

Enhancing supply chain resilience through the supply network approach

Alessandro Cinti, Maria Rosaria Marcone, Andrea Sabatini and Valerio Temperini
Department of Management, Facoltà di Economia Giorgio Fuà, Università Politecnica delle Marche, Ancona, Italy

Abstract

Purpose – This study aims to investigate the efficacy of the supply network approach in bolstering supply chain resilience amidst escalating global uncertainty. With enterprises worldwide facing increasing threats that disrupt supply chains, this research explores how firms enhance supply network resilience during crises.

Design/methodology/approach – Using a multi-case study design, this research thoroughly examines interactions within firms' supply networks to uncover new insights on supply network approach and how firms enhance supply network resilience against global uncertainty. The selection of cases was methodologically aligned to represent diverse industries and geographical locations to ensure a comprehensive analysis.

Findings – This study's findings reveal how firms develop supply network resilience during global crises. The supply network perspective provides a deeper understanding of how firms manage supply chain interactions, interdependencies and strategic positions to survive and thrive during crises. The conceptual framework developed here provides insights that can foster improved coordination and facilitate effective temporary organising. The framework highlights the need for firms to proactively seize opportunities and mitigate risks within their global supply chains during crises to boost overall resilience.

Originality/value – Offering novel insights into the domain of supply chain networks, this study underscores novel perspectives of the supply network approach when firms develop supply chain resilience during global crises. Highlighting the adaptive responses of firms that integrate these approaches enriches the understanding of strategic manoeuvres firms can use to navigate global uncertainty and secure supply chain continuity.

Keywords Supply chain resilience, Supply networks, Supply chain, Business relationships, IMP network approach

Paper type Research paper

1. Introduction

In today's intricate and tumultuous business environment that is characterised by dramatic events, such as the latest conflicts in Ukraine and Palestine or the COVID-19 pandemic, time-honoured supply chain management practices have extensively leaned upon structured frameworks to uphold stability and proactivity (Ivanov, 2020). The disruptions caused by these events have not only laid bare the vulnerabilities of supply chains but have also underscored the lack of a more contemporary and proficient approach towards the understanding of supply chain interdependencies (Craighead *et al.*, 2020; Ivanov, 2020; 2024; Mohammadi and Nikzad, 2023; Sodhi and Tang, 2021). Further, these crises underscore the critical need for resilient supply chain capable of adapting swiftly to a business landscape that is increasingly being characterised by volatility, uncertainty, complexity and ambiguity (VUCA) (Bennett and Lemoine, 2014, p. 311). Indeed, supply network resilience has emerged as a paramount concern for firms as they strive to navigate through novel challenges that, more than ever, require them to enhance their capabilities to anticipate, respond to and recover from

disruptive events (Bondeli and Havensid, 2022; O'Toole and McGrath, 2023).

Against the backdrop of escalating international instability and the increasing number of global crises emerging on a daily basis (Sheffi, 2020), organisations are now giving precedence to supply chain management and are looking for strategies to guarantee an uninterrupted flow of supply (Johnsen, 2018; Marcone, 2016; Petricevic and Teece, 2019). The term "crises" is used in this paper to refer to the full spectrum of disruptions – from routine fluctuations to unprecedented global crashes. The recent disruptive events have drawn the attention of academics towards studying the need to enhance supply chain resilience during crises (de Sa *et al.*, 2023) and to empower supply chains to brace for, respond to and recover from these disruptions (Bondeli and Havensid, 2022; Bygballe *et al.*, 2023; O'Toole and McGrath, 2023). In fact, supply

The current issue and full text archive of this journal is available on Emerald Insight at: <https://www.emerald.com/insight/0885-8624.htm>

© Alessandro Cinti, Maria Rosaria Marcone, Andrea Sabatini and Valerio Temperini. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at <http://creativecommons.org/licenses/by/4.0/legalcode>

Received 19 February 2023
Revised 19 October 2023
7 June 2024
18 August 2024
Accepted 7 September 2024



chain resilience has become central even in the European Union's industrial strategy (IMF, 2022). In particular, resilience building in supply chains has become a priority for firms operating in international supply chains. What this implies is that it is no longer sufficient for firms to rebound from disruptions; instead, they are called to proactively prepare for any shocks (Bondeli and Havenvid, 2022; Bygballe et al., 2023). Forward-thinking firms understand the importance of creating flexible structures and using disruptions as opportunities (Sheffi, 2020).

Traditionally, supply chain management aimed for stability through analytical and linear planning, assuming that this would maintain equilibrium. However, real-world events have shown that expecting stability is unrealistic due to the dynamic and complex nature of supply chains (Choi et al., 2001). Conventional methods for managing international supply chain crises are increasingly inadequate for the complex and interdependent global environment (Kalla et al., 2024; Sodhi and Tang, 2021). This study offers a new perspective on supply chain resilience during crises, informed by contemporary works of IMP scholars (Håkansson and Snehota, 2024). The IMP industrial network approach is recognised as a valuable theoretical framework for examining these issues (Axelsson et al., 2022; Cantù and Tunisini, 2023; Eriksson et al., 2021; Gadde and Snehota, 2019). The consistent development of empirical research is a hallmark of the IMP tradition, and the emergence of novel crises in recent years has made it imperative to bridge the divide between the firmly established conceptual foundation of the supply network and the empirical exploration of supply chain resilience (Bygballe et al., 2023; Johnsen, 2018; Johnsen et al., 2019). Unlike traditional linear supply chain concepts, the supply network approach encompasses a dynamic interplay of interdependencies across a network of actors (Bygballe et al., 2023; Johnsen, 2018; Johnsen et al., 2019). Such a network approach is characterised by more integrated relationships and resource management. The concept of supply network resilience refers to the ability of a network to anticipate, prepare for, respond to and recover from disruptions (de Sa et al., 2023; Mohammadi and Nikzad, 2023). Resilience in this context goes beyond mere recovery; it refers to a firm's ability to proactively adapt to disruptions and leverage the network's inherent flexibility and collaborative potential to turn challenges into opportunities (Guercini et al., 2024; Tunisini et al., 2023; Bondeli and Havenvid, 2022; Huemer and Wang, 2021). However, this concept still needs further empirical exploration (Bygballe et al., 2023).

This paper accentuates a prominent incongruity that characterises this domain: the substantial presence of conceptual studies (Bygballe et al., 2023; Tunisini et al., 2023) contrasted against the relative scarcity of empirical investigations, especially those embracing the IMP network approach. While the existing body of literature has laid the theoretical groundwork for comprehending the intricate dynamics characterising supply networks, it has concurrently exposed a noteworthy void – a deficiency in empirical inquiries (O'Toole and McGrath, 2023; Tunisini et al., 2023; Bondeli and Havenvid, 2022; Bygballe et al., 2023; Johnsen, 2018). Further, the limited empirical research is notably

dated, as it predates the advent of recent disruptive crises that have reshaped the landscape of global supply chains (Bygballe et al., 2023; Ivanov, 2024). Our research aims to fill in this discernible gap by delivering a novel empirical perspective on the realm of supply network resilience during crises.

Based on its aim, this study analyses eight firms through the lens of IMP's supply network theory by evaluating the firms' activities in buttressing (or potentially undermining) supply chain resilience during the past five years of global crises. The study provides an empirical perspective on how firms cope with supply chain disruptions while underscoring the significance of collaborative strategies (Bondeli and Havenvid, 2022; O'Toole and McGrath, 2023; Sodhi and Tang, 2021). Furthermore, the study elucidates the interplay between transient and enduring inter-organisational contexts in times of disruption and crises (Axelsson et al., 2022; Cantù and Tunisini, 2023; Eriksson et al., 2021; Gadde and Snehota, 2019; Sodhi and Tang, 2021). The study also aims to provide a novel empirical perspective into the theoretical realm of supply networks and supply network resilience development during such crises. Based on the aims described above, the study sets out to answer the following research question (RQ):

RQ. How do firms develop supply chain resilience in the business network during complex global crises?

The paper is organised as follows: Section 2 presents the theoretical background; Section 3 outlines the methodology; Section 4 describes the findings; Section 5 discusses the theoretical and managerial implications; and, lastly, Section 6 presents the conclusions of the study.

2. Theoretical background

The study positions itself at the intersection of the literature on supply chain network (see Section 2.1) and supply chain resilience (see Section 2.2).

2.1 Supply networks

Traditional linear models of supply chains primarily focus on sequential processes from raw material suppliers to end customers, which are frequently centred on upstream activities related to sourcing raw materials and production (Axelsson et al., 2022; Cantù and Tunisini, 2023; Eriksson et al., 2021; Ford et al., 2011; Gadde and Snehota, 2019). Instead, supply networks, encompassing both upstream and downstream dynamics, recognise the intricate relationships and interactions that characterise modern business operations (Axelsson et al., 2022; Bygballe et al., 2023; Cantù and Tunisini, 2023; dos Santos et al., 2020; Eriksson et al., 2021; Gadde et al., 2001; Gadde and Snehota, 2019; Harland et al., 2003; Huemer and Wang, 2021). This inter-organisational approach aims to encourage cross-functional collaboration while fostering strategic partnerships with external entities.

Supply networks entail a paradigm shift that emphasises a broad view of interconnected actors, resources and activities within and outside an organisation (Baraldi and Ratajczak-Mrozek, 2019; Gadde et al., 2002; Gadde et al., 2012; Håkansson and Ford, 2002; Håkansson and Snehota, 1995; Hu, 2022; Johnsen, 2018; La Rocca, 2013). The concept of the

supply network provides valuable insights into developing business relationships with the actors and creating efficient supply chains (Huemmer, 2012; Huemmer and Wang, 2021; Bondeli and Havenvid, 2022; Tunisini et al., 2023; Mouzas, 2024; Guercini et al., 2022). A pioneering perspective on this idea was presented by Harland in 1996 when he introduced supply networks as a distinct alternative to the conventional notion of the supply chain. Subsequently, drawing inspiration from the work of the IMP group, particularly scholars such as Gadde et al. (2010), Håkansson (1982, 1989), Harland (1996) and Harland et al. (2003), other scholars also delved into the concept of the supply network (Johnsen, 2018).

