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The role of collaborative interorganizational relationships in supply chain risks: a systematic review using a social capital perspective

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Abstract

Purpose – The purpose of this paper is to systematically review, synthesize and critically evaluate the current research status on the role of collaborative interorganizational relationships in supply chain risks from a social capital perspective, and provide an organizing lens for future scholarship in this area

Design/methodology/approach – This study adopts a systematic literature review approach to investigate 126 articles from 27 peer-reviewed journals between 1995 and 2020.

Findings – This paper investigates supply chain collaborative interorganizational relationships using a social capital perspective to explain the role of structural, relational and cognitive capital that resides in these relationships in various supply chain risks (i.e., environmental, supply, manufacturing, demand, information, financial, transportation). The review reveals that the three social capital dimensions uniquely and both positively and negatively affect different supply chain risks. The findings further suggest that the perceived supply chain risks can influence the structural and relational capital.

Practical implications – This study calls for practitioners to consider the cognitive alignment with their supply network partners, their relational investments as well as the interorganizational processes and systems in managing and alleviating supply chain risks.

Originality/value – This review offers a theoretical articulation of how various aspects of collaborative interorganizational relationships affect supply chain risks. Specifically, this study extends the existing understanding of the role of social capital in supply chain risks through offering a synthesis of dominant findings and discourses, and avenues for future research.

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Keywords – Interorganizational collaboration, buyer-supplier relationships, supply chain risk, supply chain risk management, social capital.

Paper type – Literature Review

1. Introduction

Supply chain risks (SCRs) stem from events causing supply chain irregularities such as interruptions of material or informational flow. These multifold events include devastating environmental and humanitarian catastrophes (Ho *et al*., 2015) such as the 2004 Indian Ocean tsunami, 2010 Port-au-Prince earthquake, 2017 hurricane Maria, and 2019 COVID-19 pandemic, which can result in diminished business performance impacting stock returns, income, costs, and share price volatility (Hendricks and Singhal, 2005). Given the increasing number of actors involved in the design, production, and delivery of products and services, SCRs go beyond the boundaries of one single firm. Thus, firms increasingly engage and invest in developing and maintaining collaborative interorganizational relationships (CIRs) with upstream and downstream actors to measure and manage their SCRs (Braunscheidel and Suresh, 2009). In particular, extant studies have examined the role of CIRs, such as supplier development (Dahlmann and Roehrich, 2019), joint problem-solving (Scholten and Schilder, 2015), joint planning (Jain *et al*., 2017), information sharing (Subramanian *et al*., 2015), reciprocity (Jüttner and Maklan, 2011), and trust (Laeequddin *et al*., 2009).

While there is a wealth of studies in CIRs and SCRs, the literature still suffers from shortcomings. First, a comprehensive account acknowledging the multidimensionality of CIRs in SCRs is still lacking. Indeed, CIRs remain fragmented and unconsolidated throughout the literature. Additionally, existing studies have used meta-concepts (e.g., collaboration, integration, bridging), blending different dimensions of CIRs in, and preventing the distinction between, unique aspects of CIRs. Second, the role of CIRs in SCRs remains divergent and unconnected as CIRs can influence positively and negatively different SCRs. For example, information sharing can decrease supply risks (Lavastre *et al*.,

2012), but also increase informational leakages to rivals (Zhang *et al*., 2011). SCRs can also influence CIRs. For instance, a buyer's perception of supply risks can negatively influence the level of information shared with a supplier (Dekker *et al*., 2013).

In a literature where significant findings are still scattered, a synthetic theoretical articulation of how various aspects of CIRs affect different SCRs is still absent. Indeed, over the last two decades, several literature reviews have examined the concept of SCRs. However, supply chain risk research being relatively nascent, most literature reviews to date have only explored conceptual definitions, typologies, or frameworks of SCRs (e.g., Tang, 2006), supply chain risk management (e.g., Colicchia and Strozzi, 2012), and supply chain resilience (e.g., Ali *et al*., 2017a). Early stages of research require definitional and conceptual development, but supply chain risk research has lately matured from within, enabling a shift from conceptual framing of SCRs' nature to a more in-depth understanding of risk mitigation levers such as CIRs.

Adopted by strategic management to understand social relationships between groups (Nahapiet and Ghoshal, 1998), the concept of social capital challenges the Porterian thesis explaining supplier-buyer behaviors with profit maximization objectives. Contributing to operations management, where the focus has been more on optimization than social interaction, this work has recently spelled out effectively how supply chain communities behave (Matthews and Marzec, 2012), and provides a pertinent framework to explain supplier-buyer relationships.

As such, this work (1) adopts a social capital lens grounded in the work of Nahapiet and Ghoshal (1998) to explain the role of CIRs in SCRs in supplier-buyer dyads and when these are deep-seated in supply networks, and (2) provides a research agenda. In synthesizing the consolidated findings, this paper follows the evidence-based systematic literature review technique, scientifically systematizing the data research process (Briner and Denyer, 2012), to answer the following review question: using a social capital perspective, how can we understand the effect of collaborative interorganizational relationships on supply chain risks?

The key contributions of this review are theoretical and practical. Although promising and extensively used in the social and strategy fields, social capital has been occasionally used in supply chain management (Krause *et al*., 2006; Lawson *et al*., 2007). Therefore, first, from a theoretical perspective, the present study extends the supply chain and social capital literature by explaining how CIRs interrelate with different SCRs. It also provides future research directions. Second, from a practical perspective, managers can benefit from understanding better the reciprocity between CIRs and SCRs when making business decisions involving key choices such as joint practice, partner selection, supplier development, contractual terms, sourcing practices, relationship closeness, and network configuration.

2. Research methodology and descriptive findings

2.1 Locating relevant articles

Relevant articles were found in databases consisting of EBSCO, ABI/Inform, and Scopus. A set of different keywords around CIRs and SCRs was determined. CIRs included words such as "interorganizational", “supplier-buyer", "relation", "cooperation", "coordination", "collaboration", or "integration". Supply chain risk included the word "supply" combined with "risk", "resilience", "resilient", "resiliency", "robust", or "robustness". All these words were arranged to build a string (see **Table 1**) using boolean operators, proximity connectors to narrow results, and asterisks to include word alternatives.

