



ELSEVIER

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Transportation Research Part E

journal homepage: www.elsevier.com/locate/tre

The role of communication quality, relational commitment, and reciprocity in building supply chain resilience: A social exchange theory perspective

Yesim Can Saglam^{a,*}, Sibel Yildiz Çankaya^b, Ismail Golgeci^c, Bulent Sezen^d,
Selim Zaim^e

^a Department of Business Administration, Gebze Technical University, Gebze, Turkey

^b Department of Business Administration, Abant İzzet Baysal University, Bolu, Turkey

^c Department of Business Development and Technology, Aarhus University, Herning, Denmark

^d Department of Business Administration, Gebze Technical University, Gebze, Turkey

^e Faculty of Engineering and Natural Sciences, Istanbul Zaim University, Istanbul, Turkey

ARTICLE INFO

Keywords:

Social exchange theory
Supply chain resilience
Supply chain risk management
Communication quality
Relational commitment

ABSTRACT

Although supply chain risk management is a process that can be actualized through collaboration and communication in supply chains, little is known about how social factors can lead to supply chain resilience (SCR). The present study evaluates the relationship between supply chain members as social relationships and explores their role in SCR. Following the social exchange theory perspective, communication quality, reciprocity, and relational commitment are examined as the potential antecedents of SCR. The mediating role of communication quality in linking reciprocity and relational commitment to SCR is also investigated. Partial least squares structural equation modeling is used to test the research hypotheses and analyze the data obtained from prominent executives of manufacturing firms. Our findings indicate that communication quality is an imperative factor in explaining SCR. We also found that communication quality mediates the relationship between relational commitment and SCR and between reciprocity and SCR. In line with previous literature, SCR is positively related to supply chain risk management performance, empirically supporting the proposed value of SCR for firm risk management processes. This paper advances a new front in SCM research by adopting the social exchange theory perspective and empirically examining the role of communication quality, relational commitment, and reciprocity.

1. Introduction

In a world in which supply chain (SC) risks are escalating dramatically, organizations face the exigence of establishing robust relationships and connections with their SC members to overcome these threats (Arnold et al., 2010; Gölgeci and Kuivalainen, 2020; Wiedmer et al., 2021). In today's increasingly dynamic and turbulent conditions, logistics systems and SCs are confronted with adversities that disrupt logistics and SC operations and jeopardize SC efficiency and effectiveness (Choi, 2021; Hosseini et al., 2019). For

* Corresponding author.

E-mail addresses: yesimcan@gtu.edu.tr (Y. Can Saglam), sibelyildiz@ibu.edu.tr (S. Yildiz Çankaya), i.golgeci@btech.au.dk (I. Golgeci), bsezen@gtu.edu.tr (B. Sezen), selim.zaim@izu.edu.tr (S. Zaim).

<https://doi.org/10.1016/j.tre.2022.102936>

Received 16 February 2022; Received in revised form 4 October 2022; Accepted 10 October 2022

Available online 22 October 2022

1366-5545/© 2022 Elsevier Ltd. All rights reserved.

example, the obstruction caused by the grounding of the Ever Given container ship in the Suez Canal in 2021 was estimated to result in a loss of approximately \$9.6 billion worth of global trade for every day that shipping was disrupted (Harper, 2021). It led to a rise in prices and knock-on delays and is seen as one of the triggers of the current SC challenges the world faces (Wieland, 2021). Likewise, the SC operations of almost 94 % of Fortune 1000 businesses have been influenced by the COVID-19 disruption (Sherman, 2020). The critical role of supply chain resilience (SCR) in such situations is further amplified by recent severe and ubiquitous SC disruptions and the infamous supply chain crunch (Wieland and Durach, 2021).

SCR is viewed as a system that transpires through the collective and dynamic interactions of SC partners (Tukamuhabwa et al., 2015). Given this, SC members ought to establish strong relationships to enhance their SCR. In fact, close relationships and collaboration are generally regarded as important ingredients of SC performance (Yang et al., 2008). Building robust partnerships can enhance knowledge and resource exchange, assist in overcoming communication inhibitors, and eliminate redundancy (Chang et al., 2015a). Extant research (e.g., Can Saglam et al., 2020; Guo et al., 2022) underlines the necessity for SC collaboration to eliminate SC risk, alleviate uncertainties, and optimize sustainable SCs.

While the literature is in consensus that collaboration is critical for developing SCR and obtaining a sustainable competitive advantage (Hou et al., 2018; Scholten et al., 2014), empirical investigation of the role of social factors in determining the collaborative behaviors of SC partners and their influence on resilience has been scarce, especially within the context of supply chain risk management (SCRM). Little is known about how social factors (reciprocity, relational commitment, and communication quality) affect SCR. Relational commitment, defined as the desire/willingness to maintain or improve a business relationship; reciprocity, defined as mutual SC exchanges that partners perceive as fair; and communication quality, defined as the quality of formal and informal information sharing among partners, have long been considered essential for efficient SC relationships (Morgan and Hunt, 1994). Extant research has highlighted social factors as critical for successful logistics and SC operations (Griffith et al., 2006; Yang et al., 2021). Researchers have called for the investigation of the interactions of social factors with other relational constructs (Agarwal and Narayana, 2020). However, to the best of our knowledge, the extant research is limited to the investigation of only direct relationships between any one aspect of communication quality and proposed social exchange constructs (relational commitment or reciprocity).

To effectively achieve and realize SCR, it is imperative to advance a holistic comprehension of the factors that affect SC members' behaviors (Cheng and Lu, 2017). Previous empirical research has underlined the necessity of a further theoretical lens in SCR studies to improve our understanding of the phenomenon (Li et al., 2017; Tukamuhabwa et al., 2015). In this vein, social exchange theory (SET) is the appropriate approach to gain a deep comprehension of SC relationships (Jain et al., 2017; Mishra et al., 2016) as well as the collaborative behaviors of partners in achieving SCR. There are several studies grounded on SET to explain SCRM incidents (e.g., Mishra et al., 2016; Zelbst et al., 2009), but only a few of them investigate SCR (e.g., Jain et al., 2017).

Extant literature has indicated that successful management of the relationships among SC members contributes to firm performance (Ambrose et al., 2010). It has been argued that relational factors like commitment and reciprocity play a significant role in high-value strategic relationships (Morgan and Hunt, 1994). In such relationships, both parties must perceive that the relationship is a success and they are gaining value from the relationship (Ambrose et al., 2010). Furthermore, this reciprocity has led SC members to act more collaboratively, stimulating and facilitating communication quality (Lancastre and Lages, 2006; Paulraj et al., 2008).

In this study, we respond to recent calls for the incorporation of social and behavioral elements into the understanding of SCR (Wieland and Durach, 2021). We adopt SET (Blau, 1964) and examine three basic social exchange factors (commitment, reciprocity, and communication quality) as the antecedents of SCR. We also investigate how communication quality conveys the role of relational commitment and reciprocity in pursuing SCR. In addition, we examine the link between SCR and SCRM performance to establish the value of SCR. In so doing, we rely on data obtained from prominent executives of manufacturing firms from various sectors in Turkey and analyze it through partial least squares structural equation modeling.