Globalisation, technological advances and evolving customer demands have significantly increased supply network complexity and have necessitated a clear conceptual understanding and redefinition of the concept from the viewpoint of effectively managing diverse suppliers and leveraging digital platforms. Integrating the supply chain management theory with the supply network concept highlights the crucial role of the firm and the importance of dyadic interactions within a broader interdependent network (Bankvall et al., 2010; Bygballe et al., 2023; Gadde and Snehota, 2019; Harland et al., 2003; Johnsen, 2018; Johnsen et al., 2019).

2.2 From supply chain resilience to supply network resilience

The research on supply chain resilience has been spurred by the development of major crises. For example, the contribution of Jüttner and Maklan (2011) highlights through empirical research the impact of the global financial crisis of 2008–2012. Furthermore, the study of Purvis et al. (2016) suggests possible ways to develop a supply chain resilience strategy in unpredictable environments. Another insightful study that draws the connection between supply chain resilience and unpredictable disruptions is by Forbes and Wilson (2018), who investigated supply chain resilience in the context of the wine supply chain after a disruptive event in the form of an earthquake. In addition, Colicchia et al. (2019) developed a study on the impact of cyber risks on the supply chain and how cybersecurity enhances firms' supply chain resilience. Moreover, several studies have emerged from the COVID-19 emergency, for example, the study on the network perspective developed by Ivanov and Dolgui (2020), the study by Singh et al. (2021) on the disruption of food supply chains by the COVID-19 emergency, the contribution of Ivanov (2021) in the form of the four major adaptation strategies to tackle the COVID-19 emergency and the cases of the health-care supply chain and vaccine supply chain in the studies of Golan et al. (2021) and Scala and Lindsay (2021), respectively. Lately, supply chain resilience has also been quantitatively analysed based on the supply network literature by Choudhary et al. (2021), who identified some key spatial variables related to managing and enhancing supply chain resilience. With regard to the COVID-19 emergency, some recent publications have contributed to conceptualising the role of knowledge in enhancing firms' supply chain resilience (Majumdar et al., 2022), identifying the specific effects on the automotive industry (Spieske et al., 2022) and identifying how to increase global supply chain resilience (Gebhardt et al., 2022). In

addition, one study tried to identify the role of the circular economy in disrupting traditional supply chains (Gebhardt et al., 2022). During the COVID-19 pandemic, researchers also debated the topic of reshoring, which was considered central to increasing resilience during crises (Baraldi et al., 2023a, 2024; Chen et al., 2023). Further, one study analysed the impact of both the COVID-19 outbreak and international sanctions/embargo on supply chains by developing a mathematical model (Nikian et al., 2023). Lastly, the recent study by Ali et al. (2023) has examined climate change as a reason for supply chain disruption.

Other studies on supply chain resilience have discussed it from the perspectives of the influence of organisational culture (Mandal, 2017), absorptive capacity (Salam and Bajaba, 2023), digitisation (Shi et al., 2023) and resource interaction (Bygballe et al., 2023). In addition, given the relevance of innovation in supply chain resilience (Malacina and Teplov, 2022), the present study also highlights several papers that discuss how technology can enhance a firm's ability to manage unpredictable, disruptive events and improve its resilience during crises. Specifically, these studies focused on blockchain (Pattanayak et al., 2023), cybersecurity (Colicchia et al., 2019), big data (Dennehy et al., 2021), artificial intelligence (Belhadi et al., 2022), additive manufacturing (Basu et al., 2023) and the Internet of Things (Al-Ayed and Al-Tit, 2023).

2.3 Conceptual framework

By gathering the flourishing literature on supply chain resilience spurred by the latest crises, the present study draws on previous articles that compare studies based on the supply chain network theory and supply chain resilience. The analysis of the case studies and the literature allowed us to delineate five dimensions of supply network resilience (see Table 1):

- 1 *Supply network structure*: Recent research built on Huemmer's work (Huemmer, 2006; 2012; Huemmer and Wang, 2021) re-examines the traditional view of supply chains through the lens of interconnected supply networks (Bondeli and Havenvid, 2022; O'Toole and McGrath, 2023; Mouzas, 2024). As suggested, these networks facilitate co-production and value creation beyond individual firm boundaries. This perspective emphasises the complexity of relationships within supply networks and challenges the traditional linear and sequential models.
- 2 *Interdependencies*: Huemmer and Wang (2021) articulation of different types of interdependencies – sequential, pooled and reciprocal – is expanded upon by recent studies (Guercini et al., 2022; Baraldi et al., 2024). These works highlight how tailored coordination strategies are necessary for managing interdependencies. This understanding underscores the nuanced management of relationships and resources crucial for maintaining network coherence and operational efficiency (Tunisini et al., 2023; Baraldi et al., 2024).
- 3 *Coordination/collaboration*: Building on Huemmer's foundational concepts, Johnsen (2018) and Johnsen et al. (2019), as well as recent contributions by Baraldi et al., 2024, Guercini et al. (2024) and Mouzas (2024), emphasise the critical role of coordination within supply

Table 1 Conceptual framework

Supply network	Perspectives from the relevant literature	References
Supply chain structure	Interlinked supply chains embedded in indistinct actor, resource and activity networks	Huemer (2006, 2012), Huemer and Wang (2021), Bondeli and Havensvid (2022), O'Toole and McGrath (2023), Mouzas (2024)
Interdependencies	Stress on the systematic building of inter-dependencies by firms	Huemer (2006, 2012), Guercini et al. (2022), Tunisini et al. (2023), Baraldi et al. (2024), Bygballe et al. (2023), Huemer and Wang (2021)
Coordination/collaboration	Handling and utilisation of resource (inter)dependencies Mutuality, relational norms, trust enabling open-ended resource interaction across organisational boundaries	Mouzas (2024), Johnsen (2018), Johnsen et al. (2019), Huemer (2006, 2012), Baraldi et al. (2024), Guercini et al. (2024), Bygballe et al. (2023), Tunisini et al. (2023), Huemer and Wang (2021)
Positioning	Positioning within networks for strategic network identity	Bygballe et al. (2023), Huemer (2006, 2012), Huemer and Wang (2021), Johnsen et al. (2019)
Temporary organising	Temporary organising in which technical and organisational resources are mobilised and recombined in contrast to continuing reliance on permanent organising	Bygballe et al. (2023), Tunisini et al. (2023)

Source: Authors' elaboration

networks. Their work highlights the importance of strategic coordination, continuous interaction and integrated supply chain strategies in enhancing network resilience and operational responsiveness in complex supply environments.

- 4 *Positioning*: Strategic positioning is essential for firms to influence and optimise their interactions within the network (Bygballe et al., 2023; Johnsen, 2018; Johnsen et al., 2019). This dimension requires a deep understanding of the firm's role within the broader network and determines a firm's ability to navigate complex interdependencies effectively.
- 5 *Temporary organising*: This dimension, introduced by Bygballe et al. in 2023, focuses on the agility and flexibility needed by firms to adapt to rapid changes and disruptions in the supply chain and advocates for the proactive recombination of resources (Tunisini et al., 2023) to navigate and mitigate potential impacts effectively.

Taken together, these five dimensions form a comprehensive framework for comprehending and navigating the intricate landscapes of supply chain networks and offer valuable insights into how these networks operate and how organisations can strategically position themselves within them.

3. Methodology

3.1 Case selection and data collection

This study is explorative in its design and, therefore, adopts an empirical qualitative approach. Data were collected through in-depth interviews with key figures from companies operating in international supply networks. The primary data collection centred on multiple case studies involving 29 semi-structured, in-depth interviews with eight firms (Eisenhardt, 1989; Yin, 2018) (see Table 2). The empirical data collection approach adopts a firm-level perspective of the network in the face of crises and major disruptions. The study adopts the perspective of the supply chain network theory as it attempts to capture how the firms interact during crises.

The firms involved in this study were chosen from a roster of more than 100 SMEs participating in university–industry collaboration programmes. The cases were selected using a purposeful sampling method (Eisenhardt and Graebner, 2007), focusing on firms operating within global supply chains that engaged in initiatives to bolster resilience in response to recent crises impacting their activities (Yin, 2018). The factors considered during their selection included size, ownership structure, scope of operations and international supply chain positioning (Eisenhardt, 1989; Halinen and Törnroos, 2005). The selection process adheres to the principle of data saturation in qualitative research and ensures comprehensive coverage and depth of analysis (Yin, 2018). Notably, the proximity and the existent links between the research team and these firms provided preferential access to key informants that enhanced the richness and validity of the data. Below, a brief overview of each company is provided (to ensure confidentiality and protect the identities of the firms involved, all case studies are discussed under pseudonyms):

- Alpha, an Italian coffee machine manufacturer, generates around €120m in annual revenue and has a global presence, focusing on Europe and the Americas. Its global presence is developed through subsidiaries in charge of sales and technical assistance to customers.
- Beta, an Italian company that produces industrial machinery for automotives and appliances, surpasses €60m in annual revenue and primarily conducts its operations in Europe and Asia. Their machines require heavy on-site setup and a large team for deployment.
- Gamma specialises in 3D printing and prototyping and is based in Italy. It boasts around €5m in annual revenue and maintains a global supply chain. Gamma's customers globally demand fast delivery and continuous interactions during the initial phases of component development.
- Delta, an Italian industrial solutions provider, operates globally and makes approximately €100m in annual revenue. Delta's customers are large assembling firms, such as car makers and home appliance producers, that