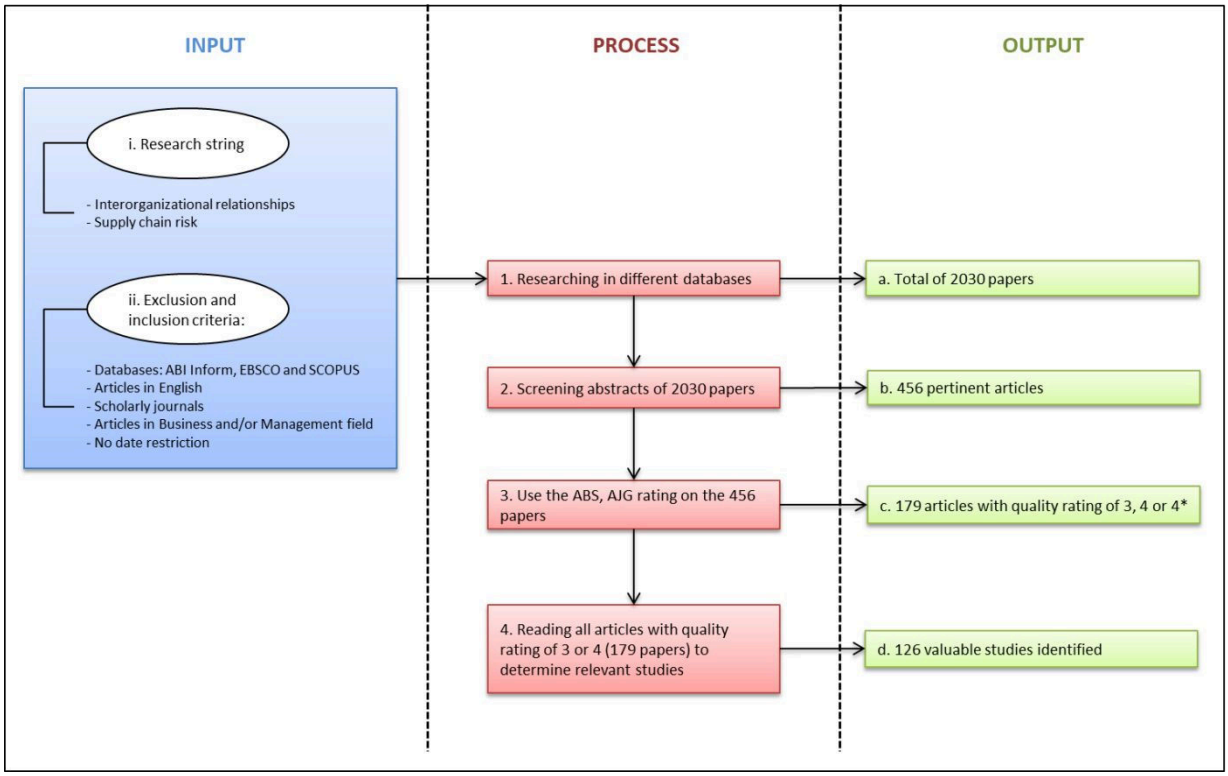
Table 1. Research string

CRITERIA	DECISION
Databases	EBSCO, ABI/Inform and Scopus
Search targets	Titles, abstracts and keywords
Field of search	Business and Management domain
Nature of documents	Scholarly articles
Language of studies	English
String for "interorganizational relationship" keywords combined with : - Asterisks - Boolean operator "OR"	interfirm OR interorgani?ation* OR "firm to firm" OR "business to business" OR relation* OR cooperat* OR coordinat* OR coopetition OR share OR shared OR sharing OR partner* OR alliance* OR collaborat* OR integrat*
Boolean operator "OR" to add next string:	OR
String using paired words for "interorganizational relationship" combined with: - Asterisks - Boolean operator "OR" - Proximity operator "WITHIN"	(supplier* OR vendor* OR seller* OR manufacturer*) WITHIN 3 WORDS OF (buyer* OR dealer* OR distributor* OR customer* OR retailer*)
Boolean operator "AND" to overlap previous strings with next string:	AND
String for "supply chain risk or Supply chain resilience" keywords combined with" - Asterisks - Boolean operator "OR" - Proximity operator "WITHIN"	supply* WITHIN 8 WORDS OF (resilien* OR robust* OR risk*)

2.2 Studies selection and assessment process

The scope of the research targeted abstracts, titles, and keywords in scholarly articles written in English in the Business and Management field, up to 2020. 2,030 articles were identified, and their abstracts screened. A high proportion of simulation and modeling papers looked at contract optimization minimizing risks. These studies were excluded to focus on broader social aspects of CIRs. 456 articles were determined to be congruent. Subsequently, the trusted journal quality rating published by the Chartered Association of Business Schools (CABS) in 2018 was used. Due to the high number of articles, quality consideration, and effort to render the search more replicable, all articles with a quality rating of 3, 4, or 4* were selected (i.e., 179 articles). These articles were screened for qualitative, methodological, and contribution eligibility (Miles and Huberman, 1994). Finally, 126 articles were kept. The process described is in **Figure 1**.

Figure 1. Studies selection process flowchart



2.3 Data extraction and synthesis of the selected studies

2.3.1 Descriptive analysis

27 unique journals with CABS rating of three and more were found from the 126 articles collected. Three journals represented about 52% of the sample, with *Supply Chain Management: An International Journal*, *International Journal of Production Research*, and *International Journal of Production Economics,* respectively sharing the first, second, and third positions.

The first paper found in our SLR is from 1995. Since then, the number of publications has steadily increased.

The methodologies used in all 126 studies were surveys (34.9%), case studies (25.4%), modeling-focused (15.9%), conceptual (11.1%), literature reviews (8.7%), and public dataset-based (4.0%).

Authors affiliated to 31 countries. The top three most represented countries were the USA (21.3%), UK (20.7%), and Australia (6.9%).

The top three industries studied were Manufacturing (43.8%), Food (10%) and Transportation (6.3%)

2.3.2 Thematic coding process

Social capital literature highlights that the sum of all resources associated with the network of relationships is critical in the management of social affairs. The body of work aims at understanding behaviors of individuals and groups at multidimensional levels (Nahapiet and Ghoshal, 1998), and has been lately used effectively in the supply chain and operations domains to explain supplier-buyer intricate relationships (Matthews and Marzec, 2012). Social capital consists of structural, relational, and cognitive dimensions. These dimensions embedded in CIRs play a role in mitigating, but also creating SCRs. This review separates and grounds CIRs' elements in the social capital dimensions (see **Table 2**) to clarify how different collaborative behaviors affect SCRs differently.

First, the structural capital consists of systems, routinized practices, or regular patterns of interactions structuring interorganizational communication and joint action (Carey *et al*., 2010; Lawson *et al*., 2007) by ways of formal and informal methods (Roden and Lawson, 2014). These interorganizational practices cover a broad spectrum of processes such as information sharing, supplier evaluation, and supplier development (Krause *et al*., 2006); or social events, joint workshops, cross-functional team working, team-building exercises, and co-location (Carey *et al*., 2010; Lawson *et al*., 2007). Hence, the nature of structural capital revolves around routinized practices. Consequently, the review identifies structural capital embedded in CIRs as buyer-led, supplier-led, and joint practices. Throughout the sample of papers, buyer-led practices comprised supplier management including supplier development and supplier performance management (Fan and Stevenson, 2018; Jüttner and Maklan, 2011), and sourcing practices covering sole-sourcing (Waters-Fuller, 1995), single-sourcing (Tukamuhabwa *et al*., 2015), and multi-sourcing (Chopra and

Sodhi, 2004). Supplier-led practices encompassed customer portfolio management (Hua *et al*., 2011). Joint practices were associated with scripted processes of supply chain risk management, planning, problem-solving, information and knowledge sharing, decision-making (Stone and Rahimifard, 2018), best practice sharing (Gallear *et al*., 2015), co-location (Habermann *et al*., 2015), and contracts (Kleindorfer and Saad, 2005). Structural capital deals with collaborative practices, but also the network-level configuration that they shape. Acting as an information transmission platform influencing the range of information accessibility in the network (Nahapiet and Ghoshal, 1998), network-level configuration enables information circulation between organizations. It is connected in the sample to the ideas of supply-base complexity with supplier differentiation, number of suppliers, and supplier interaction levels (Choi and Krause, 2006), and overall network structure or scale-free network configuration (Statsenko *et al*., 2018).

Second, relational capital describes particular personal relationships that people or communities develop through a history of interactions (Nahapiet and Ghoshal, 1998). Roden and Lawson (2014) operationalized relational capital with interaction closeness, trust, respect, friendship, and reciprocity. In this study, the relational dimension refers to trust (Laeequddin *et al*., 2009), reciprocity (Liu *et al*., 2018), and conceptually combines interaction closeness, respect, and friendship into the idea of relationship closeness (Chowdhury and Quaddus, 2015). Despite information sharing's association with the relational dimension of social capital in strategic management research (Kim *et al*., 2015a), this study links information sharing with structural capital because of its routinized nature in supply chain research (Krause *et al*., 2006).

