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INTRODUCTION

Delivering Sustainability Through Ecosystem Innovation: A Multilevel Framework for Sustainability Transitions

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Abstract

This introduction to the special issue examines how ecosystems can operate as arenas through which sustainability transition can be organized and enacted. Drawing on the articles included in this special issue, it analyses the mechanisms through which ecosystems generate and diffuse sustainable innovation by combining three complementary perspectives: (1) governance and coordination across plural logics, (2) redefinition of value creation, and (3) cognitive and learning dynamics supporting collective adaptation. Building on these insights, our introductive paper theorizes a multilevel framework that links microlevel cognition, mesolevel governance, and macrolevel institutions as recursive components of collective learning. It positions ecosystems as organizational interfaces that translate local experimentation into systemic transformation and argues that research methods should reflect this complexity through participatory, design-based, and data-enabled inquiry. We conclude by outlining several avenues for future research on sustainable ecosystem innovation as a continuous process of organizing, learning, and alignment across actors at different levels.

Keywords: Ecosystem innovation; sustainability; ecosystem governance; multilevel framework; value creation

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The search for new ways of organizing innovation has intensified over the past two decades, particularly to create and capture value from collectively developed innovations and shared solutions (Adner, 2017). An ecosystem is not merely a network of relationships but a structured configuration of roles, responsibilities, and governance arrangements that link organizations, institutions, and users within and across industries (Jacobides et al., 2018). Ecosystem boundaries are porous, their coordination decentralized, and their success depends on the alignment of diverse participants rather than on single players. In such systems, the ability to create and capture value extends beyond individual organizations to emerge from the collective orchestration of knowledge, technologies, and institutional resources across sectors and geographies (Kapoor & Agarwal, 2017). As a result, competitiveness increasingly results from the active and complementary participation of a diversity of actors that connect and coordinate in ecosystems around a distributed innovation rather than from the internal capacities of single firms. Beyond the ecological metaphor and the structural heterogeneity that it can encompass, the notion of ecosystem provides a privileged perspective to explain how actors coordinate despite belonging to different institutional worlds (Koenig, 2012).

Concurrently, the urgency of sustainability has become one of the defining issues of our time. Climate change, biodiversity loss, natural resources depletion, and deepening social inequalities constitute grand challenges, understood as complex, global, interdependent, and unsolved problems that defy linear solutions and call for cross-boundary collaboration (Ferraro et al., 2015; George et al., 2016; Leixnering et al., 2025). Addressing these challenges demands a shift from firm-level responsibility to systemic and ecosystemic accountability, in which environmental

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and social outcomes are co-produced through networked innovation processes (Gladwin et al., 1995; Shrivastava, 1995). Such collective innovation dynamics raise not only economic and technological issues but also moral and institutional ones since achieving ecological resilience while ensuring justice, inclusivity, and intergenerational balance requires a just transition capable of reconciling ecological imperatives with social well-being.

These two transformations – the diffusion of ecosystemic modes of organizing innovation and the growing imperative of sustainability – are now deeply intertwined. As technological acceleration needs to converge with societal imperatives, ecosystems have the potential to become the crucibles of sustainable innovation by constituting dynamic arenas where actors with diverse interests and logics of action experiment with new forms of coordination, value creation, and collective purpose. However, despite the potential of ecosystems for sustainable innovation, our understanding of how these arrangements actually contribute to sustainability remains limited. Existing research richly describes value co-creation (Adner, 2017), complementarities (Jacobides et al., 2018), and orchestration (Dhanaraj & Parkhe, 2006) but rarely examines how these mechanisms are mobilized to achieve environmental and social goals: objectives that often conflict with efficiency, growth, or short-term profitability (Egels-Zandén, 2014).