Table 2 Data collection

Primary data – first round							
Primary data	Item	Round	Date	Interviewee role	Company	Form of record	Length (mins)
<i>Interview</i>	1	<i>First round</i>	03-April-2020	General manager	Alpha	<i>Audio + note</i>	72
<i>Interview</i>	2	<i>First round</i>	03-April-2020	General manager	Beta	<i>Video + note</i>	80
<i>Interview</i>	3	<i>First round</i>	05-April-2020	Buyer manager	Beta	<i>Video + note</i>	71
<i>Interview</i>	4	<i>First round</i>	05-April-2020	Project manager	Gamma	<i>Audio + note</i>	78
<i>Interview</i>	5	<i>First round</i>	05-April-2020	General manager	Gamma	<i>Audio + note</i>	44
<i>Interview</i>	6	<i>First round</i>	07-April-2020	Project manager	Delta	<i>Audio + note</i>	68
<i>Interview</i>	7	<i>First round</i>	07-April-2020	Buyer	Delta	<i>Audio + note</i>	46
Primary data – second round							
<i>Interview</i>	1	<i>Second round</i>	01-Dec-2022	General manager	Alpha	<i>Video + note</i>	43
<i>Interview</i>	2	<i>Second round</i>	01-Dec-2022	Project manager	Alpha	<i>Video + note</i>	54
<i>Interview</i>	3	<i>Second round</i>	05-Dec-2022	General manager	Alpha	<i>Video + note</i>	63
<i>Interview</i>	4	<i>Second round</i>	05-Dec-2022	Project manager	Alpha	<i>Video + note</i>	60
<i>Interview</i>	5	<i>Second round</i>	12-Dec-2022	General manager	Alpha	<i>Video + note</i>	44
<i>Interview</i>	6	<i>Second round</i>	12-Dec-2022	Project manager	Alpha	<i>Video + note</i>	49
<i>Interview</i>	7	<i>Second round</i>	02-Dec-2022	General manager	Beta	<i>Video + note</i>	54
<i>Interview</i>	8	<i>Second round</i>	02-Dec-2022	Operations manager	Gamma	<i>Video + note</i>	50
<i>Interview</i>	9	<i>Second round</i>	05-Dec-2022	CEO	Delta	<i>Video + note</i>	79
<i>Interview</i>	10	<i>Second round</i>	12-Dec-2022	CEO	Delta	<i>Video + note</i>	56
<i>Interview</i>	11	<i>Second round</i>	01-Dec-2022	CEO	Delta	<i>Video + note</i>	63
<i>Interview</i>	12	<i>Second round</i>	06-Dec-2022	Buyer	Epsilon	<i>Video + note</i>	72
<i>Interview</i>	13	<i>Second round</i>	06-Dec-2022	Retailer manager	Epsilon	<i>Video + note</i>	79
<i>Interview</i>	14	<i>Second round</i>	06-Dec-2022	HR manager	Epsilon	<i>Video + note</i>	49
<i>Interview</i>	15	<i>Second round</i>	06-Dec-2022	CEO	Epsilon	<i>Video + note</i>	64
<i>Interview</i>	16	<i>Second round</i>	06-Dec-2022	Buyer manager	Zeta	<i>Video + note</i>	67
<i>Interview</i>	17	<i>Second round</i>	07-Dec-2022	General manager	Zeta	<i>Video + note</i>	56
<i>Interview</i>	18	<i>Second round</i>	07-Dec-2022	HR manager	Eta	<i>Video + note</i>	49
<i>Interview</i>	19	<i>Second round</i>	15-Nov-2022	General manager	Eta	<i>Video + note</i>	68
<i>Interview</i>	20	<i>Second round</i>	29-Nov-2022	HR manager	Theta	<i>Video + note</i>	40
<i>Interview</i>	21	<i>Second round</i>	07-Dec-2022	General manager	Theta	<i>Video + note</i>	45
<i>Interview</i>	22	<i>Second round</i>	09-Dec-2022	Buyer	Theta	<i>Video + note</i>	34
Total amount (minutes)							1813 (mins)
Secondary data – first round							
Secondary data	Item	Round	Date	Event title	Event details	Form of record	Length (mins)
<i>Conference</i>	1	<i>First round</i>	07-Sept-2020	Grand challenges: Companies and universities working for a better society. Supply chains network during a global crisis: COVID-19 emerging challenge	International conference focused on the collaboration between companies and universities. The study idea was presented in a dedicated session on global supply chain risk management.	<i>Video + note</i>	135
<i>Conference</i>	2	<i>First round</i>	08-Sept-2020	Grand challenges: Companies and universities working for a better society. Supply chains network during a global crisis: COVID-19 emerging challenge	The event facilitated the collection of valuable feedback from both academic scholars and industry practitioners, contributing to the refinement of our research approach	<i>Video + note</i>	170

(continued)

Table 2

<i>Round tables</i>	3	<i>First round</i>	28-Sep-2020	Round tables – supply chain resilience in time of crises – Fucina Week 2020	Roundtable event during Fucina Week 2020, featuring key industry leaders and academics discussing supply chain resilience during crises. The invitation followed our previous presentation, and the discussion yielded critical insights into real-world applications of our study, as well as other studies presented by participants	<i>Video + note</i>	152
<i>Conference</i>	4	<i>First round</i>	29-Sep-2020	Supply Chain Lessons from COVID-19: post-corona innovative action in Japan, “The Japanese contribute for FUCINA 2020”	International symposium highlighting post-COVID-19 innovative actions within supply chains. The long abstract of our study was showcased, to an audience of international scholars and practitioners. This engagement allowed us to gather comparative data on international strategies and further discussions with both scholars and industry professionals, enhancing the depth of our research findings	<i>Video + note</i>	155
<i>Conference</i>	5	<i>First round</i>	30-Sep-2020	Supply Chain Lessons from COVID-19: post-corona innovative action in Japan, “The Japanese contribute for FUCINA 2020”		<i>Video + note</i>	179
<i>Conference</i>	6	<i>First round</i>	01-Oct-2020	Supply Chain Lessons from COVID-19: post-corona innovative action in Japan, “The Japanese contribute for FUCINA 2020”		<i>Video + note</i>	132

(continued)

Table 2

<i>Conference</i>	7	<i>First round</i>	02-Oct-2020	Supply Chain Lessons from COVID-19: post-corona innovative action in Japan, "The Japanese contribute for FUCINA 2020"		<i>Video + note</i>	151
<i>Secondary data – second round</i>							
<i>Webinars</i>	1	<i>Second round</i>	05-Nov-2021	SMEs growth in global competition I4.0 – DIMA	By attending, we collected data on how other scholars and industry leaders propose addressing crises within SMEs, complementing our study with broader perspectives from the field	<i>Video + note</i>	124
<i>Webinars</i>	2	<i>Second round</i>	02-Sept-2021	The Words of Economy, Pier Carlo Padoan	The discussions contributed to our understanding of the broader economic environment affecting global supply chains, with data collected directly from the insights of a leading economist	<i>Video + note</i>	180
<i>Conference</i>	3	<i>Second round</i>	25-Oct-2022	Global Supply Chain Forum	Significant data from industry practitioners and scholars, which helped to situate our research within the current challenges and trends in global supply chain management	<i>Video + note</i>	125
<i>Seminar</i>	4	<i>Second round</i>	09-Feb-2023	Innovation and international business relationships. Uppsala University seminar	The seminar fostered rich discussions with relevant scholars, allowing to collect feedback and secondary data, that was critical in refining the subsequent phases of our research	<i>Video + note</i>	120

(continued)

Table 2

<i>Conference</i>	5	<i>Second round</i>	24-March-2023	International crisis and business relationships. Uppsala Seminar International Business – USIB	Presenting our second-round findings here enabled to engage in discussions that provided valuable data on the practical implications and scholarly perspectives, further informing our study's conclusions	<i>Audio + note</i>	115
Total amount (minutes)							1758 (mins)
Notes: Data collection and analysis have progressed concurrently and iteratively. Initial insights were generated through an abductive approach, characterised by a continuous interaction between empirical data, secondary sources and the existing body of literature							
Source: Authors' elaboration							

demand deep involvement in developing and deploying the machines.

- Epsilon, an Italian construction machinery manufacturer with an annual revenue exceeding €30m, has a global presence, with a focus on Europe and the Americas. The company manages customers and suppliers across the globe and operates from a single headquarter.
- Zeta, a leading Italian home furnishings retailer with an annual revenue of €700m, primarily operates in Europe, and has over 50 mono-brand shops and 40 logistics hubs.
- Eta, an Italian furniture manufacturer with approximately €10m in annual revenue, mainly caters to the European market. It currently has more than 45 showrooms selling custom furniture directly to consumers.
- Theta, an Italian home furniture company with around €140m in annual revenue, has a global presence, serving the large-scale retail, small-scale retail, and contract sector and operating primarily in Europe, the Middle East and Asia.

Primary data collection through semi-structured interviews occurred in two rounds: the first during the pandemic lockdown in 2020 and the second in December 2022. As the study progressed, new crises and disruptive events emerged, necessitating additional rounds of data collection to capture how the included companies were responding to these (see Table 2). Following Kvale's (1997) guidelines for semi-structured interviews, our approach combined structured questions with participant-driven discussions that allowed participants to express their perspectives freely. Initially, the interview guide was structured to capture immediate responses to the pandemic, with a focus on immediate dynamics and related adaptation. The guide was revised for the second round of interviews to include questions on long-term changes and lessons learned from ongoing emerging global supply chain challenges. After the first round of interviews, the observations were compared with those reported in the related literature to

understand the findings and develop the theoretical framework, while ensuring that it remained relevant to the evolving business contexts reflected in the interviews. To fortify the validity of our findings, we also used supplementary primary and secondary data sources (Eisenhardt, 1989; Yin, 2018). In addition, the participating companies engaged in two-panel workshops to foster enhanced collaboration and relationship thinking. Observations and notes from these workshops enriched our understanding of the topic. Secondary materials, including conferences, speeches, presentations and company websites, were used to nurture the data set and corroborate the interview data (see Table 2). In addition, secondary data derived from managerial studies and reports added depth and relevance to our research.

3.2 Data analysis

The data analysis, guided by abductive reasoning (Baraldi et al., 2012; Dubois and Gadde, 2002; Thompson, 2022), involved a constant interplay between empirical evidence, secondary data and existing literature. The paper draws on the work of Awuzie and McDermott (2017) and is supported by Yin (2018) and Dubois and Gadde (2002) studies, which underscore the benefits of implementing an abductive approach for a multiple-case study method. This method accentuates the importance of increasing replication across cases to fortify the overall methodology. In addition, the adoption of a systematic combining approach facilitated the integration of empirical data collected against the existing body of literature, thereby providing a thorough understanding of the relatively limited empirical research on supply networks and resilience. This study used snowball sampling to curate background literature for categorisation and analysis. The approach allowed for the generation of novel theoretical linkages and insights from the observed empirical data.

The systematic combining approach (Dubois and Gadde, 2002; Thompson, 2022) for data analysis started with a broad coding of the transcribed interviews and field notes to

capture all the significant details. The data analysis was conducted through iterative rounds of refining codes and identifying relationships between themes. Thus, the conceptual framework was developed through an abductive approach that allowed for the emergence of new theories based on explanations grounded in the data (Dubois and Gadde, 2002; Thompson, 2022).

Data triangulation, which involves continuous comparison of all the collected data within the existing literature, was also used in the data analysis process. The conceptual framework created empowered the researchers to navigate the complex landscape of supply network approach and supply chain resilience and yielded valuable insights and contributions to the field. A peer review process was also implemented, with all the authors independently analysing the data and comparing their results to ensure the reliability and validity of the findings. This rigorous analysis approach aimed to provide robust and credible findings to address the research objectives effectively (Miles et al., 2014; Saldaña, 2021).