Third, cognitive capital represents resources providing shared representations, interpretations, meanings, values, goals, and understanding developed via participative and continuous sense-making processes (Krause *et al*., 2006; Nahapiet and Ghoshal, 1998). From the sample, the two main components of cognitive capital are (1) shared codes and language, and (2) shared narrative (Johnson *et al*., 2013). Shared codes and languages represent goals, key performance indicators,

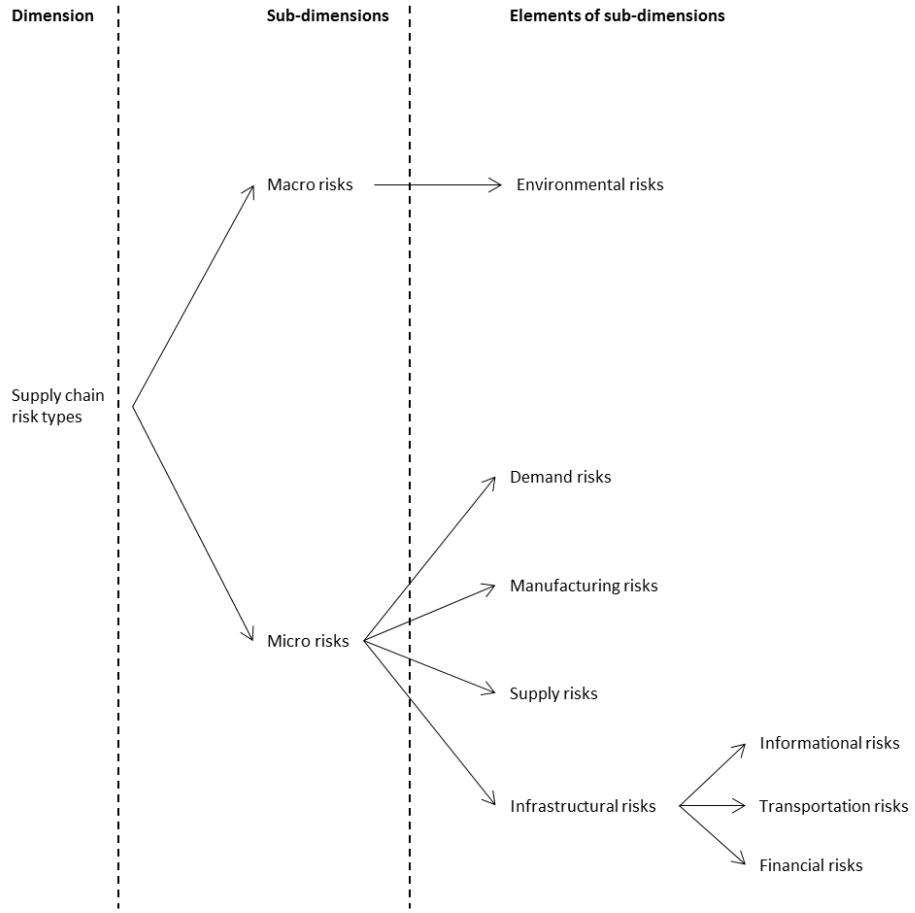
sector language, task ownership, standardization, training, standards, and tacit understanding (Fan and Stevenson, 2018; Johnson *et al*., 2013). Shared narratives comprise past adaptive responses to issues (Johnson *et al*., 2013), shared corporate culture (Fan and Stevenson, 2018), company values, philosophies, business approaches and capabilities, management styles, (Chowdhury *et al*., 2019), and national cultures (Gupta and Gupta, 2019; Manhart *et al*., 2020).

Table 2. Dimensions of CIRs derived from Nahapiet and Ghoshal (1998)

Theoretical lens	Theoretical sub-dimensions	Elements of sub-dimensions extracted from sample			
Social capital: sum of all resources available through the network of relationships (Nahapiet and Ghoshal, 1998)	**Structural capital:** Network-level configuration and systems, practices or regular patterns of interactions structuring interorganizational communication (Krause *et al*., 2006; Lawson *et al*., 2007; Carey *et al*., 2010) by ways of formal and informal methods (Roden and Lawson, 2014)	**Supplier-buyer practices**	Buyer-led practices	Supplier management	Supplier performance management Supplier development
				Sourcing practices	Strategic outsourcing Multi-sourcing Sole-sourcing Single-sourcing
			Supplier-led practice	Customer portfolio management	
			Joint practices	Information and knowledge sharing Joint supply chain risk management Joint planning Joint problem solving Joint decision making Best practice sharing Co-location Contract	
		Network-level configuration	Supply-base complexity	Supplier differentiation Number of suppliers Supplier interaction levels	
			Overall network structure	Scale-free network structure	
	Relational capital: close interaction, trust, and reciprocity (Carey *et al*., 2010)	**Relationship closeness**	Respect Frienship Interaction level		
		Reciprocity	Risk and revenue sharing		
		Trust			
	Cognitive capital: shared representations, interpretations, meaning, values, goals, and understanding developed via participative and continuous sense making processes (Krause *et al*., 2006)	**Shared codes and language**	Goals and key performance indicators Sector language, standards and tacit understanding Task ownership, standardization, and training		
		Shared narrative	Past adaptive responses to issues Corporate shared culture, philosophies, values, approach, management styles, and capabilities National culture		

Additionally, throughout this review, SCRs were categorized to highlight the granularity of interactions between CIRs and SCRs. The sample at hand indicates an underpinning split between macro and micro-risks, referred to respectively as catastrophic/disruption and operational risks (Tang, 2006). Consequently, this review uses the supply chain risk classification from Ho *et al*. (2015), where macro and micro risks prevail (see **Figure 2**). Macro-risks are rare external natural and human-made events, such as tsunamis, earthquakes, wars, or terrorism. Micro-risks are repetitive events emanating from internal activities or relationships within the supply chain, consisting of demand, manufacturing, supply, and infrastructural risks. Manufacturing risks relate to the inherent ability to produce goods and services within firms. Demand and supply risks refer to downstream and upstream uncertainties around a firm. Finally, informational, transportation, and financial risks are infrastructural risks.

Figure 2. Supply chain risk typology based on Ho *et al*. (2015)



3. The role of CIRs in SCRs

CIRs are examined through the social capital dimensions (see **Table 2**). As to SCRs, the supply chain risk classification from Ho *et al*. (2015) is used (see **Figure 2**).

3.1 The role of CIRs' structural capital in SCRs

Structural capital refers to supplier-buyer practices and network-level configuration shaped by these practices (Carey *et al*., 2010). First, supplier-buyer practices consist of (1) buyer-led practices (i.e., supplier development, supplier performance management, strategic outsourcing, multi-sourcing, sole-sourcing, single-sourcing), (2) the supplier-led practice of customer portfolio management, and (3) joint practices (i.e., information and knowledge sharing, joint supply chain risk management, joint planning, joint problem-solving, best practice sharing, co-location, joint decision-making, contract). Second, the network-level configuration includes (1) supply-base complexity (i.e., supplier differentiation, number of suppliers, supplier interaction levels), and (2) overall network structure or scale-free network structure.

