



Collective Value Creation as the Generative Mechanism of Sustainable Entrepreneurial Ecosystems

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Abstract

Increasing sustainability challenges have exposed the limitations of entrepreneurial ecosystem research, which has predominantly emphasized structural configurations and economic outcomes while providing limited explanation of how ecosystem interactions generate enduring economic, social, and environmental value. This conceptual paper addresses this theoretical gap by developing a middle-range theory that explains the transition from entrepreneurial ecosystems to sustainable entrepreneurial ecosystems through the mechanism of collective value creation. Drawing on an integrative synthesis of Entrepreneurial Ecosystem Theory, Sustainable Entrepreneurship, Ecosystem Strategy, and Relational and Stakeholder Theory, the paper develops a theory-building framework that specifies core constructs, causal mechanisms, boundary conditions, and five theoretical propositions. The proposed framework positions collaborative resource orchestration as the enabling capability, collective value creation as the central generative mechanism, institutional reinforcement as the system-level outcome, and adaptive resilience as the long-term capability of sustainable entrepreneurial ecosystems. By shifting analytical attention from ecosystem composition to ecosystem processes, the framework advances existing scholarship through a coherent explanation of how sustainability emerges from collaborative interactions among heterogeneous actors. The proposed middle-range theory provides a foundation for cumulative theory development and offers a theoretically grounded agenda for future empirical research across diverse entrepreneurial ecosystem contexts.

Keywords

entrepreneurial ecosystems; sustainable entrepreneurial ecosystems; collective value creation; collaborative resource orchestration

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1. Introduction

Entrepreneurial ecosystems (EEs) have emerged as one of the most influential frameworks for explaining how entrepreneurial activities are shaped by interactions among institutions, organizations, entrepreneurs, and supporting actors within a particular context. Rather than attributing entrepreneurial success solely to individual capabilities or firm-level resources, the ecosystem perspective emphasizes the systemic relationships that enable opportunity recognition, resource mobilization, knowledge exchange, and innovation. Consequently, entrepreneurial ecosystems have become a dominant lens for understanding regional competitiveness, innovation-driven growth, and entrepreneurial development (Spigel, 2017; Stam, 2015; Stam & van de Ven, 2021).

Despite its growing prominence, the entrepreneurial ecosystem literature has largely evolved around economic performance indicators, including venture creation, innovation output, productivity, and regional growth. Although these outcomes remain important, mounting global challenges—including climate change, biodiversity loss, social inequality, and resource scarcity—have shifted scholarly and policy attention toward entrepreneurship that simultaneously creates economic, social, and environmental value. Sustainable entrepreneurship therefore extends the traditional entrepreneurial objective beyond wealth creation to encompass broader societal and ecological goals (Dean & McMullen, 2007; Muñoz & Cohen, 2018; Shepherd & Patzelt, 2011). This shift implies that ecosystems supporting entrepreneurship should likewise evolve from fostering entrepreneurial activity alone toward enabling sustainability-oriented value creation.

Recognizing this transformation, recent studies have introduced the concept of Sustainable Entrepreneurial Ecosystems (SEEs), arguing that sustainability should become an integral characteristic of ecosystem design rather than merely an outcome of entrepreneurial activity (Volkmann *et al.*, 2021). Emerging research demonstrates that sustainability-oriented ecosystems depend not only on the presence of entrepreneurial actors but also on sustainability-oriented institutions, stakeholder collaboration, contextual conditions, and ecosystem readiness (Audretsch & Belitski, 2024; DiVito & Ingen-Housz, 2021; Siqueira *et al.*, 2023). Consequently, the ecosystem is increasingly viewed as a mechanism through which multiple actors collectively mobilize resources and coordinate actions to address complex societal challenges.

Although this emerging body of literature has significantly expanded the understanding of sustainability within entrepreneurial ecosystems, important conceptual ambiguities remain. Existing studies primarily examine ecosystem characteristics, contextual determinants, institutional support, or sustainability orientations of ecosystem participants (Chaudhary *et al.*, 2023; Khurana & Dutta, 2024; Pankov *et al.*, 2021). While these studies explain why sustainable entrepreneurial ecosystems emerge and identify factors associated with their development, they provide limited theoretical explanation regarding the underlying mechanism through which heterogeneous actors transform dispersed resources into shared sustainable outcomes. In other words, the process connecting ecosystem interactions with sustainable value generation remains insufficiently theorized.

The broader ecosystem literature similarly recognizes ecosystems as systems of interconnected actors whose competitive advantage depends on complementarities and interdependence rather than isolated organizational capabilities (Adner, 2017; Jacobides *et al.*, 2018). However, much of this literature continues to conceptualize value creation primarily in strategic or economic terms, emphasizing innovation complementarities, platform dynamics, or ecosystem governance. Comparatively less attention has been devoted to explaining how ecosystems generate collective value that simultaneously satisfies economic, environmental, and social objectives. This omission becomes increasingly important

because sustainability challenges inherently require collaborative rather than individual entrepreneurial responses.

Theoretical developments in sustainable entrepreneurship provide useful foundations but do not fully resolve this issue. Sustainable entrepreneurship scholars have argued that entrepreneurial opportunities increasingly emerge from market failures, institutional voids, and environmental challenges requiring innovative solutions (Cohen & Winn, 2007; Schaltegger & Wagner, 2011; York & Venkataraman, 2010). Nevertheless, these explanations remain predominantly entrepreneur-centric by emphasizing entrepreneurial opportunity recognition and organizational action. They offer limited insight into how ecosystem-level interactions enable collective capabilities that exceed the capacity of individual firms to create sustainable value.

This conceptual limitation suggests that the transition from entrepreneurial ecosystems to sustainable entrepreneurial ecosystems requires a different theoretical explanation. Rather than viewing sustainability merely as an additional ecosystem objective, this paper argues that sustainability fundamentally changes the logic through which ecosystems generate value. Specifically, sustainable entrepreneurial ecosystems depend on collective value creation, whereby entrepreneurs, governments, universities, investors, communities, and intermediary organizations jointly integrate complementary resources, coordinate sustainability-oriented actions, and reinforce institutional conditions that enable long-term ecosystem resilience. This mechanism shifts analytical attention from ecosystem composition toward ecosystem processes.

The concept of collective value creation offers an appropriate theoretical bridge because it explains how value emerges through collaboration among interdependent actors rather than through isolated organizational performance. Previous studies have highlighted the importance of relational resources, stakeholder engagement, interorganizational cooperation, and multilevel value creation for achieving sustained competitive advantage (Donaldson & Preston, 1995; Dyer & Singh, 1998; Lepak *et al.*, 2007). Integrating these perspectives with ecosystem theory suggests that sustainable entrepreneurial ecosystems should be understood not merely as collections of entrepreneurial actors but as relational systems in which collective interactions continuously generate, distribute, and renew economic, social, and environmental value.

