

Resilient interorganizational culture in multi-tier supply networks: the 'what' and 'how'

Abstract

Purpose: Highlighted in multiple calls, research on interorganizational culture remains limited in the supply chain resilience (SCRES) literature, particularly at the supply network-level. Drawing from an in-depth case study of a US chemical multinational and 21 multi-tier suppliers facing the COVID-19 disruption, this paper explores interorganizational culture's role in SCRES in a multi-tier supply network. *Based on the case data, this work proposes an exploratory definition of resilient interorganizational culture*, conceptualizing it as a network-wide cultural alignment framework that *can strengthen* SCRES through cultural propagation and transitivity mechanisms.

Design/methodology/approach: The case consists of 83 in-depth interviews over nine months, collecting data from a buyer and 21 suppliers in the chemical industry. Using balance theory, the analysis examines what and how inter-organizational culture elements influence the SCRES elements of collaboration, flexibility, visibility, and velocity in a disrupted multi-tier supply network.

Findings: The case study sheds light on the various cultural elements and supply network mechanisms between organizations that form a resilient interorganizational culture during a significant global disruption. These cultural elements encompass shared goals, expectations, understanding, processes, and values. The findings of this study indicate that these cultural elements, along with the mechanisms of network-level cultural propagation and cultural transitivity in balanced and unbalanced triadic cultural relationships, affect different aspects of SCRES uniquely. The study underscores the significance of evaluating the interorganizational cultural alignments existing in supply networks to achieve SCRES.

Originality: This paper maps aligned *and misaligned* cultural elements and explores how they characterize a resilient interorganizational culture in *a* multi-tier supply network, drawing on the concepts of network-level cultural propagation and transitivity in balanced and unbalanced triadic relationships. *It extends balance theory by introducing cultural transitivity as a mechanism linking triadic cultural structures to resilience outcomes. It complements balance theory by conceptualizing cultural propagation as the diffusion of cultural alignments and misalignments beyond triads, influencing resilience at the network-level. It contributes to network theory by articulating*

study, the work advances SCRES theory by offering exploratory insights into how cultural transitivity and propagation enable the SCRES elements of collaboration, flexibility, visibility, and velocity.

Keywords: supply chain resilience, supply network, balance theory, interorganizational relationships, interorganizational culture, buyer-supplier relationships.

Article classification: Research paper, case study.

1. Introduction

In today's interconnected and complex supply chain networks, the importance of culture is amplified. It is not only a foundation for ethical and moral habits that nurture trust and partnership commitment (Fukuyama, 1995; Sambasivan and Yen, 2010) but also a critical factor in avoiding misalignment that can lead to business disruptions, impairing decision-making and information-processing capabilities (Ali et al., 2023; Cadden et al., 2013; Wong et al., 2023). Culture impacts strategy (Green, 1988) and shapes core supply chain dynamics such as trust, collaboration, risk tolerance, and information sharing (Cao et al., 2015; Kumar et al., 2018). Interorganizational culture represents shared goals and objectives, business philosophies or management styles (Sáenz et al., 2014), assumptions (Chowdhury et al., 2019), norms, beliefs, and values (Hult et al., 2007) that help achieve strategic alignment between partners (Sáenz et al., 2014). Scholars have connected the idea of interorganizational culture to cultural compatibility (e.g., Sáenz et al., 2014). While interorganizational culture is what partners culturally share, cultural compatibility, also known as cultural alignment or fit (Cartwright and Cooper, 1993), identifies the degree to which two partners share a set of norms, beliefs, or values (Hult et al., 2007). The sharing of norms between partners enables the transition of intra- to interorganizational rules and vice versa (Sáenz et al., 2014). Existing studies have demonstrated that interorganizational culture significantly shapes supply chain performance in the buyer-supplier context (Cao et al., 2015), notably by influencing collaborative synergies, shared understanding, and cognitive efforts to mitigate supply risks, thereby enabling supply chain resilience (SCRES) (Chowdhury et al., 2019). Misaligned cultures can disrupt collaboration and hinder SCRES (Ali et al., 2017; Christopher and Peck, 2004). Scholars have further revealed that compatible or aligned interorganizational cultures can help avoid business failure, strife, and suspicion (Rajaguru and Matanda, 2019). Indeed, shared cultural foundations have been shown to facilitate mutual understanding and learning across firms, contributing to more resilient responses (Razak et al., 2024). Recent empirical studies have demonstrated that various forms of culture, such as learning culture, digital organizational culture, and humanitarian values, play a critical role in enabling key SCRES capabilities, including collaboration, flexibility, and risk response (Acar et al., 2022; Michel et al., 2023; Rodríguez-González et al., 2023). While research on interorgan

Over the past few decades, the literature has increasingly adopted a relational view, recognizing that firm performance and resilience are heavily influenced by external relationships, specifically who organizations choose to work with (Mesquita et al, 2008; Wang and Rajagopalan, 2015). In the context of supply chains, this shift highlights the need to move beyond examining isolated firm attributes and instead zoom in on the relational dynamics between organizations, including the alignment and misalignment of their cultural elements. The existing supply chain literature has largely focused on cultural aspects at the organizational and buyer-supplier levels (Chowdhury et al., 2019; Rajaguru and Matanda, 2019). However, culture transcends the walls of one firm or buyer-supplier relationships, since social interactions among groups of people occur without any clear boundaries (Lee et al., 2015). **This underscores the importance of studying interorganizational culture at the network-level.** Indeed, supply chains go beyond the confines of buyer-supplier dyads (Kim et al., 2011), as these dyads can influence each other and be influenced by different connections within the broader supply networks. **This is particularly evident in the context of large-scale disruptions, where resilience depends on multilevel coordination mechanisms and collaboration across interconnected supply chain tiers** (Aman and Seuring, 2023; Lusiantoro and Pradiptyo, 2022). A firm's failure to address supply disruptions often stems from a limited understanding of the supply network in which it is embedded (Kim et al. 2015). Consequently, SCRES strategies must be network-wide (Christopher and Peck, 2004). Indeed, the performance of a supplier relies on the effectiveness of its extended supply network. Therefore, buyers need to reduce supply risks by selecting and assessing suppliers not in isolation but rather in consideration of their embeddedness within larger supplier networks (Kim et al., 2011). A relevant example is Toyota, whose North American truck production stopped over a component disruption in a Japanese plant (Kim et al. 2015). As such, a network lens is necessary to develop resilience and understand how global supply chains work comprehensively. Given the increasing number of supply chain players struck by disruptions, a few studies have recently shifted their attention from dyads to broader supply networks to unveil complex and inconspicuous supply network patterns and how disruptions proliferate insidiously in multi-tier supply networks.

This study introduces and explores the phenomenon of resilient interorganizational culture at the supply network-level. Unlike firm-level organizational culture, resilient interorganizational culture is **presented here as a** supply network-wide cultural phenomenon characterized by cultural alignments that **may** strengthen a supply network's ability to foster the key

interconnected actors, thereby enabling resilience beyond dyadic or triadic boundaries. Investigated in triads, balance theory stipulates that relationship balance is possible when all partners share similar views or when two relationships in the triad are adversarial (Hummon and Doreian, 2003). SCRES enables companies to persist, adapt, or transform when dealing with disruptions (Wieland and Durach, 2021) through organizational and interorganizational resources and capabilities (Kamalahmadi and Parast, 2016). This study seeks to identify precisely what and explain how interorganizational culture elements impact the four most common SCRES capability elements (i.e., collaboration, flexibility, visibility, and velocity) (Ali et al., 2017; Johnson et al., 2013; Jüttner and Maklan, 2011) in a disrupted multi-tier supply network. These SCRES capabilities will be fully defined in the following literature review section. The research questions guiding this work are as follows:

- (1) What interorganizational cultural elements impact SCRES elements at a supply network-level?
- (2) How do these interorganizational cultural elements impact SCRES at the supply network-level?

