytic task was primarily descriptive and chronological: to establish what triggered the episode, which actors became involved, how the issue travelled across positions in the value chain, what responses were attempted, and what followed. This temporally ordered reconstruction follows established approaches to theorising from process data, where sequencing is central to explaining how outcomes emerge over time (Langley, 1999).

The second stage involved within-episode coding and interpretive analysis. Each reconstructed timeline was examined more closely in order to identify how sustainability demands were framed by different actors, what concerns became salient, how responses were justified or resisted, and where interpretations began to diverge across positions. Initial coding remained close to participants' language and to the practical terms through which they described the issue, the demands it created, and the constraints they faced (see Supplementary File C). The aim at this stage was not to impose a fixed explanatory vocabulary, but to remain open to how the implementation process was being made sense of by actors situated in different organisational roles.

The third stage involved systematic comparison across actors and across episodes. Matched comparisons within episodes were used to examine how different participants described the same trigger, interaction sequence, and practical challenge, while comparisons across episodes were used to identify recurring patterns in triggers, interpretations, responses, and developing trajectories. This stage was especially important for distinguishing what appeared idiosyncratic from what recurred more systematically across the material. It also enabled movement from descriptive episode accounts toward a more general process explanation of how sustainability initiatives were translated in practice.

The fourth stage involved iterative dialogue with relevant theory in order to clarify what kind of explanation was emerging from the comparisons. Governance- and capability-based accounts helped specify the structural and organisational context within which implementation unfolded, but they did not fully account for the observed variation in how apparently similar sustainability demands were interpreted and enacted across positions (Chae et al., 2024; Arda et al., 2023; Jia et al., 2022). This prompted closer engagement with processual, interpretive, and paradox-oriented literatures. Throughout, paradox theory functioned as a sensitising orientation to persistent tension rather than

as a coding frame (Carmin and De Marchi, 2023; Albertsen, 2025). Theory therefore served as a resource for sharpening explanation, clarifying contrasts, and naming the emerging mechanism, rather than as a template through which the empirical material was forced.

Given the interpretive and processual nature of the study, trustworthiness was pursued through comparative reconstruction, temporal revisiting, and analytic transparency rather than through claims of detached objectivity (Lincoln and Guba, 1985; Tracy, 2010). Credibility rested not simply on the number of interviews, but on the study's ability to reconstruct the same sustainability decision episodes across multiple organisational positions and, where possible, across time. The layered design reduced reliance on single-respondent retrospective accounts by allowing the same trigger, sequence of interaction, and developing response pattern to be examined through matched perspectives from connected actors in the value chain. Follow-up interviews, focus groups or workshops, and documentary, workflow-related, and system-based artefacts further strengthened the analysis by helping situate narrated experience within the formal and operational contexts in which sustainability initiatives were taking shape. The analytical process was documented through episode timelines, coding rounds, analytic memos, and comparison matrices, creating a visible trail from empirical reconstruction to conceptual development (Nowell et al., 2017; Bowen, 2009).

Reflexivity was integral throughout the analysis. The researcher played an active role in defining episode boundaries, reconstructing timelines, identifying contrasts, and engaging relevant theory, so analysis involved repeated movement between immersion in the material and critical distance from early interpretations. Sensitising concepts were used provisionally and revised where cross-actor contrasts, cross-episode comparisons, and later follow-up material suggested a different reading. This study received ethical approval from the [name withheld for blind review] Research Ethics Committee, United Kingdom, under reference [reference withheld for blind review]. The research was conducted in accordance with the approved protocol and relevant institutional procedures for research involving human participants. All participants were informed about the purpose of the study, the voluntary nature of participation, the handling and storage of data, the protection of anonymity and confidentiality, and their right to withdraw in line with the approved participant information and consent materials. Informed consent was obtained from all participants prior to data collection. Given the commercial sensitivity of the setting, participants' organisations, individual identities, and potentially identifying process details were removed, pseudonymised, or reported in aggregated form where necessary.

4. Findings

Across the reconstructed episodes, sustainability initiatives became consequential not simply because a formal requirement existed, but because particular events made that requirement matter in ongoing work. Reporting changes, audit pressures, digital tools, and process adjustments did not move through the value chain with a fixed practical meaning. As they travelled across buyer, supplier, and selected upstream positions, they were interpreted differently, connected to different practical concerns, and acted on in different ways. What emerged from the analysis was therefore not a linear cascade from formal initiative to implementation, but an uneven process in which similar sustainability demands could gain traction, narrow into symbolic compliance, or be reworked as actors tried to make them workable in context. Across the 31 reconstructed episodes, this pattern was visible across multiple trigger families and implementation pathways rather than being concentrated in a single type of intervention or outcome, as shown in Table III. The findings that follow therefore build from a varied empirical base rather than from a small number of isolated illustrations.