Accordingly, this article develops a theory-building framework that reconceptualizes sustainable entrepreneurial ecosystems through the lens of collective value creation. Instead of proposing another descriptive classification of ecosystem elements, the paper identifies the causal mechanism that connects entrepreneurial ecosystem structures with sustainable ecosystem outcomes. By integrating entrepreneurial ecosystem theory, sustainable entrepreneurship, ecosystem strategy, and relational value creation, the proposed framework explains how collaborative resource orchestration transforms entrepreneurial ecosystems into sustainable entrepreneurial ecosystems.

This paper makes three primary theoretical contributions. First, it extends entrepreneurial ecosystem theory by shifting its explanatory focus from ecosystem components to ecosystem processes. Second, it introduces collective value creation as the central generative mechanism linking ecosystem interactions to sustainability outcomes. Third, it advances a middle-range theory of sustainable entrepreneurial ecosystems that explains how coordinated interactions among heterogeneous actors convert sustainability orientations into enduring economic, social, and environmental value creation. Together, these contributions provide a stronger theoretical foundation for understanding the evolution of entrepreneurial ecosystems in an era where long-term societal resilience has become inseparable from entrepreneurial success.

2. Theoretical Foundations

2.1 Entrepreneurial Ecosystems: From Structural Components to System Dynamics

The entrepreneurial ecosystem (EE) perspective emerged as a response to the limitations of firm-centric and entrepreneur-centric explanations of entrepreneurship by emphasizing that entrepreneurial outcomes are embedded within interconnected systems of actors, institutions, and contextual conditions. Rather than viewing entrepreneurship as an isolated activity, EE theory conceptualizes entrepreneurial success as the product of interactions among entrepreneurs, universities, governments, investors, intermediaries, markets, and supporting institutions operating within a particular geographical or institutional context (Spigel, 2017; Stam, 2015).

Subsequent developments have shifted the perspective from identifying ecosystem components toward understanding ecosystem dynamics. Spigel & Harrison (2018) argue that entrepreneurial ecosystems evolve through continuous interactions among actors, while Cantner *et al.* (2021) conceptualize ecosystems as dynamic systems progressing through different lifecycle stages. Similarly, Stam & van de Ven (2021) propose that entrepreneurial outcomes depend not only on the availability of ecosystem elements but also on the quality of interactions among these elements. This dynamic perspective recognizes that ecosystem performance cannot be explained by the mere presence of supporting institutions but by the ways these institutions collectively facilitate entrepreneurial processes.

Despite these theoretical advances, entrepreneurial ecosystem research has predominantly evaluated ecosystem performance using economic indicators such as venture creation, innovation intensity, employment, and regional competitiveness (Audretsch & Belitski, 2021; Content *et al.*, 2020). Although these outcomes remain important, they inadequately capture broader societal expectations regarding environmental stewardship and social well-being. Consequently, ecosystem success is often interpreted through an economic lens, leaving limited theoretical space for explaining how ecosystems simultaneously generate economic, environmental, and social value.

Recent research has therefore called for a broader entrepreneurial ecosystem research agenda capable of explaining ecosystem complexity beyond regional economic development alone (Wurth *et al.*, 2022). This broader perspective provides an important foundation for integrating sustainability into ecosystem theory but does not yet specify the mechanisms through which sustainability becomes embedded within ecosystem processes.

2.2 Sustainable Entrepreneurial Ecosystems: Extending the Logic of Entrepreneurial Ecosystems

The emergence of Sustainable Entrepreneurial Ecosystems (SEEs) represents an important evolution in ecosystem research by redefining the objectives of entrepreneurial ecosystems from supporting entrepreneurial activity toward fostering sustainable development. Early discussions by Cohen (2006) suggested that entrepreneurial ecosystems could simultaneously enhance economic vitality and environmental sustainability. However, only recently has SEE developed into a coherent research stream.

Volkman *et al.* (2021) describe SEE as an emerging field that integrates entrepreneurship, sustainability, and ecosystem thinking into a unified research agenda. Rather than treating sustainability as an external outcome, SEE positions sustainability as an organizing principle shaping ecosystem structures, institutions, and interactions. Within this perspective, ecosystem effectiveness depends not only on economic productivity but also on its capacity to support long-term environmental integrity and societal well-being.

Subsequent studies have enriched this perspective by examining sustainability-oriented ecosystem actors, institutional arrangements, contextual factors, and ecosystem readiness. DiVito & Ingen-Housz (2021) demonstrate that individual sustainability orientations can evolve into collective sustainability innovation through ecosystem interactions. Likewise, Pankov *et al.* (2021) show that contextual conditions influence sustainable entrepreneurial activities, while Siqueira *et al.* (2023) emphasize ecosystem readiness as a prerequisite for knowledge-intensive sustainable entrepreneurship. More recently, Audretsch & Belitski (2024) argue that institutional quality and entrepreneurs' sustainability orientation jointly shape ecosystem outcomes.

The preceding synthesis demonstrates that existing theoretical perspectives explain complementary aspects of entrepreneurial ecosystems but remain insufficiently integrated. The following conceptual framework illustrates how these perspectives converge to underpin the proposed theory.

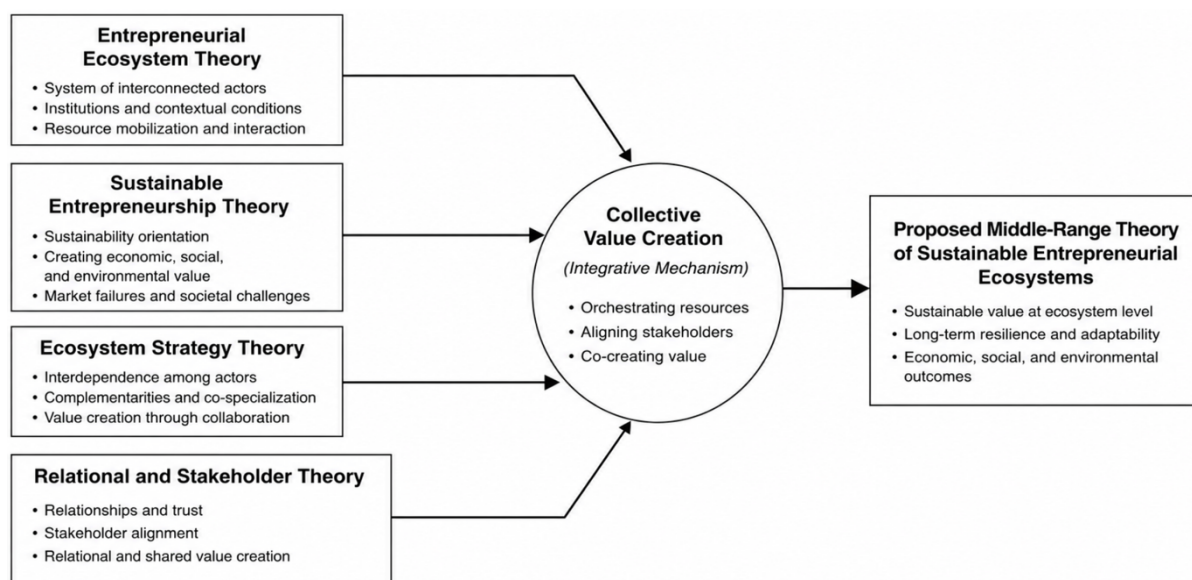


Figure 1. Theoretical Integration Framework for Sustainable Entrepreneurial Ecosystems

Source: Developed by the author based on the synthesis of Entrepreneurial Ecosystem Theory, Sustainable Entrepreneurship, Ecosystem Strategy, and Relational and Stakeholder Theory.