From a theoretical perspective, we also argue that adopting an ecosystem approach on sustainability is particularly fruitful as it permits to connect innovation management and sustainability-transitions research, two fields that have largely evolved in parallel. Innovation management focuses on firm-level processes of knowledge recombination and capability development (Teece, 2018), whereas transition research investigates systemic change across technologies, institutions, and practices (Geels, 2002; Markard et al., 2012). Ecosystem thinking offers a link between these scales at the mesolevel. By focusing on coordination, co-evolution, and governance among interdependent actors, it constitutes a privileged analytical perspective through which to examine how transitions can be collectively organized for the good. It also helps clarify how networks of firms, public bodies, and other communities of actors mobilize resources, negotiate meaning, and institutionalize new norms of production and consumption.

However, this integrative potential remains underexploited. Much of the ecosystem literature still privileges technological innovation and economic performance, often taking for granted growth and competitiveness as unquestioned goals (Adner & Kapoor, 2016). Conversely, sustainability-transition studies typically emphasize macrolevel structures while overlooking the organizational and cognitive mechanisms through which transformation occurs. As a result, little is known about how ecosystem actors govern, learn, and align around sustainability objectives, involving that several questions remain largely unaddressed: how do orchestrators balance economic, ecological, and social imperatives? How do new forms of value creation and capture emerge from cross-sector collaboration? How can distributed networks maintain shared direction without centralized control? And what forms of inquiry are suited to capturing these recursive processes of coordination, co-evolution, and learning?

Addressing these questions calls for a perspective that is simultaneously theoretical, methodological, and empirical. It requires the development of conceptual frameworks capable of linking microlevel sensemaking, mesolevel governance, and macrolevel institutional embedding. Additionally, it also calls for research practices that can empirically observe these interactions as they unfold.

This introductory article develops such a perspective by drawing on the contributions assembled in this special issue, which together explore the institutional, organizational, and cognitive dynamics of sustainable ecosystem innovation across a variety of contexts. These contributions examine ecosystems operating in different sectors and regions, from industrial clusters and meta-organizations in Europe, Africa, and Asia (Ardiet, 2025; Neukam et al., 2025; Orbell et al., 2025) to sustainable start-up networks and digital platforms (Bally et al., 2025) and through diverse methodological lenses, including qualitative case studies, quantitative analyses, and conceptual essays (Romme, 2025; Vanhaverbeke, 2025). Despite this heterogeneity, they converge on a central premise: sustainability is not an outcome to be delivered by individual actors but the result of emergent dynamics through which ecosystems align, learn, and adapt collectively. Their analyses reveal the multiple ways in which ecosystems mobilize governance, value creation, and cognition to pursue environmental and social objectives while sustaining innovation.

Building on these insights, we develop an integrative argument in three steps.

In the next section, we identify and discuss three complementary perspectives that illuminate how ecosystems deliver sustainability: (1) governance and coordination, which address how heterogeneous actors organize under plural logics; (2) redefinition of value creation, which examines how sustainability redefines purpose and temporality; and (3) cognitive and learning dynamics, which explain how vision, empathy, and sensemaking sustain adaptation across scales. These perspectives are synthesized into a multilevel framework linking cognition, organization, and institutional context as interdependent layers of collective learning.

Then, we extend the argument by positioning ecosystems within the broader literature on sustainability transitions and reflecting on the methodological approaches required to study them as complex, evolving, and reflexive systems.

The final section outlines several research avenues that stem from this synthesis, reframing sustainability as a continuous process of organizing and learning across levels.

Understanding how ecosystems deliver sustainability

Exploring how ecosystems contribute to sustainability requires moving beyond abstract definitions to examine the concrete mechanisms through which collective action takes shape (Richard et al., 2024). The analysis that follows builds on the articles collected in this special issue to identify three complementary perspectives that together illuminate these mechanisms. Each perspective highlights a distinctive domain of inquiry while together they reveal the multifaceted nature of sustainable ecosystem innovation. The first focuses on governance and coordination, showing how diverse organizations align under plural and sometimes conflicting logics. The second examines value creation and stakeholder relations, emphasizing the redefinition of purpose and temporality that sustainability entails. The third addresses cognitive and learning dynamics, revealing how vision, empathy, and distributed sensemaking sustain adaptation across scales. These perspectives form the analytical foundation for our integrative, multilevel framework, and they collectively demonstrate that sustainability is achieved through ongoing processes of organization, interaction, and learning within and across ecosystems.