Early contrasts made this clear. In EP-07, a supplier-side production manager described a new reporting requirement as “something dropped on top of the work, without changing the realities underneath,” framing the initiative as an external burden. By contrast, in EP-18, a buyer-side operations lead recalled that “once we sat down with them and translated it into what it meant on the line, it stopped being a compliance issue and became a work issue we could solve.” These contrasts suggested that sustainability initiatives did not carry a stable practical meaning as they moved across the value chain. Their consequences depended on how they became salient in practice, how actors interpreted what they required, and how ensuing responses accumulated over time. The analysis that follows traces this process from the moments through which sustainability initiatives became consequential, to the ways actors responded, and finally to the longer-term pathways that emerged across the episodes.

4.1 Sustainability triggers: when initiatives became consequential in practice

Across the reconstructed episodes, sustainability initiatives became consequential not simply because they existed as formal requirements, but because they entered ongoing work as practical demands that disrupted established routines, expectations, or interactions. The triggers varied in form, but they shared a common feature: each made sustainability newly salient in a way that required actors to respond. In some cases, the trigger took the form of a revised reporting requirement or a new documentation routine. In others, it emerged through an audit demand, the introduction of a digital monitoring or traceability tool, a process change linked to environmental performance, or a buyer request that altered how work had to be explained or justified.

One recurrent category of trigger involved reporting and documentation requirements. Formally, these often appeared relatively straightforward. In practice, however, they altered what had to be recorded, who became accountable, and how operational activities had to be represented. In EP-07, a supplier-side production manager described the revised reporting routine as “something dropped on top of the work, without changing the realities underneath,” while a buyer-side compliance actor in the same episode stated that “from our side it was just about making the process visible.” The contrast is revealing. What appeared as a modest visibility mechanism from one position in the value chain became a much more consequential operational demand from another.

A second group of triggers involved audits, reviews, and external checks. These made sustainability salient by compressing time and raising the stakes of visibility. In EP-29, a quality lead recalled that “everybody moved when the audit was near, but once the pressure went, the routine loosened again.” Another actor in the same episode described the audit as “the moment when a loose expectation suddenly became a real operational issue.” Audit-related triggers therefore generated movement, but not necessarily stable implementation. Their force lay as much in intensified scrutiny as in the content of the requirement itself.

A third group involved digital monitoring and traceability tools. These triggers often appeared as technical devices for improving visibility, verification, or control, but in practice they also redistributed attention, accountability, and perceived exposure. In EP-11, the digital monitoring tool was described as “another system asking for perfect data from a process that is not perfect,” while in EP-24 the traceability tool initially attracted suspicion because it was seen as another visibility mechanism, but gradually gained traction once actors began using it to address practical bottlenecks in the flow of work. These episodes showed that digital and traceability tools did not matter simply because they generated more information. Their consequences depended on whether actors experienced them primarily as instruments of surveillance and exposure or as workable supports for practical problem-solving.

A fourth category involved process changes linked more directly to environmental performance, such as revised routines, altered sequencing, or modified operational practices. These initiatives often became consequential when they intersected with tightly coupled workflow arrangements. In EP-18, the trigger became more acceptable once it was translated into operationally meaningful terms. In more fragile episodes, however, actors questioned whether the demand, in its current form, was workable in relation to the realities of production, workflow, and coordination. This did not necessarily mean rejecting the broader sustainability goal. Rather, it meant questioning whether the specific initiative could be enacted without disrupting other valued aspects of work.

Taken together, these episodes show that sustainability triggers differed in form, but became consequential through a related underlying process. Whether they appeared as reporting requirements, audit pressures, digital visibility tools, or process changes, they entered ongoing work as practical demands that actors had to interpret, accommodate, and enact. In doing so, they disrupted settled assumptions about what had to be done, who was responsible, and how sustainability should be integrated into everyday operations across different positions in the value chain. What varied, therefore, was not simply the trigger itself, but how these demands were understood and handled in practice.

4.2 Interpretive concerns: how actors interpreted sustainability demands

The reconstructed episodes showed that sustainability triggers did not translate directly into action. They first became significant through the interpretive concerns they activated. Actors assessed what the initiative implied for their competence, role, coordination responsibilities, and practical legitimacy. In this sense, implementation diverged not only because structures differed, but because actors interpreted what new demands required of them in different ways.

A first set of concerns centred on competence and practical mastery. Actors frequently evaluated whether the demand could be enacted within the realities of existing workflows, data limitations, and operational sequencing. In EP-11, the digital monitoring tool was interpreted less as an abstract sustainability improvement than as a demand for a level of data precision that the process could not readily support. In EP-31, a supplier manager observed that “the request was understandable from a sustainability point of view, but not in the sequence through which we actually run the process.” Such statements did not necessarily reject the sustainability rationale. Rather, they revealed concern over whether the initiative could be incorporated without undermining competent performance.