Figure 1 illustrates the theoretical foundation of the proposed framework by integrating four complementary streams of literature. Rather than treating these perspectives independently, the framework positions collective value creation as the integrative mechanism linking ecosystem dynamics, sustainability orientation, interdependence, and stakeholder collaboration. This theoretical integration establishes the conceptual basis for the middle-range theory developed in the subsequent section.

Although these studies substantially advance the SEE literature, they primarily explain antecedents and contextual determinants of sustainable ecosystems. They provide valuable insights into *what* contributes to sustainable entrepreneurial ecosystems but offer less theoretical explanation regarding *how* sustainability emerges from interactions among heterogeneous ecosystem participants. Consequently, the transformation from entrepreneurial ecosystems into sustainable entrepreneurial ecosystems remains only partially theorized.

2.3 Collective Value Creation as the Missing Explanatory Mechanism

The ecosystem literature outside entrepreneurship provides useful theoretical foundations for addressing this limitation. Ecosystems have increasingly been conceptualized as structures of interdependent actors that jointly create value through complementarities rather than through isolated organizational capabilities (Adner, 2017; Jacobides *et al.*, 2018). Within

this perspective, competitive advantage emerges from coordinated interactions among ecosystem participants rather than from individual organizations alone.

Similarly, strategy scholars argue that value creation increasingly occurs at the ecosystem level because innovation depends on collaboration among multiple complementary actors (Shipilov & Gawer, 2020; Steigenberger & Wilhelm, 2018). The emphasis therefore shifts from organizational resources to ecosystem relationships, coordination mechanisms, and interdependence. However, this stream primarily focuses on innovation ecosystems and competitive advantage, leaving sustainability-oriented value creation comparatively underdeveloped.

Relational theories offer additional insights into how collective value may emerge. The relational view proposes that interorganizational collaboration enables partners to generate relational rents unavailable through independent action (Dyer & Singh, 1998). Likewise, value creation has been conceptualized as a multilevel process involving diverse stakeholders whose interactions generate shared value exceeding individual organizational gains (Lepak *et al.*, 2007). Stakeholder theory further argues that organizational success increasingly depends on balancing the interests of multiple stakeholder groups rather than maximizing benefits for a single actor (Bridoux & Stoelhorst, 2014; Donaldson & Preston, 1995).

Collectively, these theoretical perspectives suggest that sustainability within entrepreneurial ecosystems cannot be adequately explained through ecosystem structures or entrepreneurial orientation alone. Instead, sustainability appears to emerge from collaborative processes through which ecosystem actors integrate complementary resources, coordinate collective actions, and continuously reinforce institutional arrangements that sustain long-term value creation.

2.4 Toward a Theory of Sustainable Entrepreneurial Ecosystems through Collective Value Creation

The preceding discussion reveals an important theoretical discontinuity. Entrepreneurial ecosystem theory explains how ecosystem configurations support entrepreneurship, whereas sustainable entrepreneurship literature explains why entrepreneurial activities increasingly pursue social and environmental objectives. Meanwhile, ecosystem strategy and relational theories explain how value is created collaboratively across organizational boundaries. However, these streams remain insufficiently integrated to explain the transition from entrepreneurial ecosystems to sustainable entrepreneurial ecosystems.

This paper argues that collective value creation constitutes the missing theoretical mechanism connecting these perspectives. Rather than conceptualizing sustainability as an additional ecosystem outcome, collective value creation explains the process through which entrepreneurs, governments, universities, investors, communities, and intermediary organizations jointly transform dispersed resources into enduring economic, social, and environmental value. In this view, sustainability becomes an emergent property of ecosystem interactions rather than an isolated characteristic of individual organizations.

Accordingly, sustainable entrepreneurial ecosystems should be understood as relational systems whose long-term performance depends on the continuous orchestration of collaborative capabilities, stakeholder alignment, institutional reinforcement, and shared value creation. This conceptualization extends existing entrepreneurial ecosystem theory beyond structural explanations by emphasizing the dynamic processes through which ecosystem actors collectively create and sustain value over time. The following section develops this argument into a middle-range theoretical framework by specifying its core constructs, causal mechanisms, boundary conditions, and theoretical propositions.

The preceding synthesis demonstrates that existing theoretical perspectives provide complementary insights but remain only partially integrated, thereby necessitating a comparative overview that clarifies their respective contributions and unresolved limitations.

Table 1. Comparative Synthesis of Theoretical Perspectives Underpinning Sustainable Entrepreneurial Ecosystems

Theoretical Perspective	Primary Contribution	Key Limitation	Role in the Proposed Theory
Entrepreneurial Ecosystem Theory	Explains how interconnected actors, institutions, and contextual conditions support entrepreneurial activity and ecosystem development.	Focuses predominantly on ecosystem structure and economic performance, offering limited explanation of sustainability processes.	Provides the structural context within which sustainable entrepreneurial ecosystems emerge.
Sustainable Entrepreneurship Theory	Explains how entrepreneurial activities address economic, social, and environmental challenges through sustainability-oriented opportunities.	Primarily entrepreneur-centric, with limited attention to ecosystem-level interactions and collaborative mechanisms.	Provides the sustainability orientation that broadens ecosystem objectives beyond economic growth.
Ecosystem Strategy Theory	Explains interdependence, complementarities, and collaborative value creation among multiple actors within ecosystems.	Emphasizes competitive advantage and innovation ecosystems rather than sustainability transformation.	Explains resource interdependence and collaborative orchestration across ecosystem actors.
Relational and Stakeholder Theory	Explains how trust, stakeholder alignment, and interorganizational collaboration generate shared value and long-term relationships.	Does not explicitly conceptualize entrepreneurial ecosystems as the unit of analysis.	Provides the relational logic underpinning collective value creation as the central generative mechanism.

Source: Developed by the author based on the synthesis of the reviewed literature

Table 1 demonstrates that no single theoretical perspective sufficiently explains the emergence of sustainable entrepreneurial ecosystems. Entrepreneurial ecosystem theory provides structural foundations, sustainable entrepreneurship introduces sustainability objectives, ecosystem strategy explains interdependence, and relational and stakeholder theory clarifies collaborative value creation. Their integration establishes the conceptual basis for the proposed middle-range theory developed in the following section.