The main contribution of this study is to enable a better understanding of the importance of SET factors in the supply chain management (SCM) literature and to develop a novel model that includes SCR along with empirical validation. It is found that reciprocity and relational commitment are indirectly related to SCR indirectly via communication quality. This finding justifies further research into the models related to SCM literature which include core factors of SET. For executives, this study makes key suggestions contingent upon the business's capability to gain a more robust structure and effectively overcome SC risks by developing social relationships with SC partners.

The paper is structured into several sections. Section 2 commences with SET and a literature review related to its factors. Section 3 discusses linkages between communication quality, relational commitment, reciprocity, and SCR in the context of SCRM and discusses the development of the research hypotheses. Research methodology and analysis are outlined in section 4. Finally, the conclusion, theoretical contributions, managerial implications, and suggestions for future research are propounded in section 5.

2. Theoretical background and literature review

2.1. Social exchange theory in logistics and supply chain management

SET was originally developed as a sociological theory for examining human social behaviors from the viewpoint of the exchange of resources. Blau (1964, p. 91) described the social exchange as "voluntary actions of individuals that are motivated by the returns they are expected to bring and typically do in fact bring from others." SET examines the social interaction between two entities that are participating in such an interaction in order to achieve a positive economic outcome (Ali and Khalid, 2017). Entities compare the potential benefits to costs before performing a behavior (Blau, 1964; Lai et al., 2014; Shin et al., 2017; Tsai and Kang, 2019). For instance, if an individual perceived that the costs of a relationship outweighed the sensed benefits, they would select to leave the

relationship.

Over time, SET has significantly progressed. Apart from dyadic relationships between people and organizations, SET principles have also been implemented to understand network relationships (Lai et al., 2014) since a social exchange is largely managed by social obligations rather than by contracts (Blau, 1964). Subsequently, SET has been adopted to explain the drivers and nature of SC relationships (e.g., Chang et al., 2015a; Griffith et al., 2006; Lai, 2009; Merminod et al., 2021; Voss et al., 2019; Yang et al., 2021). In the context of SC relationships, SET depicts how relational mechanisms tend to affect business behavior through social/business interactions and emphasizes the management of SC exchanges through social interactions and socially embedded relationships (Yang et al., 2021). Recent research has also highlighted collaborative social relationships as potential enablers of responses to and mitigation of SC disruptions (Merminod et al., 2021). Thus, SET has become an important theoretical perspective to better understand the reason SC partners collaborate and how their relationship dynamics change over time, including perceptions of fairness and justice. SET can be linked with SCM because SCs are an interrelated network of suppliers and customers (Zelbst et al., 2009) and are managed by social obligations.

SET postulates that inter-organizational exchanges involve a set of implicit obligations and reciprocity, thereby highlighting the role of relational governance in cultivating collaboration against risks (Lai, 2009). As such, SET can assist in identifying the factors that help leverage the external resources of enterprise between SC partners. In building our conceptual framework, we draw on the notion that integration of resources in exchange relationships may be optimized through high communication quality (Mohr and Nevin, 1990; Morgan and Hunt, 1994), relational commitment (Morgan and Hunt, 1994; Söllner, 1999), and reciprocity (Emerson and Richard, 1962). In particular, we concentrate on three specific factors that emblemize a business's external social relationships: (1) communication quality in managing the relationships between SC partners on SC risks, (2) partners' identification with the management of SC risk and its objectives, and (3) the perceived reciprocal benefits of the outcomes obtained from the risk management process. The glue that binds these factors is SET, by which these three concepts constitute core premises of social exchange behavior between business partners and are frequently applied to better understand antecedents and consequences of successful SC relationships (Emerson and Richard, 1962; Mohr and Nevin, 1990; Morgan and Hunt, 1994; Söllner, 1999).

Relational commitment is central to successful relationships among partners (Morgan and Hunt, 1994). It ensures partners' potentially high-risk actions are prudent due to the belief that their partners will not act opportunistically. The social exchange is based on reciprocal relationships which warrant that exchange parties will satisfy their share of socioemotional necessities in the future. Effective communication conveys a relational understanding of each party's expectations of others, thereby creating relational commitment and feelings of reciprocity (Shin et al., 2017). Therefore, it is necessary to investigate these three factors jointly to better understand SC relationships. This study examines these three critical concepts in relation to SCR, which is increasingly becoming a critical aspect of modern SCs (Gölgeci and Kuivalainen, 2020). Detailed explanations of each construct in light of SET and the proposed hypotheses are discussed in the subsections.

2.1.1. Relational commitment

The core focus of SET is on creating values that motivate partners to retain the relationship (Shin et al., 2017) as sustainable long-run relationships are instrumental for successful SCM. Mutual commitment is a significant ingredient of social exchange. It ensures that partners will put forth the effort and make the investments essential to generate mutually desired outcomes and cooperative behaviors. Mutually desirable outcomes enhance the partners' desires to proceed with the relationship or stimulate their commitment to the relationship (Morgan and Hunt, 1994). For this reason, creating relational commitment has great importance in developing a successful relationship (Ambrose et al., 2010; Chang et al., 2015a). Morgan and Hunt (1994, p. 23) defined *relational commitment* as "an exchange partner believing that an ongoing relationship with another is so important as to warrant maximum efforts at maintaining it; that is, the commitment party believes the relationship is worth working on to ensure that it endures indefinitely." In this research, we focus in particular on firms' relational commitment to their SC partners rather than on mutual/dyadic commitment among SC partners.

Relational commitment is a significant factor for stable SC relationships from a long-term view (Park et al., 2012; Yang et al., 2008). Relational commitment in alliances engenders reciprocal reverence for suppliers and buyers. It instills confidence in SC partners and creates reciprocally beneficial exchanges (Yang et al., 2008). However, in some situations, low levels of commitment might inhibit the development of effective SC practices and investments in long-term SC goals (Agarwal and Narayana, 2020). Therefore, creating relational commitment is essential for businesses to improve steady relationships among partners (Yang et al., 2008).

2.1.2. Reciprocity

The theoretical tenets of SET explain that "social behavior is a series of exchanges" (Chang et al., 2015a, p.868). Besides tangible resources, SET depicts the exchange of discrete resources with symbolic benefits, such as knowledge, status, respect, or reputation (Chang et al., 2015a). According to SET, reciprocity—defined as mutual SC exchanges that partners perceive as fair—is an important concept because behavior by an exchange partner will encourage reciprocal action by the other partner. SET comprises prior unknown obligations and there is uncertainty when rewards are dispatched (Blau, 1964). If no reward is bestowed on an individual after ensuring a favor, they or other individuals may abandon the favor (Akhavan et al., 2015). However, if one can provide value to another, another can reciprocally provide the same. The two parties' interactions end up with the continuance of the social relationships. This may happen between two individuals or in SC relationships (Shin et al., 2017). Generally, when a partner obtains something beneficial from other partners, they have a responsibility to reciprocate (Chang et al., 2015a; Chang et al., 2015b; Emerson and Richard, 1962). However, in some situations, if they fail to reciprocate "mutual assistance" obtained from others, it raises adverse feelings, such as culpability (Tsai and Kang, 2019).

