



Orchestrating Collaborative Resilience: A Network Perspective on Interorganizational Adaptation under Environmental Uncertainty

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Abstract

Organizations increasingly depend on interorganizational networks to withstand persistent environmental uncertainty, yet existing research remains fragmented across network theory, governance theory, and organizational resilience. This article addresses the unresolved theoretical problem of how resilience emerges collectively across organizational boundaries rather than within isolated firms. Its objective is to develop Collaborative Resilience as a middle-range theory explaining how relational structures are transformed into network-level adaptive capability. Through conceptual integration of interorganizational network theory, the relational view, resource dependence theory, governance theory, and organizational resilience, the article specifies a sequential mechanism linking network embeddedness, collaborative governance, coordination capability, interorganizational trust, adaptive learning, and collaborative resilience. Environmental uncertainty is theorized as a principal boundary condition strengthening the adaptive value of collective learning. The proposed framework advances current knowledge by shifting the unit of explanation from the individual organization to the interorganizational network, integrating previously disconnected theoretical traditions, and formalizing six propositions that clarify the emergence of collaborative resilience. The framework establishes a bounded platform for longitudinal, multilevel, comparative, and digitally oriented research on interorganizational adaptation..

Keywords

collaborative resilience; interorganizational networks; collaborative governance; network embeddedness; adaptive learning; environmental uncertainty

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1. Introduction

Organizations increasingly operate in environments characterized by persistent uncertainty, frequent disruptions, and rapidly evolving interdependencies. Climate-related disasters, geopolitical conflicts, technological disruptions, pandemics, and institutional volatility have fundamentally altered the nature of organizational risks, making resilience a strategic imperative rather than merely an operational capability. Recent studies emphasize that resilience should no longer be understood solely as an organization's ability to recover from disruptions, but also as its capacity to anticipate, adapt, and transform in response to continuously changing environments (Duchek, 2020; Hillmann & Guenther, 2021). At the same time, major disruptions have revealed that organizations rarely confront crises in isolation. Instead, their capacity to adapt is increasingly shaped by the quality of relationships and interactions with suppliers, customers, alliance partners, governmental agencies, and other network actors (Ivanov, 2021; You & Williams, 2023).

This shift has stimulated growing scholarly attention toward interorganizational collaboration as a critical source of adaptive capacity. Evidence from recent crises demonstrates that collaborative arrangements enable organizations to mobilize complementary resources, exchange critical information, coordinate collective responses, and accelerate recovery under highly uncertain conditions (Craighead et al., 2020; Ivanov & Dolgui, 2021). Although empirical research frequently highlights collaboration as a key enabler of resilience, existing studies predominantly examine collaboration as an antecedent or managerial practice rather than as part of a broader explanatory mechanism that accounts for how resilience emerges collectively across organizational networks (Scholten et al., 2019; You & Williams, 2023).

The importance of interorganizational relationships has long been recognized within organizational research. Network scholars argue that firms are embedded in social structures that shape access to information, resources, opportunities, and innovation (Granovetter, 1985; Powell, 1990). Subsequent studies further demonstrate that strategic alliances and interorganizational networks constitute important organizational assets because valuable resources increasingly reside within relationships rather than within individual firms (Gulati, 1998; Gulati et al., 2000; Lavie, 2006). Similarly, the relational view proposes that sustainable competitive advantage can emerge through collaborative relationships that generate relational rents unavailable to isolated organizations (Dyer & Singh, 1998). Collectively, these perspectives suggest that organizational adaptation should be understood not only through internal capabilities but also through the architecture of interorganizational relationships.

Parallel developments have occurred within the resilience literature. Earlier studies primarily conceptualized resilience as organizational recovery following unexpected events (Sutcliffe & Vogus, 2003; Weick, 1993). More recent research has expanded this perspective by emphasizing resilience as a dynamic capability involving anticipation, coping, adaptation, and renewal (Duchek, 2020; Hepfer & Lawrence, 2022; Lengnick-Hall et al., 2011). Nevertheless, despite these conceptual advances, resilience research continues to focus predominantly on organizations as independent analytical units. Even comprehensive reviews acknowledge that the mechanisms through which resilience develops across interconnected organizations remain insufficiently theorized, despite increasing recognition that contemporary crises unfold within highly interdependent organizational systems (Hillmann & Guenther, 2021; Linnenluecke, 2017; You & Williams, 2023).

A similar fragmentation characterizes the governance literature. Research on interorganizational governance has produced substantial insights into the roles of trust, contractual governance, relational governance, coordination, and resource dependence in facilitating cooperation among organizations (Cao & Lumineau, 2015; Gulati & Sytch, 2007; Poppo & Zenger, 2002; Ring & Van De Ven, 1994). Likewise, coordination scholars demonstrate that effective collaboration depends upon integrating communication,

accountability, and shared understanding across organizational boundaries (Gulati et al., 2012; Okhuysen & Bechky, 2009). However, these studies primarily explain how organizations manage relationships rather than how governance mechanisms collectively generate adaptive resilience under conditions of environmental uncertainty.

Consequently, an important theoretical gap remains unresolved. Existing network theories explain how organizations establish and maintain relationships, governance theories explain how these relationships are coordinated, and resilience theories explain how organizations adapt to disruptions. Yet these three streams have largely evolved independently, resulting in limited theoretical understanding of how network structures, governance mechanisms, and adaptive capabilities interact to produce resilience at the interorganizational level. Current explanations therefore remain fragmented, preventing scholars from fully understanding resilience as an emergent property of collaborative organizational systems rather than merely the aggregation of firm-level capabilities (Duchek, 2020; Hillmann & Guenther, 2021; Provan & Kenis, 2008).

Addressing this gap requires moving beyond viewing collaboration as a simple antecedent of resilience toward explaining the underlying mechanisms through which collaborative interactions become organized into adaptive network capabilities. Such an approach recognizes that resilience emerges through continuous orchestration of embedded relationships, governance arrangements, trust development, coordination processes, information visibility, and resource complementarity across multiple organizations. While prior studies identify many of these elements independently, they provide limited explanation regarding how these mechanisms operate collectively to sustain adaptation under persistent uncertainty (Dyer & Singh, 1998; Gulati et al., 2012; You & Williams, 2023).