3. Theory Building: Collective Value Creation as the Generative Mechanism of Sustainable Entrepreneurial Ecosystems

Bagian ini merupakan inti dari artikel konseptual. Berbeda dengan bagian sebelumnya yang meninjau fondasi teori, bagian ini membangun dengan mengembangkan domain teori, mendefinisikan konstruk, menjelaskan mekanisme kausal, mengidentifikasi kondisi batas, dan merumuskan proposisi. Seluruh argumentasi dibangun berdasarkan korpus referensi yang Anda sediakan dan tidak menambahkan referensi di luar daftar tersebut.

3.1 Domain Specification

This paper defines a Sustainable Entrepreneurial Ecosystem (SEE) as a relational system of interdependent entrepreneurial actors, institutions, and supporting organizations that collectively create, coordinate, and sustain economic, social, and environmental value through continuous collaboration. This definition extends the conventional entrepreneurial ecosystem perspective by repositioning sustainability from an ecosystem outcome to a constitutive characteristic of ecosystem functioning. Rather than viewing sustainability as an external objective pursued by individual entrepreneurs, the proposed perspective considers sustainability an emergent property generated through repeated interactions among heterogeneous ecosystem participants.

The proposed theory operates at the ecosystem level, where the unit of analysis is neither the entrepreneur nor the individual organization but the network of relationships connecting entrepreneurs, governments, universities, investors, intermediary organizations, civil society, and local communities. This level of analysis is consistent with entrepreneurial ecosystem research emphasizing systemic interactions rather than isolated organizational performance (Donaldson & Preston, 1995; Spigel, 2017; Stam & van de Ven, 2021). However, unlike existing ecosystem models that primarily explain entrepreneurial productivity, the present framework focuses on explaining how ecosystem interactions generate sustainable value over time.

The theory assumes that ecosystem actors possess heterogeneous resources, capabilities, and sustainability orientations. Sustainable outcomes therefore cannot be attributed to any single actor but emerge through collaborative processes integrating complementary knowledge, financial resources, institutional support, technological capabilities, and societal legitimacy. Such integration enables ecosystem participants to address increasingly complex sustainability challenges that exceed the capabilities of individual organizations (DiVito & Ingen-Housz, 2021; Volkmann *et al.*, 2021).

The explanatory scope of the proposed theory is intentionally bounded. It applies primarily to regional and place-based entrepreneurial ecosystems where repeated interactions among multiple actors facilitate long-term collaboration and institutional learning. The framework is particularly relevant for ecosystems pursuing sustainability-oriented innovation, green entrepreneurship, social entrepreneurship, circular economy initiatives, and knowledge-intensive entrepreneurial development. Conversely, it is not intended to explain short-term entrepreneurial performance, isolated firm-level competitive advantage, or purely market-driven ecosystems where collaboration remains minimal.

3.2 Core Constructs

The proposed theory comprises five interrelated constructs that collectively explain the transition from entrepreneurial ecosystems to sustainable entrepreneurial ecosystems.

The first construct, Entrepreneurial Ecosystem, refers to the interconnected system of entrepreneurial actors, institutions, infrastructure, culture, markets, and supporting organizations that collectively influence entrepreneurial activity (Stam, 2015; Stam & van de Ven, 2021). Within the present framework, the entrepreneurial ecosystem provides the structural context within which collaborative relationships emerge.

The second construct, Collective Value Creation, constitutes the central theoretical mechanism proposed in this article. It refers to the collaborative process through which ecosystem actors integrate complementary resources, coordinate activities, exchange knowledge, and jointly generate value that simultaneously produces economic prosperity, social well-being, and environmental sustainability. Unlike conventional value creation emphasizing firm performance, collective value creation is inherently relational and ecosystem-wide (Lepak *et al.*, 2007; Steigenberger & Wilhelm, 2018)

The third construct is Collaborative Resource Orchestration, defined as the capability of ecosystem participants to mobilize, align, and coordinate complementary tangible and intangible resources across organizational boundaries. Effective orchestration enables ecosystem participants to transform dispersed capabilities into collective solutions that no individual actor could produce independently (Dyer & Singh, 1998; Helfat & Raubitschek, 2018).

The fourth construct, Stakeholder Alignment, represents the extent to which ecosystem actors develop shared sustainability objectives, reciprocal trust, and mutually reinforcing governance arrangements. Stakeholder alignment reduces coordination failures while strengthening collaborative commitment across ecosystem participants (Bridoux & Stoelhorst, 2014; Donaldson & Preston, 1995)

Finally, Sustainable Entrepreneurial Ecosystem represents the long-term outcome of continuous collective value creation. Rather than measuring ecosystem success solely through entrepreneurial activity, SEE reflects the ecosystem's capacity to continuously generate integrated economic, environmental, and social value while maintaining adaptive resilience under changing contextual conditions (Audretsch & Belitski, 2024; Donaldson & Preston, 1995; Volkmann *et al.*, 2021).

The proposed theory relies on clearly specified constructs whose conceptual roles differ within the explanatory framework, thereby requiring explicit definitions before developing the causal mechanism and theoretical propositions.

Table 2. Core Constructs of the Proposed Middle-Range Theory

Construct	Conceptual Definition	Theoretical Role	Analytical Level
Entrepreneurial Ecosystem	A system of interconnected entrepreneurs, institutions, organizations, markets, and supporting actors whose interactions shape entrepreneurial activity.	Provides the structural context from which ecosystem interactions originate.	Ecosystem
Collaborative Resource Orchestration	The coordinated mobilization, integration, and alignment of complementary resources, knowledge, capabilities, and institutional support across multiple ecosystem actors.	Enables collaborative interaction and initiates the generative process of value creation.	Inter-organizational
Collective Value Creation	The collaborative process through which ecosystem actors jointly generate economic, social, and environmental value that exceeds individual organizational contributions.	Serves as the central generative mechanism linking ecosystem interactions to sustainability outcomes.	Ecosystem Process
Institutional Reinforcement	The strengthening of trust, governance arrangements, collaborative norms, and institutional legitimacy through repeated collective interactions.	Stabilizes collaboration and reinforces the sustainability of ecosystem relationships over time.	Institutional
Sustainable Entrepreneurial Ecosystem	An entrepreneurial ecosystem capable of continuously creating integrated economic, social, and environmental value while maintaining long-term adaptability and resilience.	Represents the principal theoretical outcome of the proposed middle-range theory.	Ecosystem Outcome

Source: Developed by the author based on the synthesis of the reviewed literature.

Table 2 clarifies the conceptual architecture of the proposed theory by distinguishing structural context, enabling capability, generative mechanism, institutional consequence, and ecosystem outcome. This hierarchical specification reduces construct ambiguity and establishes a coherent analytical foundation for the subsequent explanation of causal mechanisms, boundary conditions, and theoretical propositions presented in the remainder of the theory-building section.