Culture is an intricate concept, lending itself to qualitative methods seeking data depth to understand unclear underlying assumptions and meanings (Cadden et al., 2013). Hence, a qualitative approach based on an in-depth case study of the industrial lubricant supply network of a chemical multinational in the US was used to collect data from 83 interviews from 22 organizations (i.e., 21 suppliers and one lead buyer). This work makes three theoretical contributions. First, it extends balance theory by analyzing how cultural transitivity influences SCRES across connected triadic actors, offering a novel application of the theory to cultural alignment in supply networks. It also complements balance theory by introducing cultural propagation as a mechanism through which interorganizational alignments spread beyond triads to shape resilience at the network-level. Second, it contributes to network theory by revealing how cultural alignment flows directionally (i.e., backward and forward) and transitively across interconnected tiers, clarifying underexplored alignment dynamics. Third, it advances SCRES theory by framing interorganizational culture as a dynamic, multi-tier enabler of collaboration, flexibility, visibility, and velocity. These mechanisms are grounded in a case study and formalized through propositions that capture network-level cultural dynamics. Practically, the paper advances the professional field of supply chain management by providing actionable insights for organizations aiming to foster resilience amid heightened global disruptions.

2. Theoretical background</

In the supply chain literature, scholars have mainly adopted an engineering view of resilience, highlighting the system's ability to bounce back to an equilibrium state (Sheffi and Rice, 2005; Ponomarov and Holcomb, 2009; Ali et al., 2017). However, some supply chain researchers have recently started to challenge the equilibrium state and consider disruptions as opportunities to metamorphose, adapt, evolve, and transform (Wieland and Durach, 2021). Recent empirical findings emphasize that disruptions such as the COVID-19 pandemic have accelerated firms' need to shift from traditional resilience strategies to more adaptive, real-time responses (Ivanov, 2021; van Hoek, 2020). Drawing on complex adaptive systems from the study of ecosystems, social systems, and the panarchy framework, scholars have introduced the notion of growth (Day, 2014), adaptation, transformability (Wieland and Durach, 2021), and antifragility, embracing turbulence rather than avoiding it (Nikookar et al., 2021). In the same vein, recent theorizations have adopted the dynamic capability lens to study transformation and growth in SCRES (Nikookar and Yandori, 2022). This lens investigates the SCRES capabilities to (1) sense/recognize threats and opportunities (i.e., proactive capability to prepare and learn), (2) seize/respond to threats and opportunities (i.e., reactive capability to respond), and (3) transform/improve the firm's capabilities (i.e., reactive capability to recover and learn) (Nikookar and Yandori, 2022). Accordingly, this study considers SCRES as an adaptive capability to maintain operational continuity against disruptions at the desired level of connectedness and control over structure and function (Ponomarov and Holcomb, 2009). This adaptive capability consists of preparing for, responding to, recovering from (Ponomarov and Holcomb, 2009), and learning from disruptions (Day, 2014). Building on this foundation, Ivanov (2025) frames SCRES as a dynamic, bioinspired capability, emphasizing the interdependence of adaptation and viability as strategic imperatives. Recent contributions also emphasize a systemic view of SCRES quality and the interplay between supply network structures and resilience capabilities (Gruchmann et al., 2024; Wang et al., 2025).

SCRES capabilities of preparation, response, recovery, and learning are enabled by elements (Ali et al., 2017; Christopher and Peck, 2004). The most common SCRES elements discussed in the literature are collaboration, flexibility, visibility, and velocity (Ali et al., 2017; Jüttner and Maklan, 2011; Johnson et al., 2013; Sá et al., 2019

information about the identification, location, and status of supply chain events or entities (Johnson et al., 2013). Velocity revolves around the adaptation speed by which a supply chain responds to and recovers from a market event (Christopher and Peck, 2004). Enhanced visibility and velocity are increasingly supported by AI and digital tools, strengthening the information-processing dimension of SCRES (Belhadi et al., 2021; Zhang et al., 2024). A growing body of evidence highlights collaboration, flexibility, visibility, and velocity as central mechanisms of resilience, particularly in turbulent and complex environments (Berger et al., 202; El Baz and Ruel, 2024; Ivanov, 2025; Juan et al., 2021; Scala and Lindsay, 2021; Zhao et al., 2024). Scholten et al. (2025) include redundancy as a fifth commonly cited SCRES element, based on a qualitative study of seven organizations that experienced twelve disruptions. Some scholars argue that redundancy may reinforce or overlap with flexibility, depending on how buffering and adaptation are defined (Stevenson and Spring, 2007). This illustrates the ongoing conceptual ambiguity surrounding the boundaries of SCRES capabilities. In addition to these core elements, many others stemming from these can be found in the SCRES literature, such as management support, continuity teams, training, past learning (Chowdhury and Quaddus, 2016), risk awareness, efficiency, knowledge management, but also social capital (Ali et al., 2017) with personal relationships and social interactions (Nikookar and Yandori, 2022).

2.2 SCRES and interorganizational culture

Components of interorganizational culture have been acknowledged within buyer-supplier relationships in the supply chain risk and resilience literature (Ding et al., 2024). Suppliers and buyers use interorganizational culture to facilitate tacit and explicit understanding, but also cognitive effort in supply risk identification (Fan and Stevenson, 2018) and mitigation (Chowdhury et al., 2019). This aligns with recent findings showing that cultural and relational foundations can foster shared interpretation and coordinated action, thereby enhancing resilience across supply networks (Razak et al., 2024). Studying humanitarian supply chains, Altay et al. (2018) show that control and flexibility orientation cultures positively influence SCRES and pre- and post-disaster performance. SCRES and supply chain risk management cultures are specific organizational cultures that enable the concepts of resilience (Christopher and Peck, 2004). Risk management culture is positively associated with firm risk reduction (Ali et

culture strengthens supplier-buyer absorptive capacity and enhances risk-coping mechanisms across the supply chain (Rodríguez-González et al., 2023).

Buyer-supplier organizational culture compatibility achieves the highest performance outcomes (Cadden et al., 2013). Interorganizational cultural compatibility in philosophies, values, social norms, professionalism, and chemistry positively impacts interorganizational information systems integration and supply chain capabilities (Rajaguru and Matanda, 2019). Cultural similarities in supplier-supplier and supplier-buyer relationships reduce communication costs, foster altruistic behavior, and strengthen mutual trust, ultimately leading to improvements in supplier cost efficiency, investment, and innovation (Ding et al., 2024). While components of interorganizational culture have been explored in dyadic buyer-supplier settings, their role across multi-tier supply networks remains underexplored.

2.3 A supply network view of SCRES

A supply network is a collection of nodes and arcs (Borgatti and Li, 2009). Nodes consist of suppliers, manufacturers, service providers, and customers linked by arcs/ties in the form of physical flows (e.g., materials) or contractual relationships (Kim et al., 2011). The literature discusses disruptions at two levels of analysis: the node/arc-level and network-level. The node/arc-level investigates nodes individually and/or arcs consisting of a dyad with two nodes, while the network-level examines the broader structure and the cascading effects of disruptions as they propagate through the system (Kim et al., 2011; Kim et al., 2015; Christopher and Peck, 2004; Lusiantoro and Pradiptyo, 2022). This study adopts a network view centered on a focal node network, encompassing a focal firm or the lead buyer, and a set of firms or suppliers with direct or indirect ties to the focal firm (Borgatti and Li, 2009). In this study, the focal firm or lead buyer is the destination of the physical flows emanating from other nodes. Acknowledged in a few studies, SCRES at the supply network-level remains underexamined (Kim et al., 2015), particularly in terms of how disruption and cultural alignment may propagate beyond immediate dyads, shaping resilience dynamics across the extended supply network.