The role of mutually beneficial exchanges is often highlighted in SC relationships (Lai et al., 2005). The order and persistence of the

relationship are established on the reciprocal exchange of benefits among SC partners. For partners, reciprocity provides long-term gratification (Johnson and Sohi, 2001). Reciprocity is characterized by relationships that are discerned to have a greater value than are relationships with merely-one-way communication (Ganguly et al., 2019). It also reveals exchange partners' inclinations to abide by behavioral norms (Voss et al., 2019). Reciprocity can thus be considered a substantial factor in managing risks. Some researchers argue that reciprocity has been given extensive attention in the SET literature and management research (e.g., Jajja et al., 2020). Others (e.g., Johnson and Sohi, 2001; Voss et al., 2019) highlight that despite the importance of reciprocity, it has generally escaped attention in models of SC relationships based on SET arguments.

2.1.3. Communication quality

As has been known for many years, communication among SC members is central to SC philosophy (Ellinger et al., 1999). In this study, communication quality can be described as the formal and informal sharing of risk information among partners. It signifies "the quality of the information that is exchanged," which can facilitate overcoming the encountered risk in SCs. It describes the comprehensive value of this exchange to member relationships rather than the amount of communication (Chang et al., 2015a). Morgan and Hunt (1994) highlighted that communication quality is evaluated by three facets: relevant to the subject, timely, and reliable. When these characteristics are satisfied, partners consider there to be strong communication quality and trust is formed between the members. If quality communication is regularly achieved, it prevents SC members from terminating relationships (Mohr and Nevin, 1990). Effective communication decreases unnecessary arguments and enhances productive outcomes even when two actors experience disputes (Shin et al., 2017). Arnold et al. (2010) provided empirical support that communication has multiple qualities which are contingent upon the profoundness of SC relationships. For example, high-quality communications might assist SC members to have extensive and accurate information on the SC at the right time and place and thus improve their business comprehension. In their relationships, effective communication indicates SC success (Shin et al., 2017).

SC communication has been receiving increased attention in the literature (Lai et al., 2005). Communication is an important interpersonal process comprising a recurrent cycle of initiating, sustaining, and terminating information exchanges (Park et al., 2012). The efficiency of this process between firms has been conceptualized as communication quality (Chang et al., 2015a). Healthy communication patterns raise the possibility of meaningful information exchanges in the relationship (Johnson and Sohi, 2001). The communication quality intrinsically signifies "the formal and informal sharing of timely and meaningful information between SC partners" (Park et al., 2012). Researchers recommend increasing communication quality to decrease miscommunication in the process of SCRM (Can Saglam et al., 2020).

2.2. Supply chain resilience

SCR is the competency to effectively respond to, recover from, and leverage unexpected disruptions (Yu et al., 2019). Recently, Wieland and Durach (2021, p.316) defined SCR to be "the capacity of a supply chain to persist, adapt, or transform in the face of change." It is argued that given the recent developments in global SCs, this definition represents a more dynamic view of SCR and is better aligned with modern SCs and modern approaches to SCM. As such, we adopt Wieland and Durach's (2021) definition in this study.

Modern SCs are "complex, nonlinear, and self-organizing, permeated by uncertainty and discontinuities." (Wieland and Durach, 2021, p.319). In view of these realities, SCR is the backbone of the effective management of SC risk. However, SCR also emphasizes nonlinear dynamics, uncertainty, thresholds, and surprise, and it incorporates the capacity to adapt and transform. Even though SCR can overcome unexpected disruptions and incidents, it is on the underlying grounds that not all risks can be predicted, managed, or averted. SCR highlights a firm's capacity to survive and adapt when faced with uncertainty and change (Scholten et al., 2014). Although each resilient practice comes at a cost, it is suggested that in turbulent and uncertain environments, enterprises should make more investments in risk response and prevention practices to integrate resilience into SCs (Li et al., 2017; Yu et al., 2019).

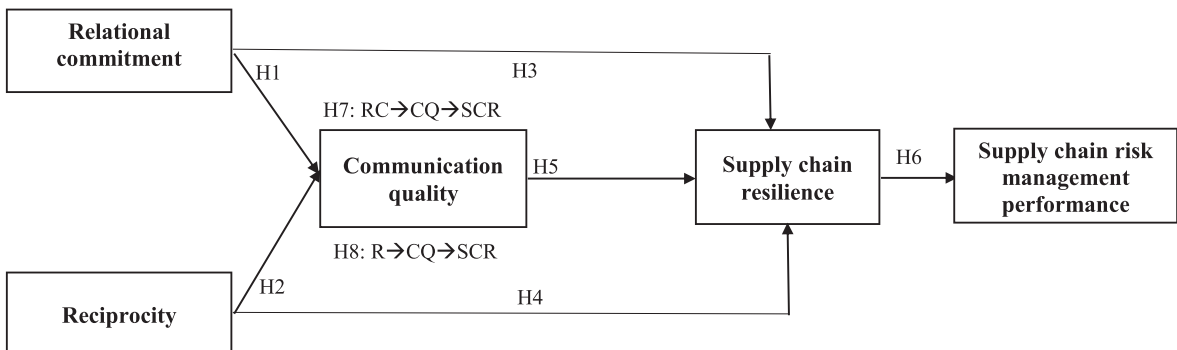


Fig. 1. Conceptual framework of the study.

3. Hypotheses development

Based on SET, we propounded a series of hypotheses on the relationships between social factors (relational commitment, communication quality, and reciprocity), SCR, SCR performance, and the mediating effect of communication quality. Fig. 1 presents the conceptual model of the study.

3.1. Direct hypotheses

Relational commitment is argued to be instrumental to improve a consistent relationship as well as confidence in the stability of the relationship (Chang et al., 2015a). With a greater commitment of firms to their SC partners, those partners are likely to have a steady motivation to constitute, retain, and strengthen the relationships (Lancastre and Lages, 2006) and improve communication quality (Ellinger et al., 1999). Chang et al. (2015a) emphasized that SC members' commitments to their partners have been seen as the core driver of reciprocal beneficial processes, such as communication quality. According to Lancastre and Lages (2006), relational commitment leads to better collaboration among SC members because communication quality is one of the key elements of successful collaboration (Paulraj et al., 2008). While it could be argued that communication quality enhances relational commitment more than vice versa, we expect that a firm's relational commitment to its SC partners precedes communication quality between these partners. As such, we expect that when a firm's relational commitment to its SC partners is high, such commitment is likely to be reciprocated with improved communication quality. As the efforts that SC partners dedicate to enhancing their relationships with their partners over the long term are likely to positively influence the quality of the communication, the following hypothesis is proposed:

H1 *Relational commitment is positively associated with communication quality.*

The concept of reciprocity indicates that people are compelled to assist those who have assisted them and should not harm them (Tsai and Kang, 2009). In line with the "pay it forward" mantra, the best way to obtain assistance from others is to assist them in the first place (Voss et al., 2019). Reciprocal investments in the long term (including tangible and intangible assets) can be seen as an inhibitor of opportunistic actions (Chang et al., 2017) and a facilitator of greater communication quality between SC partners. In fact, reciprocity is argued to be instrumental for knowledge sharing and communication (Chang et al., 2015b; Ganguly et al., 2019). Reciprocal relationships are characterized by greater degrees of credibility and benevolent trust (Voss et al., 2019), which can be strong grounds for enhancing communication quality between SC partners. That said, it might be difficult to maintain a perfect balance of reciprocity between the partners (Voss et al., 2019), and even small asymmetries in reciprocity might be harmful to communication quality. Still, as one of the fundamental pillars of communication and knowledge sharing is trust (Kwon and Sulh, 2005; Morgan and Hunt, 1994), reciprocity could be an important bedrock for building trust and subsequently cultivating communication quality. As such, it can be concluded that if two partners believe that reciprocal benefits exist between them, they may share more accurate information about SC operations and improve their communication quality. This study thus propounds the following hypothesis on the relationship between reciprocity and communication quality:

H2 *Reciprocity is positively associated with communication quality.*

A firm's relational commitment to its SC partners is required to advance robust SC relationships and the outcomes desired from these relationships (Söllner, 1999). According to Chang et al. (2015a), building and manifesting relational commitment necessitates substantial investments, but if an enterprise takes a long-term view of relational rents to succeed in balancing personal gain and relations with others, the benefits over time will likely outweigh the costs. In other words, these authors argued that firms might improve and strengthen their relationships with their SC partners if they abstained from short-term interests and committed to long-term shared interests.