3.3 Mechanism Development

The proposed theory argues that collective value creation explains the causal process through which entrepreneurial ecosystems evolve into sustainable entrepreneurial ecosystems. Existing entrepreneurial ecosystem studies acknowledge the importance of interactions among ecosystem actors but generally treat these interactions as enabling conditions rather than explanatory mechanisms (Spigel & Harrison, 2018; Wurth *et al.*, 2022). Consequently, the process through which interactions generate sustainability outcomes remains underdeveloped.

The proposed mechanism unfolds through four sequential but mutually reinforcing stages.

First, ecosystem actors recognize their resource interdependence. Entrepreneurs, universities, governments, investors, intermediaries, and communities each possess distinct resources and capabilities that are individually insufficient to address sustainability challenges. Recognition of this interdependence creates incentives for collaborative engagement rather than isolated entrepreneurial action (Adner, 2017; Jacobides *et al.*, 2018).

Second, ecosystem participants engage in collaborative resource orchestration, integrating complementary knowledge, technologies, institutional support, financial capital, and legitimacy across organizational boundaries. This process enhances the ecosystem's collective problem-solving capacity while reducing duplication of resources and increasing adaptive flexibility (Helfat & Raubitschek, 2018).

Third, repeated collaboration gradually produces collective value creation. Economic value is generated through innovation and entrepreneurial growth, social value through inclusive participation and community development, and environmental value through sustainability-oriented innovation and responsible resource utilization. These three dimensions reinforce one another rather than functioning as competing objectives (Chaudhary *et al.*, 2023; DiVito & Ingen-Housz, 2021).

Finally, sustained collective value creation strengthens ecosystem institutions, stakeholder trust, and collaborative norms. Institutional reinforcement further encourages cooperation, creating a positive feedback loop in which ecosystem resilience and sustainability continuously reinforce one another. Sustainable entrepreneurial ecosystems therefore emerge not through a single intervention but through cumulative cycles of collaborative learning and value creation.

The proposed theory conceptualizes sustainable entrepreneurial ecosystems as a dynamic process rather than a static configuration. The following process model synthesizes the sequential mechanism underlying ecosystem transformation.

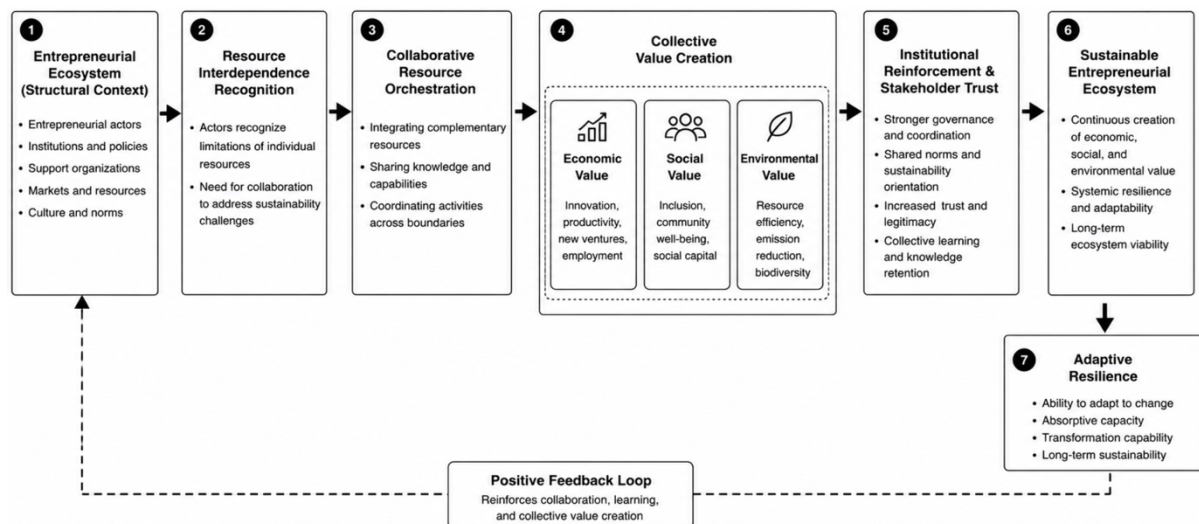


Figure 2. Generative Mechanism of Sustainable Entrepreneurial Ecosystems through Collective Value Creation

Source: Developed by the author based on the proposed middle-range theory and the synthesis of the entrepreneurial ecosystem, sustainable entrepreneurship, ecosystem strategy, and relational value creation literature.

Figure 2 illustrates the generative mechanism through which entrepreneurial ecosystems evolve into sustainable entrepreneurial ecosystems. The framework emphasizes that collective value creation emerges through collaborative resource orchestration following recognition of resource interdependence. The resulting economic, social, and environmental value reinforces institutions and stakeholder trust, creating a positive feedback loop that strengthens ecosystem resilience and long-term sustainability.

3.4 Boundary Conditions

Although collective value creation provides the principal explanatory mechanism, its effectiveness depends on several boundary conditions.

The first boundary condition is institutional quality. High-quality institutions facilitate trust, reduce uncertainty, and encourage collaboration, whereas institutional weaknesses hinder coordinated action (Audretsch & Belitski, 2024).

The second boundary condition concerns stakeholder commitment to sustainability. Collective value creation is more likely when ecosystem participants share sustainability-oriented objectives instead of pursuing exclusively short-term economic interests (Bischoff & Volkmann, 2018).

Third, ecosystem diversity influences collaborative capacity. Diversity of actors increases access to complementary knowledge and resources but simultaneously raises coordination complexity. Effective governance therefore becomes increasingly important as ecosystem diversity expands (Shipilov & Gawer, 2020).

Finally, contextual uncertainty shapes ecosystem adaptation. Rapid technological change, environmental crises, or institutional disruption may strengthen the need for collaborative responses while simultaneously increasing coordination challenges (Dattée *et al.*, 2018).

3.5 Proposition Development

Based on the preceding theoretical arguments, five propositions are advanced.

Proposition 1 (P1).

Entrepreneurial ecosystems characterized by stronger collaborative resource orchestration are more likely to generate collective value creation.

Proposition 2 (P2).

Collective value creation positively facilitates the transformation of entrepreneurial ecosystems into sustainable entrepreneurial ecosystems.

Proposition 3 (P3).

Stakeholder alignment strengthens the positive relationship between collaborative resource orchestration and collective value creation.

Proposition 4 (P4).

Institutional quality positively moderates the relationship between collective value creation and sustainable entrepreneurial ecosystem development.

Proposition 5 (P5).

Sustainable entrepreneurial ecosystems exhibit greater long-term adaptive resilience because continuous collective value creation reinforces ecosystem learning, institutional legitimacy, and collaborative capability.

The proposed propositions collectively specify the causal logic of the emerging theory by linking structural conditions, collaborative processes, contextual contingencies, and ecosystem-level outcomes into an integrated explanatory sequence.