Accordingly, this article develops a middle-range theoretical framework termed Collaborative Resilience, which conceptualizes resilience as an emergent capability generated through the orchestration of interorganizational network relationships. Integrating insights from Network Theory, the Relational View, Resource Dependence Theory, Governance Theory, and Organizational Resilience literature, the proposed framework explains how network embeddedness facilitates collaborative governance, how governance strengthens coordination and trust, and how these mechanisms collectively enhance adaptive learning and resilience across organizational networks. Rather than replacing existing theories, the framework seeks to integrate their complementary explanatory strengths into a coherent mechanism that addresses a long-standing conceptual fragmentation within the literature.

This article makes three primary theoretical contributions. First, it extends organizational resilience research by shifting the unit of explanation from individual organizations to interorganizational networks. Second, it integrates previously disconnected theoretical streams into a unified explanatory mechanism capable of explaining how collaborative resilience emerges under environmental uncertainty. Third, it proposes a middle-range theory that specifies the core constructs, causal mechanisms, boundary conditions, and propositions linking network embeddedness, collaborative governance, coordination, trust, adaptive learning, and collaborative resilience. Through these contributions, the article aims to advance theoretical understanding of interorganizational adaptation while providing a stronger conceptual foundation for future empirical research on collaborative resilience.

2. Theoretical Foundations and Conceptual Gaps

2.1 Interorganizational Network Theory

Interorganizational Network Theory provides a foundational perspective for explaining why organizations increasingly rely on external relationships to achieve strategic objectives under conditions of environmental uncertainty. Rather than viewing firms as autonomous entities

competing solely through internally controlled resources, network scholars argue that organizational actions are embedded within broader social and economic structures that shape access to information, knowledge, legitimacy, and complementary resources (Granovetter, 1985). Embeddedness therefore influences not only resource exchanges but also the opportunities and constraints organizations encounter when responding to environmental disruptions.

Building upon this perspective, Powell (1990) proposed that networks constitute a distinct organizational form that differs fundamentally from both markets and hierarchies. Network governance facilitates repeated interactions, mutual adjustment, and collective learning, enabling organizations to coordinate activities beyond formal contractual arrangements. Subsequent studies extended this argument by demonstrating that strategic alliances and collaborative networks represent important mechanisms for knowledge creation and innovation because valuable capabilities increasingly emerge through interactions among multiple organizations rather than through isolated firms (Gulati, 1995, 1998; Powell et al., 1996).

The relational nature of competitive advantage is further articulated by the Relational View, which argues that interorganizational relationships themselves constitute strategic resources capable of generating relational rents that cannot be replicated by individual organizations acting independently (Dyer & Singh, 1998). Similarly, Lavie (2006) extends the resource-based view by emphasizing that competitive advantage depends not only on internally owned resources but also on resources accessed through interconnected partners. Consequently, organizational adaptation increasingly depends upon the configuration, quality, and diversity of network relationships rather than solely on firm-specific capabilities.

Network research also highlights that network structures influence organizational performance through different mechanisms. Dense networks facilitate trust, coordination, and resource sharing, whereas structural holes expose organizations to diverse information and novel opportunities (Ahuja, 2000; Burt, 2004). Reviews of organizational network research further demonstrate that network position, embeddedness, and governance significantly shape organizational outcomes across multiple contexts (Borgatti, 2003; Brass et al., 2004; Kilduff & Brass, 2010). At the network level, effective governance becomes increasingly important as collaborative arrangements grow more complex, requiring mechanisms capable of coordinating multiple autonomous organizations while maintaining collective effectiveness (Provan et al., 2007; Provan & Kenis, 2008).

Despite these substantial contributions, Interorganizational Network Theory primarily explains how relationships are formed, maintained, and leveraged for strategic advantage. It provides comparatively limited explanation regarding how network structures generate adaptive resilience during prolonged environmental disruptions. While embeddedness and network governance clearly facilitate collaboration, the mechanisms through which these relational characteristics are transformed into collective adaptive capabilities remain insufficiently theorized.

2.2 Governance and Coordination Mechanisms

Governance research complements network theory by explaining how collaborative relationships are coordinated and sustained over time. Resource Dependence Theory argues that organizations establish interorganizational relationships because critical resources are distributed unevenly across organizational environments, creating mutual dependencies that necessitate cooperation (Pfeffer & Salancik, 1978). Earlier work on power-dependence relations similarly demonstrates that organizational interactions evolve from reciprocal dependence rather than purely market transactions (Emerson, 1962). Consequently, governance mechanisms become essential for managing uncertainty arising from resource interdependence.

A central debate within governance literature concerns the relative roles of formal and relational governance. Transaction Cost Economics emphasizes contractual arrangements as mechanisms for reducing opportunism and safeguarding exchanges under uncertainty (Williamson, 1991). In contrast, relational perspectives argue that long-term collaboration develops through trust, reciprocity, and relational norms that evolve gradually across repeated interactions (Das & Teng, 1998; Ring & Van De Ven, 1994). Rather than functioning as competing mechanisms, subsequent empirical evidence indicates that contractual governance and relational governance frequently complement one another in improving interorganizational performance (Cao & Lumineau, 2015; Poppo & Zenger, 2002).

Trust occupies a particularly central role within collaborative governance. Trust reduces transaction costs, facilitates information sharing, enhances commitment, and enables organizations to coordinate activities under conditions where complete contractual specification is impossible (McEvily et al., 2003; Zaheer et al., 1998). Likewise, dependence asymmetry and prior relational experience influence how organizations negotiate, resolve conflicts, and sustain cooperative behavior over time (Gulati & Sytch, 2007; Lumineau & Henderson, 2012; Lumineau & Malhotra, 2011)

Beyond trust, effective collaboration also requires coordination mechanisms that integrate distributed activities across organizational boundaries. Okhuysen & Bechky (2009) conceptualize coordination as the development of accountability, predictability, and shared understanding among collaborating actors. Similarly, Gulati et al. (2012) distinguish cooperation from coordination, arguing that successful alliances require not only willingness to collaborate but also capabilities for synchronizing interdependent activities. Marketing and operations research similarly demonstrate that governance structures, relational norms, and coordination mechanisms jointly improve collaborative effectiveness by aligning expectations and reducing behavioral uncertainty (Heide & John, 1992; Jap & Ganesan, 2000; Mesquita & Brush, 2008)

Nevertheless, governance research largely concentrates on explaining how collaborative relationships function efficiently. It provides limited theoretical explanation regarding how governance mechanisms collectively generate resilience when organizations confront repeated disruptions and prolonged environmental uncertainty. Trust, coordination, and governance are frequently treated as desirable organizational attributes, yet the processes through which these mechanisms become integrated into collaborative adaptive capabilities remain underdeveloped.