Past empirical evidence has indicated that relational commitment stimulates SC performance (Agarwal and Narayana, 2020), as it enhances knowledge sharing among SC partners (Holm et al., 1999). In addition, it may lead to a change in SC manager's motivations from being "concerned about my firm's needs" to being "concerned about SC's needs" (De Clercq et al., 2010). When firms' relational commitment to their SC partners instigate a greater degree of concern about the whole SC's needs among SC members, it is more likely that SC partners will stick together in the face of disruptions and hardships and a greater commitment toward SCR will result. On the other hand, research on the dark side of SC relationships notes that at times, inertia—that is, sticking to the same organizational routines and reproducible structures—is often negatively correlated with SCR but might be positively linked to commitment (Gligor et al., 2021). This perspective may spell the limits of relational commitment in relation to SCR and highlight a more nuanced view of the connection between relational commitment and SCR. Still, we expect that firms' relational commitment to SC partners is required to properly mitigate SC risks. Without sufficient commitment, the working relationship will become vulnerable and fragile (Kwon and Sulh, 2005), more exposed to disruptions and shocks. Similarly, a firm's relational commitment to its SC partners may function as a hedge against challenges and disruptions that these partners face. They may be more likely to withstand adversity and adapt to unexpected changes if the firm stays committed to its relationships and maintains the coherence and connectedness of its SCs.

Furthermore, if a firm cares about its management of SC risks, it values its SC partners' efforts and invests more in the development of relational commitment in collaborative risk management. In this way, developing relational commitment may enhance SCR. By leveraging SET, we contend that a firm's relational commitment to its SC partners provides a greater opportunity to enhance SCR.

H3 *Relational commitment is positively associated with SCR.*

Drawing from SET, this study evaluates reciprocity as a strong sense of obligation that portrays how a firm should treat its SC partners in the pursuit of SCR. Reciprocity describes a firm's perceived commitment to its SC partners in terms of assisting them on demand and on a reciprocal basis (Tsai and Kang, 2019). It can foster trust among members and reduce opportunism in SC relationships. Zelbst et al. (2009) empirically found that favorable SC relationships that engender win-win situations positively affect SC

performance. Collaboration that enhances reciprocal benefits is better suited to developing sustainable relationships (Hou et al., 2018). In turn, SCR can be improved through successful collaborations nourished by reciprocity principles. If SC members believe that their SC partners will respond in the same way as they do to the disruptions and hardships and will help each other in the face of adversity, they reciprocate in the same way. Likewise, a firm that strongly adopts reciprocity toward its SC partners and treats them fairly (Griffith et al., 2006) can expect its SC partners to favorably reciprocate in times of disruptions and hardships to offset its vulnerabilities and enhance SCR. While the kind of reciprocity may matter more than the mere existence of reciprocity in times of hardship, a firm following the principles of reciprocity toward its SC partners can, by and large, expect that it will be more effective to navigate disruptions and hardships together, as one's strength can offset the other's weakness. Therefore, we claim that SCR may be increased by the reciprocity of positive outcomes in risk management over time among SC partners.

H4 *Reciprocity is positively associated with SCR.*

Collaborative SC relationships are critical for SCs in attaining sustainable competitive advantages (Hou et al., 2018). Communication is an essential ingredient for collaborative SC relationships (Ellinger et al., 1999; Paulraj et al., 2008), and communication quality is pivotal when a multitude of actors and activities are involved in interactive relations among SC partners. This type of interaction could be evaluated as a mechanism encapsulating rich information processing and a high degree of effective communication that could offer increased visibility and connectedness in SC operations amid disruptions (Johnson and Sohi, 2001). These mechanisms, therefore, can directly alleviate problems, such as uncertainty in information (Johnson and Sohi, 2001; Park et al., 2012) and the severity of SC disruptions (Yu et al., 2019). Such uncertainty mitigation signals that information flows will be of high quality (Johnson and Sohi, 2001).

While miscommunication prevents managers from sharing risk information in SCs (Can Saglam et al., 2020), efficient communication reduces pointless arguments and enhances positive outcomes, such as trust and intactness amid adversity (Morgan and Hunt, 1994). In fact, strong and frequent unidirectional communication between SC members is the crux of the supply chain. Likewise, effective communication significantly reinforces the enhancement of long-term relationships among SC members that can be a bedrock for achieving greater levels of SCR (Park et al., 2012). When SC partners frequently and effectively communicate about their SC activities, they are more likely to either foresee or quickly respond to unexpected disruptions and adversities and recover quickly in the aftermath of hardships through their joint efforts. The caveat here is that not all communications are effective (Park et al., 2012). Communication may not always convey correct or useful information between SC partners (Gligor et al., 2021). There might be cases in which communication quality may hurt SCR if the conveyed information is wrong/harmful to the partners. Considering its benefits and the fact that communication quality between SC partners plays a crucial role in addressing SC disruptions, this study hypothesizes that communication quality will positively influence SCR.

H5 *Communication quality is positively associated with SCR.*

Given that SCR is a relatively new management concept, there is scarce research empirically investigating the linkage between SCR and performance metrics (Han et al., 2020; Li et al., 2017). Prior research evaluates SCR as an enabler of organizational performance (Gölgeci and Kuivalainen, 2020) and financial performance (Li et al., 2017; Yu et al., 2019). This limited research calls for an examination of the relationship between SCR and other related performance outcomes (Li et al., 2017; Yu et al., 2019). It is thus essential to examine the role of SCR on SCRM performance. Since SCR is considered a proactive risk management strategy (Can Saglam et al., 2021; Scholten et al., 2014) and a critical capability to respond to, withstand, and recover from manifested SC risks (Gölgeci and Kuivalainen, 2020), SCR can be anticipated to play an important role in enhancing SCRM performance.

H6 *SCR is positively associated with SCRM performance.*

3.2. The mediating role of communication quality

In discussing the direct hypotheses, we argued for direct linkages between relational commitment and communication quality, reciprocity and communication quality, and communication quality and SCR. Based on these arguments, we scrutinize the possible mediating role of communication quality in conveying the influences of relational commitment and reciprocity on SCR.

SC relationships can have both positive and negative outcomes (Gligor et al., 2021; Gölgeci and Kuivalainen, 2020). Hence, relational commitment and reciprocity may not always automatically lead to desired performance consequences. Implementing qualified communication in SCs can help organizations realize the potential of reciprocity and relational commitment and derive positive outcomes from these attitudinal concepts. This is because communication quality can be evaluated as an adhesive that holds SC partners together in the risk management process (Mohr and Nevin, 1990). Relational commitment and reciprocity in SCs can enhance communication quality. Communication quality, in turn, may facilitate the manifestation of the positive attributes of relational commitment and reciprocity in the pursuit of SCR. Furthermore, it aligns the partners' expectations and perceptions, facilitates the development of close relationships, reduces misunderstandings, and enables partners to overcome challenges (Khalid and Ali, 2017). Therefore, reciprocity and relational commitment may entail the mediating means of communication quality to realize their potential impact on SCR.