Governance and coordination: Orchestrating plural logics

Governance – understood as the configuration of authority, coordination, and accountability among interdependent actors – remains a cornerstone of ecosystem analysis (Dhanaraj & Parkhe, 2006; Jacobides et al., 2018). Within sustainability transitions, governance plays an ambivalent role: both enabling and constraining. It is enabling because it creates conditions for joint action; it is constraining because it must reconcile heterogeneous logics, geographies, and cultures.

Economic growth, ecological integrity, and social equity are rarely aligned, and ecosystems become the arenas where these tensions are worked out through actions. Alignment between such logics should not be taken for granted. For instance, sustainability can be recognized as a morally legitimate strategy while considered as practically irrelevant at an operational level, a well-known hiatus that may lead to decoupling (Egels-Zanen, 2014). It is especially the case in ecosystems where alignment across different institutional logics, and not to a unique dominant logic, leads to success. Because new ecosystems operate at the frontier between well-established fields, legitimization is key to their success, and governance can allow for the institutional translation between contexts that can lead to legitimization of an innovative idea (Claus et al., 2021).

In this respect, the case of Cluster Montagne, examined by Ardiet (2025), offers a striking illustration. Originating as a competitiveness cluster for mountain industries, the organization is now expected to champion ecological transition in Alpine tourism. Four logics of action (facilitation, knowledge production, networking, and narrative construction) not only structure its operations but also pull it in diverging directions. The coexistence of these logics forces constant negotiation between incremental adaptation and structural change. The cluster's governance style (consensual, member based, and legitimacy seeking) enables participation but constrains radical experimentation. In this study, governance is a process of maintaining productive tension, keeping economic imperatives alive while introducing ecological ambition into the organizational fabric.

A different form of orchestration is analyzed by Orbell et al. (2025), who investigate agricultural service ecosystems in sub-Saharan Africa. Their longitudinal study of participatory guarantee systems (PGS) for agro-ecological certification shows that alignment among actors is achieved less through formal authority than through a hub organization performing facilitation, mediation, and representation. The PGS evolves through successive stages (preparation, birth, and growth), each shaped by shifting configurations of NGOs, farmer groups, and donors. External development projects and volatile market demand continually destabilize these arrangements, requiring flexible governance capable of re-articulating roles and expectations.

Across these contexts, governance for sustainability emerges as a reflexive capability rather than a fixed structure. Multistakeholders' meta-organizations emerge through iterative coordination and negotiation based on evolving boundaries, organizational practices, and logics of action (Saniossian et al., 2022). It involves ongoing boundary work and the cultivation of trust, narrative coherence, and procedural fairness (Ansell & Gash, 2008). As such, ecosystems that succeed in achieving sustainability are those able to institutionalize meta-organizational forms as structures that coordinate through persuasion and shared identity rather than authority (Dhanaraj & Parkhe, 2006). It is less about controlling than about dynamically steering diversity without erasing it, allowing plural interests and time horizons to coexist while sustaining a common orientation toward sustainability goals.

Value creation definition: Re-architecting purpose and temporality

While governance influences how actors interact, the notion of value defines why they interact. Sustainability alters both the purpose and the temporality of value creation, moving attention from efficiency, coopetition, and value appropriation (Chiambaretto et al., 2020; Theodoraki, 2020) toward regeneration and shared prosperity (Bocken et al., 2014). The question is no longer how to maximize ecosystem rents, but how to rethink value architectures so that they can internalize ecological and social objectives.

Astorino et al. (2025) propose a very comprehensive attempt to capture this transformation. Their comparative investigation of sustainable business model innovation (SBMI) in Brazil and Belgium develops a cosmo-local meta-model that integrates firm-level and territorial perspectives. The model distinguishes between 'internal–external dynamics' (how organizations diffuse sustainable practices outward) and 'external–internal dynamics' (how local socio-ecological conditions reshape organizational strategies). Through the meta-Model for Eco-Innovation (MEI) framework, they reveal how sustainability arises from reciprocal learning between global firms and local ecosystems, creating hybrid arrangements that are neither purely corporate nor purely community based.