2.3 Organizational Resilience

Organizational resilience literature explains how organizations respond to unexpected disruptions through processes of adaptation, recovery, and transformation. Early resilience research emphasized sensemaking during crises, illustrating how organizational failures often emerge when collective interpretations collapse under rapidly changing conditions (Weick, 1993). High Reliability Organization research subsequently highlighted the importance of collective mindfulness, continuous attention, and coordinated responses in sustaining organizational performance within highly volatile environments (Bigley & Roberts, 2001; Weick et al., 2005).

More recent conceptualizations extend resilience beyond recovery by viewing it as a dynamic organizational capability. Strategic human resource management, anticipatory adaptation, and organizational learning are increasingly recognized as critical foundations of resilient organizations (Lengnick-Hall et al., 2011; Linnenluecke et al., 2012). Duchek (2020) synthesizes these perspectives by conceptualizing resilience as an organizational capability encompassing anticipation, coping, and adaptation. Similarly, Hillmann & Guenther (2021) argue that resilience has become a valuable construct for management research because it integrates organizational flexibility, strategic renewal, and long-term sustainability.

Subsequent studies broaden resilience beyond operational recovery toward strategic transformation. Sustainable business practices, social capital, and organizational learning contribute not only to surviving disruptions but also to strengthening long-term competitiveness (DesJardine et al., 2019; Ortiz-de-Mandojana & Bansal, 2016). Other scholars distinguish functional, operational, and strategic resilience, emphasizing that resilience manifests differently across organizational levels and temporal horizons (Hepfer & Lawrence, 2022). Reviews by Williams et al. (2017) and Bundy et al. (2017) likewise integrate crisis management and resilience research, demonstrating that adaptation involves multiple organizational processes extending beyond immediate crisis response.

Although resilience scholarship has become increasingly sophisticated, its primary analytical focus remains the individual organization. Even studies acknowledging external stakeholders generally conceptualize networks as contextual conditions rather than as central explanatory mechanisms through which resilience emerges. Consequently, resilience research has yet to develop a comprehensive explanation of how adaptive capacities are collectively generated through ongoing interactions among multiple autonomous organizations operating within interconnected networks.

2.4 Conceptual Integration and Theoretical Gap

The preceding discussion reveals that Interorganizational Network Theory, Governance Theory, and Organizational Resilience literature each contribute important but incomplete explanations of organizational adaptation under uncertainty. Network theory explains how organizations become embedded within collaborative structures that facilitate access to valuable resources and knowledge. Governance theory explains how trust, contracts, coordination, and relational mechanisms stabilize these collaborative relationships. Organizational resilience literature explains how organizations anticipate, absorb, recover from, and adapt to disruptions. However, these theoretical traditions have largely evolved independently, resulting in fragmented explanations of interorganizational adaptation.

Specifically, existing network theories pay insufficient attention to the adaptive processes through which collaborative relationships become resilience-generating capabilities. Governance theories explain how relationships are managed but provide limited insight into how governance arrangements produce collective adaptive outcomes under persistent environmental uncertainty. Conversely, resilience research emphasizes adaptive capabilities but generally treats collaboration as a contextual factor rather than as the primary mechanism through which resilience emerges. This fragmentation restricts current theoretical understanding of resilience as an emergent property of interorganizational systems rather than as a firm-level capability.

Accordingly, this article argues that collaborative resilience should be conceptualized as a network-level adaptive capability generated through the orchestration of interorganizational relationships, collaborative governance, coordination processes, trust development, resource complementarity, and adaptive learning. Such a perspective does not replace existing theories; instead, it integrates their complementary strengths into a coherent middle-range explanation capable of addressing an important conceptual gap within contemporary management research. The following section therefore develops the core constructs, causal mechanisms, boundary conditions, and theoretical propositions underlying the proposed theory of Collaborative Resilience.

To clarify the conceptual fragmentation identified across the three major research streams, the following comparison synthesizes their explanatory strengths and limitations, thereby illustrating the theoretical space addressed by the proposed framework.

Table 1. Comparison of Existing Theoretical Perspectives and the Emerging Conceptual Gap

Theory	Primary Focus	Unit of Analysis	Main Explanatory Strength	Remaining Conceptual Limitation
Interorganizational Network Theory	Network embeddedness, alliances, and relational structures	Interorganizational network	Explains how organizations establish and leverage collaborative relationships to access resources, information, and knowledge	Does not explain how network relationships are transformed into collective adaptive resilience under prolonged environmental uncertainty
Governance Theory	Trust, contracts, coordination, and relational governance	Interorganizational relationship	Explains how collaborative relationships are coordinated and sustained through formal and informal governance mechanisms	Provides limited explanation of how governance mechanisms collectively generate adaptive resilience across organizational networks
Organizational Resilience Theory	Organizational adaptation, recovery, and transformation	Individual organization	Explains how organizations anticipate, absorb, recover from, and adapt to disruptions	Predominantly adopts a firm-level perspective and offers limited explanation of resilience emerging from interorganizational collaboration
Collaborative Resilience Theory (Proposed)	Orchestration of network relationships, governance, and adaptive capability	Interorganizational network	Explains resilience as an emergent network-level capability generated through coordinated collaboration, adaptive learning, and governance mechanisms	Provides a theoretically integrated explanation requiring future empirical validation

Source: Developed by the author based on Granovetter (1985), Dyer and Singh (1998), Provan and Kenis (2008), Ducheck (2020), Hillmann and Guenther (2021), and You and Williams (2023).

Table 1 demonstrates that although network theory, governance theory, and organizational resilience each provide valuable insights into interorganizational adaptation, they remain theoretically fragmented. Their complementary yet incomplete explanations justify the development of Collaborative Resilience as a middle-range theory that integrates relational structures, governance mechanisms, and adaptive capabilities into a unified explanatory framework.

To further clarify the identified theoretical fragmentation, the conceptual relationships among the three dominant perspectives are synthesized into a visual representation that highlights the unresolved explanatory space motivating this study.