This work focuses on node/arc disruptions and how they affect the SCRES elements of collaboration, flexibility, visibility, and velocity within the supply network. Conceptualizing supply networks in the

Balance theory is a theoretical framework, first developed in behavioral psychology, to study triadic interpersonal and group relationships, where a (+) sign typically represents a cooperative relationship between two firms, while a (-) sign indicates an uncooperative relationship between two firms (Choi and Wu, 2009). *Applied to the supply chain context, balance theory provides a lens to understand cooperative and adversarial interorganizational cultural dynamics.* It helps identify and understand balanced and unbalanced cultural relationships in triads. According to the literature on balance theory (Hummon and Doreian, 2003), a balanced triadic relationship always has three (+) signs or two (-) signs and one (+) sign, and an unbalanced triadic relationship always has two (+) signs and one (-) sign or three (-) signs. Balance theory describes interorganizational relationships similarly to the buyer-supplier relationship literature, with positive/cooperative relationships or negative/adversarial relationships between two nodes.

Balance theory is the only theory from the broad academic literature that addresses triads (Choi and Wu, 2009). Triads constitute the smallest supply networks. Therefore, using balance theory has sound applicability to interorganizational cultural relationships in triads, *and its insights may inform broader reflections on cultural dynamics in larger supply networks.* Although initially, this theory focused on the individual level, management researchers have used it to understand organizations. Despite its relevance, balance theory remains underutilized in the supply chain resilience literature, particularly in relation to cultural alignments and misalignments across networked relationships. *This paper explores how cultural elements and their alignments contribute to SCRES by applying balance theory in triads and examining cultural propagation mechanisms across larger supply networks, thereby offering deeper insight into culture-driven resilience in supply networks.* This work characterizes cultural alignments between two actors with a (+) and cultural misalignments between two actors with a (-).

3. Method

Understudied in the literature, *network-level* interorganizational culture and resilient interorganizational culture are complex real-life phenomena that can be amply explored through a single case study (Siggelkow, 2007) seeking meaning and context over causality and positivist generalization (Eisenhardt, 1989). As such, despite its limited generalizability, applications and risk of subjectivity, a case study method was selected to focus on detailed descriptions, data analysis, and exploration of contextual factors (Yin, 2018). This approach serves as a first exploratory step to examine the role of interorganizational culture in

division of a chemical multinational, consisting of a lead buyer referred to as LEAD_BUYER in this paper and 21 other organizations operating in its extended upstream supply chain (Figure 1). While the lead buyer plays a central role in shaping interorganizational culture and resilience, the 21 suppliers are also interconnected. A buyer's supplier is often also a buyer of another supplier within the network, creating a dynamic multi-tier structure where resilience is shaped by multiple interconnected relationships.

Figure 1. Examination of LEAD_BUYER's supply network

LEAD_BUYER was the focal buyer and purchased products and services directly from 21 suppliers. LEAD_BUYER had a FREIGHT_FORWARDER that managed ocean and land carriers for products overseas. LEAD_BUYER subcontracted the production of some special blends to BLENDER_1, BLENDER_2, BLENDER_3, and BLENDER_4 which produced oil blends shipped to LEAD_BUYER's third-party WAREHOUSE_1, WAREHOUSE_2, and WAREHOUSING_4PL or end-customers. In the production process, LEAD_BUYER and blenders used suppliers: BASE_OIL_1, BASE_OIL_2, ADDITIVE_1, ADDITIVE_2, PACKAGER_1, PACKAGER_2, PACKAGER_3, DISTRIBUTOR_1, and DISTRIBUTOR_2. In the delivery process, blenders used LEAD_BUYER's transportation 4PL, TRANSPORT_4PL, to organize transport with LTL_CARRIER (i.e., LTL: Less-Than-Truckload), BULK_CARRIER_1, and BULK_CARRIER_2 shipping to LEAD_BUYER's third-party warehouses and customers. The warehouses worked with all LEAD_BUYER's suppliers, except the base oil suppliers, to schedule deliveries of materials that LEAD_BUYER needed. LTL and bulk carriers were exclusively managed by LEAD_BUYER's transportation 4PL. Distributors purchased products from additive suppliers. Packaging suppliers supplied the blenders and LEAD_BUYER. Suppliers were selected for their product and service diversity to enable a richer contextual analysis. The data collection process lasted nine months, between January and September 2022.

3.1 Case study selection and context

The choice of the case study was based on the supply network complexity (i.e., number

of phenomenon characteristics (Scholten et al., 2014). As an extreme case, the COVID-19 pandemic context was chosen as an opportunity to delve into the concept of resilient interorganizational culture at the supply network-level. Multiple COVID-driven incidents were identified throughout the case, enabling the utilization of critical incident analysis (Flanagan, 1954) to understand how people perceived unfolding events. The case predominantly revolves around LEAD_BUYER and tier-1 and tier-2 suppliers, but also incorporates tier-3 and tier-4 suppliers. A network approach was selected to explore qualitatively how interorganizational cultural elements align to form supply network resilience.

3.2 Data collection

The study uses mainly 83 semi-structured interviews of individuals from 22 companies in the US chemical industry, plus other data (i.e., Table I: respondent profiles list). Representing all product categories needed to produce industrial lubricants, top tier-1 suppliers in volume selling to LEAD_BUYER were selected for interviews. All selected tier-1 suppliers working in Sales agreed to participate in the study. Then, based on a chain sampling process, these Sales participants referred the research team to other participants from their Supply Chain departments and top suppliers. These suppliers were tier-2 suppliers to LEAD_BUYER, which provided access to their suppliers, as well. Chain sampling continued until data saturation was reached, sometimes up to tier-3 and tier-4 suppliers.

To allow data-rich collection, individuals with different title levels and decision-making influence in Sales and Operations were selected and interviewed. Twelve company types were interviewed: an industrial lubricant manufacturer/lead buyer, two base oil suppliers, four blenders, two additive suppliers, three packaging suppliers, two distributors, one 4PL warehouse provider, two warehouses, one 4PL transportation provider, one LTL carrier, two bulk carriers, and one freight forwarder. On the buyer side, 20 individuals in Operations were interviewed from Production, Maintenance, Quality, Engineering, Planning, Purchasing, Procurement, Transportation, and Logistics at different levels (i.e., Analyst, Manager, Director). On the supplier side, 63 individuals were interviewed. Three people were interviewed per supplier from the Sales and Supply Chain departments at different levels (i.e., Analyst, Manager, Director, VP, President/GM/CEO). Additionally, information available in supplier-buyer project presentations, meetings, emails, and phone calls allowed for data triangulation, increasing the reliability and validity of the results (Yin, 2018). Data were collected and analyzed from participatory observations (i.e., 29 hours of 36 virtual and face-to-face meetings) and non-participatory observations (i.e., 1

Table I. Respondent profile

An in-depth interview protocol was built using open-ended questions with broad and known themes to enable understanding, exploration, and follow-up questions (i.e., Table II). The same interview questions were used for buyers and suppliers. Questions probed buyers and suppliers about their respective relationships. Interorganizational cultures and networks were investigated using words such as corporate culture similarities/differences, suppliers, and customers. SCRES was examined using words such as risk coping mechanisms/resilience, and the SCRES elements of collaboration, flexibility, visibility, and velocity. 95% of the interviewees had three or more years of experience in their respective organizations. Approximately 30% of respondents were female and 70% were male. The interview average time was 46 minutes. No pattern emerged from the employees' time in their organizations, titles, or core business functions.

Table II. Interview questions: themes and goals

Interviewees discussed certain disruption events that involved their organizations with others, explaining how one or more cultural alignment(s) helped them cope with disruptions and create resilience. These disruption events constituted narratives with respondents, organizations, cultural alignments/misalignments, and impacted SCRES elements. Every collected narrative was modeled by connecting the organizations of the disruption-driven story in a diagram/supply network where nodes represent the organizations and links/arcs characterize cultural alignments/misalignment embedded in material, informational, and financial flows. Respondents highlighted relevant cultural elements that impacted SCRES in their respective supply networks and narratives. Supply networks were only modeled and created when actors of the network discussed a specific disruption, respective cultural alignments/misalignments, and impacted SCRES elements with actors they were connected to in the modeled network. This enabled the identification of shared/interorganizational cultural elements running through the supply network between organizations during a specific disruption. Some disruptions were discussed in narratives where actors and cultural elements were different but embedded in supply networks of similar structure (i.e., same number of actors and links/arcs configuration). Thus, each diagram/supply network can represent multiple narratives or disruption stories between different actors discussing different cultural and SCRES elements.