Table 3. Summary of Theoretical Propositions

Proposition & Theoretical Relationship		Underlying Logic	Expected Outcome
P1	Entrepreneurial Ecosystem → Collaborative Resource Orchestration	Resource interdependence encourages ecosystem actors to mobilize and coordinate complementary resources.	Greater collaborative capability across the ecosystem.
P2	Collaborative Resource Orchestration → Collective Value Creation	Effective coordination enables joint generation of economic, social, and environmental value.	Emergence of collective value creation as the central ecosystem process.
P3	Stakeholder Alignment × Collaborative Resource Orchestration → Collective Value Creation	Shared sustainability goals and trust strengthen collaborative resource integration.	Stronger collective value creation.
P4	Institutional Quality × Collective Value Creation → Sustainable Entrepreneurial Ecosystem	Supportive institutions reinforce collaboration and legitimize sustainability-oriented interactions.	Higher likelihood of sustainable entrepreneurial ecosystem development.
P5	Sustainable Entrepreneurial Ecosystem → Adaptive Resilience	Continuous collective value creation reinforces learning, institutional legitimacy, and long-term adaptability.	Greater ecosystem resilience and sustained multidimensional value creation.

Source: Developed by the author based on the proposed middle-range theory.

Table 3 consolidates the theoretical propositions into a coherent causal structure by connecting ecosystem context, collaborative capability, generative mechanism, institutional reinforcement, and long-term outcomes. Together, the propositions define the explanatory logic of the proposed middle-range theory and provide a clear foundation for future empirical validation across different entrepreneurial ecosystem contexts and institutional environments.

The preceding propositions collectively define the architecture of the proposed theory by integrating its core constructs, causal relationships, contextual contingencies, and expected ecosystem outcomes into a coherent explanatory framework.

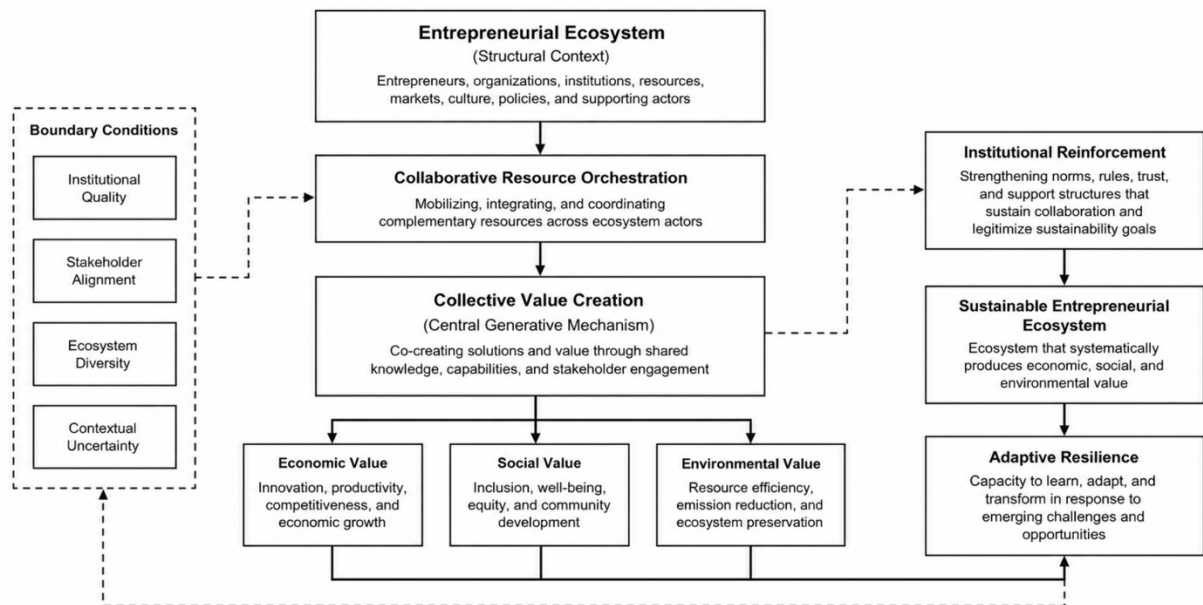


Figure 3. Proposed Middle-Range Theory of Sustainable Entrepreneurial Ecosystems through Collective Value Creation

Source: Developed by the author.

Figure 3 synthesizes the proposed middle-range theory by illustrating how entrepreneurial ecosystems evolve into sustainable entrepreneurial ecosystems through collective value creation. The model emphasizes collaborative resource orchestration as the enabling capability, collective value creation as the central explanatory mechanism, institutional reinforcement as the system-level outcome, and adaptive resilience as the ecosystem's long-term capability under specific boundary conditions.

4. Discussion

The proposed theory advances the entrepreneurial ecosystem literature by shifting the analytical emphasis from ecosystem composition to ecosystem processes. While previous studies have successfully identified the structural elements that characterize entrepreneurial ecosystems, including institutions, entrepreneurial actors, networks, finance, culture, and policy support, their explanatory power remains largely centered on identifying ecosystem conditions associated with entrepreneurial performance (Stam & van de Ven, 2021; Wurth *et al.*, 2022). Consequently, the literature has provided only limited explanation of how these ecosystem elements interact to generate sustainability-oriented outcomes. By positioning collective value creation as the central generative mechanism, this study argues that sustainable entrepreneurial ecosystems emerge through continuous collaborative processes rather than through the simple coexistence of ecosystem components.

4.1 Theoretical Implications

The first theoretical contribution concerns the conceptual evolution of entrepreneurial ecosystem theory itself. Existing ecosystem research has progressively evolved from static descriptions of ecosystem components toward dynamic explanations of ecosystem development (Cantner *et al.*, 2021; Spigel & Harrison, 2018). Nevertheless, sustainability has generally been incorporated as an additional ecosystem objective instead of fundamentally transforming the underlying logic of ecosystem functioning. The proposed theory extends this literature by suggesting that sustainability is not merely another ecosystem outcome but an emergent property arising from sustained collaboration among interdependent ecosystem actors.

A second contribution lies in integrating previously fragmented theoretical traditions. Entrepreneurial ecosystem theory explains how entrepreneurial environments facilitate venture creation, whereas sustainable entrepreneurship literature explains why entrepreneurial activities increasingly pursue environmental and social objectives (Dean & McMullen, 2007; Shepherd & Patzelt, 2011). Meanwhile, ecosystem strategy research demonstrates that value creation increasingly depends on interdependence among complementary actors (Adner, 2017; Jacobides *et al.*, 2018). These perspectives have largely developed in parallel. The present framework connects them through collective value creation, thereby providing a coherent explanation of how entrepreneurial ecosystems evolve into sustainable entrepreneurial ecosystems.

Third, the proposed theory contributes to the ecosystem literature by emphasizing relational processes instead of structural attributes. Previous ecosystem studies have often measured ecosystem quality through the presence of supporting institutions, entrepreneurial density, or resource availability (Brown & Mason, 2017; Stam, 2015). Although these characteristics remain important, they do not adequately explain why ecosystems with similar structural conditions frequently produce different sustainability outcomes. The present framework suggests that differences may arise because ecosystem actors vary in their capacity to orchestrate complementary resources, align stakeholder interests, and repeatedly generate collective value. Consequently, ecosystem effectiveness depends not only on "what exists" within an ecosystem but also on "how actors collaborate" within it.