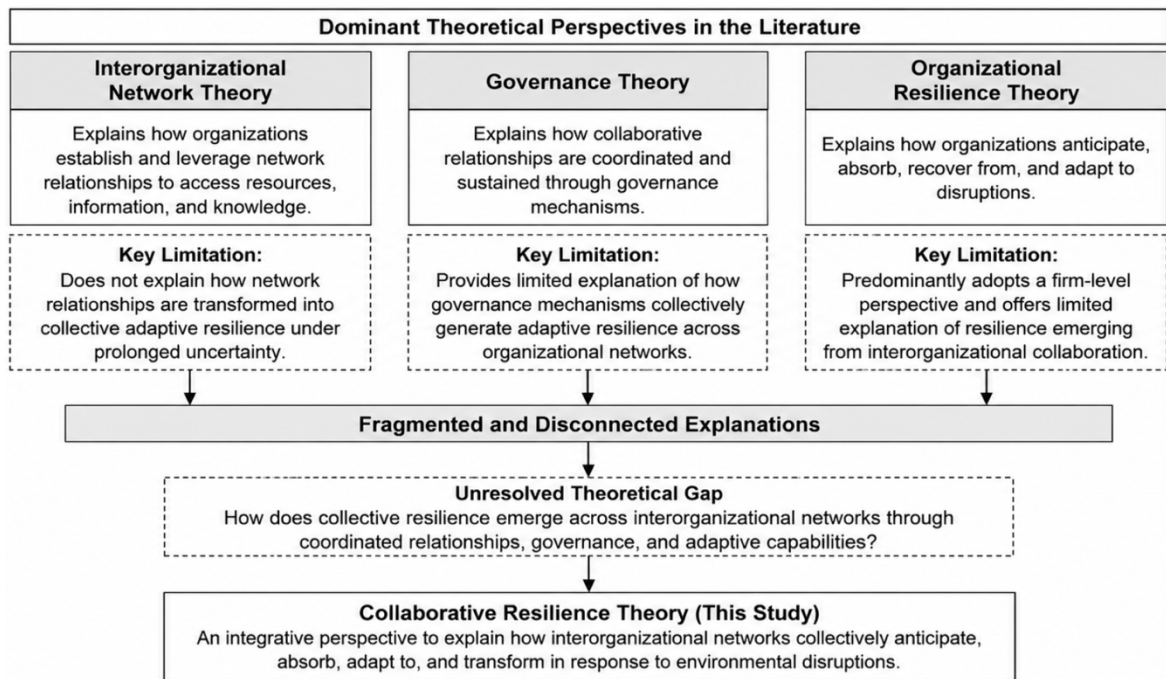


Figure 1. Theoretical Fragmentation Underlying the Development of Collaborative Resilience
Source: Developed by the author.

Figure 1 synthesizes the theoretical landscape by demonstrating that existing perspectives offer complementary but disconnected explanations of collaborative adaptation. While each theory contributes valuable insights within its own domain, none sufficiently explains the emergence of resilience across interorganizational networks. The figure therefore establishes the conceptual rationale for developing Collaborative Resilience as an integrative middle-range theory.

3. Toward a Theory of Collaborative Resilience

3.1 Defining Collaborative Resilience

This article proposes Collaborative Resilience as a middle-range theoretical construct that explains how adaptive capacity emerges from the coordinated interactions of multiple organizations embedded within interorganizational networks. Unlike conventional organizational resilience, which primarily conceptualizes resilience as an internal organizational capability (Duchek, 2020; Hillmann & Guenther, 2021), collaborative resilience recognizes that contemporary organizations increasingly depend on external actors to anticipate disruptions, mobilize complementary resources, coordinate responses, and accelerate recovery under conditions of persistent environmental uncertainty.

The proposed construct extends the network perspective by arguing that resilience is neither an attribute of individual organizations nor merely an outcome of collaboration. Instead, resilience represents an emergent network capability generated through continuous interaction among network embeddedness, collaborative governance, coordination, trust, knowledge exchange, and adaptive learning. These mechanisms operate collectively rather than independently, producing adaptive responses that exceed the capabilities of isolated organizations. Consequently, collaborative resilience is conceptualized as the collective capability of interconnected organizations to anticipate, absorb, coordinate, adapt, and transform in response to environmental disruptions through orchestrated interorganizational relationships.

This conceptualization differs from supply-chain resilience studies that primarily focus on maintaining operational continuity across logistics systems (Christopher & Peck, 2004; Ivanov, 2021; Ponomarov & Holcomb, 2009). Although evidence from supply-chain research demonstrates the importance of collaboration, visibility, and coordination for resilient performance, these studies largely emphasize operational adaptation. The proposed theory generalizes these insights to broader interorganizational contexts, including strategic alliances, innovation ecosystems, public–private partnerships, and other collaborative organizational arrangements, thereby positioning collaborative resilience as a more general organizational phenomenon rather than a domain-specific capability.

To operationalize the proposed theory conceptually, its principal constructs must first be clearly specified, including their definitions, theoretical roles, and levels of analysis within the proposed explanatory framework.

Table 2. Sekarang Specification of Core Constructs in the Collaborative Resilience Framework

Construct	Conceptual Definition	Theoretical Role	Level of Analysis
Network Embeddedness Granovetter (1985); Gulati (1998); Lavie (2006)	The extent to which organizations are connected through enduring relational ties that facilitate access to information, resources, and collaborative opportunities.	Foundational antecedent	Interorganizational network
Collaborative Governance Ring & Van de Ven (1994); Poppo & Zenger (2002); Cao & Lumineau (2015)	Formal and informal governance arrangements that coordinate interactions, align expectations, and regulate collaborative behavior among organizational partners.	Enabling mechanism	Interorganizational network
Coordination Capability Okhuysen & Bechky (2009); Gulati et al. (2012)	The collective capability to synchronize decisions, resources, and activities across organizational boundaries in pursuit of shared objectives.	Mediating capability	Interorganizational network
Interorganizational Trust Zaheer et al. (1998); McEvily et al. (2003)	The shared expectation that network partners will behave reliably, cooperatively, and in ways that support mutual objectives despite uncertainty.	Relational mediator	Interorganizational network
Adaptive Learning Weick (1993); Ducheck (2020)	The collective process through which network participants acquire, share, interpret, and apply knowledge to improve future collaborative responses.	Dynamic mediating mechanism	Interorganizational network
Collaborative Resilience	An emergent network-level capability through which interconnected organizations collectively anticipate, absorb, adapt to, and transform in response to environmental disruptions.	Focal outcome	Interorganizational network

Source: Developed by the author based on the conceptual synthesis of the interorganizational network, governance, and organizational resilience literature reviewed in this study.