3.3 Data analysis

The thematic and data analysis of the transcribed interviews was processed in NVivo, helping to systematize substantial textual data (Johnson et al., 2013). The coding and analysis process was conducted collaboratively among all researchers, ensuring consistency in theme identification and reducing individual biases. Consensus discussions were held throughout the coding process to refine interpretations and enhance reliability.

Interorganizational culture represents common goals, objectives, business philosophies, or management styles (Sáenz et al., 2014), assumptions (Chowdhury et al., 2019), norms, beliefs, and values (Hult et al., 2007). Using this definition, the data analysis unveiled (1) what specific interorganizational cultural elements impact SCRES and (2) how these interorganizational cultural elements impact SCRES at the supply network-level. Figure 2 shows the thematic analysis of interorganizational cultural elements surfacing from the data in a supply network context with a total of 101 codes. Staying faithful to the terms used by informants and the definition of interorganizational culture, the Gioia methodology (Gioia et al., 2013) was used to determine the interorganizational cultural elements aligning between partners to help enable SCRES in the supply network. Interorganizational cultural elements consisted of shared goals and expectations (i.e., 17 codes), understanding (i.e., 23 codes), processes (i.e., 24 codes), and values (i.e., 37 codes). Shared goals were comprised of shared delivery performance, business continuity, and safety goals, emerging as shared principles guiding all strategic and operational processes. Shared understanding entailed shared assumptions and narratives. Shared assumptions were beliefs assumed by partners to be true, such as logistical capabilities, while shared narratives were shared stories. Shared processes were agreed-upon norms consisting of forecast sharing, shared delivery scheduling processes, and shared invoice management processes. Shared values revolved around shared communication, empathy, and respect.

Figure 2. Interorganizational cultural elements emerging from the Gioia method

Ponomarov and Holcomb (2009) define SCRES as a supply chain adaptive capability to maintain operations continuity against disruptions at the desired level of connectedness and control over structure and function. Underexamined in the previous SCRES literature, the concept of connectedness over structure and function is explored in this work through the lens of cultural alignments, enabling cultural connectedness between partners. All actors in the supply network interacted through material, financial, and informational flows. The paper examines interorganizational cultural alignments embedded in these flows. Quotes were selected and split into two categories: those describing

To understand what and how interorganizational cultural elements influence SCRES elements, quotes including aligned/misaligned interorganizational cultural elements were sorted and connected to the SCRES elements of collaboration, flexibility, visibility, and velocity (Ali et al., 2017; Johnson et al., 2013; Jüttner and Maklan, 2011; Scholten et al., 2025). Firms are not self-sufficient and need each other’s critical resources to operate and survive in supply networks. As such, resilience in supply networks depends on resources possessed by different supply network members (Nikookar and Yandori, 2022). These resources are often called network resources (Gulati, 1999), and among the most frequently cited are collaboration, flexibility, visibility, and velocity, which are consistently recognized in the literature as foundational to resilience (Ali et al., 2017; Johnson et al., 2013; Jüttner and Maklan, 2011; Scholten et al., 2025). In this study, only these four SCRES elements are examined, identified during the coding process and grounded in the case data. Scholten et al. (2025) identify five frequently cited SCRES elements: collaboration, flexibility, visibility, velocity, and redundancy, based on a qualitative case study of seven organizations facing twelve disruptions. Redundancy did not appear as a distinct mechanism in this study. Instead, flexibility is treated as an integrative capability that includes both adaptive reconfiguration and structural buffering, such as slack resources or excess capacity. This interpretation aligns with Stevenson and Spring’s (2007) view of flexibility as the capacity to generate a diverse range of potential responses to disruption and reflects a synthesis of what Scholten et al. (2025) describe separately as flexibility and redundancy into a single, empirically grounded construct. Table III provides illustrative case study quotes and their links with these four SCRES elements. A total of 7,933 quotes (i.e., 164,083 words) discussing interorganizational cultural elements in SCRES emerged and were selected for an in-depth analysis. These cultural elements were ranked (i.e., Table IV) by the percentage of companies and people discussing them per SCRES elements. Table IV is only descriptive and is not at claim or generalization of how important cultural elements are for every SCRES element.

Table III. Illustrative case study quotes and their links with SCRES

Table IV. Distribution % and ranking of interorganizational cultural elements per SCRES element

Some minor contextual

capabilities across tiers. These recurring themes, observed across multiple organizations and supply network tiers, strengthen the credibility of the findings despite the study's qualitative nature, contextual specificity, and exploratory design.

Drawing from critical incident analysis (Flanagan, 1954), supply chain disruption events emanating from the case were scrutinized for connections between specific cultural elements and SCRES elements. Grounded in the data, a total of 22 critical types of supply chain incidents appeared: demand variability, demand visibility, production stoppage, warehouse space shortage, production staff shortage, selection of unsafe materials, supply shortage, supplier staff shortage, lack of training, supply price increases, unpaid suppliers, relationship tension, deception, driver and truck shortage, excessively high delivery performance goals, disrespectful and aggressive drivers, early deliveries, late deliveries, unpaid carriers, drivers not wearing PPE (i.e., Personal Protective Equipment), reckless drivers, and unsafe transportation operations. Nine supply structures surfaced from these critical incidents: six triads with three actors each (3), two tetrads with four actors each (4), one pentad (5), one hexad (6), one heptad (7), one octad (8), one nonad (9), one decad (10), and a 22-actor network representing all 22 organizations interviewed in this study. Bounded by their stories, the structures were always composed of the lead buyer and other suppliers. Throughout this study, networks with more than three actors will be called higher-order supply networks (i.e., Figure 3).

Building diagrams helped model, visualize, and grasp the nature of interorganizational cultural elements embedded in these flows between actors. The nature of the cultural relationship between actors for every cultural element was characterized in these diagrams using balance theory with a (+) for cultural alignment when partners in a dyad shared the same cultural element and a (-) for cultural misalignment when partners in a dyad did not share that cultural element (i.e., Figure 3).

Analyzing the disruptions, cultural alignments/misalignments, and impacted SCRES elements in different supply networks, two cultural mechanisms impacting SCRES surfaced from the data. These mechanisms were proliferative processes describing the movement or reproduction of cultural elements influencing SCRES throughout the supply network. They consisted of (1) cultural propagation and (2) cultural transitivity. Cultural propagation occurred in triads and higher-order supply networks where cultural alignments/misalignments shared in a dyad propagated to other dyads located downstream or upstream. Cultural transitivity exclusively occurred in triads where cultural alignments/misalignments between actors A and B, as well as actors B and C

(Kim et al., 2011; Kim et al., 2015), to determine how individual nodes and/or dyads influenced the resiliency of the entire supply network.

Figure 3. Supply network diagrams examining cultural alignments/misalignments in the data

(Diagrams A1 to D)

(Diagrams E to H)

(Diagram I)

4. Findings

All supply networks are built around the orchestrating lead buyer node. Results revealed two mechanisms: cultural propagation and cultural transitivity. Cultural propagation transpired in open networks where actors are more disconnected and spread out, whereas transitivity appeared in closed triads where all actors were interconnected. To clarify how cultural elements and mechanisms came to be, a table was built to connect them with their respective impacted SCRES elements, managerial activities such as joint meetings and communication enabling the mechanisms, network configurations (i.e., structure, number of tiers), diagrams, disruption types, and disruption tier origins (i.e., Table V).

Table V. Cultural mechanisms in supply networks and SCRES

4.1 Backward and forward cultural propagation

Findings are first presented through the triadic lens as the smallest unit of network found in the case. A broader view is then taken with higher-order supply networks.

Modeling the disruption stories with supply networks, a (+) sign is assigned between two actors in a buyer-supplier dyad when both actors are aligned on a cultural element (i.e., (+) in Figure-3 | Diagrams). Cultural

business continuity goals can align between two actors in a dyad and propagate to others in the supply network.