3.1.1 Buyer-led and supplier-led practices interplay with SCRs

The buyer-led practices of supplier development and supplier performance management enable risk visibility (Jüttner and Maklan, 2011; Manhart *et al*., 2020), which helps to contain supply risks' propagation to downstream networks of buyers (Zhang *et al*., 2018). Supplier development can reduce disaster risks (Dahlmann and Roehrich, 2019; Hu *et al*., 2019; Sawyer and Harrison, 2019), and mitigate supply risks (Chowdhury *et al*., 2019; Fan and Stevenson, 2018; Zhao *et al*., 2013), as it trains suppliers to be proactively aware of problems such as supply quality risks (Tse *et al*., 2019) or slave labor (Gold *et al*., 2015). The more supply, manufacturing, and transportation risks increase, the more buyers' SCRs awareness rises, which elevates supplier development (Jajja *et al*., 2018). Supplier performance management can restrict environmental, supply, and demand risks via improved risk detection, contingency intelligence, and visibility (Brusset and Teller, 2017). It can also

apprehend buyers' manufacturing and supply risks (Cheng and Lu, 2017) like suppliers' opportunism to produce fraudulent products (Duhadway *et al*., 2020) or non-quality products (Tse *et al*., 2019).

Strategic outsourcing is the decision for a buyer to select an external source to process a task. In times of recession, this practice can alleviate disruption risks at the network-level as it builds flexibility, risk-sharing, and risk absorption (Jüttner and Maklan, 2011).

Multiple-sourcing creates supply redundancy used by buyers to mitigate supply risks (Aboah *et al*., 2019; Ali *et al*., 2017b; Gaur *et al*., 2019; Tan *et al*., 2019; Zhao *et al*., 2019a) or environmental disasters (Sawyer and Harrison, 2019) such as droughts (Sá *et al*., 2019) or earthquakes (Todo *et al*., 2015). Chopra and Sodhi (2004) conceptually highlighted the advantage of multiple-sourcing for buyers facing supply risks. Multiple-sourcing dominates for low impact and high-frequency supply disruptions or when the supply risk aversion is high (Namdar *et al*., 2017). Urciuoli *et al*. (2014) encouraged European oil and gas supply chains to source their energy from different countries to avoid over-dependency on few suppliers resulting in loss of power, disadvantageous contracts, and replenishment risks. Nevertheless, multi-sourcing can still create supply risks in networks, notably in the construction industry, where high levels of multiple-sourcing can handicap a buyer's visibility and control of suppliers' opportunism (Rudolf and Spinler, 2018).

Sole-sourcing mingled with just-in-time, and single-sourcing have been determined to be potentially damaging. Sole-sourcing, combined with just-in-time, may increase financial risks for suppliers who could invest in facilities or vehicles, creating dependence on the buyer (Waters-Fuller, 1995). In the case of single-sourcing, buyer's dependency could drive supply risks up because of the lack of alternative suppliers when needed (Chopra and Sodhi, 2004; Tukamuhabwa *et al*., 2015).

The supplier-led practice of customer diversification can reduce suppliers' financial and forecast risks. Hua *et al*. (2011) indicate, in an agent-based modeling study, that retailer diversification reduces retailers' non-payment risk, lowering manufacturers' bankruptcy risk. Along these lines,

Chopra and Sodhi (2004) associate more customers in a network to less receivable risks for the supplier, minimizing downstream financial risks' propagation upstream. Moreover, customer diversification enables risk pooling, which reduces suppliers' earnings forecast error (Hu *et al*., 2018).

3.1.2 Joint practices' interrelationships with SCRs

Joint SCRM practices encompass multiple shared procedures between partners targeting the control of SCRs (Ritchie and Brindley, 2007) such as environmental, supply discontinuity, and manufacturing risks (Kauppi *et al*., 2016), but also cybersecurity risks (Colicchia *et al*., 2019a). They are the most effective strategies to manage SCRs (Lavastre *et al*., 2014) and are highly discussed throughout the literature. Surveys in France (Lavastre *et al*., 2014), India (Mishra *et al*., 2016), Austria, Germany and Switzerland (Durach and Machuca, 2018), and 69 other countries (Revilla and Saenz, 2017) evidenced that buyers pursuing joint SCRM strategies with their suppliers obtain lower levels of quality, delivery, and supply disruptions than those who do not pursue them. Indeed, joint SCRM practices ameliorate risk information sharing and assessment (Fan *et al*., 2017), which empowers partners' anticipative capability to detect supply risks (Bevilacqua *et al*., 2019; Lima *et al*., 2018; Manhart *et al*., 2020; Stone and Rahimifard, 2018), and builds strong partnerships reassuring suppliers seeking minimum future contracts uncertainty with their buyers (Ritchie and Brindley, 2007).

Joint planning is a cooperative capability used to plan and cope with environmental risks (Dubey *et al*., 2020; Jain *et al*., 2017), like the weak rule of law (Wiengarten *et al*., 2016), but also supply risks (Bevilacqua *et al*., 2019; Chowdhury *et al*., 2019, Dubey *et al*., 2019; Hu *et al*., 2019; Lima *et al*., 2018; Manhart *et al*., 2020; Stone and Rahimifard, 2018) including lead time fluctuation, forecast inaccuracy, and on-time delivery (Sinha *et al*., 2004). Joint planning enables stock pooling, which decreases supply and demand risks among partners (Cohen *et al*., 2000). An example of joint planning used to decrease the bullwhip effect is collaborative planning, forecasting, and replenishment (CPFR) systems (Chopra and Sodhi, 2004). In a concern to minimize informational

risks, partners have been continuously using this planning technique to allow transparency and risk identification (Kleindorfer and Saad, 2005). CPFR helps suppliers and buyers reduce inventory shortage risks via forecast sharing (Raghunathan, 1999). It can also avoid anticipatory inventory deployment and enable postponement strategies reducing new product launch risks such as demand variability and overstocking (Bowersox, 1999). Other examples of joint planning practices such as vendor-managed inventory or efficient customer response can improve transparency, brainstorming, and risk detection, reducing environmental, supply and demand risks (Brusset and Teller, 2017). Joint planning influences SCRs, but SCRs can influence joint planning as well. Supply, manufacturing, and transportation risk levels can increase a firm's joint planning with both customers and suppliers for better coordination (Jajja *et al*., 2018).

Based on decision, resource and synchronization abilities, joint problem-solving is a synergetic practice highly effective against environmental (Scholten and Schilder, 2015), demand (Chen *et al*., 2013), and supply risks (Bevilacqua *et al*., 2019; Chowdhury *et al*., 2019; Kalaitzi *et al*., 2019; Lima *et al*., 2018; Manhart *et al*., 2020; Stone and Rahimifard, 2018) such as specifications, lead times, quantity requirements, and forecasts consistency (Chen *et al*., 2013). Grötsch *et al*. (2013) found a positive correlation between joint problem-solving philosophy and buyers' proactiveness to detect supplier insolvency risks in the German automotive industry. SCRs can shape joint problem-solving as well. Indeed, supply and environmental risk influence joint problem-solving between organizations. A survey of buyers from Dekker *et al*. (2013) showed that supplier monitoring problem risks and environmental risk of technological unpredictability reduce joint problem-solving with suppliers. In parallel, environmental variability, lack of competition, and supplier risks linked to part complexity increase joint problem-solving. Besides, Hajmohammad and Vachon (2016) suggested that buyers prefer to mitigate a high level of perceived supplier sustainability risk (i.e., ecological or social misconduct) via an open dialogue strategy based on joint planning.