4. Findings

Based on the conceptual framework developed in Section 2, the observations related to each dimension will be discussed here for each of the eight cases (see Table 3).

4.1 Supply chain structure

The structure of supply networks is pivotal during crises, as it determines how companies across various sectors navigate and mitigate disruptions. This examination showcases how the companies leveraged their supply networks' inherent flexibility and interconnectivity to foster resilience and strategically respond during challenging periods. In particular, companies Alpha and Gamma exemplify the critical importance of a robust and adaptive supply network structure.

Alpha implemented innovative logistics solutions by collaborating with key partners, optimising shipping routes and sharing storage facilities during the fuel crisis. This strategic adaptation was not merely about cost reduction but represented a fundamental enhancement of the network's overall sustainability and resilience.

During the fuel crisis, our Supply Chain Director and the Account Managers collaborated to revamp our logistical frameworks. This teamwork led to the creation of streamlined shipping routes and combined storage solutions, significantly enhancing our operational agility and reducing overhead costs (Supply Chain Director, Alpha).

These efforts highlight how Alpha capitalised on the collaborative nature of its network and strengthened its resilience against future disruptions.

When confronted with geopolitical tensions during the Ukraine–Russia crisis, Gamma swiftly adapted its supply network to maintain operational continuity. This involved enhancing communication with suppliers and rerouting supplies to effectively mitigate the impact of disruptions.

Our tightly knit supply network became a cornerstone of our resilience, allowing us to confidently navigate through the crisis with enhanced communication and quick adaptation strategies (Project manager, Gamma).

Both cases reveal the significance of a responsive network structure in managing crises. The strategies adopted by Alpha and Gamma underscore the transformative power of well-structured supply networks in enhancing operational agility, fostering resilience and ensuring sustainability amidst global challenges (Bondeli and Havenvid, 2022; O'Toole and McGrath, 2023; Mouzas, 2024). The practical applications they adopted are in alignment with the existing literature on supply networks that emphasise the potential for network connectivity (O'Toole and McGrath, 2023; Huemer and Wang, 2021; Huemer, 2006). However, the operational integration strategies adopted specifically in crisis management by Alpha and Gamma illustrate a deeper, more practical level of network utilisation than is typically covered in theoretical discussions (Bygballe et al., 2023; Johnsen et al., 2019).

To summarise, by leveraging their networks' inherent flexibility and collaborative potential, these two companies manage current challenges and position themselves for long-term sustainability and resilience. Importantly, their approach is dynamic and interconnected and transcends traditional supply chain management practices.

4.2 Interdependencies

This section highlights how the firms effectively managed and enhanced their interdependencies to ensure both survival and collective strength during challenging times. In this regard, Beta and Delta are exemplary examples illustrating the strategic enhancement of interdependencies within their supply networks.

Beta took a comprehensive approach during the fuel crisis by viewing each supplier not merely as a vendor but as a crucial partner in their operational strategy. This perspective allowed Beta to co-create crisis mitigation solutions that went beyond immediate financial relief to enhance long-term environmental sustainability and network efficiency.

Our approach to supplier relationships transcends traditional transactions; we view each supplier as a pivotal partner in our journey. This perspective was crucial during the fuel crisis, as our interdependent network enabled us to collaborate closely and co-create solutions that addressed the challenges effectively (Procurement manager, Beta).

This deep integration with suppliers facilitated not just a response to immediate challenges but also a strengthening of the network's resilience and adaptability. It also showcased the proactive application of interdependencies that extended beyond typical academic discussions on network management.

Delta emphasised nurturing deep interdependencies during the pandemic by extending substantial financial and operational support to its network partners. This strategic choice aimed to sustain the network through the crisis and enhance its overall resilience and adaptability.

Our extended support during the pandemic was a strategic initiative to fortify our network, ensuring that all partners could collectively withstand the pandemic's impacts. It's about more than maintaining links; it's about empowering our network to face future challenges more robustly (CEO, Delta).

Delta's approach highlights the importance of robust interdependencies in managing a crisis collectively and aligns with academic perspectives that stress the need for strong network connections to enhance resilience (Baraldi et al., 2024;

Table 3 Summary of the findings

Cases	Supply chain structure	Interdependencies	Coordination/Collaboration	Positioning	Temporary organising
ALPHA	Leveraged partnerships and optimised logistics, reflecting a dynamic approach during the fuel crisis. "...creation of streamlined shipping routes..." – Project manager, Alpha	Long-standing supplier relationships enable joint innovation during crises. "...symbiotic relationship... proactive engagement was vital during recent disruptions..." – General manager, Alpha	Collaborative response with suppliers during fuel crisis enhances resilience. "...collaborative efforts... devised cost-saving measures and sustainable practices..." – General Manager, Alpha	Strong supplier relationships maintained stability and drove resilience. "...robust market positioning... ensured quick adaptation during the pandemic..." – Project manager, Alpha	Reorganised logistics and resource allocation swiftly during fuel crisis. "...adjusting order volumes and delivery schedules... crucial in keeping production lines running..." – General manager, Alpha
BETA	Flexible, interconnected structure quickly adapted to rising fuel costs. "...rapid reconfiguration of transportation logistics... mitigating impact on production..." – General manager, Beta	Deep supplier integration facilitated effective crisis response. "...interdependent network enabled close collaboration..." – Buyer manager, Beta	Coordinated with suppliers to optimise logistics during fuel crisis. "...working hand-in-hand with suppliers... implemented innovative solutions..." – General manager, Beta	Utilised network identity to enhance resilience through collaboration. "...fostering deep interdependencies and collaborative innovation..." – General manager, Beta	Reorganised supply chain strategies aligning with sustainability goals during fuel crisis. "...temporary adjustments proved essential in maintaining operational continuity..." – Buyer manager, Beta
GAMMA	Adapted supply chain to geopolitical tensions, ensuring continuity. "...Gamma's supply chain exemplifies precision and adaptability..." – Operations manager, Gamma	Strong global supplier network managed supply shortages effectively. "...tightly knit supply network... swiftly delivered solutions..." – General manager, Gamma	Enhanced communication with suppliers maintained operations during crisis. "...collaborated, shared insights, and supported each other..." – Operations manager, Gamma	Leveraged network position to maintain operations during crisis. "...strategically leveraging collaborations... amplify our impact..." – General manager, Gamma	Mobilised resources quickly and adapted production processes during crisis. "...transformed supplier relationships into robust partnerships... reorganised supply chain dynamics..." – Project manager, Gamma
DELTA	Proactively supported suppliers with financial aid during pandemic. "...dynamically supported partners like Epsilon during the pandemic..." – Buyer manager, Delta	Nurtured deep interdependencies, enhancing mutual resilience during the pandemic. "...our success is interconnected with our partners' health..." – Project manager, Delta	Aligned operations and restructured contracts to support partners during the pandemic. "...extended financial supports and flexible terms..." – CEO, Delta	Highlighted strategic network identity by supporting partners during the pandemic. "...supporting our partners in times of need exemplifies our network value..." – CEO, Delta	Swiftly reorganised supply strategies to adapt to pandemic disruptions. "...strategic adjustments in logistics and supplier relations ensured continuity..." – Buyer, Delta
EPSILON	Rapidly adjusted supply chain during the pandemic, enhancing logistics. "...maximise efficiency and responsiveness... swiftly adapted to changing conditions..." – Buyer manager, Epsilon	Strengthened interdependencies with suppliers for stability during the pandemic. "...collaborative spirit maintained supply chain stability..." – Retail manager, Epsilon	Adapted joint processes with global partners for mutual support. "...enhancing supply chain collaboration was pivotal..." – HR, Epsilon	Strategically used network position to sustain operations and enhance market presence. "...strategically crafted to respond and thrive during crises..." – CEO, Epsilon	Reorganised resources quickly to ensure business continuity during the pandemic. "...quick response to reorganise supply network temporarily..." – CEO, Epsilon
ZETA	Quickly adapted production lines and identified alternative suppliers during the pandemic. "...pivot to address supply chain disruptions..." – Buyer manager, Zeta	Strengthened interdependencies with local suppliers to ensure continuity. "...working closely with partners ensured supply chain resilience..." – Buyer manager, Zeta	Enhanced collaboration for inventory and logistics management during the pandemic. "...proactive collaboration strategy with partners ensured continuity..." – General manager, Zeta	Used network position to navigate the pandemic and respond to demand changes. "...swiftly adapt offerings to meet changing needs..." – General manager, Zeta	Reorganised resources and adjusted strategies swiftly during the pandemic. "...mobilise and recombine resources swiftly... effective response to challenges..." – General manager, Zeta

(continued)

Table 3

Cases	Supply chain structure	Interdependencies	Coordination/Collaboration	Positioning	Temporary organising
ETA	Adapted supply chain to maintain showroom operations during the pandemic. "... <i>agility and precision supported partners during demanding times</i> ..." – General manager, Eta	Strengthened relationships with suppliers for material availability during the pandemic. "... <i>interdependency with Zeta enhances both supply chains</i> ..." – HR Manager, Eta	Coordinated with suppliers to adjust offerings and schedules during the pandemic. "... <i>synchronised logistics and production efforts to meet demand</i> ..." – General manager, Eta	Leveraged market position to align sales strategies with consumer shifts. "... <i>maximising collaborative opportunities enhanced service during pandemic</i> ..." – HR Manager, Eta	Reorganised digital tools and workforce to adapt to online demand. "... <i>implemented flexible schedules and diversified sourcing</i> ..." – General manager, Eta
THETA	Adapted supply chain to maintain operations across diverse markets. "... <i>flexibility and scalability supported operations during pandemic</i> ..." – General manager, Theta	Strengthened partnerships with suppliers to maintain stock levels during the pandemic. "... <i>mutual support and resource sharing enhanced resilience</i> ..." – Buyer manager, Theta	Increased collaboration with suppliers to synchronise supply with demand. "... <i>collaborative efforts key to maintaining supply chain fluidity</i> ..." – General manager, Theta	Strategically used network position to focus on digital sales channels. "... <i>leverages retail and contract services to offer tailored solutions</i> ..." – General manager, Theta	Reorganised operational strategies, enhancing online platforms during the pandemic. "... <i>temporary adjustments in logistics and resource allocation maintained continuity</i> ..." – HR Manager, Theta

Source: Authors' elaboration

Tunisini *et al.*, 2023; Guercini *et al.*, 2022; Huemer, 2012). However, the practical application of these interdependencies, particularly in extending comprehensive support during crises, showcases the dynamic and active leveraging of network strengths beyond conventional theoretical models.