A (-) sign is assigned between two actors in a buyer-supplier dyad when both actors are misaligned on a cultural element (i.e.,(-) in Figure-3|Diagrams). When one actor in a dyad is misaligned on a cultural element with the other actor and is forced by this actor to align the same element with an external actor who disagrees, cultural misalignment propagates. Repeating with other actors, this propagation process spreads the cultural misalignment to other dyads and cascades throughout the supply network, negatively influencing SCRES.

Backward propagation is when the cultural alignment or misalignment propagates from a buyer to a supplier, then from this supplier to one or more of this supplier's suppliers. Forward propagation occurs when the cultural alignment or misalignment propagates from a supplier to a buyer, then from this buyer to one or more of this buyer's buyers. Throughout the case, cultural alignments were noticed to propagate both backward (Figure-3|Diagram-B2) and forward (Figure-3|Diagram-A3), while cultural misalignments were only propagating backward (Figure-3|Diagram-A1).

4.1.1 Cultural propagation in triads and SCRES

Spreading from LEAD_BUYER to TRANSPORT_4PL and then its suppliers/carriers, the propagation of delivery performance and business continuity goals flowed backward. Invited by TRANSPORT_4PL to joint-weekly meetings, carriers helped track deliveries, identify non-performance root causes, and resolve problems. Triadic in nature, these weekly performance meetings improved joint collaborative approaches, developing dedicated driver and backhauling models, and enhancing LEAD_BUYER's customer order fulfillment (Figure-3|Diagram-A2). Safety goals also propagated backward from LEAD_BUYER to upstream suppliers. For instance, LEAD_BUYER selected blenders following specific safety and material specifications, and these blenders selected additive suppliers following the same specifications, which avoided safety-driven supply disruptions (Figure-3|Diagram-A2).

Through joint brainstorming, business

PACKAGER_3 conveyed production line hiccups or chemical shortfalls to BLENDER_1. Learning these shared assumptions from PACKAGER_3, BLENDER_1 shared these issues with LEAD_BUYER to develop rapid and flexible plans sustaining deliveries to LEAD_BUYER's customers (Figure-3 | Diagram-A3).

The shared value of communication in triads propagated both backward and forward between LEAD_BUYER and its suppliers, empowering information and mutual understanding to proliferate and support joint decisions. Shared communication allowed partners to find speedy and flexible solutions during supply shortages (Figure-3 | Diagrams-A2/A3). For example, LEAD_BUYER communicated extensively with blenders to ensure base oil availability to produce blends. Thus, blenders had to communicate their needs to base oil suppliers. Any supply delays/allocations from base oil suppliers were communicated to blenders, who worked with LEAD_BUYER to find other base oil sources.

Sometimes, LEAD_BUYER had excessively high delivery performance goals with its suppliers. Overwhelmed, some suppliers disagreed with the expectations, as did their suppliers, making the delivery performance goal misalignment propagate backward throughout the supply network (Figure-3 | Diagram-A1). For example, LEAD_BUYER expected a delivery performance level from BLENDER_1. However, BLENDER_1 did not meet these delivery standards due to resource constraints. Frustrated, BLENDER_1 then demanded the same performance from PACKAGER_3, who threatened to stop shipping materials, causing potential supply and collaboration disruptions.

4.1.2 Cultural propagation in higher-order supply networks and SCRES

Delivery performance and business continuity goals propagated backward from LEAD_BUYER to suppliers. For example, tetradic joint weekly meetings helped LEAD_BUYER, the transportation 4PL, and carriers to manage delivery performance goals and develop flexible solutions like dedicated drivers and backhauling systems (Figure-3 | Diagram-B2). To maintain business continuity, LEAD_BUYER was constantly in touch with its blenders in need of raw material alternatives from distributors. Through brainstorming sessions, blenders and distributors exchanged their technical product knowledge in periods of shortfalls. For instance, in a hexad, DISTRIBUTOR_2 frequently recommended alternative suppliers or materials that BLE

Reducing the spread of COVID and potential supply disruptions, safety goals and expectations propagated backward from LEAD_BUYER to upstream suppliers through audits, daily receipt evaluations, product specifications, supplier selection, and production protocols. Requesting to transport hazardous chemicals and people safely, LEAD_BUYER mandated suppliers to use PPE on all suppliers. LEAD_BUYER audited annually and monitored daily how safely products were handled by all tier-1 suppliers. LEAD_BUYER's tier-1 suppliers did the same with their suppliers, disseminating safety rules throughout the supply network to maintain safe and resilient joint operations (Figure-3|Diagram-I). In a heptad, TRANSPORT_4PL and all carriers only selected drivers wearing PPE and respecting road regulations. Similarly, WAREHOUSING_4PL abided by LEAD_BUYER's expectations and contracted warehouses trained to deal with chemicals (Figure-3|Diagram-E).

Shared understanding traveled backward and forward through communication between LEAD_BUYER, WAREHOUSE_1, WAREHOUSE_2, WAREHOUSING_4PL, TRANSPORT_4PL, BULK_CARRIER_1, BULK_CARRIER_2, and LTL_CARRIER. Seen in tetrads and pentads, shared assumptions such as warehousing space and resource shortages eased joint brainstorming on agile and flexible solutions, including load rescheduling and transportation mode diversity (Figure-3|Diagrams-B1/C). COVID brought supply, pricing, demand, and resource challenges. This shared narrative ran through the entire supply network, creating a collaborative survival mode and increasing problem resolution velocity. Staying connected virtually, partners coordinated activities around the clock through the entire supply network (Figure-3|Diagram-I).

From a shared process perspective, LEAD_BUYER shared forecasts and backlog reports with tier-1 suppliers early in the pandemic to enable visibility and joint workload predictions. Shared forecasts allowed suppliers to schedule production, purchasing, and transportation ahead of time with their suppliers, warehouses, carriers, and LEAD_BUYER. Propagating backward from LEAD_BUYER to upstream suppliers, forecast sharing improved network visibility in a nonad and the entire supply network, enabling distant actors to resiliently synchronize their supply chains with LEAD_BUYER (Figure-3|Diagrams-G/I).

The shared value of communication enabled information to cascade backward and forward between LEAD_BUYER and

enabled LEAD_BUYER to switch blenders quickly, but also use distributors to help find substitute additive sources for these disrupted blenders (Figure-3|Diagram-F).

In sum, cultural alignments on delivery performance, safety, business continuity, communication, and shared assumptions propagated backward and forward across triads and higher-order networks. This propagation allowed actors to coordinate, brainstorm, and adapt, supporting SCRES through flexible sourcing, joint planning, and workload adjustments. Cultural misalignments, especially around performance expectations, propagated backward and disrupted upstream relationships, reducing collaboration and resilience across the supply network. The direction (i.e., backward, forward) and quality of this propagation (i.e., alignments, misalignments) shaped how resilience emerged or weakened across the network.

4.2 Cultural transitivity

Cultural transitivity manifested when cultural alignments/misalignments between actors A and B, as well as actors B and C, propagated transitively between actors A and C. In this case study, cultural transitivity occurred exclusively in closed triads where LEAD_BUYER and two suppliers were all connected. The results are presented below using balance theory (Choi and Wu, 2009; Hummon and Doreian, 2003). Balanced triadic cultural relationships occurred when all three relationships in a triad were culturally aligned through transitivity of cultural alignments (i.e.,(+,+,+)|Figure-3|Diagram-A4) or when two relationships were misaligned and one relationship was aligned through transitivity of partial cultural misalignments (i.e.,(+,-,-)|Figure-3|Diagram-A6). Unbalanced triadic cultural relationships manifested when all three relationships in a triad were culturally misaligned through transitivity of cultural misalignments (i.e.,(-,-,-)|Figure-3|Diagram-A5).