In Neukam et al. (2025), the focus shifts to long-term stakeholders' relationships in Japanese sustainable open innovation (SOI). By tracing how public and private actors collaborate with international partners on sustainable development goals (SDG)-aligned projects, the study uncovers a cultural logic of patient relationship building rooted in long-term orientation. Sustainability here is achieved through temporal discipline: the ability to privilege continuity, trust, and incremental progress over short-term financial returns. Human capital, technological mediation, and ethical commitment interact to create durable alliances that outlast project cycles.

Both studies converge on a fundamental transformation of what counts as value. Rather than the result of a transaction, value becomes a process of mutual adaptation among actors and their environments. The metrics of success extend beyond profit to include social legitimacy, territorial resilience, and ecological restoration. These findings invite a reframing of classical strategy notions such as competitive advantage or value capture: in sustainable ecosystems, advantage stems from the capacity to maintain the commons on which all participants depend.

Hence, the imperative of sustainability calls for renewed governance models and exploring value through this lens echoes current theoretical and empirical challenges. How value is distributed across interdependent stakeholders, how measurement systems can integrate qualitative and nonmarket outcomes, and how institutional arrangements can prevent the re-privatization of collectively created benefits remain open questions (Boons & Lüdeke-Freund, 2013; Snihur & Bocken, 2022).

Cognitive and learning dynamics: From leadership vision to distributed sensemaking

Ecosystems evolve through learning. Their capacity to innovate and endure depends on how participants perceive, interpret, and learn within complex environments (Howard-Grenville et al., 2019). The third pathway identified in this special issue examines the cognitive and learning processes through which ecosystem members develop shared direction while retaining creative diversity.

In the context of autonomous electric vehicles, Niesten et al. (2025) analyze how leaders' cognitive capabilities shape ecosystem strategies. Drawing on the dynamic managerial capabilities framework (Helfat & Peteraf, 2015; Teece, 2007), they show that future orientation (the ability to envision and persuade around alternative futures) supports 'system strategies' of vertical integration and standard setting, whereas cognitive empathy (the capacity to understand partners' perspectives) facilitates 'component strategies' based on collaboration and complementarity. These cognitive orientations influence not only firm behavior but also the configuration of the broader ecosystem, determining whether it evolves toward competition or cooperation.

Bally et al. (2025) extend this analysis to the collective level of learning by examining how startups mobilize intermediaries to access resources in sustainable and technological innovation ecosystems. Using a large comparative dataset, they identify seven intermediation trajectories and demonstrate that sustainability-oriented ventures rely more heavily on interpersonal, public, and nonprofit intermediaries than their technology-driven counterparts. These intermediaries provide legitimacy, connect entrepreneurs to diverse communities, and translate sustainability ideals into operational guidance. Learning, therefore, unfolds through relational chains rather than through formal hierarchies or markets.

Across these two studies, cognition and learning appear as complementary processes linking vision to action. Leadership cognition provides directionality; intermediation and network learning provide adaptability. Ecosystems capable of articulating a shared vision while remaining open to new interpretations display what Weick and Sutcliffe (2001) term collective mindfulness, as the readiness to detect weak signals and adjust behavior before failures escalate. Delivering sustainability thus depends on cultivating interpretive flexibility and reflexivity, qualities that allow participants to question prevailing logics and reimagine their collective future (Howard-Grenville, 2021).

A multilevel framework on sustainable ecosystem innovation

The perspectives discussed above highlight different mechanisms through which ecosystems can foster sustainability: governance ensures coordination across plural logics, value creation redefines purpose and temporality, and cognition shapes learning and adaptation. Yet these mechanisms unfold at distinct analytical levels. Governance concerns the meso arena of interorganizational coordination, value creation depends on macroinstitutional and territorial frameworks, and cognitive dynamics arise from micro interactions and sensemaking. Delivering sustainability therefore presupposes the alignment of these levels, not their separate optimization. Co-evolution is indeed key. For instance, business models do not merely

respond to environmental conditions; they actively shape the ecosystem in which organizations operate, as strategic choices influence stakeholders' configurations, as well as competition and collaboration (Demil et al., 2018).