H7 *Communication quality mediates the relationship between relational commitment and SCR.*

H8 *Communication quality mediates the relationship between reciprocity and SCR.*

4. Research methodology

4.1. Data collection and sampling

A series of interviews with four academic and four practitioner experts were performed to prepare the survey and perform content analysis. After some modifications based on the experts' feedback, we pre-tested the survey in a second step on 15 managers who acted both as reviewers and respondents. The survey was then modified and improved based on their recommendations, resulting in the final version. The survey was conducted in the Turkish language; the English version of the survey was translated into Turkish by the first author. It was then checked for accuracy following the conventional back-translation process. Back-translation is a useful process to determine misunderstandings and misinterpretations before a survey is carried out (Gölgeci et al., 2019). Appendix A (Table A1) presents the construct items and their sources.

The target group of the research was the manufacturing firms operating in Turkey. The Union of Chambers and Commodity Exchanges of Turkey (TOBB) presents an industrial database that encapsulates > 40,000 companies registered within its 93 chambers in Turkey. The sampling frame of this study was based on the website of TOBB. A total of 500 randomly selected firms were invited to take part in the study. The targeted respondents were high- and mid-level managers who were knowledgeable about their firms' process of SCRM. As a result, 156 managers from each enterprise who were contacted via e-mail took part in the survey. Power analysis was performed using the G Power program to ensure that the sample size of 156 surveys was sufficient. The parameters determined for the analysis are $f^2 = 0.15$ (medium effect size), $\alpha = 0.05$, power = 0.80, and the number of predictors = 6. According to the determined parameters, the minimum acceptable sample size is 98. As a result, 156 surveys were accepted as sufficient as they met the minimum sample size.

We reached out to a single high or middle manager for each firm. Although SET was initially developed to investigate interpersonal phenomena, it was later found to have wide-range applications in other business and management domains (e.g., De Clercq et al., 2010; Khalid and Ali, 2017; Lai et al., 2014). Several previous studies in the SCM field adopted SET at a firm level of analysis to apply insights afforded by SET to SC relationships (e.g., Chang et al., 2015a; Griffith et al., 2006; Mishra et al., 2016). Descriptive statistical information about the enterprises that answered the questionnaire is given in Table 1. As seen in Table 1, most of the respondents held the position of operational manager, SC manager, sales and marketing manager, or CEO, so they were well informed about their firms' process of SCRM.

4.2. Measurement

This study has five variables: relational commitment, communication quality, reciprocity, SCR, and SCRM performance. A four-item scale was used to measure relational commitment in order to reflect both the importance respondents place on their relationships with SC members and their beliefs about maintaining and strengthening the relationships. As relational commitment is related to the dedication of SC members to their relationships in this study, relational commitment items were adapted from Morgan and Hunt's (1994) and Shin et al.'s (2017) studies. The concept of reciprocity was operationalized by associating it with the subject of risk. It is often conceptualized vis-à-vis knowledge sharing and cooperation (Chang et al., 2015b; Tsai and Kang, 2019). Therefore, our three

Table 1
Descriptive statistics of the respondents.

Characteristic	Number	%
<i>Respondent position</i>		
Supply chain/Logistic manager	31	19.8
General manager/CEO	42	26.9
Marketing/Purchasing manager	28	17.9
Operation manager	16	10.2
Other senior managers	39	25
<i>Industry sector</i>		
Automotive and related	36	23
Food and beverage	21	13.4
Electronics and electrical	27	17.3
Metal and steel	25	16
Chemical	19	12.1
Other industries	28	17.9
<i>Number of employees</i>		
≤50	42	12
51–100	39	30
101–150	31	20
151–200	36	23
>200		
<i>Years of operation</i>		
≤10	16	10.2
11–40	52	33.3
>40	88	56.4
N	156	

items are based on items adapted from Chang et al. (2015b) related to sharing mutually beneficial risk information with SC members and items adapted from Tsai and Kang (2019) related to helping an SC member who previously helped the business in risk management. The communication quality variable, like the reciprocity variable, was conceptualized by associating it with the risk issue, and a five-item scale was used for this. The items in this scale were adapted from Morgan and Hunt (1994) and Shin et al. (2017). SCR reflects more than a reactively deployed capability. It measures the extent to which SC members both resist difficulties and adversities and realize the benefits of various opportunities the environment presents. As such, a five-item scale from Gölgeci and Kuivalainen (2020) was used to measure SCR in order to capture a holistic understanding of SCR. SCR performance fundamentally measures the ability of companies to mitigate the frequency of supply risk occurrence and face opportunities and threats (Hoffman et al., 2013; Liu et al., 2018). A three-item scale used by Hoffman et al. (2013) was used for SCR performance—the dependent variable of the research—and two items were also taken from Liu et al. (2018) for this variable. The first three items in this scale measured the frequency of SC risks for enterprises and to what extent the effects caused by these risks can be reduced. The last two items in the scale measured the ability of enterprises to face opportunities and threats and the level of resources allocated to risk management. Consequently, the questionnaire consisted of 24 measurement items, with a 5-point Likert scale used for the answers (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree).

4.3. Common method variance (CMV) analysis

Common method variance may occur if the self-assessment method is used in survey studies and different variables are answered by the same participants simultaneously (Malhotra et al., 2006). In this study, Harman’s single factor test was used to detect the presence of CMV. Accordingly, the measurement items included in the unrotated factor analysis were not collected under a single factor. A large proportion of the explained variance was not represented by a single factor (Luo et al., 2015; Podsakoff et al., 2003; Singh et al., 2008). In conclusion, Harman’s single factor test signified that common method variance was not a problem for this study.

4.4. Analysis

Partial least squares (PLS) structural equation modeling (PLS-SEM) was preferred for data analysis. PLS is a second-generation modeling technique that is of prevalent use in SCM research (Stekelorum et al., 2021). It simultaneously evaluates the measurement model and the relationships between structures (Lai et al., 2012). This method is based on the estimation of the correlation coefficients that maximize the R² value of the dependent variable. Compared to covariance-based SEM, such as AMOS and LISREL, PLS-SEM does not have many assumptions. For example, PLS-SEM does not require the assumption of normal distribution and can

Table 2
Confirmatory and exploratory factor analysis.