Beta and Delta demonstrate that managing interdependencies involves more than just maintaining connections; it requires a strategic and proactive enhancement of these relationships to build a resilient network capable of withstanding global disruptions. This approach aligns with and extends the literature by demonstrating how deep, strategic collaborations can significantly enhance network resilience and adaptability during crises (Bygballe *et al.*, 2023).

To sum up, strategic enhancement of interdependencies within supply networks is critical for effectively navigating complex global crises. By fostering deeper, more proactive collaborations, companies such as Beta and Delta have maintained operational continuity and enhanced their collective capacity to respond to disruptions, thus underscoring the transformative power of well-managed interdependencies in modern business environments.

4.3 Coordination/collaboration

The importance of coordination and collaboration is prominently featured in the narratives of the companies Delta and Theta, who navigated through crises by emphasising trust, mutuality and relational norms as foundational elements for effective operations (Mouzaz, 2024; Johnsen, 2018; Johnsen *et al.*, 2019; Huemer, 2006, 2012).

Delta showcased exceptional coordination during the pandemic by proactively restructuring contractual obligations to support network partners and, thereby, ensuring operational continuity. This strategic initiative not only addressed immediate challenges but also strengthened the network's overall robustness, underscoring the critical role of collaborative strategies in crisis management.

In response to the pandemic's disruptions, we elevated our supply chain collaboration, coordinating closely with critical partners like Epsilon to extend financial support and flexible terms that ensured their operational continuity and fortified our mutual resilience (CEO, Delta).

Delta's approach highlights the importance of adaptive collaboration, wherein mutual support is leveraged to ensure collective survival and resilience. This broad application of collaboration extends beyond operational alignment to enhance the entire network's capability to withstand disruptions.

Theta enhanced its collaborative efforts during the pandemic by synchronising supply with fluctuating consumer demands, thereby ensuring stability across the network.

Effective coordination with Zeta enabled us to streamline our supply processes and mitigate the impacts of the pandemic swiftly. Our collaborative efforts were key to maintaining supply chain fluidity and meeting the evolving needs of our customers (CEO, Theta).

Theta's case illustrates the practical necessity of strategic collaboration, which fosters trust-based, mutually beneficial relationships (Baraldi *et al.*, 2024; Guercini *et al.*, 2024; Bygballe *et al.*, 2023; Tunisini *et al.*, 2023; Huemer and Wang, 2021). This approach not only boosts operational efficiency but

also enhances customer satisfaction during critical periods and reflects the profound impact of trust and joint problem-solving capabilities.

Both Delta and Theta exemplify how strategic collaboration and coordination can transform supply chain management, particularly in times of crisis. They used their established relational norms to not just sustain operations but also to reinforce their network's collective strength and resilience. These examples highlight the dynamic and crisis-responsive approach to coordination and collaboration. Importantly, they provide empirical evidence to demonstrate practical crisis management tactics for maintaining supply chain integrity under adverse conditions.

Through the above insights, it is evident that firms adhere to and expand upon theoretical principles by actively leveraging coordination and collaboration efforts to navigate and adapt to complex, crisis-driven market environments. This approach enhances both immediate crisis management and long-term strategic resilience. Further, these examples advocate for a comprehensive re-evaluation of the role of coordination and collaboration within the dynamic landscape of global supply networks.

4.4 Positioning

This section delves into how the firms Beta and Theta leveraged their strategic network positioning to navigate disruptions, enhance resilience and bolster their industry roles.

Beta used its strategic network identity effectively during the fuel crisis by fostering deep interdependencies and catalysing collaborative innovation, thus enhancing the entire network's resilience. This approach was pivotal in reinforcing Beta's position as a leader in the industrial machinery sector. The Marketing Director of Beta explained the strategic significance of these efforts:

Our commitment to deep collaboration and innovation during the fuel crisis was crucial in maintaining our lead in the market. It allowed us to not just respond to immediate challenges but also to strengthen our strategic position within the network (Marketing director, Beta).

Beta's method underscores the importance of strategic positioning in managing crisis situations effectively.

Theta demonstrated proactive use of its strategic network position during the pandemic by focusing on digital sales channels and customer service to meet the surge in demand for home deliveries. This strategy was not only responsive to immediate market needs but also positioned Theta favourably for emerging market trends:

Adapting our strategy to focus on digital channels during the pandemic was a game-changer, enabling us to meet customer demands efficiently and maintain our market position (CEO, Theta).

Theta's approach highlights how strategic positioning can dynamically influence network behaviour and drive operational and strategic responses during crises.

During crises, firms' strategic positioning involves a dynamic and proactive management approach that extends beyond traditional competitive strategies (Bygballe *et al.*, 2023; Huemer and Wang, 2021; Johnsen *et al.*, 2019). By aligning their strategic positions with broader network objectives, Beta and Theta navigated disruptions effectively and shaped their

network roles to enhance collective and individual successes. This sophisticated understanding of the influence of strategic positioning on network behaviour, particularly under challenging circumstances, showcases the importance of a nuanced understanding of each of the firm's strategic network identity. Further, this understanding directly influences their operational and strategic responses during crises, allowing for adaptations that align with broader network objectives and contribute to the success of the overall network.

Beta and Theta exemplify the strategic advantage of effective positioning within the network during crises. Beta's use of its position to facilitate collaborative problem-solving and innovation during the fuel crisis and Theta's alignment of digital strategies with consumer demands illustrate the critical role of strategic positioning in enhancing resilience and providing platforms for innovative solutions during disruptions.

These two cases collectively highlight the strategic value of positioning within complex supply networks. That is, the ability of these firms to adapt quickly and manage their roles strategically during crises underscores the importance of positioning in operational continuity and enhancing network resilience and adaptability (Bygballe *et al.*, 2023). Their dynamic utilisation of strategic network positions suggests a broader, more integrated application of positioning strategies to navigate and thrive amid market disruptions and shifts in consumer behaviour. The insights from these cases provide valuable lessons on the power of strategic positioning in fostering collaborative resilience and enhancing the collective capabilities of supply networks.

4.5 Temporary organising

This section shows how firms Alpha, Beta, Gamma and Delta temporarily organising their strategies to respond to the challenges posed by crises.

Alpha exemplified the concept of temporary organising during the fuel crisis by swiftly adjusting logistical strategies and resource allocations. This proactive approach ensured that production lines remained efficient despite fluctuating market conditions and illustrates the strategic depth of temporary organising beyond simple crisis management.

Faced with sudden changes in market conditions, our Account Managers worked closely with counterparts at our suppliers to reorganise our supply strategies. This involved adjusting order volumes and delivery schedules on the fly, which was crucial in keeping our production lines running smoothly (Operations Director, Alpha).

This operational agility not only addressed immediate challenges but was also in alignment with long-term sustainability goals.

Beta displayed similar agility during the fuel crisis by quickly adapting its supply chain strategies to mitigate rising fuel costs. The implementation of innovative logistics solutions facilitated a rapid response to the crisis and reinforced the strategic value of temporary organising in enhancing network adaptability and long-term resilience.

Gamma responded to the challenge of geopolitical tensions by mobilising resources to adapt production processes and maintain critical operations (Bygballe *et al.*, 2023; Tunisini *et al.*, 2023).

During the crisis, our commitment to strengthening supplier relationships and enhancing coordination proved vital. We transformed our standard transactional relationships into robust partnerships, swiftly reorganising our supply chain dynamics to ensure continuity amid escalating tensions (General manager, Gamma).

This strategic reorganisation by Gamma underscores the importance of flexible operational approaches in sustaining network resilience.

Delta's strategy during the pandemic involved a comprehensive reorganisation of supply strategies and resource allocations to support network partners, particularly Epsilon. This approach aimed at stabilising the supply chain and ensuring uninterrupted operations across the network. It further highlights the critical role of temporary organising in crisis management and network support.

The practical applications of temporary organising across these cases demonstrate a robust capability not only to respond to immediate disruptions but also to integrate these adaptations into broader strategic frameworks. This approach goes beyond conventional tactical responses and highlights a more integrated use of temporary organising to drive long-term business models, enhance customer engagement and ensure sustainability.

To conclude, temporary organising within supply networks is not merely a reactive measure but a tool that enables firms to enhance their adaptability and resilience. By dynamically adjusting resources and processes, the companies discussed here have not only navigated disruptions effectively but have also positioned themselves for future success, thus demonstrating the strategic value of temporary organising in contemporary supply network management.

5. Theoretical implications

Through the theoretical framework developed here, this study makes key contributions to the supply chain network and resilience extant theory as summarised in Table 4. The conceptual framework (see Table 1) describes and analyses empirical dynamics during crises and identifies five key dimensions to help cope with supply chain network disruptions in times of crises. The study provides empirical insights into how firms develop supply network resilience according to the supply network approach: a firm develops supply network resilience when it builds its long-term goals on short-term activities undertaken during crisis times that are enacted through social and business relationships and resource interdependence (see Bondeli and Havenvid, 2022; Bygballe *et al.*, 2023; Guercini and Milanese, 2017). According to the previous studies on supply chain networks (Huemmer, 2006, 2012; Huemmer and Wang, 2021; Bondeli and Havenvid, 2022; O'Toole and McGrath, 2023; Mouzas, 2024; Guercini *et al.*, 2024), the empirical findings from the case studies suggest that the supply chain structure often goes beyond the traditional focus on interconnectedness to show specific adaptations tailored to crisis management and that these adaptations allow firms to redefine supply chain structures to be relationship-oriented, crisis-responsive and aimed at operational continuity. The cases examined through the theoretical framework present specific theoretical implications to supply network