The contributions in this special issue reveal various cases in which this interdependence manifests. In Cluster Montagne (Ardiet, 2025), changes in members' cognitive frames modified the cluster's governance logics and its regional policy role. In African agro-ecological service ecosystems (Orbell et al., 2025), local learning processes shaped certification practices later institutionalized by national authorities. Conversely, macro infrastructures such as data platforms (Vanhaverbeke, 2025) or SDG frameworks (Neukam et al., 2025) reshape organizational routines and individual perceptions. Sustainability, in short, is an emergent property of recursive interactions among cognitive, organizational, and infrastructural processes.

Figure 1 summarizes this integrative view as a multilevel framework. The inner ring (microlevel) represents cognition and sense-making, where actors perceive signals and experiment; the middle ring (mesolevel) concerns governance and orchestration, translating insights into coordinated action; the outer ring (macrolevel) refers to infrastructures and institutions that stabilize and amplify learning. Feedback arrows between rings indicate continuous information flows. Linking these levels is collective learning and reflexivity as the system's ability to observe and redesign its own organizing principles, while the whole diffuses economic, social, and ecological outcomes.

This framework unites the preceding analyses into a single architecture of collective learning. Sustainability arises when microlevel sensemaking, mesolevel orchestration, and macrolevel institutional embeddedness reinforce one another through transparent feedback. The model shifts attention from isolated performances to the quality of cross-level alignment and to reflexivity as a core dynamic capability of ecosystems.

Consequently, ecosystems can be seen as evolving learning systems whose capacity to deliver sustainability depends on how effectively they connect cognition, coordination, and context into iterative cycles of experimentation and renewal.

Toward an integrative approach of ecosystem transitions

The integrated, multilevel framework developed above shows that ecosystems can be understood as multilevel learning systems that align cognition, organization, and infrastructure in pursuit of sustainability. Building on this argument, this section situates the ecosystem approach within the broader theoretical landscape of sustainability transitions and outlines the methodological renewal required to study such complex and evolving systems. The aim is not to fuse two literatures mechanically, but to demonstrate how ecosystem research and transition studies can enrich one another when viewed as complementary perspectives on collective transformation.

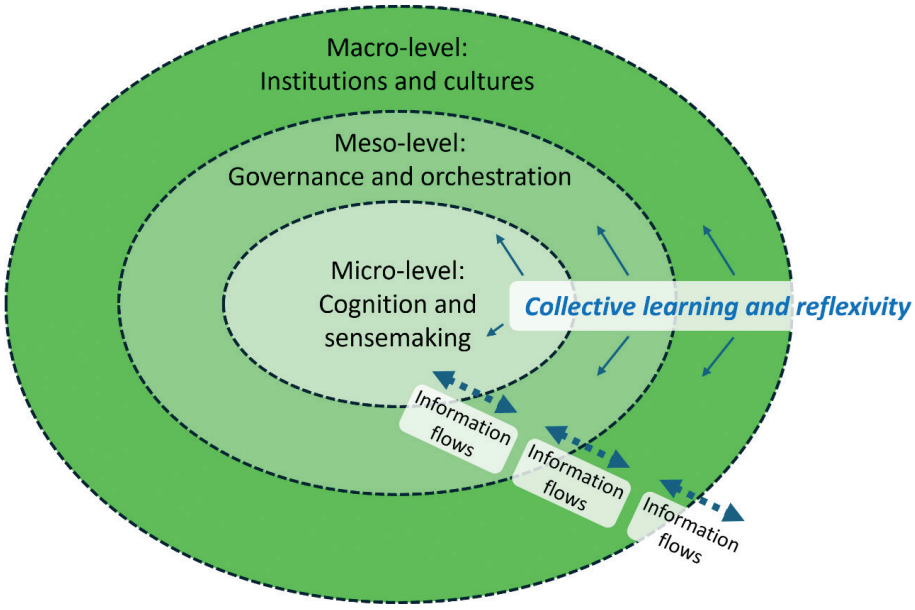

Figure 1. A multilevel framework of sustainable ecosystem innovation.
Source: Own elaboration.