Joint decision-making is a crucial risk mitigation practice in situations of high environmental risks (i.e., natural hazard, terrorism, political instability), supply discontinuity, manufacturing risk (Kauppi *et al*., 2016; Subramanian *et al*., 2015), but also demand and financial risks (Subramanian *et al*., 2015). Used in food waste management, joint decision-making can bridge unconnected parties or structural holes, enabling supply chain circularity and environmental risk reduction (Ciulli *et al*., 2019). Strategic horizontal and vertical collaboration in decision-making are vital coordination factors that can alleviate SCRs such as Hurricane Katrina (Scholten *et al*., 2014), but also inflation, political instability, supply disruption, and local food demand increase due to the Brexit constitutional changes (Hendry *et al*., 2019). Joint decision-making optimizes supplier-buyer alignment needed against disaster (Sawyer and Harrison, 2019), customer's demand variability (Zhao *et al*., 2013), and supply risks (Chowdhury *et al*., 2019; Dubey *et al*., 2019; Hu *et al*., 2019; Kalaitzi *et al*., 2019; Manhart *et al*., 2020; Zhao *et al*., 2013). In a simulation, Levalle and Nof (2015) discuss the practice of resilience by teaming based on joint decision-making where buyers select low-cost suppliers to make them work together to yield a higher combined quality of service. The study found that resilience by teaming boosted the standard and post-disruption quality of service with almost no cost increase. Joint decision-making reduces SCRs, but SCRs can influence joint decision-making too. Indeed, according to a survey from Jajja *et al*. (2018), a firm's perceived supply, manufacturing, and transportation risks can increase the firm's level of decision-making with suppliers and customers to control these SCRs.

Information sharing generates transparency (Ali *et al*., 2017a; Cohen *et al*., 2000; Colicchia and Strozzi, 2012; Colicchia *et al*., 2019b). Lack of transparency is an informational risk creating uncertainty between partners. Information sharing appeases this risk by facilitating communication and visibility (Brandon-Jones *et al*., 2014; Gunasekaran *et al*., 2015; Jain *et al*., 2017), which are used, for instance, against demand volatility, price erosion (Subramanian *et al*., 2015), or supply risks (Aboah *et al*., 2019; Bevilacqua *et al*., 2019; Chowdhury *et al*., 2019; Colicchia *et al*., 2019b; Dubey *et al*., 2019; Hu *et al*., 2019; Kalaitzi *et al*., 2019; Lima *et al*., 2018; Manhart *et al*., 2020; Stone and

Rahimifard, 2018). Knowledge sharing has similar visibility effects, enabling the identification and mitigation of supply-side risks (Chen *et al*., 2016; Dabhilkar *et al*., 2016; Scholten and Schilder, 2015; Scholten *et al*., 2019; Tukamuhabwa *et al*., 2015), and political risks emanating from strife and economic hardships (Gölgeci and Kuivalainen, 2020). Information sharing enables the containment of environmental, manufacturing, and supply risks (Kauppi *et al*., 2016; Subramanian *et al*., 2015), but also demand, informational, and transportation risks (Liu *et al*., 2018). In disaster relief operations, for example, information sharing allows feedback loops between hastily formed humanitarian organizations and helps aid groups to assess resource availability and recovery needs (Kumar and Havey, 2013), notably through blockchain technology (Dubey *et al*., 2020). Information sharing facilitates risk identification and assessment through operational data exchange (Lavastre *et al*., 2012), decreasing supply and environmental risks (Kleindorfer and Saad, 2005; Liu *et al*., 2018; Urciuoli *et al*., 2014). Information sharing can help quickly identify (a) manufacturing and supply quality risks in raw materials in any supply tier (Tse and Tan, 2011), (b) supply risk of modern labor slavery, (c) demand risk of a bad reputation, and (d) information leakage risk (Stevenson and Cole, 2018). Although information sharing can benefit partners (Du *et al*., 2003), it can also have nefarious informational risks for partners, such as infrastructure breakdown (Chopra and Sodhi, 2004; Smith *et al*., 2007), cybersecurity risks (Bhimani and Ncube, 2006; Colicchia *et al*., 2019a; Finch, 2004), information distortion (Kwak *et al*., 2018), and leakages to rivals (Zhang *et al*., 2011) via social media or production systems (Colicchia *et al*., 2019b). Excessive information transparency can increase financial risks for suppliers. A case study in the British defense industry revealed that supplier-buyer open book relations could cause buyers to push their costs to their suppliers (Johnsen *et al*., 2009). Nevertheless, in specific cases such as humanitarian crisis or CO2 emission control, knowledge and information management capabilities between partners have to be built to coordinate forces and mitigate disaster risks (Dahlmann and Roehrich, 2019; Rasouli, 2018; Sawyer and Harrison, 2019; Scholten *et al*., 2014). Consequently, the pros and cons of information and knowledge sharing on SCRs are typically contextual. The literature also highlights that SCRs can modulate information

sharing levels. In a multi-country survey, Arnold *et al*. (2010) discovered that the more the supply chain partner's B2B e-commerce risks increase, the lower the level of information sharing was, due to uncertainty. In another survey, Dekker *et al*. (2013) show that the environmental risk of technological unpredictability and supplier monitoring problem risks negatively influence buyers' information sharing with suppliers. In parallel, other environmental and supply risks such as environmental variability, lack of competition, and part complexity positively affect information sharing levels. An additional survey of Jajja *et al*. (2018) found that manufacturing firms facing supply, manufacturing, and transportation risks increase information sharing with their partners to decrease SCRs.

The joint practices of best practice sharing and co-location can mitigate SCRs. Buyers sharing environmental and ethical best practices with their suppliers can better identify relational and supply performance risks (Gallear *et al*., 2015). Additionally, the practice of co-location, when two partners decide to do business in the same location, helps lower supply lead times and supply disruption duration for buyers (Habermann *et al*., 2015).

Contracts can help minimize environmental and supply risks. Non-performance penalties built into contracts can be buyers' vehicle against natural disasters, strikes, economic disruptions, and terrorism (Kleindorfer and Saad, 2005) or supply risks (Hu *et al*., 2019; Kalaitzi *et al*., 2019) such as quality of supply (Tse *et al*., 2019). Specific risk distribution contracts can mitigate supply and demand risk propagation in networks. Revenue sharing contracts are generally more effective in mitigating customer or supplier propagated bankruptcy risks than price discount and quantity flexibility contracts (Sun *et al*., 2012). A case study in the food industry in Scotland highlighted that horizontal collaboration between producers and vertical collaboration between processors and retailers via contracts reduced supply, manufacturing, and demand risks in the network (Leat and Revoredo-Giha, 2013). Contracts can reduce SCRs, but SCR perception can influence contracts, as well. A survey of American and Brazilian firms found that buyers managing their perceived supplier's

financial risk are more likely to re-negotiate payment terms improving supplier working capital and shrinking supply disruption risks (Oliveira and Handfield, 2017). Eckerd and Girth (2017) examined the US government's risk management choice while designing 240,000 contracts aimed at mitigating supplier risks. The findings concluded that when mission criticality and service complexity are low (low supply risk), suppliers tend to agree to fixed-price contracts, thus bearing all the risks. Whereas, in high mission criticality (high supply risk), the US government tends to agree to incentive contracts. When service complexity is high (high supply risk), cost-reimbursement, and incentive contracts were preferred.

3.1.3 Interaction between network-level configuration and SCRs

Deep-seated in CIRs, network configuration is structural and includes (1) supply-base complexity (Choi and Krause, 2006), and (2) overall supply network structures.