	Factor loadings (CFA)	t Statistics ***	Factor loadings (EFA)	Alfa	CR	AVE	rho_A****
R_Commit_1	0.790	14.294	0.640	0.841	0.894	0.678	0.846
R_Commit_2	0.826	20.336	0.590				
R_Commit_3	0.878	37.354	0.766				
R_Commit_4	0.797	11.075	0.803				
Com_Quality_1	0.700	9.175	0.501				
Com_Quality_2	0.744	8.472	0.577	0.849	0.893	0.626	0.857
Com_Quality_3	0.836	20.187	0.724				
Com_Quality_4	0.857	27.790	0.810				
Com_Quality_5	0.810	22.279	0.565				
Reciprocity_1	0.898	34.373	0.836				
Reciprocity_2	0.929	48.086	0.875	0.895	0.929	0.767	0.902
Reciprocity_3	0.929	49.229	0.864				
Reciprocity_4*	–	–	–				
Reciprocity_5	0.731	12.650	0.612				
SC_Resilience_1	0.830	30.155	0.740				
SC_Resilience_2	0.846	22.066	0.778	0.841	0.893	0.676	0.848
SC_Resilience_3	0.795	21.348	0.808				
SC_Resilience_4	0.818	26.441	0.649				
SC_Resilience_5* -	–	–	–				
SCRM_Per_1	0.779	18.389	0.646				
SCRM_Per_2	0.907	60.570	0.813	0.846	0.897	0.687	0.855
SCRM_Per_3	0.864	21.484	0.782				
SCRM_Per_4	0.756	19.732	0.571				
SCRM_Per_5**	–	–	–				

*As the factor loading was low in exploratory factor analysis, it was excluded from the scale.

** As the factor loading was low in confirmatory factor analysis, it was excluded from the scale.

*** All values are significant at the 0.000 level.**** The critical value for rho_A, which is presented as an alternative to the Alpha value by some authors, is 0.70 (Henseler et al. 2016)

. It is seen that all rho_A values in the table exceeded the threshold value.

work effectively in a small sample (Chang et al., 2021; Henseler et al., 2009).

PLS is the most appropriate technique for our study for several reasons. First, this study is a relatively small sample size (n = 156). Second, PLS successfully tests and validates exploratory research models and is a substantial statistical tool for prediction-oriented research (Henseler et al., 2009). Third, in this study, normal distribution analysis was performed with the Kolmogorov-Smirnov test. In addition, kurtosis and skewness values for the normal distribution were examined in the study, and it was determined that some items exceeded the ±2 limit. As a result of these analyses, it was seen that our data set was not suitable for normal distribution and, therefore, covariance-based SEM could not be applied. Fourth, PLS accounts for measurement errors and provides more accurate estimates of interaction effects, such as mediation (Chin, 1998). Moreover, PLS-SEM is especially convenient for studies that focus on forecasting latent variables within a model and determining relationships among them (Luo et al., 2015). According to Saris and Gallhofer (2020), feelings that exist in people’s minds but are not possible to observe directly are called latent variables. In this study, relational commitment and reciprocity can be specifically called latent variables. Thus, PLS-SEM is more convenient than covariance-based SEM, which focuses more on endorsing theoretical relationships (Luo et al., 2015).

We performed validity and reliability analyses using SmartPLS and SPSS programs. First, exploratory factor analysis (EFA) was performed with the SPSS program, and as a result of the analysis, it was seen that the variables were loaded on five factors as expected. At this stage, the “Reciprocity_4” and “SC_Resilience_5” items which had low factor loadings were removed from the scale. Factor loadings of other variables were between 0.501 and 0.875 (see Table 2). The KMO (sample adequacy criterion test—Kaiser Meyer Olkin) scale value was 0.881. The Barlett test of sphericity was also found to be significant. Considering the findings that the KMO value was higher than 0.60 and the Barlett test was significant, it can be said that the data set was suitable for factor analysis. After exploratory factor analysis, confirmatory factor analysis was performed using SmartPLS.

The item “SCRM_Per_5”, which had a low factor load in the confirmatory factor analysis (CFA), was removed from the scale. Confirmatory factor analysis results were also used to analyze convergent and discriminant validity. Convergent validity indicates how much the scale overlaps with other items measuring the same construct. To analyze convergent validity, Cronbach’s alpha, Average Variance Extracted (AVE) values, Composite Reliability (CR), and factor loadings were examined (Merschmann and Thonemann, 2011). As seen in Table 2, the alpha and CR values were above the critical value of 0.70. The AVE value should be higher than 0.50 (Merschmann and Thonemann, 2011). It was seen that the AVE values obtained in the study were between 0.626 and 0.767. Finally, the significance of factor loadings was examined to evaluate convergent validity. The bootstrapping approach was used to evaluate the significance of factor loading, and the t-values of factor loadings were found to be significant at the p < 0.01 level. Based on these results, it can be said that convergent validity was achieved.

Discriminant validity means that there is a weak correlation, that is, a low correlation, between the scale for one construct and scales measuring other constructs. Two procedures were used to evaluate discriminant validity in this study. First, the Fornell-Larcker criterion was taken into account. Table 3 shows that the square root (diagonal elements) of each structure’s AVE value was higher than the correlation coefficients between the structures, thus ensuring discriminant validity according to this criterion. Another method used to test discriminant validity is the Heterotrait-Monotrait (HTMT) ratio. This ratio must be significantly < 1 to clearly distinguish between the two factors (Henseler et al., 2016). Henseler et al. (2015) stated that discriminant validity could be achieved if this ratio is < 0.85. A glance at the HTMT ratios in Table 4 shows that all values are < 0.85 and, therefore, discriminant validity is obtained.

4.5. Endogeneity

Before testing the hypotheses, we also checked if endogeneity was a serious concern by reverse causality (Lu et al., 2018). In particular, there was a possibility of reverse causality between reciprocity and the role of communication quality. The theoretical potential of communication quality influencing reciprocity raises the risk of reciprocity being endogenous. Similarly, there was a possibility of reverse causality between relational commitment and the role of communication quality. The theoretical potential of communication quality influencing relational commitment raises the risk of relational commitment being endogenous. Consequently, we conducted several tests with instrument variables and without instrument variables to identify whether endogeneity was likely to pose a serious threat.

In the first step, we adopted the Gaussian copula approach and tested for an endogeneity threat without instrumental variables (Park and Gupta, 2012). To carry out the Gaussian copula approach, one needs to use the latent variable scores of the original model estimation as input. Next, whether the variables are non-normally distributed should be checked (Sarstedt et al., 2020). A latent variable score of the relational commitment and reciprocity was checked using the Kolmogorov–Smirnov test with Lilliefors correction approaches. The results indicated that none of the latent variables had a normal distribution; the copula approach can be used to check

Table 3
Discriminant validity (Fornell-Lacker Criterion) and correlation coefficients between variables.

	Mean	Std. dev.	R_Commit	SCRM-Per	Com-Quality	Reciprocity	SC-Resilience
R_Commit	3.998	0.568	0.824*				
SCRM_Per	3.586	0.737	0.501	0.829*			
Com_Quality	3.671	0.539	0.620	0.552	0.791*		
Reciprocity	3.876	0.639	0.645	0.450	0.616	0.876*	
SC_Resilience	3.439	0.703	0.322	0.638	0.515	0.278	0.822*

* The diagonal elements are the square root of AVE

Table 4
Discriminant Validity (Heterotrait-Monotrait ratio).

	R_Commit	SCRM-Per	Com-Quality	Reciprocity	SC-Resilience
R_Commit					
SCRM_Per	0.597				
Com_Quality	0.724	0.641			
Reciprocity	0.743	0.522	0.698		
SC_Resilience	0.374	0.748	0.606	0.313	

the endogeneity problem in the model. The results, shown in Table 5, indicate that Gaussian copulas labeled as Recip^C and Commit^C are not significant at 0.05 level in all three copula models. We can conclude that there is no endogeneity problem in this study.