A second set of concerns involved role and accountability. Sustainability initiatives often shifted expectations about who was responsible for making information visible, coordinating responses, or carrying the practical burden of adaptation. In some episodes, actors responded positively when ownership became clearer and the initiative could be located within an identifiable work process. In others, ambiguity over who was meant to act generated diffusion and delay. Concerns about role therefore shaped whether the initiative acquired operational ownership or remained an externally voiced expectation without durable anchoring in practice.

A third set of concerns involved coordination and relational fit. Because many sustainability initiatives required action across organisational boundaries, actors also assessed whether surrounding relationships could support the work of adjustment. New

demands were more likely to be experienced as workable where they were accompanied by dialogue, clarification, and collaborative problem-solving. They were more likely to be experienced as threatening where expectations were intensified without corresponding opportunities for translation or mutual adjustment. In this sense, coordination was not merely a structural condition. It was interpreted as either enabling or constraining the practical feasibility of the initiative.

A fourth set of concerns centred on legitimacy. Here, legitimacy did not refer only to external moral validity or formal policy alignment. It also concerned whether the initiative appeared practically legitimate in relation to the realities of production and coordination. Actors asked, implicitly or explicitly, whether the demand was credible, appropriate, and workable in context. In some cases, the initiative gained practical legitimacy once it was translated into operational terms. In others, it remained weakly legitimate because it was experienced as disconnected from how work was actually organised. This distinction proved important because initiatives that remained weakly legitimate were more likely to generate guarded compliance or quiet reversion to prior routines.

These interpretive concerns around competence, role, coordination, and legitimacy did not determine responses mechanically, but they shaped the terms on which responses became possible.

4.3 Response patterns: how actors acted on sustainability demands

The episodes did not reduce to a simple contrast between acceptance and resistance. Rather, actors responded through a more differentiated set of response patterns that varied in how far they protected existing routines or opened space for adaptation. Across the 31 reconstructed episodes, dominant response repertoires were distributed across containment or procedural compliance (n=10), deflection or redistribution (n=9), translation or local adaptation (n=5), joint problem-solving or experimental adjustment (n=5), and mixed or shifting repertoires (n=2), indicating that the material was not dominated by a single mode of response. Across the material, two broad orientations became visible. Some responses were more defensive, seeking to contain disruption and preserve established arrangements. Others were more integrative, seeking to translate new demands into workable forms of practice.

Defensive response patterns included containment, where the demand was kept peripheral to core work, deflection, where responsibility or burden was redirected elsewhere, and narrow compliance, where actors met immediate formal requirements without deeper changes to routines or responsibilities. In these episodes, actors often engaged the initiative just enough to satisfy immediate scrutiny while minimising wider operational adjustment. Some demands were formally acknowledged but treated as peripheral additions rather than incorporated into core work. In other cases, responsibility was passed across teams or positions, or the initiative was complied with

only under conditions of heightened visibility, such as an audit or customer review. These responses did not necessarily amount to explicit opposition. More often, they reflected a cautious attempt to preserve valued expertise, existing workflow logic, or fragile coordination arrangements in the face of demands experienced as misaligned or risky.

Integrative response patterns included translation, where actors rendered the demand into operationally meaningful terms, joint problem-solving, where they worked collaboratively across positions to address practical obstacles, selective adaptation, where elements of the initiative were adjusted to fit local conditions, and experimentation, where workable forms were developed through trial and revision. In these episodes, actors did not simply accept the initiative as given. Rather, they worked to render it operable by connecting it to existing bottlenecks, clarifying ownership, adjusting formats, or reworking routines collaboratively. In EP-18, the initiative became more acceptable once it was translated into operational terms that actors could use in relation to the line. In EP-24, a traceability-related tool initially generated suspicion but later gained traction once actors began to engage it around practical issues they already recognised as relevant. These episodes suggest that integrative responses did not eliminate tension. Instead, they created a pathway through which sustainability demands could become workable without being experienced primarily as threats.

What distinguished these response patterns was not only attitude, but the practical work they performed. Defensive responses narrowed the scope of adjustment and protected existing arrangements. Integrative responses expanded the possibilities for adaptation and coordination. Importantly, episodes could move between these patterns. A demand might initially generate guarded compliance and later move toward translation, or begin with collaborative engagement and later retreat under production pressure. Response patterns therefore functioned as evolving ways of enacting sustainability demands rather than as fixed categories of actor disposition.

These response patterns mattered because they did more than register immediate reactions to sustainability demands. They shaped whether initiatives became contained, translated, jointly worked through, or only partially enacted, and in doing so they established the conditions under which longer-term pathways began to emerge. The next section traces how these cumulative response patterns developed into distinct implementation trajectories over time.