Supply-base complexity influences supply risks in networks. Using complex adaptive system theory, Choi and Krause (2006) defined supply-base complexity as the focal firm's (1) supplier differentiation in terms of cultures, practices, capabilities, and geographical dispersion, (2) number of suppliers, and (3) supplier interaction levels. Although conceptual, the paper stipulates that for a focal firm, there is a positive quadratic relationship between its supply-base complexity and supply risk. Indeed, low complexity could prevent a focal firm from accessing new and varied technologies and create supply disruption risk when single-sourcing is preferred. On the other hand, high complexity could make the focal firm lose control over its suppliers, and increase unreliable deliveries, thus exacerbating supply risks. The number of suppliers is a supply-base complexity dimension connected to the buyer-led practices of single, sole, and multi-sourcing previously discussed in **3.1.1**. A component of supply-base complexity, supplier differentiation, in terms of capability, can reduce environmental risks. In a case study of the South Australian mining industry, Statsenko *et al*. (2018) show, through complex adaptive system theory, that a large number of interconnected multi-sector organizations in the supplier-base helps with complementary partnerships adding to the reconfiguration ability of the

mining network during economic downturns. Supplier differentiation, in terms of dispersion, is also an element of supply-base complexity. Lorentz *et al*. (2016) show that supplier dispersion has an inverse U-shaped relationship with supply risk, with buyers increasingly ready for growing internationalized supplier dispersion and associated supply risks. Generally, low supply dispersion means low supply risks for buyers (Lei *et al*., 2019) who prefer dependable, responsive, and geographically close suppliers for quick problem-solving (Ellegaard, 2008). However, high to moderate supply dispersion can help mitigate environmental risks when the risks are not close to the disrupted supply network. Todo *et al*. (2015), in a survey studying a Japanese earthquake, noticed that networks with firms outside of the area impacted saw a quicker recovery for moderately damaged firms. Therefore, contexts drive supplier dispersion's relationship with SCRs. Supplier interaction, another dimension of supply-base complexity, can influence supply risks for buyers. Indeed, in a case study of British food companies, Touboulic *et al*. (2014) highlight that two suppliers can combine forces against a buyer's request to pursue shared sustainability goals.

A specific network configuration, embedding CIRs, can contain supply and environmental risks more efficiently. This configuration is scale-free supply networks, defined by a relatively small number of highly connected hubs and a large number of nodes with few connections (Statsenko *et al*., 2018). These networks recover better from supply disruptions than random networks because they have lower costs, higher fill-rates, and lower inventory needs (Kim *et al*., 2015b; Ledwoch *et al*., 2018; Zeng and Yen, 2017). Day (2014) suggests that the assessment of metrics in scale-free networks like clustering, connectedness, short-path, and high-path redundancy can help assess disaster risks. Likewise, Li *et al*. (2019) point to specific centrality indicators going beyond a scale-free characterization and highlighting essential network nodes. These resilience indicators can offer a better understanding of supply disruption propagation and consist of degree (important vertices), betweenness (shortest path), and closeness (node proximity ratio).

3.2 The role of relational capital in SCRs

Relational capital refers to mutual respect, friendship, interaction level, trust, and reciprocity (Nahapiet and Ghoshal, 1998; Roden and Lawson, 2014). Relationship closeness covers what Nahapiet and Ghoshal (1998) called mutual respect, friendship, and interaction level. Trust is a partner's threshold level of risk-bearing capacity (Laeequddin *et al*., 2009), and reciprocity alludes to shared risks and benefits.

3.2.1 Interactions between relationship closeness and SCRs

The interaction between relational closeness and SCRs is complex. Indeed, relationship capital appears to have an inverted U-shaped relationship with supply-side resilience, where the switch into the upward curvilinear relationship occurs when buyers develop relationship closeness with their suppliers (Fan and Stevenson, 2019). Building or improving relationships is one of the most preferred strategies to mitigate all SCRs (Chowdhury and Quaddus, 2015; Daultani *et al*., 2015; Govindan and Chaudhuri, 2016; Lam and Bai, 2016; Yang *et al*., 2018). Close relationships establish a mutual understanding between network-partners enabling better collaboration and visibility (Johnson *et al*., 2013). Healthy relationships make supply network structures more resilient (Day, 2014) to SCRs such as political and economic instability (Gölgeci and Kuivalainen, 2020), or supply risks (Chowdhury *et al*., 2019) like suppliers' opportunistic fraud (Duhadway *et al*., 2020), respect of sustainability obligations (Bird and Soundararajan, 2018), disruption (Dubey *et al*., 2019; Kalaitzi *et al*., 2019), and quality issues (Tse *et al*., 2019). Relationship closeness strengthens supplier-buyer communication and improves supply risk identification (Fan and Stevenson, 2018; Zhao *et al*., 2013), notably when suppliers are involved early in product development (Khan *et al*., 2012). Close relationships decrease demand variability when suppliers work with customers (Zhao *et al*., 2013; Zhao *et al*., 2019b), diminishes the bullwhip effect (Billington, 2010) through purchase volume and reduced supply-base, and help alleviate supply coordination risks in just-in-sequence activities (Wagner and Silveira-Camargos, 2012). The quality of relationships invested in a given upstream tier can generate better relationships with downstream tiers. Indeed, a buyer investing in better relationships with suppliers

can lower supply risk costs linked to opportunism and disruption, and become more competitive, which subsequently makes downstream partners more inclined to establish stronger relationships (Cruz and Liu, 2011). Moreover, buyers building relationships with suppliers can preserve mutual knowledge and build entry barriers against competitors (Bigdeli *et al*., 2018). Sometimes, because of a close relationship, a supplier becomes financially dependent on the buyer, which can decrease the buyers' financial risks. Kim and Henderson (2015) show that supplier's dependency can reduce financial risks for the buyer by increasing returns on assets and sales. Nevertheless, co-dependent relationships can create SCRs as entire supply chains can crash if one partner operationally fails (Zeng and Yen, 2017). In a Dutch food case study, Scholten and Schilder (2015) suggested that mutual supplier-buyer dependency indirectly drives financial risk as one or both parties could devote specific investments. Buyer's dependency on suppliers can exacerbate the bullwhip effect for those suppliers (Zhao *et al*., 2019b), and decrease suppliers' financial risks only to a certain point. Indeed, Kim and Henderson (2015) show that buyer's dependency can reduce financial risks for suppliers by increasing returns on assets and sales. However, the financial benefits from buyer's dependency decrease as inventory increases. Dependency can also create a power imbalance between buyers and suppliers, which can materialize through unequal sharing of sustainability investments and financial risks to the advantage of the dominant partner (Touboulic *et al*., 2014). Relationship closeness influences SCRs, but it can also be affected by SCRs. According to a survey of manufacturers in Hong Kong, perceived supply risks in quantity, quality, and lead-time can trigger buyers to develop guanxi with critical suppliers to contain supply risks (Cheng *et al*., 2012).

3.2.2 Reciprocity's role in SCRs

Throughout the literature, reciprocity considered mainly risk sharing, commonly used by partners to mitigate environmental, supply, demand, informational, and transportation risks (Liu *et al*., 2018; Rudolf and Spinler, 2018). Shared risks enable loss dispersion, risk absorption (Jüttner and Maklan, 2011), responsiveness, and readiness, which altogether improve resilience in situations of disasters

(Chowdhury and Quaddus, 2016; Dubey *et al*., 2020) and supply risks (Chowdhury *et al*., 2019; Hu *et al*., 2019; Manhart *et al*., 2020). In a supply network simulation, Zeng and Yen (2017) discuss how supply, manufacturing, demand, and transportation risks can be shared among partners, leading to increased centricity (center nodes diffuse risks to nodes nearby), ultimately improving network organization and recoverability. Reward sharing is another form of reciprocity, which, when combined with risk-sharing, can coordinate supplier-buyer process alignments and reduces manufacturing quality risks for buyers (Tse *et al*., 2018). SCRs can also influence reciprocity. In a survey, Jajja *et al*. (2018) show that a firm's elevated supply, manufacturing, and transportation risks can trigger the firm to increase risk and revenue sharing among partners for cost-efficiencies.