As a second approach to check the endogeneity problem, we carried out a two-stage least squares (2SLS) regression model using instrumental variables. The interdependence construct, adapted from Gölgeci and Ponomarov (2015) (see Appendix A for the measurement items), was chosen as an instrumental variable as it is likely related to relational commitment and reciprocity but is not necessarily correlated with communication quality.

According to 2SLS, we first separately regressed reciprocity and relational commitment on instrumental variables, then utilized the residual of this regression as an additional regressor in our model in which the mediator is the dependent variable. The parameter estimates for the residual were not significant, presenting that reciprocity and relational commitment were not endogenous in our setting and, thus, were in compliance with our conceptual model.

Second, we performed the Durbin–Wu–Hausman endogeneity test to determine whether the exogenous variables are endogenous. The results of this test, which are given in Table 6, were not significant (Wu–Hausman for reciprocity $F(1;153) = 2.43$, $p > 0.1$ and Wu–Hausman for relational commitment $F(1;153) = 0.95$; $p > 0.1$), signifying that the estimates of the 2SLS and OLS models did not vary from one another. Hence, the test results with instrumental variables and without instrumental variables confirm that our results are unlikely to be influenced by endogeneity.

4.6. Results

The SmartPLS program was utilized to test the structural model. After ensuring that the model had no reliability and validity problems, the structural model was assessed by calculating the R^2 and Q^2 values. Table 7 shows the coefficients of R^2 and Q^2 . The R^2 value is related to the predictive accuracy and looks at variance in the endogenous variable explicated by exogenous variable(s) (Afum et al., 2020). The R^2 values of communication quality, SCR, and SCRM performance were calculated as 0.462, 0.269, and 0.407, consecutively. Chin (1998) classifies the explanatory power of R^2 as follows: small 0.19, medium 0.33, and large 0.67. Based on this classification, communication quality and SCRM performance were at a medium level and SCR was at a medium-small level.

The Q^2 value assists in determining if a model has predictive relevance. As a result of the blindfolding procedure, the Q^2 values of communication quality, SCR, and SCRM performance were 0.273, 0.163, and 0.270, respectively. The fact that the Q^2 values of the model were higher than zero indicates that the research model has a predictive relevance feature (Afum et al., 2020).

Table 8 shows the standardized coefficients (β -values) of the relations, t -values calculated with the bootstrapping approach, effect size (f^2), and variance inflation factor (VIF) values. Table 8 presents that the relational commitment variable has a positive and significant effect on communication quality ($\beta = 0.381$; $t = 3.701$). Similarly, the reciprocity variable positively affects communication quality ($\beta = 0.368$; $t = 4.219$). However, while relational commitment and reciprocity variables do not significantly affect SCR, a positive and significant effect of communication quality on SCR was detected ($\beta = 0.541$; $t = 5.655$). Finally, SCR positively affects SCRM performance ($\beta = 0.638$, $t = 11.734$). However, f^2 values were also examined in the study since the path coefficients did not give complete information about the effect size. According to Cohen (1988), if the f^2 value is > 0.35 , it is considered to have a strong effect; between 0.15 and 0.35, a moderate effect; and between 0.02 and 0.15, a weak effect. According to this classification, SCR has a strong effect on SCRM performance. Likewise, the linkages between communication quality and SCR, relational commitment and

Table 5
Gaussian copula results.

Test	Construct	Coefficient	P-value
Gaussian copula of model 1 (endogenous variables; Recip)	Recip	0.232	0.160
	Commit	0.326	0.004
	Recip ^C	0.133	0.213
Gaussian copula of model 2 (endogenous variables; Commit)	Recip	0.393	0.000
	Commit	0.317	0.170
	Commit ^C	0.022	0.950
Gaussian copula of model 3 (endogenous variables; Commit and Recip)	Recip	0.216	0.213
	Commit	0.369	0.076
	Commit ^C	0.144	0.163
	Recip ^C	-0.026	0.707

*C indicates the copula term in the model.

Table 6
Endogeneity Test Results.

Variable/ Factor	Endogeneity Test for Relational Commitment			Endogeneity Test for Reciprocity		
	Dependent Variable		Communication Quality (2SLS)	Dependent Variable		Communication Quality (2SLS)
	Relational Commitment (OLS) First Stage	Communication Quality (OLS) Second Stage		Reciprocity (OLS) First Stage	Communication Quality (OLS) Second Stage	
Recip Commit		0.81***	0.81***		1.090***	1.090***
Depen1	0.11**			0.12		
Depen2	-0.12**			-0.18**		
Depen3	0.10*			-0.04		
Depen4	0.06			0.19**		
Error term		-0.25			-0.542	
Wu-Hausman test statistics F (1;153) = 0.95 P value = 0.314				Wu-Hausman test statistics F (1;153) = 2.43 P value = 0.125		

***p < 0.01, **p < 0.05, *p < 0.1.

Table 7
R-square (R²) and Q-square (Q²).

	R ²	R ² adjusted	Q ²
SCRM performance	0.407	0.403	0.270
Communication quality	0.462	0.455	0.273
SCR	0.269	0.255	0.168

Table 8
Direct relations results.

Hypothesis	β	t-value	P value	f ²	VIF	Result
H1 R_Commit- Com_Quality	0.381	3.701	0.000	0.158	1.712	Supported
H2 Reciprocity - Com_Quality	0.368	4.219	0.000	0.147	1.712	Supported
H3 R_Commit - SC_Resilience	0.037	0.330	0.742	0.001	1.982	Not supported
H4 Reciprocity - SC_Resilience	-0.079	0.821	0.412	0.004	1.963	Not supported
H5 Com_Quality - SC_Resilience	0.541	5.655	0.000	0.216	1.858	Supported
H6 SC_Resilience - SCRM_Per	0.638	11.734	0.000	0.685	1.000	Supported

communication quality, and reciprocity and communication quality exhibited a significant moderate effect. As a result, hypotheses H1, H2, H5, and H6 are supported, while hypotheses H3 and H4 are not supported.

Table 8 also shows VIF values. According to Hair et al. (2014), the VIF coefficients should be below the threshold value of 5 so that there is no problem with linearity between the variables. Since the VIF coefficients in Table 8 are below 5, it is observed that there is no linearity problem between the variables.

Finally, the mediation effects of communication quality were tested in the study. Specific indirect effects were used to test mediation effects, as recommended by Memon et al. (2018) and Agyabeng-Mensah et al. (2020). Table 9 shows the specific indirect effects obtained with the bootstrapping approach for the mediating variable. As can be seen, coefficients for the mediation effects are significant, namely Relational commitment → Communication quality → SCR ($\beta = 0.206$; $t = 2.907$; $p = 0.004$) and Reciprocity → Communication quality → SCR ($\beta = 0.199$; $t = 3.304$, $p = 0.001$). These results reveal that since the direct effects of relational commitment and reciprocity on SCR are insignificant, communication quality fully mediates both the relationship between relational commitment and SCR and between reciprocity and SCR. As a result, hypotheses H7 and H8 are supported.

4.7. Robustness check

In this study, the relationships among the constructs were used as linear. The robustness of the model is checked by investigating

Table 9
Mediation test results.

Hypothesis	Specific indirect effects	t statistics	P values	Result
H7 R_Commit-Com_Quality-SC_Resilience	0.206	2.907	0.004	Supported
H8 Reciprocity-Com_Quality - SC_Resilience	0.199	3.304	0.001	Supported

whether or not there is a nonlinear relationship between the dependent and independent constructs by using Ramsey's (1969) regression equation specification error test (RESET).