Table 2 establishes the conceptual architecture of the proposed theory by distinguishing the function of each construct within the explanatory model. Rather than presenting independent concepts, the constructs represent complementary components of a sequential mechanism through which collaborative resilience emerges as a collective capability at the interorganizational network level, thereby providing the conceptual foundation for subsequent mechanism development and proposition formulation.

3.2 Core Constructs

The proposed theory consists of six interrelated constructs that collectively explain the emergence of collaborative resilience.

Network embeddedness represents the structural foundation of collaborative resilience. Organizations embedded within dense and enduring interorganizational relationships gain privileged access to information, complementary resources, and collaborative opportunities that facilitate collective adaptation (Granovetter, 1985; Lavie, 2006). Embeddedness also reduces uncertainty by strengthening relational familiarity and facilitating repeated interactions that support coordinated decision-making during disruptions.

Collaborative governance represents the institutional architecture that regulates interactions among network members. Governance encompasses formal contractual arrangements, relational norms, shared decision-making processes, and governance structures that align expectations and reduce opportunistic behavior (Cao & Lumineau, 2015; Poppo & Zenger, 2002; Ring & Van De Ven, 1994). Rather than viewing governance as merely a control mechanism, the proposed framework conceptualizes collaborative governance as an enabling mechanism that facilitates coordinated adaptation across organizational boundaries.

Coordination capability refers to the collective ability of network participants to synchronize activities, exchange timely information, clarify responsibilities, and integrate distributed decisions under rapidly changing conditions. Coordination transforms governance arrangements into operational collaboration by enabling organizations to align interdependent activities despite environmental uncertainty (Gulati et al., 2012; Okhuysen & Bechky, 2009).

Interorganizational trust reflects the confidence that collaborating organizations will behave cooperatively despite uncertainty and incomplete contractual specification. Trust reduces transaction costs, encourages information sharing, facilitates joint problem solving, and strengthens long-term collaboration (Dyer & Chu, 2003; McEvily et al., 2003; Zaheer et al., 1998). Within the proposed theory, trust functions not merely as a governance outcome but also as a mechanism that amplifies adaptive collaboration during crises.

Adaptive learning represents the collective capability of network members to interpret disruptions, integrate distributed knowledge, modify routines, and generate coordinated responses. Adaptive learning extends organizational learning beyond individual firms by emphasizing cross-organizational knowledge integration and collective sensemaking during uncertain situations (Duchek, 2020; Lengnick-Hall et al., 2011; Weick, 1993).

Finally, Collaborative Resilience represents the emergent capability generated through the interaction of these five antecedent constructs. Rather than being directly created by any single mechanism, collaborative resilience emerges from the cumulative orchestration of embedded relationships, governance arrangements, coordination processes, trust development, and adaptive learning.

3.3 Mechanism Development

The central contribution of this article lies in explaining how collaborative resilience emerges rather than merely identifying factors associated with resilient outcomes. Existing literature often examines embeddedness, governance, trust, or resilience separately. In contrast, the proposed theory argues that these constructs form an interconnected causal mechanism.

The mechanism begins with network embeddedness, which establishes stable relational structures that facilitate repeated interactions among organizations. Embeddedness enhances access to diverse resources, reduces information asymmetry, and creates relational familiarity that supports future collaboration (Granovetter, 1985; Gulati, 1998).

However, embeddedness alone does not guarantee resilience because structural connections require governance mechanisms that regulate collaborative behavior.

Collaborative governance transforms structural relationships into coordinated organizational action. Formal contracts clarify responsibilities and reduce uncertainty, whereas relational governance encourages flexibility, reciprocity, and joint problem solving when unforeseen disruptions arise (Cao & Lumineau, 2015; Poppo & Zenger, 2002). The complementarity between contractual and relational governance therefore enables organizations to respond adaptively without sacrificing accountability.

Governance subsequently facilitates coordination capability by creating shared expectations, communication routines, and decision-making processes across organizational boundaries. Effective coordination reduces delays, minimizes conflicting actions, and enables rapid mobilization of distributed capabilities during crises (Okhuysen & Bechky, 2009). Coordination thus represents the operational mechanism through which governance arrangements become translated into collaborative action.

Repeated coordination strengthens interorganizational trust. As organizations consistently fulfill commitments and demonstrate cooperative behavior, confidence in future collaboration increases, reducing the need for costly monitoring and encouraging greater openness in information exchange (McEvily et al., 2003; Zaheer et al., 1998). Trust further promotes willingness to share tacit knowledge, experiment with novel solutions, and jointly address emerging challenges.

These collaborative interactions collectively generate adaptive learning. Organizations interpret environmental changes through distributed knowledge networks rather than isolated organizational experiences. Shared learning accelerates collective sensemaking, facilitates rapid modification of routines, and strengthens the capacity to respond creatively to unforeseen disruptions (Duchek, 2020; Weick, 1993). Adaptive learning therefore functions as the immediate antecedent of collaborative resilience because it converts accumulated relational resources into coordinated adaptive capability.

Accordingly, collaborative resilience emerges not as a direct consequence of network membership but as the cumulative outcome of orchestrated interactions among embeddedness, governance, coordination, trust, and adaptive learning. This sequential mechanism constitutes the central explanatory logic of the proposed middle-range theory.

3.4 Boundary Conditions

The explanatory power of Collaborative Resilience is expected to vary across organizational contexts. Four boundary conditions are particularly important.

First, environmental uncertainty strengthens the importance of collaborative resilience because organizations increasingly depend upon external relationships when disruptions become unpredictable and complex (Ivanov, 2021; Linnenluecke et al., 2012). Under stable environments, internal organizational capabilities may be sufficient to sustain performance, reducing dependence on collaborative adaptation.