3.2.3 Interrelations between trust and SCRs

Trust enhances supplier-buyer collaboration (Dubey *et al*., 2020), reducing supply and demand risks from malicious actors (Fan and Stevenson, 2018). Trust helps to mitigate supply risks (Chowdhury *et al*., 2019; Dabhilkar *et al*., 2016; Dubey *et al*., 2019; Jain *et al*., 2017; Tse *et al*., 2019) such as falsified drugs (Lima *et al*., 2018), or disruptions across industries and countries (Chen *et al*., 2016; Ha *et al*., 2011; Rajesh *et al*., 2015; Ritchie and Brindley, 2007; Vlajic *et al*., 2012) like manufacturing in China, where trust can also reduce environmental, demand, manufacturing, and financial risks (Subramanian *et al*., 2015). However, excessive trust can trigger opportunism exemplified by buyers negotiating supply prices, and suppliers increasing their selling prices (Laeequddin *et al*., 2009). SCRs can also affect trust. Sambasivan *et al*. (2013) found that suppliers and buyers with a strong perception of opportunistic behavior have a lower level of trust. Similarly, Laeequddin *et al*. (2009) highlight that trust exists when there is no significant risk, thereupon suggesting that partners should work on reducing risks to strengthen trust rather than building trust to minimize risks.

3.3 The role of cognitive capital in SCRs

Cognitive capital refers to shared codes, languages, and narratives (Nahapiet and Ghoshal, 1998). This dimension helps to mitigate SCRs, but in excess can become collectively blinding as group thinking can prevent buyers from developing innovative ideas to identify supply risks (Fan and Stevenson, 2018).

3.3.1 Shared codes and languages in SCRs

In a case study of the Grayrigg derailment in the UK, shared codes and languages appear in the form of supplier-buyer goals, key performance indicators, sector language, task ownership, standardization, and training. These essential elements drastically improve collaboration and communication, and establish explicit and tacit understanding (Johnson *et al*., 2013), which helps improve supplier-buyer absorptive capacity, shared understanding, but also cognitive efforts needed in supply risk identification (Fan and Stevenson, 2018) and mitigation (Chowdhury *et al*., 2019).

3.3.2 Shared narratives in SCRs

Nahapiet and Ghoshal (1998) associate shared narratives with stories, myths, and metaphors sustaining meaning in communities. Specifically, in the management of the Grayrigg rail crash in the UK, shared narratives helped to invigorate network collaboration, facilitate the identification and resolution of complex problems by recalling past adaptive responses, and enhance visibility by enticing the curiosity for resource location and status (Johnson *et al*., 2013). Corporate shared culture is also a shared narrative consisting of company values, philosophies, approaches to business dealings, management styles, and business capabilities (Chowdhury *et al*., 2019). Suppliers and buyers use shared corporate culture to help tacit and explicit understanding and cognitive effort in supply risk identification (Fan and Stevenson, 2018) and mitigation (Chowdhury *et al*., 2019). National culture is another shared narrative that appears to impact collaboration strategies in supply disruption management (Manhart *et al*., 2020). Different countries, based on their individualism,

collectivism, and feminism levels, seem to have differences in their risk-taking and negotiation approaches, but research remains poor in this domain (Gupta and Gupta, 2019).

4. Concluding discussion, future research agenda, and contribution

Summarizing the findings, this section answers the research question: using a social capital perspective, how can we understand the effect of CIRs on SCRs?

4.1 Discussion on current literature

Based on detailed findings from section 3, **Table 3** and **Table 4** present unique interaction properties between CIRs and SCRs. Four main ideas transpired from the literature. First, the structural capital of CIRs appears to affect positively and negatively SCRs. Indeed, buyer-led practices of supplier development, supplier performance management, and strategic outsourcing reduce buyers' SCRs (Jüttner and Maklan, 2011), while sole-sourcing (Waters-Fuller, 1995) and single-sourcing (Tukamuhabwa *et al*., 2015) can increase them. Multi-sourcing looks to have a positive (Chopra and Sodhi, 2004), but also negative effect on buyers' SCRs (Rudolf and Spinler, 2018). The supplier-led practice of customer portfolio management reduces SCRs for suppliers (Hua *et al*., 2011). Joint practices of supply chain risk management, planning, problem-solving, information and knowledge sharing, decision-making (Stone and Rahimifard, 2018), best practice sharing (Gallear *et al*., 2015), co-location (Habermann *et al*., 2015), and contracts (Kleindorfer and Saad, 2005) decrease supplier-buyer SCRs. However, information sharing can raise them (Bhimani and Ncube, 2006). Supply-base complexity seems to have a curvilinear relationship with buyers' SCRs (Choi and Krause, 2006). Scale-free network configurations enable better mitigation of network-level SCRs (Statsenko *et al*., 2018). Second, the relational capital of CIRs seems to influence positively and negatively SCRs. Relationship closeness (Chowdhury and Quaddus, 2015), trust (Fan and Stevenson, 2018), and reciprocity (Liu *et al*., 2018) mitigate SCRs, but can also exacerbate them (Fan and Stevenson, 2019). Third, cognitive

capital, with shared codes, languages, and narratives, appears to help in the mitigation of SCRs (Johnson *et al*., 2013). However, cognitive capital can also develop collective blinding preventing partners' out-of-the-box thinking (Fan and Stevenson, 2018). Fourth, SCRs can influence the structural capital of supplier development, joint planning, joint decision-making (Jajja *et al*., 2018), joint problem-solving, information sharing (Dekker *et al*., 2013), and contracts (Eckerd and Girth, 2017). SCRs can also influence the relational capital of relationship closeness (Cheng et al., 2012), reciprocity (Jajja et al., 2018), and trust (Sambasivan et al., 2013).

Pinpointing the state of current research, **Table 5** counts the number of papers per CIR and SCR. The literature probed some social capital dimensions of CIRs more than others. First, structural capital is at the forefront, specifically with (1) information sharing and joint planning, (2) supplier development, supplier performance management, and multi-sourcing, and finally (3) network characteristics with a relatively low number of papers. The examination of strategic outsourcing, sole-sourcing, single-sourcing, customer diversification, best practice sharing, and co-location was low. Relational capital came second as the most frequent dimension discussed in the sample, with relationship closeness being the number one element dissected. Other relational elements were less extensively analyzed. Finally, cognitive capital was by far the least scrutinized dimension.

In the sample, supply risk was the most considered risk, followed by environmental, demand, informational, and manufacturing risks. The frequency of papers dealing with financial and transportation risk studies was the lowest.