4.4 Implementation trajectories: how responses accumulated over time

Across the reconstructed episodes, response patterns accumulated into four recurring implementation trajectories: drift, toggling, stabilisation, and recalibration. Across the 31 reconstructed episodes, 10 moved toward drift, 11 exhibited toggling, and 5 each moved toward stabilisation and recalibration, reinforcing that no single pathway dominated the

material. These trajectories did not represent mutually exclusive states from the outset. Rather, they emerged gradually as early responses were repeated, revised, or combined across time and organisational positions.

A first trajectory was drift. In drifting episodes, sustainability initiatives were not openly rejected, but they failed to become firmly anchored in routine practice. Some activity occurred, often including initial compliance, internal communication, or procedural adjustments, yet these responses did not generate durable operational change. Over time, the initiative lost momentum, became peripheral, or remained largely symbolic. In EP-07, a supplier-side actor later reflected that “after the first push, it became one more thing people remembered only when they had to.” In EP-29, an audit-triggered process revision followed a similar trajectory: “the routine looked different when the pressure was on, but six weeks later most of the old habits had returned.”

A second trajectory was toggling. These episodes were marked by repeated movement back and forth between more integrative and more defensive responses. Implementation did not simply fade, but neither did it settle. Actors engaged the initiative intermittently, often making progress under one set of conditions and retreating under another. In EP-21, a [Tier-1](#) manager described the process as one where “we would move forward when attention was on it, then fall back when production pressure returned.” A similar pattern appeared in EP-11, where the digital monitoring tool was alternately used as a practical problem-solving device and dismissed as an unrealistic control mechanism.

A third trajectory was stabilisation. In these episodes, sustainability initiatives gradually became more embedded in routine practice. This did not mean the disappearance of tension or effortless acceptance. Rather, stabilisation occurred when the initiative was progressively translated into workable routines, clearer ownership, and more durable forms of coordination. In EP-18, an operations lead recalled that “it stopped being a special sustainability request and just became part of how we now do that stage of the work.” In EP-24, a quality manager similarly noted that “once people could see where it helped and who needed to do what, it stopped feeling temporary.”

A fourth trajectory was recalibration. In these episodes, implementation did not move toward either straightforward stabilisation or simple failure. Instead, the initiative itself was revised as actors reworked its scope, meaning, or operational form in light of what had been learned through earlier attempts. In EP-31, a supplier-side actor explained that “we did not implement it as originally asked; we had to redesign both the request and the routine before it became viable.” In EP-12, a buyer-side manager similarly reflected that “the breakthrough came when we stopped insisting on the original format and focused on the underlying purpose.”

Taken together, these trajectories show that sustainability implementation developed through cumulative response patterns rather than through one-off decisions. Drift

emerged where early activity failed to generate durable anchoring. Toggling emerged where competing response patterns persisted without resolution. Stabilisation emerged where translation and coordination gradually made the initiative part of ordinary work. Recalibration emerged where actors revised the initiative in order to preserve its purpose while changing its practical form. The final subsection draws these recurring elements together into an emergent process model of uneven sustainability implementation.

4.5 Emergent process model: from sustainability triggers to uneven implementation

Taken together, the preceding analyses indicate a recurring process through which sustainability initiatives generated uneven implementation trajectories across the value chain. Sustainability initiatives did not move directly from formal introduction to stable enactment. Instead, they became consequential when specific triggers disrupted existing routines, expectations, or accountability arrangements and required actors to respond. As these triggers entered ongoing work, actors interpreted what they implied for practical mastery, role and accountability, coordination and relational fit, and practical legitimacy. These interpretations shaped the response patterns that followed, and repeated responses gradually accumulated into different trajectories over time. The reconstructed episodes therefore point to four connected moments in the implementation process: sustainability triggers, interpretive concerns, response patterns, and trajectories.

Interpretation did not appear as a separate cognitive step. It unfolded through interaction as actors assessed what the initiative required, what responding to it would mean for competent performance and coordination, and whether the demand could be accommodated in practice. Relational conditions formed part of this process throughout. They shaped whether new demands were encountered under conditions of dialogue, clarification, and mutual adjustment, or under conditions of scrutiny, ambiguity, and weak support. The episodes also suggested that broader organisational and institutional conditions, including leadership support, resource availability, pressure intensity, and cultural fit, influenced how interpretive concerns became salient and which response patterns became more likely.

Figure I summarises the emergent process model developed from the reconstructed episodes. The figure should be read as a simplified representation of a recursive process rather than a strictly linear sequence, since episodes often involved movement back and forth between framing the demand, responding to it, and revising earlier actions in light of their practical consequences. For readability, an enlarged version of Figure I is also provided in Supplementary File D.