4.2.1 Transitivity in balanced triadic cultural relationships and SCRES

Transitivity of cultural alignments in balanced triads (i.e.,(+,+,+)|Figure-3|Diagram-A4) influenced SCRES positively. It occurred for the cultural elements of shared goals and shared respect, and empathy. These cultural elements existed between

BULK_CARRIER_2, and LTL_CARRIER, deciding to comply, which created transitively a cultural alignment on shared goals with LEAD_BUYER. Respect and empathy humanized relationships, inclining parties to be more receptive and flexible with each other. For example, LEAD_BUYER had a respectful and empathetic relationship with TRANSPORT_4PL, which actively sought flexible bulk tier-2 carriers for LEAD_BUYER. Relationships between TRANSPORT_4PL, BULK_CARRIER_1, and BULK_CARRIER_2 were also respectful and empathetic, and bulk carriers were performant and attentive to LEAD_BUYER's needs by proposing flexible delivery times and leaving trailers on LEAD_BUYER's site to accommodate loading schedules. Making exceptional efforts to retain their relationship with TRANSPORT_4PL, bulk carriers often covered stressful same-day shipments with multiple drivers from base oil suppliers to LEAD_BUYER, subsequently developing a two-way empathetic relationship transitively with LEAD_BUYER (Figure-3 | Diagram-A4).

Transitivity of partial cultural misalignments in balanced triads (i.e., (+,-,-) | Figure-3 | Diagram-A6) influenced SCRES negatively. It materialized when the cultural alignments of delivery performance goal, delivery scheduling process, forecast sharing process, respect and empathy, and communication existed between LEAD_BUYER and a tier-1 supplier but not between the tier-1 supplier and a tier-2 supplier, making LEAD_BUYER and the tier-2 supplier culturally misaligned transitively (Figure-3 | Diagram-A6). LEAD_BUYER agreed on specific delivery schedules with WAREHOUSE_2. However, PACKAGER_2 frequently shipped too early to WAREHOUSE_2, creating order non-visibility for LEAD_BUYER and WAREHOUSE_2. This created delivery schedule contentions between PACKAGER_2 and WAREHOUSE_2, but also between LEAD_BUYER and PACKAGER_2. Neglecting LEAD_BUYER's shared forecasts, a few tier-2 suppliers created shortages for LEAD_BUYER. For example, BLENDER_2 translated LEAD_BUYER's blend forecasts into drum requirements and continuously shared drum needs with PACKAGER_2. Personnel rotation and lack of training accruing, PACKAGER_2 continuously struggled to incorporate drum forecasts and failed to supply drums to BLENDER_2 on time. Most distributors formulate products with additive suppliers for LEAD_BUYER, and when products are developed, distributors usually manage new product inventories and sell them to LEAD_BUYER. Aligned respectful, empathetic, and communicative relationships existed between LEAD_BUYER and DISTRIBUTOR_2. During the pandemic, ADDITIVE_2 decided not to notify DISTRIBUTOR_2 of a decision to work directly with

Transitivity of partial cultural misalignments also occurred when the cultural alignments of the invoice management process, safety goals, and respect and empathy existed between LEAD_BUYER and a tier-1 supplier but not between LEAD_BUYER and a tier-2 supplier, making transitively both the tier-1 and tier-2 suppliers culturally misaligned (Figure-3|Diagram-A6). For instance, throughout the pandemic, LEAD_BUYER lost resources and encountered issues training personnel to process invoice payments to carriers. Unpaid carriers stopped working for LEAD_BUYER and automatically disengaged from TRANSPORT_4PL. Some of TRANSPORT_4PL's contracted drivers showed up at LEAD_BUYER's doors without PPE, becoming aggressive and disrespectful to LEAD_BUYER's personnel, who followed strict PPE procedures. Discontent with these disrespectful drivers causing transport disruption, LEAD_BUYER decided with TRANSPORT_4PL not to use carriers with misbehaved drivers.

4.2.2 Transitivity in unbalanced triadic cultural relationships and SCRES

Transitivity of cultural misalignments in unbalanced triads (i.e.,(-,-,-)|Figure-3|Diagram-A5) influenced SCRES negatively. It happened when on-time delivery performance goals became excessive and were not shared between LEAD_BUYER and a tier-1 supplier, but also between the tier-1 supplier and a tier-2 supplier, making both LEAD_BUYER and the tier-2 supplier transitively misaligned culturally on delivery performance goals. For example, LEAD_BUYER had on-time delivery performance issues with tier-1 WAREHOUSING_4PL, which contracted a tier-2 3PL warehouse that could not keep up with LEAD_BUYER's excessive expectations. The cultural misalignment in delivery goals between LEAD_BUYER and WAREHOUSING_4PL became similar between WAREHOUSING_4PL and the pressured 3PL warehouse. This created transitively a misalignment between the 3PL warehouse and LEAD_BUYER and engendered a triadic separation between all parties, interrupting shipments to LEAD_BUYER's customers (Figure-3|Diagram-A5).

In sum, cultural transitivity occurred in closed triads where the lead buyer and two suppliers were all connected. Balanced triads included transitivity of cultural alignments and partial cultural misalignments. Transitivity of cultural alignments supported SCRES by reinforcing shared goals, respect, empathy, and business continuity across

propagated across the triad and disrupted SCRES. Unbalanced triads involved transitivity of cultural misalignments, where all ties were misaligned. These weakened SCRES by reinforcing excessive expectations and disengagement across all three actors. The presence and type of cultural transitivity (i.e., balanced or unbalanced) shaped how SCRES was strengthened or degraded across connected actors in the supply network.

5. Theoretical contributions and discussion

Going beyond a dyadic lens, this case study extends the SCRES literature by applying balance theory to resilient interorganizational cultures in supply networks, focusing on how cultural dynamics unfold across triads and beyond. This study refines balance theory by introducing cultural transitivity to explain how the alignment between two actors can reinforce or undermine the third tie in a triad, ultimately influencing SCRES outcomes. The study also complements balance theory by conceptualizing cultural propagation as the diffusion of alignment beyond triads, a network-level mechanism that shapes resilience across interconnected actors. This offers an exploratory lens that better reflects the complexity of modern supply chains (Choi and Wu, 2009; Hummon and Doreian, 2003; Kim et al., 2011).

Building on this foundation, the study contributes to network theory by showing how cultural alignment travels not only through direct ties but also across tiers via directional and transitive flows. These flows, moving backward and forward through the network, clarify how alignment evolves dynamically over time. Such dynamics influence the formation of shared practices and relational expectations, reinforcing or weakening resilience.

In advancing SCRES theory, the study frames interorganizational culture as a distributed, multi-tier capability that enables the core resilience elements of collaboration, flexibility, visibility, and velocity. It lays the groundwork for conceptualizing resilient interorganizational culture and its potential role in strengthening supply network resilience. These contributions are formalized through empirically grounded propositions that reflect how the cultural dynamics of alignment/misalignments, transitivity, and propagation operate at the network-level. In practical terms, the findings provide actionable insights for supply chain leaders seeking to enhance resilience through strategic cultural alignment beyond the boundaries of the firm.

The findings from this paper reinforce emerging views that position SCRES not

shift toward systemic and multi-tier interpretations of resilience, consistent with relational and network-based perspectives on supply chain performance (Mesquita et al., 2008; Wang and Rajagopalan, 2015; Aman and Seuring, 2023).

Supply networks are vulnerable to disruptions propagating backward and forward from a node to neighboring nodes (Świerczek, 2014). This propagation process is called the ripple effect and can be caused, for example, by financial risk or supply and demand variability (Serrano et al., 2018). The study broadens this idea of propagation from disruption propagation to the propagation of cultural alignments, enabling SCRES, and examines cultural transitivity in culturally balanced and unbalanced triads. **This shift reframes propagation not just as a vulnerability, but as a relational opportunity through which alignment can cascade and support resilience.**

Overall, the case describes what a resilient supply network culture is and explains how it works. Table V summarizes the findings and guides the proposition development offered in this paper.

Surfacing from the case study data, supply network-level managerial activities in Table VI enable the SCRES elements of collaboration, flexibility, visibility, and velocity. In this case study, the supply network was led by the buyer. The buyers' managers accessed "invisible" suppliers in the supply network to achieve network-level cultural alignments through a centralization strategy (Choi et al., 2015). This buyer strategy entailed maintaining direct ties with suppliers to dictate cultural alignments and retain control, but also delegating the cultural alignment propagation process to entrusted tier-1 suppliers working with multi-tier suppliers.