Positioning ecosystems as the transition interface

Sustainability-transitions research and ecosystem studies share a concern with collective transformation, but they differ in both scope and emphasis. The sustainability-transitions tradition explains how sociotechnical systems evolve through long-term interactions among niches, regimes, and landscapes (Geels, 2002; Markard et al., 2012). It also clarifies why large-scale change occurs but tends to abstract from the organizational mechanisms that make it happen. The ecosystem perspective, conversely, focuses on how interdependent organizations coordinate and co-create value (Adner, 2017; Jacobides et al., 2018). It offers a fine-grained view of orchestration and collaboration, yet typically treats competitiveness and growth as its central outcomes.

Bringing these perspectives together reveals that ecosystems operate as interfaces of transition, that is, mesolevel arenas through which systemic change is organized and enacted. Ecosystems link local experimentation to institutional reconfiguration, translating innovation into transformation. Within these arenas, orchestrators (whether hub organizations, clusters, or metaorganizations) align actors around shared visions, mediate between established and emergent logics, and ensure that learning generated in one context diffuses across the system. Their governance work resembles the translation and alignment functions emphasized in transition-management theory (Loorbach, 2010; Rotmans et al., 2001).

Viewing ecosystems as interfaces of transition yields three key conceptual implications that the contributions in this special issue collectively illustrate.

First, innovation meshes the economic and the institutional dimensions. Ecosystem participants do not merely commercialize innovations; they also co-produce norms, standards, and narratives that redefine what counts as legitimate and desirable change. They are both business entrepreneurs and institutional entrepreneurs, which allows for the hybridization of institutional logics that emerges at a mesolevel, affecting both economic and societal value. Astorino et al. (2025) demonstrate how cosmo-local interactions between firms and territories create hybrid forms of value that combine competitiveness with social and environmental benefits. Similarly, Neukam et al. (2025) demonstrate how long-term partnerships in Japan generate not only financial results but also new models of stakeholder responsibility consistent with the SDGs. These examples confirm that ecosystem value creation extends beyond markets to the institutional infrastructures that sustain transitions.

Second, ecosystem dynamics unfold across nested temporal horizons. Transitions require bridging short-term projects and long-term societal trajectories (Köhler et al., 2019). Ardiet's study of Cluster Montagne (2025) and Orbell et al.'s (2025) analysis of African agro-ecological service ecosystems reveal the challenge of reconciling immediate operational needs with the slow, cumulative work of ecological transformation. Both demonstrate that sustainability depends on the ability of orchestrators to maintain strategic continuity while adapting governance practices to evolving stakeholder expectations.

Third, ecosystems are political spaces where inclusion and legitimacy determine the possibility of transitions. Bringing together corporate, public, and civic actors, ecosystems become arenas of negotiation over whose priorities guide collective action. Bally et al. (2025) highlight how sustainable startups mobilize interpersonal and public intermediaries to gain legitimacy and resources otherwise concentrated in technological ecosystems. Niesten et al. (2025) further show that cognitive empathy and visionary leadership enable orchestrators to navigate conflicting logics and power asymmetries. These findings show that ecosystems deliver sustainability only when participation and representation are actively managed, that is to say when efficiency is balanced with openness and accountability (Smith et al., 2010).

These insights position ecosystems as the institutional, organizational, and cognitive arenas of sustainability transitions. They bridge microlevel experimentation with macrolevel institutional change through processes of coordination, learning, and reflexive governance. The special issue thus contributes to a nascent organizational theory of transition, one that explains not only how structures evolve but how they are organized to evolve. However, recognizing this bridging role also poses a methodological challenge. If ecosystems are indeed transition interfaces, then studying them requires methods capable of capturing reflexive, multilevel learning processes. The next subsection addresses this need by discussing how design-based and data-enabled approaches can support an integrative science of ecosystem transitions.

Methodological renewal: Designing for reflexivity

To analyze ecosystems' processes and understand their dynamics, management research should rely on approaches that are flexible, participatory, and sensitive to context.