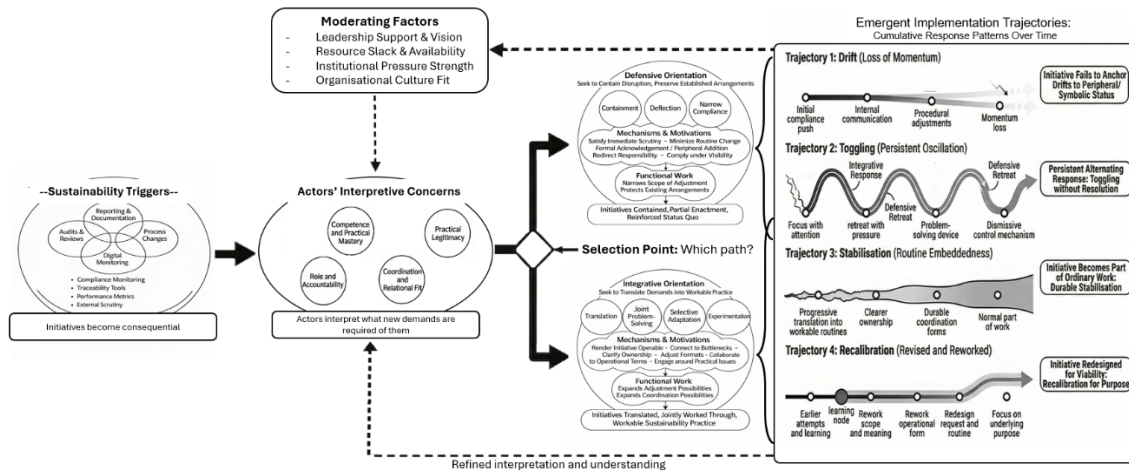


Figure 1 Emergent process model of uneven sustainability implementation

The model is processual in two linked senses. First, it shows that implementation develops over time rather than being settled when a sustainability initiative is formally introduced. Sustainability initiatives become consequential as practical triggers, activate interpretive concerns, elicit defensive or integrative response patterns, and accumulate into drift, toggling, stabilisation, or recalibration as responses are repeated, revised, or combined. Second, it shows that implementation is distributed across organisational positions rather than located within a single organisational site, as sustainability demands are interpreted, translated, and reworked across buyer, supplier, and selected upstream actors as they move through the value chain. Taken together, these patterns provide the basis for the discussion that follows.

5. Discussion

This paper began with a puzzle that recent work on multi-tier sustainable supply chain management, digital traceability, supply chain learning, traceability in multi-tier supply chains and sustainability-oriented supplier development has made increasingly difficult to ignore: why do sustainability initiatives in multi-tier value chains often fail to become distributed routine practice, even when firms invest in traceability infrastructures, digital tools, supplier development initiatives and associated changes to inter-organisational routines (Oyedijo et al., 2024; Zhou et al., 2024; Schaëfer, Kähkönen and Luzzini, 2025; Jia et al., 2026)? Existing research has shown convincingly that governance structures, capability endowments, information flows, traceability arrangements, and coordination mechanisms matter for implementation, yet these explanations do not fully account for why ostensibly similar initiatives travel so differently across value chain positions (Chae et al., 2024; Jia et al., 2026; Both and Wilhelm, 2026). Viewed through the emergent process model, uneven implementation is not adequately explained as the downstream

effect of formal design alone. Rather, it unfolds as sustainability initiatives become consequential in practice, are interpreted across roles and relationships, and accumulate into divergent trajectories over time.

Seen against this debate, the paper shows that uneven sustainability implementation in multi-tier value chains is best understood as a process in which sustainability initiatives enter ongoing work as practical demands, are interpreted under particular relational conditions, and give rise to different response patterns and trajectories over time. Prior research has generated important insight into how sustainability implementation depends on power, cascading, coordination, learning, traceability and supplier development. However, uneven implementation has usually been explained through governance arrangements, relational conditions, technological infrastructures, supplier capabilities and contextual constraints, leaving less understood how actors in different value chain positions interpret the same sustainability initiative as a workable, risky, peripheral or impractical task (Tachizawa and Wong, 2014; Sauer and Seuring, 2018; Jia et al., 2022; Santos et al., 2023; Chae et al., 2024; Schaëfer, Kähkönen and Luzzini, 2025; Jia et al., 2026). The findings extend this literature by showing that sustainability initiatives do not simply introduce new procedures or new visibility mechanisms. They also raise questions about practical mastery, role and accountability, coordination and relational fit, and practical legitimacy. These interpretive concerns shape whether actors contain, deflect, translate, or work through new demands, and how those responses accumulate into drift, toggling, stabilisation, or recalibration over time.