Table 3. CIRs influence SCRs

CIRs			Macro risks	Micro risks					
							Infrastructural risks		
Dimensions	**Elements**	**Sub-elements**	**Environmental**	**Supply**	**Manufacturing**	**Demand**	**Informational**	**Financial**	**Transportation**
Structural capital	Buyer-led practices	Supplier development	↓	↓					
		Supplier performance management	↓	↓	↓	↓			
		Strategic outsourcing	↓						
		Multi-sourcing	↓	↓↑					
		Sole-sourcing						↑	
		Single-sourcing		↑					
	Supplier-led practice	Customer portfolio management				↓		↓	
	Joint practices	Joint SCRM	↓	↓	↓	↓	↓		
		Joint planning	↓	↓		↓	↓		
		Joint problem solving	↓	↓		↓			
		Joint decision making	↓	↓	↓	↓		↓	
		Information/knowledge sharing	↓	↓	↓	↓	↓↑	↑	↓
		Best practice sharing		↓					
		Co-location		↓					
		Contract	↓	↓	↓	↓			
	Supply-base complexity	Supply-base complexity		↓↑					
		Supplier capability differentiation	↓						
		Supplier dispersion differentiation	↓	↓↑					
		Supplier interaction		↑					
	Overall network structure	Scale-free structure	↓	↓					
Relational capital	Relationship closeness		↓↑	↓↑	↓	↓↑	↓	↓↑	↓
	Reciprocity		↓	↓↑	↓	↓	↓		↓
	Trust		↓	↓↑	↓	↓↑		↓	
Cognitive capital	Shared codes and language		↓	↓↑					
	Shared narrative		↓	↓↑					

Captions: ↓ Decrease. ↑ Increase.

Table 4. SCRs influence CIRs

		CIRs								
		Structural capital						**Relational capital**		
		Supplier development	Joint planning	Joint problem solving	Joint decision making	Information and knowledge sharing	Contracts	Relationship closeness	Reciprocity	Trust
Macro risks	Environmental			↓↑		↓↑				↓
Micro risks	Supply	↑	↑	↓↑	↑	↓↑	X	↑	↑	↓
	Manufacturing	↑	↑		↑	↑			↑	
	Demand									↓
	Informational					↓				
	Transportation	↑	↑		↑	↑			↑	

Captions: ↓ Decrease. ↑ Increase. X Influence.

Table 5. Number of articles in CIRs and SCRs

CIRs			Macro risks	Micro risks						Total per:		
						Infrastructural risks						
Dimensions	**Elements**	**Sub-elements**	**Environmental**	**Supply**	**Manufacturing**	**Demand**	**Informational**	**Financial**	**Transportation**	**Sub-element**	**Element**	**Dimension**
Structural capital	Buyer-led practices	Supplier development	2	7	1				1	**8**	**41**	**203**
		Supplier performance management	1	9	2	1		1	1	**15**		
		Strategic outsourcing	1							**1**		
		Multi-sourcing	2	10						**12**		
		Sole-sourcing						1		**1**		
		Single-sourcing		1						**1**		
	Supplier-led practice	Customer portfolio management				1		2		**3**	**3**	
	Joint practices	Joint SCRM	1	10	1	1	2			**15**	**150**	
		Joint planning	5	11	1	6	1		1	**25**		
		Joint problem solving	2	9		1				**12**		
		Joint decision making	6	13	3	3		2	1	**28**		
		Information/knowledge sharing	11	22	3	3	15	2	2	**58**		
		Best practice sharing		1						**1**		
		Co-location		1						**1**		
		Contract	1	7	1	2				**11**		
	Network characteristics	Supply-base complexity	3	2						**5**	**9**	
		Scale-free network structure	1	3						**4**		
Relational capital	Relationship closeness		4	19	3	7	3	4	3	**43**	**91**	**91**
	Reciprocity		5	8	3	3	2		4	**26**		
	Trust		3	17	1	1		1		**22**		
Cognitive capital	Shared codes and language		1	2						**3**	**7**	**7**
	Shared narrative		1	3						**4**		
		Total	**50**	**155**	**19**	**29**	**23**	**13**	**13**	**302**		

CAPTION

- No papers
- One paper only
- Two or more papers

4.2 Suggestions for further research

First, social capital is a valuable perspective enabling the isolation of different dimensions of CIRs in the context of SCRs. Using this lens raises the precision and clarity of research as it avoids mixing different dimensions in various operationalization found in the literature, such as meta-concepts like integration, collaboration, and bridging. With rare studies combining all three dimensions, the social capital theoretical lens provides a holistic view of the multidimensionality of CIRs, which can help organizations identify, sustain, and develop specific social capital dimensions for valuable partnerships. Making use of social capital concepts in supply chain collaboration could enable the discovery of dimensions compensating others, providing insights into how different social capital dimensions interact and accumulate in the context of SCRs. Throughout the literature, in each study, specific SCRs were investigated. However, in supply chains, some risks can lead to other risks, which highlights a need for a global supply chain risk index while studying CIRs. In developing this index, the endogeneity of actual versus perceived risks should be addressed.

Second, ample information on structural and relational dimensions of CIRs was available in the SCR literature. Nevertheless, research on cognitive capital remains limited, despite the dimension's embeddedness and importance in other social capital dimensions (Nahapiet and Ghoshal, 1998). Only five pieces were found in the sample highlighting some elements of cognitive capital (Chowdhury *et al*. 2019; Fan and Stevenson, 2018; Gupta and Gupta, 2019; Johnson *et al*., 2013; Manhart *et al*., 2020) such as shared languages, narratives, codes, and cultures. How these elements interrelate, and their roles in SCRs remain superficial in the literature, despite research calls on cultural congruence, for instance (Revilla and Saenz, 2017). Indeed, Gupta and Gupta (2019) point out how little we know about the influence of national cultures (e.g., individualistic, collectivist, feminist) on risk-taking behaviors like willingness to report errors, negotiation coalition, opportunism, uncertainty avoidance, lies, and governance preferences. Cognitive and structural capitals influence relational capital (Carey *et al*., 2010; Tsai and Goshal, 1998), but counter-

intuitively, structural capital does not affect cognitive capital as groups can share values and beliefs without interacting (Tsai and Goshal, 1998). Could cognitive capital antecede structural capital, hence setting off both structural and relational capitals? Investigating sub-dimensions of cognitive capital, how they interact, but also impact relational and structural capital in affecting SCRs is yet to be achieved. Qualitative work could help thoroughly operationalize cognitive capital, and understand it contextually and longitudinally in the face of SCRs such as the COVID-19 pandemic. Also, qualitative research focused on shared languages, for instance, could use ethnomethodology or symbolic interactionism to study how language or body language interrelate with CIRs and SCRs. Furthermore, quantitative research could be beneficial, for example, in assessing how cognitive capital embedded in CIRs account for the variation of SCRs or resilience.

Third, the literature revealed a high number of dyadic articles. The embeddedness of dyads in networks shows that dyads and networks affect each other. However, empirical approaches, in network contexts, were scarce in the sample. Making use of network position characteristics and connectedness indicators could be valuable to understand how CIRs affect SCRs like late delivery or bad reputation. Social network analysis, through relationship intensity valuations in graphs (e.g., trust intensity or power imbalance), would be a helpful tool to study relationships between network-level CIRs, SCRs, and associated propagations. The work could consist of complete network mappings of focal firms' suppliers with information collected from both buyers and suppliers instead of only reporting buyers' perspectives, as seen in most dyadic studies thus far.

4.3 Theoretical and practical contributions

To date, the multiplexity of CIRs and their interactions with SCRs remain scattered and unconsolidated. This review fills this gap by offering a theoretical articulation of how various aspects of CIRs affect SCRs differently.

Theoretically, the contributions of this review are threefold. First, this study extends the supply chain and social capital literature. Indeed, the classification of CIRs through the lens of social capital could be useful for future research to determine the role and complexity of CIRs in SCRs. Second, this review provides an up-to-date synthesis of the interrelationships between CIRs and different SCRs. Third, this paper suggests future research avenues.

Practically, the insights of this review can aid managers in making key decisions for their organizations. Understanding the important role of social capital can allow for more informed choices when considering areas such as joint practices, partner selections, supplier management, contractual terms, sourcing practices, relationship closeness, and network configurations.

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