In this respect, this special issue illuminates two complementary methodological approaches. Romme (2025) advocates a shift toward design-based inquiry, in which theory and practice evolve together through cycles of experimentation. In this approach, research on sustainable ecosystems is not confined to describing structures or identifying best practices. It becomes a generative process in which scholars and practitioners co-design frameworks, tools, and governance mechanisms, test them *in situ*, and evaluate their contribution to collective learning. Knowledge created through this process gains relevance

not by remaining detached but by demonstrating its capacity to guide reflexive adaptation. Rather than a bias, such engagement in the field becomes a resource since observing how participants react to interventions or reframe problems offers a privileged window into their learning capabilities.

Vanhaverbeke's perspective (2025) extends this methodological renewal to the digital sphere. As ecosystems increasingly depend on data flows and algorithmic feedback, they transform into living learning environments. Researching such contexts requires methods that can combine computational mapping with interpretive understanding: quantitative analyses of data circulation complemented by qualitative attention to meaning, ethics, and power. Data are not neutral artefacts but organizing devices that influence access, inclusion, and accountability. Consequently, studying data-intensive ecosystems requires collaboration with the actors who design and use these infrastructures, making data governance part of the research process itself.

Both approaches ultimately converge on a shared methodological orientation. Research on sustainable ecosystems should be engaged, iterative, and integrative. Engaged research acknowledges that understanding ecosystems depends on collaboration with their participants and on recognizing multiple forms of expertise, including those of practitioners and of other communities' members. Iterative inquiry advances through cycles of observation, experimentation, and reflection that mirror the adaptive learning of the systems under investigation. Finally, integrative approaches combine qualitative depth, quantitative power, and design-based experimentation to capture the interplay of cognition, governance, and infrastructure. Such methodological orientation relies on principles that do not prescribe a single method but rather invite a plural and flexible repertoire suited to investigate ecosystems, as complex, evolving, and multiactor environments. Adopting such a methodological orientation would bring management research closer to the realities of collective transformation, allowing scholars to investigate and support how ecosystems learn to organize for sustainability.

Future research avenues on sustainable ecosystem innovation

If ecosystems can operate as arenas of sustainability transitions, we discussed in this introductory text how they also raise new theoretical and methodological questions. Delivering sustainability through ecosystems requires not only new governance systems and collaboration forms but also new ways of theorizing learning processes and evaluating outcomes.

Building on the insights of this special issue, four promising directions emerge for advancing research on sustainable ecosystem innovation.

Organizational forms enabling transition

A first avenue concerns the organizational forms that enable transition. The ever-expanding and porous organizational boundaries; the increasing inter- and multidisciplinary collaborations; and the intricate connections across organizations, industries, and nations – fueled by accelerated technological advancements – have jointly brought ample opportunities for new organizational forms. Existing research has introduced a few new – or untraditional – ways of organizing, such as, for example, 'meta-organizations' (Ahrne & Brunsson, 2005; Valente & Oliver, 2018), 'open team production' (Berti & Pitelis, 2022), 'crowdsourcing' (Lykourentzou et al., 2021), or 'transnational commons' (Ansari et al., 2013).

The studies by Ardiet (2025) and Orbell et al. (2025) illustrate how meta-organizations and hub structures orchestrate heterogeneous actors and reconcile competing institutional logics. Future research should build on these works to examine how such hybrid arrangements evolve as ecosystems mature and how they balance inclusiveness with strategic coherence (Ahrne & Brunsson, 2005). Key questions include who defines ecosystem boundaries, how legitimacy is developed and maintained, and when intermediary organizations shift from incremental adaptation to transformative capacity (Valente & Oliver, 2018). Comparative and longitudinal designs could help reveal how governance mechanisms, leadership roles, and funding architectures interact to sustain transition-oriented collaboration (Dhanaraj & Parkhe, 2006).