The findings also clarify the role of paradox in the analysis. Recent work has argued that paradox theory is valuable for corporate sustainability because it captures persistent and interdependent tensions that exceed narrow business-case reasoning (Carmine and De Marchi, 2023; Albertsen, 2025). The present study supports that view, but also suggests that paradox alone does not explain uneven implementation. Its value here lies in helping specify the tension-laden character of sustainability demands, while the process model developed in this paper explains how those demands are worked through unevenly in practice across the value chain.

An important implication for multi-tier sustainability research is that complexity appears not only as a structural condition, but also as an interpretive one. Multi-tier value chains are often analysed in terms of visibility gaps, indirect governance, power asymmetries, and limited control over lower-tier actors (Tachizawa and Wong, 2014; Sauer and Seuring, 2018; Chae et al., 2024; Rosca et al., 2022; Jamalnia et al., 2023; Swink et al., 2024). These remain important conditions. However, the findings suggest that complexity also arises because sustainability initiatives are repeatedly reinterpreted as they travel across positions in the chain. What appears coherent from the focal firm's perspective may become practically ambiguous, threatening, or negotiable once encountered in local work settings. Relational conditions are central to this process. They are not simply

background context, but the interactional environment through which interpretive concerns are translated into defensive or integrative response patterns. Relational settings marked by scrutiny without collaborative problem-solving, or by connectivity without support, made defensive responses more likely. By contrast, settings that created space for dialogue, experimentation, and mutual adjustment made adaptive uptake more feasible. This sharpens existing work on coordinated enactment by showing that implementation depends not only on whether actors are linked, but also on the quality of the relational conditions through which translation occurs (Risi et al., 2023; Zhang et al., 2025).

These arguments also carry managerial implications. Managers seeking to improve sustainability implementation across value chains should look beyond formal rollout, target setting, and compliance monitoring alone. The findings suggest that implementation difficulties are often signalled by repeated movement of responsibility across functions or firms, recurrent procedural compliance without routine change, and alternating periods of engagement and retreat. These are signs not simply of weak control, but of sustainability demands that remain insufficiently anchored in practice. More durable implementation is likely when managers create conditions in which new requirements can be discussed, locally adapted, and integrated into existing work logics rather than imposed in rigid form. Where such conditions were created, the work was often carried by actors with enough practical knowledge and standing to connect the formal sustainability demand to operational constraints. Rather than treating these actors as generic champions, the findings suggest that championing matters when it is anchored in translation capacity, cross-positional legitimacy, and the ability to help others discuss, adapt, and integrate the initiative in practice.

At the same time, the contribution of the paper is most visible under a particular set of empirical and analytical conditions. Empirically, the mechanism is developed in the petrochemical sector, where sustainability initiatives arise in operational environments marked by strong process interdependence, exacting technical requirements, and significant coordination pressures across organisational boundaries (Zhou, Cheng and Hua, 2000; Schulz, Diaz and Bandoni, 2005; Brömer et al., 2019; Alsaif, Grant and Shaw, 2025). Although the study adopts a multi-tier value chain perspective, empirical visibility was strongest around buyer, Tier-1, and selected upstream interactions rather than across all tiers in an even manner. Methodologically, the study examines matched value chain episodes rather than relying on full ethnographic immersion, and it follows implementation trajectories over a three-to-six-month period rather than over multiple years. Future research could examine whether the same mechanism travels across sectors with different technological, institutional, geographical, and power conditions, and whether additional trajectories emerge over longer implementation periods.

6. Conclusion

This paper set out to explain why sustainability initiatives in multi-tier value chains so often fail to become distributed routine practice. It has shown that uneven implementation is not explained fully by formal rollout, governance arrangements, or capability supports alone, but by a process in which sustainability initiatives become consequential in practice, are interpreted under particular relational conditions, and accumulate into different trajectories over time. The central implication is that sustainability initiatives become durable not simply when they are introduced, but when they can be translated into workable forms of practice across roles, relationships, and organisational positions in the value chain. Understanding this helps explain why apparently similar initiatives can stabilise in some settings while drifting, toggling, or being recalibrated in others.