Table 4 Summary of the theoretical implications

<i>Dimension</i>	<i>Summary of theoretical implications</i>	<i>References</i>
<i>Supply network structure</i>	The study highlights that proactive adaptation leads to operational agility	Huemer (2006, 2012), Huemer and Wang (2021), Bondeli and Havenvid (2022), O'Toole and McGrath (2023), Mouzas (2024)
<i>Interdependencies</i>	The study enhances the understanding that proactive alignment of short- and long-term goals with network's partners enhances supply network resilience	Huemer (2006, 2012), Guercini et al. (2022), Tunisini et al. (2023), Baraldi et al. (2024), Bygballe et al. (2023), Huemer and Wang (2021)
<i>Interdependencies</i>	The study suggests that rapid short-term adaptations should be designed to become strategic over time	Johnsen et al. (2019), Huemer (2006, 2012), Guercini et al. (2022)
<i>Coordination/collaboration</i>	The study enhances the notion that mutual collaboration creates long-term resilience	Huemer and Wang (2021), Mouzas (2024), Johnsen (2018), Johnsen et al. (2019), Huemer (2006, 2012), Baraldi et al. (2024), Guercini et al. (2024), Bygballe et al. (2023), Tunisini et al. (2023)
<i>Coordination/collaboration</i>	The study elaborates on the importance of collaboration on technological integration for supply network resilience	Mouzas (2024), Johnsen (2018), Johnsen et al. (2019), Huemer (2006, 2012), Baraldi et al. (2024), Guercini et al. (2024), Bygballe et al. (2023), Tunisini et al. (2023), Huemer and Wang (2021)
<i>Positioning</i>	The study contributes to the understanding that leveraging relationships for agility and new organisation development is crucial to develop supply network resilience	Bygballe et al. (2023), Huemer (2006, 2012), Huemer and Wang (2021), Johnsen et al. (2019)
<i>Positioning</i>	The study supports that the use of technology and relationships contributes to a broader resilience of the supply network	Bygballe et al. (2023), Huemer (2006, 2012), Huemer and Wang (2021), Johnsen et al. (2019)
<i>Temporary organising</i>	The study highlights the importance of creating temporary organisations that go beyond traditional firm boundaries to respond to crises	Bygballe et al. (2023), Tunisini et al. (2023)

Source: Authors' elaboration

resilience literature. Firstly, the study reveals that aligning short- and long-term goals with upstream and downstream partners enhances supply network resilience, highlighting the importance of leveraging relationships and network positions for agility and innovation during crises. It contributes to the literature on supply network resilience (Mouzas, 2024; Johnsen, 2018; Johnsen et al., 2019; Huemer, 2006, 2012; Baraldi et al., 2024; Guercini et al., 2024; Bygballe et al., 2023; Tunisini et al., 2023; Huemer and Wang, 2021) by highlighting the interdependence dimension of the conceptual framework. Secondly, empirical evidence shows that mutual collaboration and technological integration are critical for supporting the creation of long-term resilience. Empirical evidence includes setting up temporary organisations to respond to crises and focusing on long-term adaptation through network collaboration. These findings expand the dimension of coordination/collaboration in the study's framework developed from the previous studies of Mouzas, 2024; Johnsen, 2018; Johnsen et al., 2019; Huemer, 2006, 2012; Baraldi et al., 2024; Guercini et al., 2024; Bygballe et al., 2023; Tunisini et al., 2023; and Huemer and Wang, 2021. The coordination and collaboration dimension discussed in the present manuscript has a narrower focus on how the relationships between actors already present in the network, supporting for a higher resilience-development during crisis time (see Bondeli and Havenvid, 2022; Guercini and Milanesi, 2017). Hence, the

study contributes to the previous study by Bondeli and Havenvid (2022) by suggesting that in times of crisis firms use to rely more on existing relationships rather than trying to create new ones.

Thirdly, the study highlights the role of operational agility and flexibility through proactive adaptation in the network. The agility and flexibility developed through proactive adaptation to network change help the organisation to extend organisational boundaries and integrate temporary crisis responses into long-term strategic avenues, supporting both immediate resilience and broader development. By recognising proactive adaptation through agility and flexibility, the findings extend the existing literature on temporary organisation (see Bygballe et al., 2023; Bondeli and Havenvid, 2022; Guercini and Milanesi, 2017) and on supply network structure and network positioning towards supply network resilience (see Bygballe et al., 2023; Johnsen et al., 2019; Huemer, 2006, 2012; Huemer and Wang, 2021). Fourthly, in terms of network positioning, the findings highlighted how the creation of a collaborative response to the crisis within the supply network supported and enhanced network resilience. It adds to the previous studies of Bygballe et al. (2023) and Johnsen et al. (2019) by providing empirical evidence on how firms organise to develop supply network resilience during major global crises. Lastly, the cases suggest that the temporary organisations developed during the crisis go beyond a conventional tactical

response and become the “new normal” for the firms and the network. That is, because crises are global events that in many cases represent a paradigm shift (see [Bygballe et al., 2023](#); [Huemer and Wang, 2021](#)), the findings suggest that the temporary organisations developed during the crisis to increase the resilience of the supply network may soon become the new network setting. By contributing to the existing research developed by [Bondeli and Havenvid \(2022\)](#), [Guercini and Milanesi \(2017\)](#) and [Johnsen et al. \(2019\)](#), the present study highlights how short-term options developed in response to critical disruptions can unfold in long-term strategic development.

Furthermore, the evidence provided by the cases unfold key theoretical contributions also to supply network literature. Broadening the boundaries of the firm during crises, encompassing the interaction with the network and offering other actors’ advantages to the understanding of network actors’ interdependence enhance the supply chain resilience of the focal firm and its network (see [Huemer and Wang, 2021](#); [Guercini et al., 2022](#); [Tunisini et al., 2023](#); [Baraldi et al., 2024](#); [Bygballe et al., 2023](#)). A swift recovery after global disruption has been enhanced by collaborative supplier relationships to access new and alternative supply sources for accessing and securing critical resources more quickly, thereby reducing downtime and minimising potential revenue loss. Furthermore, as emerged from the cases, practices such as diversified sourcing and proactive risk management contribute to lower costs associated with supply chain disruptions, including expenses related to expediting shipments and alternative sourcing (see [Bygballe et al., 2023](#); [Tunisini et al., 2023](#); [Huemer and Wang, 2021](#)). According to [Ivanov and Dolgui \(2020\)](#), the present study posits that firms that are better equipped to maintain high supplier and customer satisfaction levels during crises – through their capacity to fulfil orders and transparently communicate with customers (and suppliers) about potential delays – enhance trust and loyalty (see [Huemer, 2006](#); [Huemer, 2012](#); [Huemer and Wang, 2021](#); [Johnsen et al., 2019](#)). Hence, the study suggests that developing supply network resilience might support firms in fostering greater agility when adapting to changing network conditions and disruptions (see [dos Santos et al., 2020](#); [Ivanov, 2021](#); [2024](#); [O’Toole and McGrath, 2023](#)). Considering the previous studies of [Bygballe et al. \(2023\)](#) and [Johnsen et al. \(2019\)](#), the manuscript highlights how accessibility to real-time data and collaborative decision-making empowers firms to promptly adjust production, distribution and inventory levels to ensure a more adaptive response to challenges.

5.1 Managerial implications

The empirical findings of this study also have significant managerial implications, particularly for firms deeply integrated in global supply chains, as these firms are increasingly confronted with the challenges posed by crisis contexts. The study highlights the importance of measures such as the establishment of relationship-oriented strategies (both short- and long-term) that enhance operational continuity and increase the resilience of supply networks.

The study suggests that during global crises, firms should actively enact interdependencies by promoting mutual support and interactive problem-solving at the network level. This

involves moving beyond routine operations and creating mechanisms for dynamic collaboration that can be activated during disruptions transcending the traditional firm boundaries. In times of crisis, managers are called upon not only to maintain efficiency but also to develop robust proactive contingency plans that involve interaction with the network.

It is, therefore, prudent for firms to develop deep, strategic collaborations with network actors in advance of a crisis to enable a rapid, coordinated response when needed. This preparation includes establishing communication and decision-making channels that prioritise adaptability and strategic problem-solving under stress. In fact, given the speed at which crises emerge, proper preparation for them can be the tipping point in developing a broad supply chain resilience. The study suggests that during crises, firms should focus on already-established relationships instead of creating new ones.

Positioning strategies should be dynamically adapted during crises to leverage the firm’s strategic network positions towards resilience development during crises. This involves not only protecting the firm’s immediate interests but also contributing to a wider network’s resilience development. Firms should understand strategic positioning to anticipate and respond to supply disruptions – both upstream and downstream.

Lastly, firms are called upon to integrate temporary efforts into their broader strategic framework. This means understanding short-term crisis responses as opportunities to develop long-term transformation. By embedding temporary changes into the company’s strategic planning, firms might improve long-term supply network resilience. A proactive approach ensures that temporary solutions during crises contribute to the long-term stability and growth of the business. Companies are therefore called upon to develop short-term crisis responses with a long-term perspective, i.e. by considering long-term effects and outcomes of short-term decisions, to ensure resilience during crises.

6. Conclusion

IMP’s industrial network tradition of studies is concerned with the efficiency of firms; however, following global disruptive events, the “new normal” calls for new perspectives to be developed empirically. In particular, the present study argues that this new premise requires further development of supply network theories ([Bondeli and Havenvid, 2022](#)). The study recognises that firms are now called upon to build and manage supply chain interdependencies to be resilient in the face of sudden global crisis events.

This study enhances the understanding of how firms with global supply chains have navigated through different crises. This research provided a novel empirical perspective to the theoretical field of supply network and supply network resilience according to the industrial network and IMP approach (see [Baraldi et al., 2024](#); [Mouzas, 2024](#); [Bygballe et al., 2023](#); [O’Toole and McGrath, 2023](#); [Tunisini et al., 2023](#); [Guercini et al., 2024](#); [Guercini et al., 2022](#); [Huemer, 2006, 2012](#); [Huemer and Wang, 2021](#); [Johnsen, 2018](#); [Johnsen et al., 2019](#)). It underscores how managing supply network relationships, in line with the principles established by the seminal study of [Håkansson and Snehota \(1995\)](#) and further developed by IMP scholars, can significantly enhance a firm’s

ability to navigate the contemporary context of global crises. Additionally, our research provides valuable evidence of how early consideration of contextual instabilities and adherence to network principles can enable firms to develop effective strategies for anticipating and managing crises, hence developing supply chain resilience for the long term both at the firm and network levels.

The study adds a novel contribution to the literature by providing the answer to how firms develop supply chain resilience in the business network during complex global crises. To do so, the study examines eight Italian firms by gathering qualitative data related to how they survived during the last crises and abductively analysing the data to develop theoretical and managerial implications. The abductive approach allows for the development of a framework to dive into each case and compare these cases for each dimension identified. The framework suggests that supply network resilience development is impacted by five major dimensions:

- 1 supply chain structure;
- 2 interdependencies;
- 3 coordination/collaboration;
- 4 positioning; and
- 5 temporary organising.