Second, network complexity influences the effectiveness of collaborative governance. As the number and diversity of participating organizations increase, governance mechanisms become more important for coordinating interdependent activities while maintaining flexibility (Provan & Kenis, 2008)

Third, resource dependence conditions the value of collaboration. Organizations facing high resource interdependence are more likely to invest in governance structures, trust development, and coordination because collaborative adaptation directly influences organizational survival (Gulati & Sytch, 2007; Pfeffer & Salancik, 1978)

Fourth, digital visibility enhances collaborative resilience by improving information transparency, real-time coordination, and collective decision-making across organizational boundaries. Recent studies demonstrate that digital technologies strengthen resilience by facilitating distributed information sharing and adaptive responses to disruptions (Dubey et al., 2021; Ivanov, 2021)

3.5 Proposition Development

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

P1. *Greater network embeddedness positively influences the development of collaborative governance because repeated interorganizational interactions facilitate relational stability and governance institutionalization.*

P2. *Collaborative governance positively influences coordination capability by establishing formal and relational mechanisms that synchronize organizational activities across network members.*

P3. *Coordination capability positively influences interorganizational trust because consistent coordination reinforces confidence in collaborative partners and reduces behavioral uncertainty.*

P4. *Interorganizational trust positively influences adaptive learning by encouraging open information exchange, joint problem solving, and collective knowledge integration.*

P5. *Adaptive learning positively influences collaborative resilience because collective learning enhances the network's ability to anticipate, absorb, and adapt to environmental disruptions.*

P6. *Environmental uncertainty positively moderates the relationship between adaptive learning and collaborative resilience, such that the effect becomes stronger under conditions of high uncertainty.*

To consolidate the proposed theoretical logic, the complete set of propositions is synthesized by linking each causal relationship with its underlying mechanism and expected contribution to collaborative resilience.

Table 3. Theoretical Propositions Underpinning the Collaborative Resilience Framework

	Proposition & Causal Relationship	Underlying Theoretical Mechanism	Expected Theoretical Outcome
P1	Network Embeddedness → Collaborative Governance	Dense relational ties facilitate the establishment of governance arrangements by increasing interaction, information exchange, and relational commitment.	Stronger collaborative governance across network partners
P2	Collaborative Governance → Coordination Capability	Governance mechanisms align expectations, clarify responsibilities, and enable coordinated collective action.	Enhanced coordination capability
P3	Coordination Capability → Interorganizational Trust	Repeated and effective coordination reinforces reliability, predictability, and mutual confidence among collaborating organizations.	Stronger interorganizational trust
P4	Interorganizational Trust → Adaptive Learning	Trust encourages open knowledge sharing, experimentation, and collective problem solving across organizational boundaries.	Greater adaptive learning capability

	Proposition & Causal Relationship	Underlying Theoretical Mechanism	Expected Theoretical Outcome
P5	Adaptive Learning → Collaborative Resilience	Continuous learning enables organizations to collectively anticipate, absorb, adapt to, and transform in response to disruptions.	Emergence of collaborative resilience
P6	Environmental Uncertainty × Adaptive Learning → Collaborative Resilience	Increasing environmental uncertainty amplifies the value of adaptive learning for generating collective resilience.	Stronger positive relationship between adaptive learning and collaborative resilience

Source: Developed by the author from the proposed middle-range theory integrating interorganizational network, governance, and organizational resilience perspectives.

Table 3 formalizes the theoretical structure of Collaborative Resilience by summarizing how each proposition is derived from the proposed explanatory mechanism. Rather than functioning as an independent list of hypotheses, the table demonstrates the internal coherence of the theory, clarifies the causal logic connecting successive constructs, and provides a transparent foundation for future empirical testing across collaborative organizational contexts.

The proposed theoretical explanation can be synthesized into an integrated conceptual model that illustrates the sequential relationships, underlying mechanisms, and contextual condition shaping collaborative resilience across organizational networks.

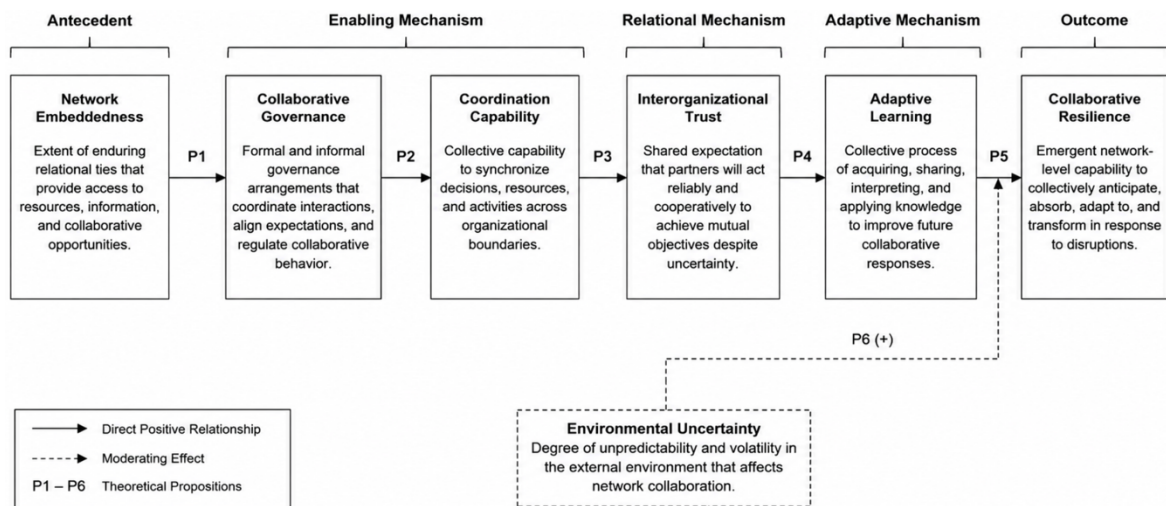


Figure 2. Proposed Middle-Range Theory of Collaborative Resilience
Source: Developed by the author.

Figure 2 integrates the proposed middle-range theory into a unified explanatory model by depicting how collaborative resilience emerges through a sequential chain of relational and adaptive mechanisms. Rather than representing isolated associations, the model emphasizes the cumulative development of resilience from network embeddedness to adaptive learning, while explicitly recognizing environmental uncertainty as the principal contextual condition shaping the theory's explanatory strength.

The proposed framework positions collaborative resilience as an emergent capability generated through the orchestration of relational structures, governance mechanisms, and adaptive processes rather than as a static organizational attribute. By integrating previously disconnected theoretical traditions into a coherent causal sequence, the model offers a middle-range explanation of how interorganizational networks collectively develop resilience under conditions of persistent environmental uncertainty. The next section discusses the theoretical contributions, managerial implications, and future research opportunities arising from this proposed theory.