7. References

- Ahmed, M.U. and Shafiq, A. (2022) 'Toward sustainable supply chains: impact of buyer's legitimacy, power and aligned focus on supplier sustainability performance', *International Journal of Operations & Production Management*, 42(3), pp. 280–303.
- Albertsen, R.R. (2025) 'Outcomes of paradox responses in corporate sustainability: a qualitative meta-analysis', *Business & Society*, 64(5), pp. 889–932.
- Alsaif, A., Grant, D.B. and Shaw, S. (2025) 'Exploring supply chain sustainability practices in the Gulf Cooperation Council petrochemical sector', *International Journal of Logistics: Research and Applications*, 28(10), pp. 1111–1140.
- Arda, O.A., Montabon, F., Tatoglu, E., Golgeci, I. and Zaim, S. (2023) 'Toward a holistic understanding of sustainability in corporations: resource-based view of sustainable supply chain management', *Supply Chain Management: An International Journal*, 28(2), pp. 193–208.
- Both, C.M. and Wilhelm, M. (2026) 'Supply chain sustainability risk management in the era of mandatory due diligence: a literature review', *Journal of Purchasing and Supply Management*, 32(2), p. 101083.
- Bowen, G.A. (2009) 'Supporting a grounded theory with an audit trail: an illustration', *International Journal of Social Research Methodology*, 12(4), pp. 305–316.
- Brandenburg, M., Warasthe, R. and Seuring, S. (2024) 'Impact pathways: improving supply chain sustainability by due diligence acts? Insights from a German case', *International Journal of Operations & Production Management*, 44(4), pp. 859–874.

Brömer, J., Brandenburg, M. and Gold, S. (2019) 'Transforming chemical supply chains toward sustainability: a practice-based view', *Journal of Cleaner Production*, 236, p. 117701.

Carmine, S. and De Marchi, V. (2023) 'Reviewing paradox theory in corporate sustainability toward a systems perspective', *Journal of Business Ethics*, 184(1), pp. 139–158.

Chae, S., Choi, T.Y. and Hoetker, G. (2024) 'Theorizing the governance of direct and indirect transactions in multi-tier supply chains', *Journal of Supply Chain Management*, 60(2), pp. 3–21.

Chen, L., Jiang, M., Li, T., Jia, F. and Lim, M.K. (2023) 'Supply chain learning and performance: a meta-analysis', *International Journal of Operations & Production Management*, 43(8), pp. 1195–1225.

Cichosz, M., Aluchna, M., Sońta-Drączkowska, E. and Knemeyer, A.M. (2025) 'Navigating paradoxical tensions in pursuit of sustainable supply chain management: review and guidance for future inquiry', *The International Journal of Logistics Management*, 36(7), pp. 99–136.

Dubois, A. and Gadde, L.-E. (2002) 'Systematic combining: an abductive approach to case research', *Journal of Business Research*, 55(7), pp. 553–560.

Falcone, E.C., Yan, T. and Fugate, B.S. (2024) 'Follow-suit or free-ride? A relational view of CSR diffusion in a supply chain with customer-supplier closure', *Journal of Operations Management*, 70(6), pp. 979–1006.

Garcia-Torres, S., Albareda, L., Rey-Garcia, M. and Seuring, S. (2019) 'Traceability for sustainability - literature review and conceptual framework', *Supply Chain Management: An International Journal*, 24(1), pp. 85-106.

Govindan, K., Demartini, M., Formentini, M., Taticchi, P. and Tonelli, F. (2024) 'Unravelling and mapping the theoretical foundations of sustainable supply chains: a literature review and research agenda', *Transportation Research Part E: Logistics and Transportation Review*, 189, p. 103685.

Grimm, J., Langley, A. and Reinecke, J. (2024) 'Process research methods for studying supply chains and their management', *Journal of Supply Chain Management*, 60(4), pp. 3–26.

Hahn, R., Reimsbach, D. and Wickert, C. (2023) 'Nonfinancial reporting and real sustainable change: relationship status, it's complicated', *Organization and Environment*, 36(1), pp. 3–16.

Hinterhuber, A. and Khan, O. (2025) 'What drives sustainable procurement? Insights from the theory of planned behavior', *International Journal of Operations & Production Management*, 45(13), pp. 28–52.

Jamalnia, A., Gong, Y. and Govindan, K. (2023) 'Sub-supplier's sustainability management in multi-tier supply chains: a systematic literature review on the contingency variables, and a conceptual framework', *International Journal of Production Economics*, 255, p. 108671.

Jia, M., Hendry, L.C. and Stevenson, M. (2022) 'Supplier absorptive capacity: learning via boundary objects in sustainability-oriented supplier development initiatives', *International Journal of Operations & Production Management*, 42(8), pp. 1173–1199.

Jia, M., Stevenson, M. and Hendry, L.C. (2021) 'The boundary-spanning role of first-tier suppliers in sustainability-oriented supplier development initiatives', *International Journal of Operations & Production Management*, 41(11), pp. 1633–1659.

Jia, M., Stevenson, M., Wilhelm, M. and Hendry, L.C. (2026) 'From the few to the many: scaling up sustainability-oriented supplier development projects', *International Journal of Operations & Production Management*, 46(4), pp. 561–586.

Kovács, G. and Spens, K.M. (2005) 'Abductive reasoning in logistics research', *International Journal of Physical Distribution & Logistics Management*, 35(2), pp. 132–144.

Langley, A. (1999) 'Strategies for theorizing from process data', *Academy of Management Review*, 24(4), pp. 691–710.