The framework allows for the analysis of each case and the emerging differences and analogies between the cases and has novel theoretical implications. In particular, the study suggests a new perspective on resilience in supply chain management through the adoption of the supply network approach. While resilience is often seen as a tactical and short-term response (or rebound) to crises, the present study contends that as disruptions occur at the global level and then become the “new normal”, resilience – which is usually developed through short-term actions – lead to long-term changes resulting from the interactions and resource interdependencies created during those crises. Hence, the study posits that firms develop resilience in the supply chain during crises by opening their boundaries both upstream and downstream, proactively leveraging their business relationships through interactions, and implementing mutual support schemes to develop a “networked resilience”; firms shift their focus from efficiency to emergency by prioritising survival over resource optimisation in the short term, with an emphasis on the role of the actors in the business according to their contribution to managing the crisis; and firms develop temporary organisations under global crisis situations and create a paradigm shift that become the new organisation in the long term. Hence, firms develop new long-term supply chain structures by implementing short-term decisions that are enabled by resilience. Therefore, the study identifies supply network resilience as being the result of a firm’s long-term goal built on short-term interactions during crisis times that are implemented through social and business relationships and resource interdependence.

6.1 Limitations and further studies

This study aims to understand better the relevance of managing network relationships for enhancing resilience to cope with international supply chain crises; however, it is not exempt from limitations. Due to the study’s explorative nature, it adopted qualitative methods and included a limited number of

case studies. The purposeful sampling of cases was realised by choosing firms according to significant differences. Therefore, the results can be analytically generalised, and it is necessary when the data of the investigated phenomenon will be historicised and integrated with quantitative studies. Finally, the manuscript highlights that further studies are required to investigate which part of the international supply network require more attention and at which point of time it is necessary to address the dynamic environment and anticipate crises. In addition, further studies can be developed using the framework developed in the manuscript to conduct single longitudinal case studies and provide more information from the theoretical and managerial perspectives. Further studies on supply chain resilience are also necessary to help firms tackle the continuously emerging disruptive situations in which the global business network continually faces new crises, such as the COVID-19 pandemic, the Ukraine war, the tensions in Taiwan and the Israeli war against Hamas.

References

- Al-Ayed, S. and Al-Tit, A. (2023), “The effect of supply chain risk management on supply chain resilience: the intervening part of Internet-of-Things”, *Uncertain Supply Chain Management*, Vol. 11 No. 1, pp. 179-186.
- Ali, I., Charles, V., Modibbo, U.M., Gherman, T. and Gupta, S. (2023), “Navigating COVID-19: unraveling supply chain disruptions through best-worst method and fuzzy TOPSIS”, *Benchmarking: An International Journal*, Vol. 31 No. 5, pp. 1548-1589.
- Awuzie, B. and McDermott, P. (2017), “An abductive approach to qualitative built environment research: a viable system methodological exposé”, *Qualitative Research Journal*, Vol. 17 No. 4, pp. 356-372.
- Axelsson, B., Gadde, L.E. and Wynstra, F. (2022), “The industrial network approach and purchasing and supply management research”, *Handbook of Theories for Purchasing, Supply Chain and Management Research*, Edward Elgar Publishing, pp. 360-377, Edward Elgar Publishing, Cheltenham, UK.
- Bankvall, L., Bygballe, L.E., Dubois, A. and Jahre, M. (2010), “Interdependence in supply chains and projects in construction”, *Supply Chain Management: An International Journal*, Vol. 15 No. 5, pp. 385-393.
- Baraldi, E., Ciabuschi, F., Pedroletti, D. and Perna, A. (2023a), “Value changes in business relationships when reshoring through outsourcing”, 39th IMP Conference, Manchester, 22nd-25th August 2023.
- Baraldi, E., Gressetvold, E. and Harrison, D. (2012), “Resource interaction in inter-organisational networks: foundations, comparison, and a research agenda”, *Journal of Business Research*, Vol. 65 No. 2, pp. 266-276.
- Baraldi, E., Harrison, D., Kask, J. and Ratajczak-Mrozek, M. (2024), “A network perspective on resource interaction: Past, present and future”, *Journal of Business Research*, Vol. 172, p. 114253, doi: [10.1016/j.jbusres.2023.114253](https://doi.org/10.1016/j.jbusres.2023.114253).
- Baraldi, E. and Ratajczak-Mrozek, M. (2019), “From supplier to center of excellence and beyond: the network position development of a business unit within “IKEA industry””, *Journal of Business Research*, Vol. 100, pp. 1-15.

- Basu, S., Malik, A., Munjal, S. and Venkataramanan, S.V. (2023), "Investigating governance of tolerable and intolerable dark sides in B2B dyads in post pandemic emerging markets", *Industrial Marketing Management*, Vol. 115, pp. 11-26.
- Belhadi, A., Kamble, S.S., Venkatesh, M., Jabbour, C.J.C. and Benkhati, I. (2022), "Building supply chain resilience and efficiency through additive manufacturing: an ambidextrous perspective on the dynamic capability view", *International Journal of Production Economics*, Vol. 249, p. 108516.
- Bennett, N. and Lemoine, G.J. (2014), "What a difference a word makes: understanding threats to performance in a VUCA world", *Business Horizons*, Vol. 57 No. 3, pp. 311-317.
- Bondeli, J.V. and Havensvid, M.I. (2022), "Bouncing back in turbulent business environments: exploring resilience in business networks", *Industrial Marketing Management*, Vol. 107, pp. 383-395.
- Bygballe, L.E., Dubois, A. and Jahre, M. (2023), "The importance of resource interaction in strategies for managing supply chain disruptions", *Journal of Business Research*, Vol. 154, p. 113333.
- Cantù, C.L. and Tunisini, A. (2023), "A circular innovation strategy in a supply network context: evidence from the packaging industry", *Journal of Business & Industrial Marketing*, Vol. 38 No. 13, pp. 220-238.
- Chen, X., He, C., Chen, Y. and Xie, Z. (2023), "Internet of things (IoT)—blockchain-enabled pharmaceutical supply chain resilience in the post-pandemic era", *Frontiers of Engineering Management*, Vol. 10 No. 1, pp. 82-95.
- Choi, T.Y., Dooley, K.J. and Rungtusanatham, M. (2001), "Supply networks and complex adaptive systems: control versus emergence", *Journal of Operations Management*, Vol. 19 No. 3, pp. 351-366.
- Choudhary, N.A., Ramkumar, M., Schoenherr, T. and Rana, N.P. (2021), "Assessing supply chain resilience during the pandemic using network analysis", *IEEE Transactions on Engineering Management*, Vol. 71, pp. 1-14, doi: [10.1109/TEM.2021.3124027](https://doi.org/10.1109/TEM.2021.3124027).
- Colicchia, C., Creazza, A., Noè, C. and Strozzi, F. (2019), "Information sharing in supply chains: a review of risks and opportunities using the systematic literature network analysis (SLNA)", *Supply Chain Management: An International Journal*, Vol. 24 No. 1, pp. 5-21.
- Craighead, C.W., Ketchen, D.J. and Darby, J.L. (2020), "Pandemics and supply chain management research: toward a theoretical toolbox", *Decision Sciences*, Vol. 51 No. 4, pp. 838-866.
- de Sa, M.M., Prim, A.L. and Birou, L. (2023), "With major risks comes great resilience: the COVID-19 effect on SMEs in a developing country", *Operations Management Research*, Vol. 16 No. 2, pp. 1-13.
- Dennehy, D., Oredo, J., Spanaki, K., Despoudi, S. and Fitzgibbon, M. (2021), "Supply chain resilience in mindful humanitarian aid organisations: the role of big data analytics", *International Journal of Operations & Production Management*, Vol. 41 No. 9, pp. 1417-1441.
- dos Santos, L.D., Holmen, E. and Pedersen, A.C. (2020), "Viewing lean supply from the IMP perspective", *Journal of Business & Industrial Marketing*, Vol. 35 No. 1, pp. 172-182.
- Dubois, A. and Gadde, L.E. (2002), "Systematic combining: an abductive approach to case research", *Journal of Business Research*, Vol. 55 No. 7, pp. 553-560.
- Eisenhardt, K.M. (1989), "Building theories from case study research", *The Academy of Management Review*, Vol. 14 No. 4, pp. 532-550.
- Eisenhardt, K.M. and Graebner, M.E. (2007), "Theory building from cases: opportunities and challenges", *Academy of Management Journal*, Vol. 50 No. 1, pp. 25-32.
- Eriksson, V., Hulthén, K. and Pedersen, A.C. (2021), "Improving transport performance in supply networks: effects of (non) overlapping network horizons", *Journal of Business & Industrial Marketing*, Vol. 36 No. 10, pp. 1767-1779.
- Forbes, S.L. and Wilson, M.M. (2018), "Resilience and response of wine supply chains to disaster: the Christchurch earthquake sequence", *The International Review of Retail, Distribution and Consumer Research*, Vol. 28 No. 5, pp. 472-489.
- Ford, D., Gadde, L.E., Håkansson, H. and Snehota, I. (2011), *Managing Business Relationships*, John Wiley & Sons Ltd, Chichester, UK.
- Gadde, L.E. and Snehota, I. (2019), "What does it take to make the most of supplier relationships?", *Industrial Marketing Management*, Vol. 83, pp. 185-193.
- Gadde, L.E., Håkansson, H. and Persson, G. (2010), *Supply Network Strategies*, John Wiley & Sons Ltd, Chichester, UK.
- Gadde, L.E., Hjelmgren, D. and Skarp, F. (2012), "Interactive resource development in new business relationships", *Journal of Business Research*, Vol. 65 No. 2, pp. 210-217.
- Gadde, L.E., Håkansson, H., Jahre, M. and Persson, G. (2001), "Logistic networks in the new economy", Paper presented at NOFOMA, University of Iceland, Reykjavik, June 14-15.
- Gadde, L.E., Håkansson, H., Jahre, M. and Persson, G. (2002), "More instead of less"-strategies for the use of logistics resources", *Journal on Chain and Network Science*, Vol. 2 No. 2, pp. 81-91.
- Gebhardt, M., Spieske, A., Kopyto, M. and Birkel, H. (2022), "Increasing global supply chains' resilience after the COVID-19 pandemic: empirical results from a Delphi study", *Journal of Business Research*, Vol. 150, pp. 59-72.
- Golan, M.S., Trump, B.D., Cegan, J.C. and Linkov, I. (2021), "Supply chain resilience for vaccines: review of modeling approaches in the context of the COVID-19 pandemic", *Industrial Management & Data Systems*, Vol. 121 No. 7, pp. 1723-1748.
- Guercini, S. and Milanese, M. (2017), "Extreme luxury fashion: business model and internationalization process", *International Marketing Review*, Vol. 34 No. 3, pp. 403-424.
- Guercini, S., La Rocca, A. and Snehota, I. (2022), "Decisions when interacting in customer-supplier relationships", *Industrial Marketing Management*, Vol. 105, pp. 380-387.
- Guercini, S., La Rocca, A. and Perna, A. (2024), "The IMP research on business networks: a systematic literature review and research agenda", *Italian Journal of Marketing*, Vol. 2024 No. 2, pp. 1-27.
- Håkansson, H. (1982), "An interaction approach. International marketing and purchasing of industrial goods: an interaction approach", pp. 10-27.