4. Discussion

4.1 Theoretical Contributions

This article contributes to management theory by advancing Collaborative Resilience as a middle-range theory that explains how resilience emerges through the orchestration of interorganizational relationships rather than solely through firm-level capabilities. Existing resilience research has made significant progress in conceptualizing resilience as a dynamic capability encompassing anticipation, coping, adaptation, and transformation (Duchek, 2020; Hillmann & Guenther, 2021). However, resilience has predominantly been theorized as an attribute residing within individual organizations. By contrast, the present framework shifts the unit of explanation from the organization to the interorganizational network, arguing that resilience is an emergent capability generated through interactions among multiple autonomous organizations embedded within collaborative relationships.

The proposed theory also extends Interorganizational Network Theory. Foundational network research has demonstrated that embeddedness, strategic alliances, and network governance facilitate access to information, knowledge, and complementary resources (Granovetter, 1985; Gulati, 1998; Provan & Kenis, 2008). Nevertheless, these studies primarily explain the formation, governance, and strategic value of networks rather than the processes through which networks develop adaptive capabilities under sustained environmental uncertainty. Collaborative Resilience addresses this limitation by specifying a causal sequence in which network embeddedness provides the structural foundation for collaborative governance, governance enables coordination, coordination strengthens interorganizational trust, trust facilitates adaptive learning, and adaptive learning ultimately produces collective resilience. In doing so, the theory complements rather than replaces existing network perspectives by identifying the adaptive mechanism that links relational structures to resilient outcomes.

A second contribution concerns the integration of governance theory with resilience research. Governance literature has traditionally emphasized contractual arrangements, relational governance, and trust as mechanisms for reducing opportunism and coordinating interdependent organizations (Cao & Lumineau, 2015; Poppo & Zenger, 2002). While these mechanisms improve collaborative performance, they have rarely been conceptualized as components of a broader adaptive capability. The proposed framework reinterprets governance as an enabling infrastructure for resilience, demonstrating that governance mechanisms acquire strategic value because they facilitate coordination, accelerate collective learning, and enable network-wide adaptation during environmental disruptions. Consequently, governance is positioned not merely as a control mechanism but also as a dynamic capability that supports collaborative resilience.

Finally, the article contributes to middle-range theory development by integrating three previously fragmented research streams: interorganizational networks, collaborative governance, and organizational resilience, into a coherent explanatory framework. Rather than proposing a universal theory of organizational adaptation, the framework specifies a bounded explanation applicable to collaborative organizational settings characterized by interdependence and environmental uncertainty. This level of abstraction is consistent with the objective of middle-range theories, which seek to explain identifiable organizational phenomena through clearly specified constructs, causal mechanisms, and boundary conditions. The resulting theory therefore provides a stronger conceptual foundation for cumulative empirical research on collaborative resilience.

4.2 Managerial Implications

The proposed theory has several managerial implications for organizations operating within increasingly interconnected environments. First, managers should recognize that resilience

is unlikely to be achieved through investments in internal capabilities alone. Contemporary disruptions frequently transcend organizational boundaries, requiring coordinated responses from multiple actors. Consequently, resilience strategies should prioritize the development of durable interorganizational relationships that facilitate access to complementary resources, distributed expertise, and timely information.

Second, the framework highlights the strategic importance of collaborative governance. Organizations often emphasize contractual safeguards to manage uncertainty; however, the proposed theory suggests that formal governance should be complemented by relational mechanisms that foster trust, reciprocity, and joint problem solving. Such governance arrangements enable organizations to respond more flexibly when unforeseen disruptions render contractual provisions insufficient. Managers should therefore view governance as an adaptive infrastructure that supports long-term collaboration rather than merely as a mechanism for monitoring compliance.

Third, the model emphasizes coordination capability as a strategic organizational competence. Effective collaboration requires more than willingness to cooperate; it depends upon mechanisms that synchronize decision-making, clarify responsibilities, and facilitate rapid information exchange across organizational boundaries. Investments in shared communication protocols, joint planning routines, and collaborative decision-making processes can therefore strengthen collective adaptive capacity before disruptions occur.

Finally, the framework underscores the importance of adaptive learning as the immediate driver of collaborative resilience. Organizations should encourage systematic learning across network partners through post-crisis evaluations, cross-organizational knowledge sharing, and continuous refinement of collaborative routines. By transforming dispersed experiences into collective learning, organizations enhance their ability to anticipate future disruptions and coordinate more effective responses.

4.3 Boundary Conditions and Limitations

The explanatory power of Collaborative Resilience is subject to several boundary conditions that define the scope of the proposed theory. First, the framework is primarily applicable to organizational contexts characterized by substantial interdependence among multiple autonomous organizations. It is therefore less appropriate for explaining resilience in highly centralized organizations where adaptation depends predominantly on internal managerial capabilities rather than collaborative interactions.

Second, the theory assumes the presence of relatively stable interorganizational relationships that permit the development of governance structures, trust, and adaptive learning over time. Temporary or highly transactional exchanges may not provide sufficient opportunities for these mechanisms to develop fully. Consequently, the proposed explanatory logic is expected to be strongest within strategic alliances, innovation ecosystems, supply networks, public-private collaborations, and other enduring collaborative arrangements.

Third, environmental uncertainty constitutes an important contextual condition. Under relatively stable environments, organizations may achieve satisfactory performance through routine coordination and internally controlled resources. As uncertainty increases, however, organizations become increasingly dependent on collaborative governance, distributed knowledge, and adaptive learning to sustain organizational performance. The explanatory strength of Collaborative Resilience is therefore expected to increase alongside the complexity and unpredictability of environmental conditions.

Despite its contributions, the proposed theory has several limitations. As a conceptual article, it develops theoretical propositions without empirical testing. Future empirical studies are therefore required to validate the proposed causal relationships, examine alternative

mechanisms, and investigate contextual variations across industries and institutional environments. In addition, the current framework adopts a network-level perspective and does not explicitly incorporate multilevel interactions among individuals, teams, organizations, and broader institutional systems. Integrating these levels represents an important opportunity for future theoretical refinement.