Finally, the proposed middle-range theory contributes to sustainable entrepreneurial ecosystem research by identifying a specific causal mechanism linking ecosystem interactions to sustainability outcomes. Earlier studies have demonstrated that sustainability orientation, institutional quality, contextual conditions, and ecosystem readiness influence sustainable entrepreneurship (Audretsch & Belitski, 2024; Siqueira *et al.*, 2023; Volkmann *et al.*, 2021). However, these factors have primarily been treated as antecedents. The present theory complements this literature by explaining the intervening process through which these enabling conditions are translated into enduring economic, social, and environmental value.

4.2 Managerial Implications

The proposed theory also carries important implications for practitioners responsible for developing entrepreneurial ecosystems. Governments and regional development agencies have traditionally concentrated on strengthening individual ecosystem components such as access to finance, incubators, regulatory reforms, or entrepreneurship education. Although these interventions remain necessary, the present framework suggests that sustainable ecosystem development requires equal attention to mechanisms that facilitate collaboration across organizational boundaries.

For ecosystem orchestrators—including incubators, accelerators, universities, and innovation intermediaries—the findings imply that their primary role extends beyond supporting individual ventures. These organizations should actively facilitate knowledge integration, stakeholder coordination, and collaborative learning among entrepreneurs, investors, policymakers, civil society organizations, and local communities. Such orchestration can strengthen collective problem-solving capabilities while improving ecosystem resilience.

Entrepreneurs likewise benefit from adopting an ecosystem perspective. Rather than viewing competitive advantage exclusively through firm-specific resources, entrepreneurs operating within sustainable ecosystems should recognize collaborative relationships as strategic assets. Partnerships with universities, public institutions, established firms, and community organizations can enhance innovation capacity while simultaneously increasing social legitimacy and environmental impact. Consequently, entrepreneurial success increasingly

depends on participation in collaborative value creation rather than independent resource accumulation.

4.3 Policy Implications

The theory further suggests several implications for public policy. Policies intended to stimulate entrepreneurship have frequently emphasized increasing the quantity of entrepreneurial activity through financial incentives, business creation programs, or regulatory simplification. While such interventions may increase entrepreneurial participation, they do not necessarily generate sustainable ecosystem development.

The present framework indicates that policy should instead strengthen institutional arrangements that facilitate long-term collaboration among diverse ecosystem participants. Policies promoting cross-sector partnerships, knowledge-sharing platforms, sustainability-oriented innovation networks, and collaborative governance may create stronger foundations for sustainable entrepreneurial ecosystems than isolated support programs directed toward individual firms.

Moreover, sustainability policies should not be designed independently from entrepreneurship policies. Integrating sustainability objectives into entrepreneurial ecosystem governance can improve policy coherence while encouraging entrepreneurs to pursue innovations that simultaneously generate economic competitiveness, environmental stewardship, and societal well-being. Such integration aligns ecosystem development with broader sustainable development objectives without treating sustainability as a separate policy domain.

4.4 Boundary Conditions and Limitations

Although the proposed theory provides a coherent explanation of how entrepreneurial ecosystems evolve into sustainable entrepreneurial ecosystems, several limitations should be acknowledged. First, the framework is intentionally conceptual and therefore does not empirically evaluate the proposed propositions. Future empirical studies are required to examine whether collective value creation consistently mediates ecosystem transformation across different institutional and geographical contexts.

Second, the explanatory scope of the theory is bounded primarily to regional entrepreneurial ecosystems characterized by repeated interaction among heterogeneous actors. Ecosystems operating under highly centralized governance structures, weak institutional environments, or extremely fragmented stakeholder relationships may exhibit different collaborative dynamics that require theoretical refinement.

Third, the theory assumes that ecosystem participants possess at least a minimum willingness to collaborate around sustainability objectives. In practice, conflicting stakeholder interests, power asymmetries, and institutional constraints may inhibit collaborative value creation. These conditions do not invalidate the theory but indicate that the effectiveness of collective value creation is contingent upon contextual factors such as institutional quality, governance capacity, and stakeholder commitment.

Finally, while the proposed framework explains the transition from entrepreneurial ecosystems to sustainable entrepreneurial ecosystems, it does not claim that collective value creation is the only mechanism capable of producing sustainability outcomes. Rather, it identifies one theoretically grounded generative mechanism that integrates ecosystem theory, sustainable entrepreneurship, and relational value creation into a coherent middle-range explanation. Future studies may extend this framework by incorporating additional mechanisms, alternative governance configurations, or different institutional settings to further elaborate the evolving theory of sustainable entrepreneurial ecosystems.

5. Future Research Agenda

The middle-range theory proposed in this paper provides a conceptual foundation for understanding how entrepreneurial ecosystems evolve into sustainable entrepreneurial ecosystems through the mechanism of collective value creation. As with any theory-building study, its primary purpose is not to provide definitive empirical conclusions but to establish a coherent explanatory framework that can guide subsequent theory refinement and empirical investigation. Consequently, several promising research directions emerge from the proposed framework.

First, future studies should empirically examine the collective value creation mechanism proposed in this article. Existing entrepreneurial ecosystem research has largely focused on identifying ecosystem components and contextual determinants of entrepreneurial performance, while relatively little attention has been devoted to explaining the relational processes connecting ecosystem interactions with sustainability outcomes. Longitudinal and comparative research designs could investigate whether collaborative resource orchestration consistently generates collective value creation across ecosystems with different institutional characteristics, governance arrangements, and stages of ecosystem maturity. Such empirical evidence would strengthen the explanatory validity of the proposed middle-range theory and clarify the temporal dynamics through which sustainable entrepreneurial ecosystems emerge.

Second, future research should explore the multi-level nature of collective value creation. Although the present theory adopts the ecosystem as its primary unit of analysis, collaborative processes originate from interactions among individuals, organizations, institutions, and broader societal actors. Multi-level empirical studies could therefore examine how entrepreneurial cognition, organizational capabilities, interorganizational collaboration, and institutional arrangements jointly contribute to ecosystem-level sustainability outcomes. Such investigations would enrich ecosystem theory by explaining how micro-level interactions aggregate into macro-level ecosystem transformation.

Third, comparative research across different institutional contexts offers another important avenue for theory development. Entrepreneurial ecosystems differ considerably in governance quality, institutional maturity, regulatory environments, cultural norms, and resource availability (Audretsch & Belitski, 2024; Stam & van de Ven, 2021). These contextual differences may influence both the effectiveness of collaborative resource orchestration and the capacity of ecosystem actors to generate collective value. Comparative studies across developed and emerging economies, urban and rural ecosystems, or centralized and decentralized governance systems would help identify the boundary conditions under which the proposed theory exhibits stronger or weaker explanatory power.