Lincoln, Y.S. and Guba, E.G. (1985) *Naturalistic inquiry*. Beverly Hills, CA: Sage.

Loos, C. and Spraul, K. (2025) 'The why, how, and when of CSR managers' internal legitimization strategies', *Journal of Management Studies*, 62(7), pp. 2830–2858.

Marttinen, K. and Kähkönen, A.K. (2022) 'Fostering firms' ability to cascade sustainability through multi-tier supply chains: an investigation of power sources', *International Journal of Operations & Production Management*, 42(8), pp. 1146–1172.

McGrath, P., McCarthy, L., Marshall, D. and Rehme, J. (2021) 'Tools and technologies of transparency in sustainable global supply chains', *California Management Review*, 64(1), pp. 67–89.

Morgan, T.R., Gabler, C.B. and Manhart, P.S. (2023) 'Supply chain transparency: theoretical perspectives for future research', *The International Journal of Logistics Management*, 34(5), pp. 1422–1445.

Nowell, L.S., Norris, J.M., White, D.E. and Moules, N.J. (2017) 'Thematic analysis: striving to meet the trustworthiness criteria', *International Journal of Qualitative Methods*, 16, pp. 1–13.

Oyedijo, A., Kusi-Sarpong, S., Mubarik, M.S., Khan, S.A. and Utulu, K. (2024) 'Multi-tier sustainable supply chain management: a case study of a global food retailer', *Supply Chain Management: An International Journal*, 29(1), pp. 68–97.

Risi, D., Wickert, C. and Ramus, T. (2023) 'Coordinated enactment: how organizational departments work together to implement CSR', *Business & Society*, 62(4), pp. 745–786.

Rosca, E., Tate, W.L., Bals, L., Huang, F. and Ciulli, F. (2022) 'Coordinating multi-level collective action: how intermediaries and digital governance can help supply chains tackle grand challenges', *International Journal of Operations & Production Management*, 42(12), pp. 1937–1968.

Santos, K.A., Silva, M.E. and Pereira, S.C.F. (2023) '(Un)Learning sustainability practices in a multi-tiered supply chain: an interpretive study', *International Journal of Operations & Production Management*, 43(8), pp. 1226–1249.

Sauer, P.C. and Seuring, S. (2018) 'A three-dimensional framework for multi-tier sustainable supply chain management', *Supply Chain Management: An International Journal*, 23(6), pp. 560–572.

Schaëfer, K., Kähkönen, A.K. and Luzzini, D. (2025) 'Traceability in multi-tier supply chains: insights from five case studies', *Supply Chain Management: An International Journal*, 30(7), pp. 77–99.

Schrage, S. and Rasche, A. (2022) 'Inter-organizational paradox management: how national business systems affect responses to paradox along a global value chain', *Organization Studies*, 43(4), pp. 547–571.

Schulz, E.P., Diaz, M.S. and Bandoni, J.A. (2005) 'Supply chain optimization of large-scale continuous processes', *Computers & Chemical Engineering*, 29(6), pp. 1305–1316.

Searcy, C., Castka, P., Mohr, J. and Fischer, S. (2022) 'Transformational transparency in supply chains: leveraging technology to drive radical change', *California Management Review*, 65(1), pp. 19–43.

Swink, M., Sant'Ana Gallo, I., Defee, C. and da Silva, A.L. (2024) 'Supply chain visibility types and contextual characteristics: a literature-based synthesis', *Journal of Business Logistics*, 45(1), p. e12366.

Tachizawa, E.M. and Wong, C.Y. (2014) 'Towards a theory of multi-tier sustainable supply chains: a systematic literature review', *Supply Chain Management: An International Journal*, 19(5/6), pp. 643–663.

Tang, S. and Higgins, C. (2022) 'Do not forget the "how" along with the "what": improving the transparency of sustainability reports', *California Management Review*, 65(1), pp. 44–63.

Tracy, S.J. (2010) 'Qualitative quality: eight "big-tent" criteria for excellent qualitative research', *Qualitative Inquiry*, 16(10), pp. 837–851.

Zhang, Z., Mishra, N., Wulandhari, N.B.I., Gölgeci, I. and Singh, A. (2025) 'Diffusion of digital transformation initiatives in multi-tier supply chains: the double agency role of Tier-1 suppliers', *International Journal of Production Economics*, 288, p. 109728.

Zhou, Z., Cheng, S. and Hua, B. (2000) 'Supply chain optimization of continuous process industries with sustainability considerations', *Computers & Chemical Engineering*, 24(2–7), pp. 1151–1158.

Zhou, X., Lu, H. and Mangla, S.K. (2024) 'The impact of digital traceability on sustainability performance: investigating the roles of sustainability-oriented innovation and supply chain learning', *Supply Chain Management: An International Journal*, 29(3), pp. 497–522.