Table VI. Managerial activities enabling SCRES elements

5.1 Cultural propagation in supply networks and SCRES

The cultural propagation mechanism occurs when cultural element alignments/misalignments disseminate throughout the supply network.

suppliers, shared goals propagated backward through buyer-led joint meetings, brainstorming, audits, and protocols. Shared on-time delivery and business continuity goals helped track deliveries, non-performance, and unsafe behaviors. Facilitating collaboration and flexibility, these goals enabled the development of solutions such as dedicated drivers, backhauling, product knowledge transfer, and alternative suppliers/materials. Requesting to handle hazardous chemicals and follow material specifications safely, LEAD_BUYER ensured processes and materials followed specifications through methodical supplier selection, audits, and daily operational evaluations. This buyer-led safety behavior triggered suppliers to behave similarly to their suppliers.

Instrumental in supply risk mitigation (Chowdhury et al., 2019), shared business continuity goals propagated backward and forward between LEAD_BUYER and suppliers. LEAD_BUYER discussed business continuity risks regularly with suppliers. This resulted in conversations between tier-1 and tier-2 suppliers looking collaboratively for flexible sourcing. Similarly, tier-2 suppliers often proposed contingency plans to tier-1 suppliers to sustain activities. Tier-1 suppliers communicated these plans to LEAD_BUYER for approval. Shared understanding enables rapid supply risk identification and alleviation (Fan and Stevenson, 2018; Johnson et al., 2013). Shared understanding flowed from downstream to upstream actors and vice versa, creating a collaborative survival mode. Organizational cultures supporting communication enhance value creation, strategic alliances, risk mitigation (Rajaguru and Matanda, 2019; Ali et al., 2023), and collaboration outcomes (Prasanna and Haavisto, 2018). Throughout the case study, shared communication empowered information to circulate quickly between LEAD_BUYER and suppliers, improving problem-solving, rapid responses, flexibility, and collaboration.

These combined cultural elements strengthened SCRES. Overall, this proposition is put forward:

P1. Shared goals, expectations, understanding, and values propagate back and forth in a supply network between the lead buyer, tier-1, and tier-2 suppliers, enabling collaboration, flexibility, visibility, and velocity during supply chain disruptions.

In addition to these broader cultural elements, shared processes such as forecast communication and backlog reporting also played a key role in enhancing SCRES across multiple tiers. Shared processes

(Rodríguez-González et al., 2023; Wong et al., 2023). Propagating from LEAD_BUYER to upstream suppliers, forecast sharing improved visibility, enabling multi-tier actors to synchronize their supply chains.

Thus, this proposition emerges:

P2. Shared processes propagate backward in a supply network. The lead buyer shares processes with tier-1 suppliers. These processes are passed on from tier-1 to tier-2 suppliers, then from tier-2 to tier-3 suppliers, and finally from tier-3 to tier-4 suppliers, enabling collaboration and visibility during supply chain disruptions.

Shared goals clarify responsibility and reduce disagreements, while misaligned goals can create conflict (Villena et al., 2011). The only misaligned cultural element that propagated backward was the delivery performance goal. Tier-1 suppliers sometimes disagreed with LEAD_BUYER's high delivery performance expectations. To abide by these excessive expectations, these tier-1 suppliers often tried to pressure their tier-2 suppliers, who became overwhelmed, making the misalignment propagate backward throughout the supply network, and sometimes causing supply network fractures.

Therefore, the following proposition surfaced:

P3. Misaligned and excessive expectations from the lead buyer towards tier-1 suppliers can propagate and be imposed by tier-1 on tier-2 suppliers. This can cause tier-2 suppliers to refrain from collaborating with culturally misaligned tier-1 suppliers and the lead buyer. Tier-1 suppliers can also decide to refrain from collaborating with the culturally misaligned lead buyer, causing supply network collaboration disintegration during supply chain disruptions.

5.2 Cultural transitivity in supply networks and SCRES

The cultural transitivity mechanism happens when cultural alignments/misalignments between actors A and B, as well as actors B and C, propagate transitively between actors A and C. Cultural alignment transitivity affects SCRES positively, while cultural misalignment transitivity impacts SCRES negatively

also defines unbalanced triadic relationships when triads have two positive relationships and one negative (i.e.,+,+,-), and when triads have three negative relationships (i.e.,-, -, -) (Choi and Wu, 2009).

Culturally balanced triads with positive cultural relationships (i.e.,+,+,+) formed in the case. LEAD_BUYER shared goals with tier-1 suppliers, who communicated expectations to tier-2 suppliers. Tier-2 suppliers fulfilling expectations aligned transitively and culturally on shared goals with LEAD_BUYER, promoting supply network collaboration, flexibility, and contingency planning needed to prevent disruptions. Buyer empathy can increase supplier performance (Altay et al., 2018; Daghar et al., 2023). LEAD_BUYER and tier-1 suppliers developed respectful and empathetic values. These tier-1 suppliers used respect and empathy to seek flexible solutions from tier-2 suppliers. LEAD_BUYER recognized tier-2 suppliers' willingness to adjust to expectations by proposing flexible deliveries or supply. This developed respectful and empathetic transitive values between LEAD_BUYER and these tier-2 suppliers.

Hence, the following proposition is derived:

P4. The lead buyer sharing goals, expectations, and values with tier-1 suppliers can influence these suppliers to propagate these cultural elements to their tier-2 suppliers, generating the same shared cultural elements between the lead buyer and tier-2 suppliers and overall collaborative, flexible, and culturally balanced triads during supply chain disruptions.

Culturally balanced triads also surfaced when two firms had a positive cultural relationship in the triad (i.e.,+,-,-). Cultural alignments of delivery performance goals, delivery scheduling, and forecast sharing processes, respect, empathy, and communication existed between LEAD_BUYER and a tier-1 supplier, but sometimes not between this tier-1 supplier and a tier-2 supplier. This transitively made LEAD_BUYER culturally misaligned with the tier-2 supplier, affecting SCRES negatively. Sometimes, tier-2 suppliers can become competitors of tier-1 suppliers by directly working with the buyer (Rossetti and Choi, 2005). Aligned, respectful, empathetic, and communicative values existed between LEAD_BUYER and tier-1 suppliers. However, during the pandemic, a

P5. When misaligned goals, expectations, processes, and values exist between tier-1 and tier-2 suppliers, and the lead buyer is culturally aligned with tier-1 suppliers, these misalignments can propagate from tier-2 suppliers to the lead buyer. This can lead the culturally aligned lead buyer and tier-1 suppliers to refrain from collaborating with the culturally misaligned tier-2 suppliers, thereby negatively impacting collaboration, flexibility, visibility, and velocity in triads during supply chain disruptions.

Cultural alignments of invoice management processes, safety goals, and respect and empathy existed between LEAD_BUYER and a tier-1 supplier, but sometimes not between LEAD_BUYER and a tier-2 supplier. This transitively made the tier-1 and tier-2 suppliers culturally misaligned, influencing SCRES negatively. In this scenario (i.e.,+,-,-), triads became culturally balanced when LEAD_BUYER and the culturally aligned tier-1 supplier refrained from working with the culturally misaligned tier-2 supplier.

Accordingly, the following proposition is considered:

P6. When misaligned goals, expectations, processes, and values exist between the lead buyer and tier-2 suppliers, and tier-1 suppliers are culturally aligned with the lead buyer, these misalignments can propagate from tier-2 to tier-1 suppliers. This can lead the culturally aligned lead buyer and tier-1 suppliers to refrain from collaborating with the culturally misaligned tier-2 suppliers, creating culturally misaligned triads and dysfunctional collaboration during supply chain disruptions.