- Håkansson, H. and Ford, D. (2002), "How should companies interact in business networks?", *Journal of Business Research*, Vol. 55 No. 2, pp. 133-139.
- Håkansson, H., & Snehota, I. (Eds) (1995), *Developing Relationships in Business Networks*, Routledge, London.
- Håkansson, H. and Snehota, I. (2024), "Economic effects of interaction. The neglected economy of connectivity", *Journal of Business & Industrial Marketing*, Vol. 39 No. 2, pp. 117-123.
- Hälén, A. and Törnroos, J.Å. (2005), "Using case methods in the study of contemporary business networks", *Journal of Business Research*, Vol. 58 No. 9, pp. 1285-1297.
- Harland, C.M. (1996), "Supply chain management: relationships, chains and networks", *British Journal of Management*, Vol. 7 No. s1, pp. S63-S80.
- Harland, C., Brenchley, R. and Walker, H. (2003), "Risk in supply networks", *Journal of Purchasing and Supply Management*, Vol. 9 No. 2, pp. 51-62.
- Hu, L. (2022), "The PPE industry in Italy during COVID-19: supply chain disruption and the adoption of digital and social media in B2B firms", *Journal of Business & Industrial Marketing*, Vol. 37 No. 10, pp. 2050-2063.
- Huemer, L. (2006), "Supply management: value creation, coordination and positioning in supply relationships", *Long Range Planning*, Vol. 39 No. 2, pp. 133-153.
- Huemer, L. (2012), "Unchained from the chain: supply management from a logistics service provider perspective", *Journal of Business Research*, Vol. 65 No. 2, pp. 258-264.
- Huemer, L. and Wang, X. (2021), "Resource bundles and value creation: an analytical framework", *Journal of Business Research*, Vol. 134, pp. 720-728.
- IMF (2022), "World economic outlook. War sets back the global recovery", available at: www.imf.org/en/Publications/WEO/Issues/2022/04/19/world-economic-outlook-april-2022
- Ivanov, D. (2020), "Predicting the impacts of epidemic outbreaks on global supply chains: a simulation-based analysis on the coronavirus outbreak (COVID-19/SARS-CoV-2) case", *Transportation Research. Part E, Logistics and Transportation Review*, Vol. 136, p. 101922.
- Ivanov, D. (2021), "Supply chain viability and the COVID-19 pandemic: a conceptual and formal generalisation of four major adaptation strategies", *International Journal of Production Research*, Vol. 59 No. 12, pp. 3535-3552.
- Ivanov, D. (2024), "Transformation of supply chain resilience research through the COVID-19 pandemic", *International Journal of Production Research*, pp. 1-22.
- Ivanov, D. and Dolgui, A. (2020), "Viability of intertwined supply networks: extending the supply chain resilience angles towards survivability. A position paper motivated by COVID-19 outbreak", *International Journal of Production Research*, Vol. 58 No. 10, pp. 2904-2915.
- Johnsen, T.E. (2018), "Purchasing and supply management in an industrial marketing perspective", *Industrial Marketing Management*, Vol. 69, pp. 91-97.
- Johnsen, T.E., Mikkelsen, O.S. and Wong, C.Y. (2019), "Strategies for complex supply networks: findings from the offshore wind power industry", *Supply Chain Management: An International Journal*, Vol. 24 No. 6, pp. 872-886.
- Jüttner, U. and Maklan, S. (2011), "Supply chain resilience in the global financial crisis: an empirical study", *Supply Chain Management: An International Journal*, Vol. 16 No. 4, pp. 246-259.
- Kalla, C., Scavarda, L.F. and Hellingrath, B. (2024), "Integrating supply chain risk management activities into sales and operations planning", *Review of Managerial Science*, pp. 1-31,
- Kvale, S. (1997), "Den kvalitative forskningsintervju", The qualitative research interview. Lund: Studentlitteratur.
- La Rocca, A. (2013), "Approaching (inter-) actors in the business landscape", *Imp Journal*, Vol. 7 No. 3, p. 171.
- Majumdar, A., Agrawal, R., Raut, R.D. and Narkhede, B.E. (2022), "Two years of COVID-19 pandemic: understanding the role of knowledge-based supply chains towards resilience through bibliometric and network analyses", *Operations Management Research*, Vol. 16 No. 3, pp. 1-17.
- Malacina, I. and Teplov, R. (2022), "Supply chain innovation research: a bibliometric network analysis and literature review", *International Journal of Production Economics*, Vol. 251, p. 108540.
- Mandal, S. (2017), "The influence of organisational culture on healthcare supply chain resilience: moderating role of technology orientation", *Journal of Business & Industrial Marketing*, Vol. 32 No. 8, pp. 1021-1037.
- Marcone, M.R. (2016), "Multilocalisation and the growth of knowledge assets in medium-sized multinationals (MSMs)", *Journal of the Knowledge Economy*, Vol. 7 No. 3, pp. 676-693.
- Miles, M.B., Huberman, A.M. and Saldaña, J. (2014), *Qualitative Data Analysis: A Methods Sourcebook*, 3rd ed., Sage Publications, Inc, Thousand Oaks.
- Mohammadi, M. and Nikzad, A. (2023), "Sustainable and reliable closed-loop supply chain network design during pandemic outbreaks and disruptions", *Operations Management Research*, Vol. 16 No. 2, pp. 969-991.
- Mouzas, S. (2024), "Towards a theory of interfirm adaptation in business relationships", *Industrial Marketing Management*, Vol. 120, pp. 206-215.
- Nikian, A., Khademi Zare, H., Lotfi, M.M. and Fallah Nezhad, M.S. (2023), "Redesign of a sustainable and resilient closed-loop supply chain network under uncertainty and disruption caused by sanctions and COVID-19", *Operations Management Research*, Vol. 16 No. 2, pp. 1019-1042.
- O'Toole, T. and McGrath, H. (2023), "Insights into processes underlying capability, complexity, and resilience using IMP assumptions to studying markets-as-networks", *Industrial Marketing Management*, Vol. 112, pp. A1-A4.
- Pattanayak, S., Arputham, R.M., Goswami, M. and Rana, N. P. (2023), "Blockchain technology and its relationship with supply chain resilience: a dynamic capability perspective", *IEEE Transactions on Engineering Management*, Vol. 71 No. 71, pp. 10398-10412.
- Petricevic, O. and Teece, D.J. (2019), "The structural reshaping of globalisation: implications for strategic sectors, profiting from innovation, and the multinational enterprise", *Journal of International Business Studies*, Vol. 50 No. 9, pp. 1487-1512.
- Purvis, L., Spall, S., Naim, M. and Spiegler, V. (2016), "Developing a resilient supply chain strategy during 'boom' and 'bust'", *Production Planning & Control*, Vol. 27 Nos 7/8, pp. 579-590.

- Salam, M.A. and Bajaba, S. (2023), "The role of supply chain resilience and absorptive capacity in the relationship between marketing-supply chain management alignment and firm performance: a moderated-mediation analysis", *Journal of Business & Industrial Marketing*, Vol. 38 No. 7, pp. 1545-1561.
- Saldaña, J. (2021), *The Coding Manual for Qualitative Researchers*, SAGE Publications, Inc, Thousand Oaks, California, USA.
- Scala, B. and Lindsay, C.F. (2021), "Supply chain resilience during pandemic disruption: evidence from healthcare", *Supply Chain Management: An International Journal*, Vol. 26 No. 6, pp. 672-688.
- Sheffi, Y. (2020), "Who gets what when supply chains are disrupted", MIT Sloan Management Review.
- Shi, Y., Zheng, X., Venkatesh, V.G., Humdan, E.A. and Paul, S.K. (2023), "The impact of digitalisation on supply chain resilience: an empirical study of the Chinese manufacturing industry", *Journal of Business & Industrial Marketing*, Vol. 38 No. 1, pp. 1-11.
- Singh, S., Kumar, R., Panchal, R. and Tiwari, M.K. (2021), "Impact of COVID-19 on logistics systems and disruptions in food supply chain", *International Journal of Production Research*, Vol. 59 No. 7, pp. 1993-2008.

- Sodhi, M.S. and Tang, C.S. (2021), "Supply chain management for extreme conditions: research opportunities", *Journal of Supply Chain Management*, Vol. 57 No. 1, pp. 7-16.
- Spieske, A., Gebhardt, M., Kopyto, M. and Birkel, H. (2022), "Improving resilience of the healthcare supply chain in a pandemic: evidence from Europe during the COVID-19 crisis", *Journal of Purchasing and Supply Management*, Vol. 28 No. 5, p. 100748.
- Thompson, J. (2022), "A guide to abductive thematic analysis", *The Qualitative Report*, Vol. 27 No. 5, pp. 1410-1421, doi: [10.46743/2160-3715/2022.5340](https://doi.org/10.46743/2160-3715/2022.5340).
- Tunisini, A., Harrison, D. and Bocconcelli, R. (2023), "Handling resource deficiencies through resource interaction in business networks", *Industrial Marketing Management*, Vol. 109, pp. 154-163.
- Yin, R.K. (2018), *Case Study Research and Applications: Design and Methods*, SAGE Publications, Inc., Thousand Oaks, California, USA.

Corresponding author

Alessandro Cinti can be contacted at: alessandro.cinti@univpm.it