4.4 Future Research Agenda

The proposed theory provides several directions for future research. First, empirical studies should examine the sequential mechanism proposed in this article using longitudinal research designs capable of capturing the evolution of collaborative relationships before, during, and after major disruptions. Such studies would enable researchers to assess whether collaborative governance, coordination, trust, and adaptive learning develop cumulatively over time, as suggested by the proposed framework.

Second, future research should investigate how different forms of network governance influence collaborative resilience across varying institutional and industrial contexts. Comparative studies involving public organizations, private firms, nonprofit organizations, and cross-sector partnerships may reveal important contextual contingencies that refine the boundary conditions of the theory.

Third, digital transformation offers promising opportunities for extending Collaborative Resilience. Emerging technologies, including digital platforms, data analytics, and artificial intelligence, increasingly shape information visibility, coordination processes, and collective decision-making across organizational networks (Dubey et al., 2021; Ivanov, 2021). Examining how digital capabilities interact with collaborative governance may substantially enrich future theory development.

Finally, future studies should investigate Collaborative Resilience using multilevel and cross-national perspectives. Organizational networks differ considerably in institutional environments, governance traditions, and cultural norms. Examining these differences would improve understanding of the contextual conditions under which collaborative resilience emerges, thereby strengthening both the explanatory power and the generalizability of the proposed middle-range theory.

Building on the proposed theory, several promising research directions can systematically extend its explanatory scope by examining new contexts, mechanisms, methodological approaches, and boundary conditions.

Table 4. Future Research Agenda for Extending Collaborative Resilience Theory

Research Direction	Theory Extension	Suggested Research Design	Expected Theoretical Contribution
Multilevel Collaborative Resilience	Integrate individual, team, organizational, and network-level adaptation processes	Multilevel modelling; hierarchical linear modelling	Explains cross-level emergence of collaborative resilience
Temporal Dynamics of Collaboration	Examine how collaborative resilience evolves before, during, and after disruptions	Longitudinal studies; panel data; process research	Introduces a dynamic perspective on resilience development
Digital and AI-Enabled Collaboration	Investigate how digital platforms, analytics, and artificial intelligence reshape collaborative adaptation	Mixed methods; digital trace analysis; case studies	Extends the theory to digitally connected organizational ecosystems
Institutional and Cross-National Contexts	Explore how institutional environments, governance traditions, and national cultures influence collaborative resilience	Comparative international studies	Refines contextual boundary conditions and improves theoretical generalizability

Research Direction	Theory Extension	Suggested Research Design	Expected Theoretical Contribution
Collaborative Governance Configurations	Compare alternative governance structures across alliances, innovation ecosystems, and public–private networks	Comparative case studies; configurational analysis (QCA)	Identifies alternative pathways leading to collaborative resilience

Source: Developed by the author based on the theoretical implications and future research directions derived from the proposed Collaborative Resilience framework.

Table 4 translates the proposed middle-range theory into a coherent research program by identifying theoretically grounded opportunities for future development. Rather than merely listing research topics, the table specifies how Collaborative Resilience can be extended through new analytical levels, temporal perspectives, technological contexts, institutional settings, and governance configurations, thereby supporting cumulative theory development.

5. Conclusion

This article addressed an increasingly important yet insufficiently theorized question in contemporary management research: how resilience emerges collectively across interorganizational networks under conditions of persistent environmental uncertainty. Although prior studies have substantially advanced understanding of interorganizational networks, collaborative governance, and organizational resilience, these streams have largely evolved in parallel, offering fragmented explanations of collective adaptation. Consequently, existing literature provides limited insight into the mechanisms through which relational structures, governance arrangements, and adaptive processes interact to generate resilience beyond the boundaries of individual organizations. Responding to this knowledge gap, the present study sought to develop a middle-range theoretical explanation of collaborative resilience by integrating these previously disconnected perspectives into a coherent explanatory framework.

The primary novelty of this study lies in its reconceptualization of resilience as an emergent network-level capability rather than solely an organizational attribute. By proposing a sequential mechanism linking network embeddedness, collaborative governance, coordination capability, interorganizational trust, adaptive learning, and collaborative resilience, the article moves beyond identifying isolated antecedents of resilience toward explaining the causal processes through which resilience is collectively produced. In doing so, the proposed framework extends existing network, governance, and resilience theories by demonstrating how their complementary explanatory strengths can be integrated into a unified model of interorganizational adaptation. The six theoretical propositions further provide a structured foundation for future empirical investigation while positioning Collaborative Resilience as a bounded yet transferable middle-range theory applicable to collaborative organizational systems characterized by sustained interdependence and environmental uncertainty.

Theoretically, this study contributes by shifting the unit of analysis from individual organizations to interorganizational networks, integrating fragmented theoretical traditions, and specifying the causal mechanisms and boundary conditions through which collaborative resilience develops. These contributions enrich current understanding of organizational adaptation while offering a more comprehensive conceptual foundation for future resilience research. From a managerial perspective, the framework highlights that resilience should be cultivated not only through internal organizational capabilities but also through deliberate investments in collaborative governance, trust-building, coordination routines, and cross-organizational learning. More broadly, the framework offers useful guidance for managers and policymakers seeking to strengthen adaptive capacity across strategic alliances,

innovation ecosystems, public–private partnerships, and other forms of collaborative governance.

Several limitations should be acknowledged. As a conceptual study, the proposed framework has not yet been empirically validated, and the causal relationships remain theoretical propositions requiring systematic examination across different organizational, industrial, and institutional contexts. Furthermore, the model adopts a network-level perspective and therefore does not explicitly incorporate multilevel interactions among individuals, teams, organizations, and institutional actors. These limitations, however, represent opportunities for future theory development rather than weaknesses of the proposed framework. Future research should employ longitudinal, multilevel, and comparative designs to examine the dynamic evolution of collaborative resilience, investigate the influence of digital technologies and artificial intelligence on interorganizational adaptation, and explore how institutional environments and governance configurations shape resilience across diverse collaborative settings.

In conclusion, this study argues that organizational resilience in an increasingly interconnected world is best understood not as the achievement of isolated organizations but as the collective outcome of strategically orchestrated relationships that enable organizations to anticipate, coordinate, adapt, and transform together. By introducing Collaborative Resilience as a theoretically grounded middle-range explanation of interorganizational adaptation, this article provides a platform for advancing future scholarship and offers a new lens through which resilience can be understood, investigated, and developed in complex organizational ecosystems.

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