Triads became culturally unbalanced when all actors became culturally misaligned (i.e.,-,-,-). In the case, this occurred when excessive delivery performance expectations were not shared between LEAD_BUYER and a tier-1 supplier, nor between the same tier-1 supplier and a tier-2 supplier. These misalignments compounded transitively, leading the tier-1 supplier to become culturally misaligned with LEAD_BUYER. This created a complete cultural fracture within the triad and suggests that fully unbalanced triads reinforce cultural separation and inhibit resilience during supply chain disruptions.

This leads to the following proposition:

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5.3 Definition of resilient interorganizational culture

Prior research has emphasized that culturally aligned interorganizational relationships enhance performance and collaborative synergies (Cao et al., 2015), while cultural compatibility in philosophies, values, and norms reduces friction and fosters integration across partners (Rajaguru and Matanda, 2019). Using the propositions developed above, the insights from Table V, and the case data observed, this study proposes the following exploratory definition of the resilient interorganizational culture phenomenon observed in this study:

Resilient interorganizational culture is a supply network-wide cultural phenomenon, defined by shared goals, expectations, understanding, processes, and values that may strengthen a supply network's ability to foster the key SCRES capabilities of collaboration, flexibility, visibility, and velocity. Unlike firm-level organizational culture, resilient interorganizational culture emerges through the alignment, propagation, and transitivity of these cultural elements across supply network actors, reinforcing SCRES.

By defining resilient interorganizational culture as a multi-tier phenomenon, this research highlights how cultural propagation and transitivity help strengthen SCRES beyond dyadic exchanges. This study contributes to SCRES research by suggesting that resilience is shaped not only by structural and relational factors, but also by the way cultural elements move and take hold across a supply network.

6. Managerial implications, future research, and limitations

6.1 Managerial implications

This study invites practitioners to recognize the importance of interorganizational cultural alignments/misalignments, learn what and how interorganizational cultural elements impact SCRES through propagation and transitivity, and use this new lens to assess and adjust their cultural match with partners in their supply networks. Figure 6 summarizes how cultural elements and their mechanisms influence SCRES in supply networks, and Table VII synthesizes the propositions elaborated in the discussion section to help practitioners visualize the cultural dynamic in SCRES.

Figure 6.

time delivery goals with TRANSPORT_4PL in bi-weekly meetings. TRANSPORT_4PL aligned with LEAD_BUYER and disseminated this goal to tier-2 carriers who performed (i.e., LTL_CARRIER, BULK_CARRIER_1, BULK_CARRIER_2). This created an on-time delivery alignment between LEAD_BUYER and tier-2 carriers transitively. Conversely, when TRANSPORT_4PL considered LEAD_BUYER's on-time delivery goal unrealistic, this misalignment spread to the carriers, who were unwilling to comply. This created an on-time delivery misalignment between LEAD_BUYER and tier-2 carriers transitively.

Understanding the essential role of interorganizational culture in SCRES can help decision-makers make more informed choices regarding network risk assessments, joint practices, partner selection, relationship arrangements, supplier evaluation, contracts, sourcing practices, processes, and network configurations. Indeed, supply chain practitioners are urged to consider balanced and unbalanced cultural states in their relationships as they can impact the resilience of their supply networks. *While disconnection from culturally misaligned suppliers may be considered in extreme or persistent cases, this study primarily aims to offer a nuanced framework that supports early identification of misalignments and encourages engagement, dialogue, and collaborative practices to strengthen cultural fit.* Illustrating the profound implications of cultural relationships, this work develops the ideas of cultural propagation and transitivity and highlights the cultural aspects that professionals can consider for SCRES. This research encourages practitioners to expand their perspective from a traditional buyer-supplier dyadic view to a multi-tier supply network approach, emphasizing the need to evaluate cultural dynamics in supply network resilience.

6.2 Future research agenda

Firstly, interorganizational cultures and their impacts on SCRES may vary depending on factors such as industry, geography, company size, types of disruptions, and supply network configurations. Thus, future research could explore multi-network studies within or across industries to examine nuances related to networks, industries, and geographies, including variations in geographical dispersion or concentration. Using supply networks as the unit of analysis, this work could enable supply network resiliency comparisons across different industries and regions. Moreover, the role of the network lead in culture and SCRES presents a compelling avenue for research. Network leads may act as cultural moderators, adopt a controlled approach, or favor a more delegative approach, each of which could influence the theoretical propositions examined in this paper. Different regulatory frameworks, cultural norms,

targets buyer-led networks, but supplier-led networks are also worth probing. Building on this, future studies could investigate how interorganizational culture and SCRES mechanisms differ between domestic and foreign supplier contexts, particularly in light of cross-border regulatory divergence and cultural distance. These insights would also help assess the broader generalizability of resilient interorganizational culture across varied industries and geographies. As resilient supply chains also underpin societal well-being, future research could explore how cultural resilience supports stability in essential sectors such as healthcare, food, and energy.

Secondly, the connections between interorganizational cultural elements could be explored through large-scale survey data. Shared goals, understanding, processes, and values might trigger, mediate, and/or moderate each other to enable SCRES. Largely focusing on cultural elements, this study might downplay the interaction between culture and other factors such as technological capabilities, financial resources, and regulatory environments. Thus, a quantitative validation (e.g., surveys) could provide a more robust argument for relationships observed in this case study and test potential connections between interorganizational cultural elements from within while controlling for other factors. Also, misaligned cultural elements emerged as potential risks to examine because they can destabilize SCRES. Additionally, understanding what triggers a supply network to transition from culturally aligned to misaligned or vice versa and why is essential to understanding SCRES levers and disruptors.

Thirdly, investigating how the embeddedness of cultural elements in social capital can influence SCRES is appealing. Indeed, cultural elements are part of cognitive capital (i.e., shared codes, language, narratives) (Daghar et al., 2021) and can influence structural (i.e., shared routinized processes, network configuration structure) and relational capitals (i.e., closeness, reciprocity, trust) needed in SCRES (Daghar et al., 2023; Johnson et al., 2013). Similarly, examining how cultural elements connect with relational governance could help clarify the relational role of culture in SCRES. According to relational exchange theory, relational governance consists of trust and relational norms linked conceptually to culture such as flexibility, reliance, solidarity, social bonds, reciprocity, values, culture, and goals (Zhou et al., 2023).

sense opportunities and threats, seize a timely plan to leverage opportunities or respond to threats, and reconfigure resources after a change (Teece et al., 2007). For example, complementing the SCRES element lens used in this paper, Nikookar and Yandori (2022) propose a SCRES dynamic capability framework that considers supply chain visibility as a sensing capability, supply chain responsiveness as a seizing capability, and supply chain flexibility as a reconfiguration capability. Understanding how culturally balanced and unbalanced supply networks are formed for each SCRES dynamic capability is essential.

6.3 Research Limitations

This study advances the conceptualization of resilient interorganizational culture as a supply network-wide phenomenon; however, it is not without limitations. The empirical evidence stems from a single case study within the US chemical sector during the COVID-19 disruption. While the crisis context offered a valuable opportunity to observe SCRES dynamics, the specificity of the industry and geographical setting limits the generalizability of the findings. The study does not claim to present a universal theory but instead offers a context-bound, exploratory conceptualization of resilient interorganizational culture. Although the case involved 83 interviews across 22 organizations, variation exists in the roles, visibility, and decision-making scope of the respondents. For instance, while the lead buyer and tier-1 suppliers held cross-tier visibility, other actors, such as the warehousing 4PL or freight forwarder, focused more on localized operational activities and lacked a broader strategic perspective across tiers. Nonetheless, as discussed in Section 3.3 in Table IV, all cultural and SCRES elements were consistently cited across tiers. This provides limited but reinforcing confidence in the findings, despite the study's qualitative and context-specific design. Additionally, the study relied on qualitative methods and critical incident analysis, which, despite the use of triangulation and collaborative coding, may introduce interpretive subjectivity. Finally, while the study moves beyond the dyadic view and introduces the mechanisms of cultural propagation and transitivity, the conceptualization of resilient interorganizational culture remains exploratory. Further multi-case, cross-industry, and quantitative research would be required to clarify what these mechanisms entail, determine when and where they apply, and assess their generalizability across different types of supply networks.

Data availability statement: Due to the nature of this

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