Fourth, future studies should investigate the governance mechanisms that facilitate or constrain collective value creation. The present framework assumes that collaborative interactions become self-reinforcing through institutional learning and stakeholder alignment; however, ecosystem governance may take multiple forms, including public-sector coordination, intermediary orchestration, network governance, or entrepreneur-led collaboration. Examining how alternative governance configurations influence ecosystem sustainability would contribute to a more nuanced understanding of ecosystem coordination and institutional evolution.

Finally, future research may extend the proposed theory by integrating emerging themes that are increasingly shaping entrepreneurial ecosystems. Digital platforms, artificial intelligence, data ecosystems, circular economy initiatives, mission-oriented innovation policies, and climate transition strategies are transforming the ways ecosystem actors interact, exchange knowledge, and create value. Investigating how these emerging phenomena reshape collaborative resource orchestration and collective value creation would not only refine the

proposed theory but also expand its relevance to rapidly evolving entrepreneurial environments.

Overall, the proposed middle-range theory should be viewed as a platform for cumulative theory development rather than a final explanation of sustainable entrepreneurial ecosystems. By identifying collective value creation as the central generative mechanism linking entrepreneurial ecosystems with sustainability outcomes, this study provides a theoretically grounded framework that future research can test, refine, extend, and adapt across diverse institutional settings and entrepreneurial contexts.

The proposed theory opens multiple opportunities for cumulative research by identifying empirical, contextual, and theoretical directions that can validate, refine, and extend its explanatory scope across diverse ecosystem settings.

Table 4. Future Research Agenda for Advancing the Proposed Middle-Range Theory

Research Priority	Representative Research Question	Suggested Research Design	Expected Theoretical Advancement
Theory Validation	How does collective value creation explain the transition from entrepreneurial ecosystems to sustainable entrepreneurial ecosystems?	Longitudinal studies, SEM, fsQCA	Empirically validates the proposed generative mechanism.
Multi-Level Theory Development	How do individual, organizational, and institutional interactions jointly shape ecosystem-level sustainability?	Multilevel analysis, mixed methods	Explains cross-level interactions underlying ecosystem transformation.
Boundary Condition Assessment	How do institutional quality, stakeholder alignment, ecosystem diversity, and contextual uncertainty influence the proposed relationships?	Cross-country comparison, comparative case studies	Refines the contextual boundaries of the middle-range theory.
Theory Extension	How do emerging phenomena such as AI, digital platforms, and the circular economy reshape collective value creation within entrepreneurial ecosystems?	Multiple-case studies, process research	Extends the theory to contemporary entrepreneurial ecosystem contexts.

Source: Developed by the author based on the proposed middle-range theory.

Table 4 outlines a cumulative research agenda that extends beyond empirical testing by identifying opportunities for theory refinement, contextual specification, and conceptual expansion. Collectively, these research priorities support the progressive development of the proposed middle-range theory while encouraging scholars to examine its validity, boundary conditions, and applicability across diverse entrepreneurial ecosystem contexts and evolving sustainability challenges.

6. Conclusion

Growing sustainability challenges have exposed an important limitation in the entrepreneurial ecosystem literature: while existing theories successfully explain how ecosystems foster entrepreneurial activity and regional economic development, they provide only limited insight into the mechanisms through which ecosystem interactions generate enduring economic, social, and environmental value simultaneously. Although the emerging Sustainable Entrepreneurial Ecosystem (SEE) literature has broadened the discussion by incorporating

sustainability as a central objective, the process through which heterogeneous actors transform dispersed resources into collective sustainable outcomes has remained conceptually underdeveloped. Addressing this knowledge gap, the objective of this paper was to develop a middle-range theory that explains how entrepreneurial ecosystems evolve into sustainable entrepreneurial ecosystems by positioning collective value creation as the central generative mechanism linking ecosystem interactions to sustainability outcomes.

The proposed theoretical framework contributes to the literature in several important ways. First, it reconceptualizes entrepreneurial ecosystems from predominantly structural configurations of actors and institutions into dynamic relational systems in which sustainability emerges through continuous collaboration among interdependent participants. Second, it identifies collective value creation as the missing explanatory mechanism that integrates entrepreneurial ecosystem theory, sustainable entrepreneurship, ecosystem strategy, and relational and stakeholder perspectives into a coherent explanatory framework. Rather than treating sustainability as an additional ecosystem outcome, the proposed theory conceptualizes sustainability as an emergent property generated through collaborative resource orchestration, stakeholder alignment, and institutional reinforcement. Third, the framework advances existing ecosystem scholarship by specifying the causal relationships, boundary conditions, and theoretical propositions that collectively explain ecosystem transformation, thereby providing a more rigorous conceptual foundation for future theory development and empirical investigation.

Beyond its theoretical contribution, the proposed framework also offers meaningful implications for practice. The theory suggests that ecosystem development strategies should extend beyond strengthening individual ecosystem components toward facilitating collaborative processes that enable actors to integrate complementary resources and jointly create multidimensional value. For policymakers, this implies designing institutional arrangements that encourage cross-sector collaboration, knowledge exchange, and sustainability-oriented governance rather than relying exclusively on firm-level support mechanisms. For ecosystem orchestrators—including universities, incubators, innovation intermediaries, and regional development agencies—the framework highlights the importance of fostering trust, stakeholder alignment, and collaborative learning as essential conditions for achieving long-term ecosystem resilience.

Several limitations should nevertheless be acknowledged. As a theory-building conceptual paper, the proposed framework has not yet been subjected to empirical validation, and the causal propositions remain theoretically derived. Furthermore, the explanatory scope is intentionally bounded to entrepreneurial ecosystems characterized by sustained interaction among heterogeneous actors and supportive institutional environments. Ecosystems operating under fundamentally different governance structures or severe institutional constraints may require additional theoretical refinement. These limitations, however, should be viewed as opportunities for cumulative theory development rather than weaknesses of the proposed framework.

Future research should therefore examine the proposed propositions across diverse institutional contexts using longitudinal, comparative, and multilevel research designs capable of capturing the dynamic evolution of entrepreneurial ecosystems over time. Additional studies may investigate alternative governance configurations, emerging digital and artificial intelligence ecosystems, circular economy initiatives, and mission-oriented innovation systems to determine whether collective value creation operates similarly under different contextual conditions. Such investigations would not only validate the proposed theory but also refine its boundary conditions and extend its applicability across a broader range of entrepreneurial ecosystems.

Positioning collective value creation at the center of sustainable entrepreneurial ecosystem theory offers a new conceptual lens for understanding how entrepreneurship contributes to

long-term societal transformation. By integrating previously fragmented theoretical perspectives into a coherent middle-range explanation, the proposed framework shifts scholarly attention from ecosystem composition toward ecosystem processes and provides a stronger foundation for future research on entrepreneurship, sustainability, and collaborative value creation. As sustainability increasingly becomes inseparable from entrepreneurial success, understanding how ecosystems collectively generate enduring value is likely to become one of the defining theoretical challenges, and opportunities, for entrepreneurship research in the years ahead.

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