Cognitive and human foundations of collective learning

A second direction relates to the cognitive and human foundations of collective learning in ecosystems for innovation. Contributions by Niesten et al. (2025) and Bally et al. (2025) demonstrate that leadership cognition, empathy, and intermediation shape how ecosystems' stakeholders interpret sustainability challenges and coordinate responses. These insights invite researchers to take a closer look at how cognition becomes collective and to explore how ideas, frames, and expectations travel across organizational boundaries and scale up into shared visions (Gavetti, 2012; Weick, 1995). In this respect, Fan and Zietsma (2017) demonstrated how actors embedded in disparate logics across multiple fields can overcome the constraints of their own logics to construct a new, shared governance logic together; still, we know very little about how such shared perspectives emerge in the pursuit of sustainability. Further research could explore the microprocesses through which actors interpret sustainability challenges, translate them into joint projects, and institutionalize reflexivity in everyday routines. Methods such as cognitive mapping, ethnographic observation, or participatory workshops could help capture how

sensemaking unfolds in real time and how diversity of perspectives enhances or constrains learning (Howard-Grenville, 2021). Investigating these dynamics would connect the microfoundations of dynamic capabilities (Helfat & Peteraf, 2015) with the collective intelligence required for sustainability transitions. Finally, the rapid development of technologies and the growing hyperconnectivity among organizations, industries, and nations have also posted new requirements and call for new capabilities at both individual and organizational levels.

Digital and territorial infrastructures sustaining ecosystem learning

A third research avenue concerns the digital and territorial infrastructures that sustain ecosystem learning. Ecosystems today operate at the intersection of digital connectivity and territorial embeddedness (Markoff-Legrand et al., 2024). The contribution by Vanhaverbeke (2025) shows that data network effects can accelerate sustainable innovation; yet, they also raise issues of bias, inclusion, and data governance. Conversely, Astorino et al. (2025) and Neukam et al. (2025) remind us that sustainability remains anchored in specific places, cultures, and communities. Altogether, these perspectives reveal a productive tension between global digital infrastructures and local contexts of application.

Future research could examine how data-driven ecosystems interact with territorial policies and social norms, and how these interactions produce new spatial configurations of innovation (Nambisan et al., 2017). Comparative analyses across regions and sectors could clarify how digitalization reshapes inclusiveness and how place-based capabilities moderate the effects of platformization. Such work would inform policy debates on how to govern digital infrastructure as common goods serving ecological and social goals (Constantiou & Kallinikos, 2015; Kohli & Melville, 2019).

Methodological and evaluative approaches to capture complexity

A fourth and last direction for future research involves the methodological and evaluative approaches required to capture these complex dynamics. The essays by Romme (2025) and Vanhaverbeke (2025) both argue for methodological renewal, through design-based collaboration and through the use of data-enabled infrastructures that allow researchers to observe ecosystems as they evolve. Future work could operationalize these methodological orientations through different approaches, including collaborative action research, living labs, and system-dynamics modeling (Bulkeley et al., 2019; Reason & Bradbury, 2008). Such approaches would help scholars examine the recursive learning processes that conventional case studies often overlook.

At the same time, developing metrics for ecosystem sustainability performance remains a crucial task. From this perspective, integrative evaluation frameworks – combining quantitative measures of environmental efficiency with qualitative assessments of legitimacy, equity, and learning – would enable both academics and practitioners to assess an ecosystem's broader contribution to the public good (Boons & Lüdeke-Freund, 2013; Lozano, 2018). Hence, expanding these methodological repertoires would enhance both the relevance and the societal impact of management research on sustainability.

The four research avenues proposed above are connected by one common thread: the need to connect microlevel agency, mesolevel governance, and macrolevel transformation in a unified research agenda. The study of sustainable ecosystem innovation thus invites scholars to think beyond disciplinary boundaries and methodological conventions. It calls for collaborations among organization theorists, transition scholars, economists, and data scientists, as well as with policymakers and practitioners who shape ecosystems on the ground. Pursuing these avenues will allow management scholarship to move from explaining isolated cases of eco-innovation to articulating the broader institutional and cognitive infrastructures that sustain long-term transition, therefore consolidating a field that not only observes but also actively supports how societies organize for sustainability.

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