To implement the RESET test in a variance-based structural equation model, construct scores should first be computed. Then quadratic and cubic effects should be considered to check whether the specification of a nonlinear effect yields a significant result (Sarstedt et al., 2019). In the first model, SCR is considered a dependent construct with communication quality, reciprocity, and relational commitment used as independent constructs. In the second model, SCR performance is a dependent construct with SCR, communication quality, reciprocity, and relational commitment as independent constructs. Quadratic and cubic terms are added individually and together to each model to check the potential nonlinear effect using STATA software.

Ramsey's RESET results show that neither quadratic (Y2), cubic (Y3), nor both nonlinear effects were found to be significant, as given in Table 10. Therefore, it is concluded that the linear model is robust.

5. Discussion and conclusions

Resilience in the face of crises and unexpected disruptions is pivotal to survival in the volatile modern business environment (Lin et al., 2021). Yet it is getting harder and harder for businesses to survive in today's turbulent, complex, and uncertain conditions. SCR not only effectively deals with SC risks but also may be leveraged to turn hardships into advantages (Can Saglam et al., 2021). Achieving SCR depends on the condition that SC members closely coordinate and collaborate. While the antecedents of SCR have been extensively examined, social drivers and enablers of SCR have received scant attention (Wieland and Durach, 2021), and little is known about how social relationship-based factors lead to SCR.

In this research, SET was used to examine the antecedents of SCR, and three main social relationship-based concepts were discussed. These are relational commitment, reciprocity, and communication quality. The main objective of this study was to examine the path-dependent effect of these antecedents based on SET on SCR.

SC success relies on the proper communication of values (Anderson et al., 1998), which signifies the role of communication quality. In this study, results show that communication quality positively affects SCR. Risk-based communication quality is considered effective if it warns the target group about the danger, its extent, and what needs to be done to protect against it. When risk communication between SC members is effective, it will be easier for SC partners to adapt to unexpected developments, respond to interruptions, and

Table 10
Assessment of nonlinear effects.

	Test	Construct	Coefficient (β) Value	P-value
Model1 Dependent: SC Resilience	Quadratic	R_Commit	0.016	0.891
		Com_Quality	0.321	0.689
		Reciprocity	-0.061	0.741
		Y ²	0.088	0.561
		F test Value	0.339	0.561
	Cubic	R_Commit	0.017	0.885
		Com_Quality	0.529	0.246
		Reciprocity	-0.099	0.472
		Y ³	0.009	0.562
		F test Value	0.337	0.562
	Quadratic and Cubic	R_Commit	0.016	0.892
		Com_Quality	0.365	0.927
		Reciprocity	-0.069	0.926
		Y ²	0.069	0.967
		Y ³	0.002	0.991
Model2 Dependent: SCRM Per	Quadratic	F test Value	0.168	0.845
		SC Resilience	0.490	0.099
		R_Commit	0.249	0.133
		Com_Quality	0.027	0.810
		Reciprocity	0.303	0.136
	Cubic	Y ²	-0.005	0.946
		F test Value	0.004	0.946
		SC Resilience	0.483	0.005
		R_Commit	0.245	0.044
		Com_Quality	0.027	0.812
	Quadratic and Cubic	Reciprocity	0.298	0.030
		Y ³	-0.0002	0.939
		F test Value	0.005	0.939
		SC Resilience	0.402	0.741
		R_Commit	0.205	0.733
	Com_Quality	0.024	0.843	
	Reciprocity	0.248	0.745	
	Y ²	0.051	0.946	
	Y ³	-0.005	0.940	
	F test Value	0.005	0.995	

Table A1
Construct measures.

Relational commitment (R_Commit_) (Morgan and Hunt, 1994; Shin et al., 2017)
1_The relationship among our supply chain members is something we are very committed to.
2_The relationship among our supply chain members is something my firm intends to maintain indefinitely.
3_Our firm plans to do everything in its power to maintain the relationship among our supply chain partners.
4_The relationship among our supply chain members is something that our firm will continue devoting necessary resources to strengthen.
Reciprocity (Reciprocity_) (Chang et al., 2015b; Tsai and Kang, 2019)
1_Our firm considers that sharing risk-related information can be mutually helpful for risk management in the supply chain.
2_Our firm finds that sharing risk-related information can be advantageous to supply chain members for reducing risk.
3_Our firm thinks that sharing risk-related information can improve reciprocally obtained benefits in the process of supply chain risk management.
4_Our firm will spend time and energy to respond to supply chain members who previously helped us to manage risk.
5_Our firm will contribute by conveying our knowledge about the management of supply chain risk to the supply chain members who previously helped us with risk management.
Communication quality (Com_Quality_) (Morgan and Hunt 1994; Shin et al., 2017)
In our relationship, our supply chain members ...
1_keep us informed of upcoming potential threats.
2_communicate well their expectations for our firm's performance in the risk management process.
3_frequently discuss with us the ideas that can mutually benefit for mitigating risk.
4_are good at notifying me about potential threats and uncertainties for supply chain.
5_are helpful in providing feedback on our supply chain risk management performance.
SCR (SC_Resilience_) (Gölgeci and Kuivalainen, 2020)
1_“Our firm's supply chain can adequately respond to unexpected disruptions by quickly restoring its product flow”.
2_“Our firm's supply chain can quickly return to its original state after being disrupted”.
3_“Our firm's supply chain can move to a new, more desirable state after being disrupted”.
4_“Our firm's supply chain is well prepared to deal with the financial outcomes of potential supply chain disruptions”.
5_“Our firm's supply chain has the ability to maintain the desired level of control over structure and function at the time of disruption”.
SCRM performance (SCRM_Per_) (Hoffman et al., 2013; Liu et al., 2018)
1_“Our supply chain risk management is better than that of our competitors”.
2_“In recent years, we were able to (taking into account the industry cycle) Minimize the frequency of supply risks occurring”.
3_“In recent years, we were able to (taking into account the industry cycle) Minimize the magnitude of the effect of occurring supply risks”.
4_“Our company's ability to confront opportunities and threats in the environment is better compared to recent years”.
5_“Our company's resource input into risk management (e.g., material elements and efforts) is better compared to recent years”.
Interdependence (Gölgeci and Ponomarov, 2015)
1_“The time to establish another strategic supplier alliance/partnership in place of a terminated one would be extremely long for our firm”.
2_“The time to replace a lost strategic customer would be extremely long for our firm”.
3_“The cost to establish another strategic supplier alliance/partnership in place of a terminated one would be extremely high for our firm”.
4_“The cost to establish a new strategic customer partnership would be extremely high for our firm”.

increase SCR. This is because strong communication quality can facilitate the estimation of the probability a risk will result in an unexpected situation as well as the extent of damage that will occur. In addition, it solves various potential problems inherent in exchanging information and knowledge (Park et al., 2012).

Our results also indicate that relational commitment positively affects communication quality. Relational commitment helps build social relationships, encourages supportive behaviors among partners (Yang et al., 2008), enhances exchange relationships, and ensures long-run gratification for partners (Johnson and Sohi, 2001). When SC members are committed to each other, they are more willing to collaborate and act in accordance with the others' requests, share information, and be involved in joint problem solving. Considering the risk inherent in the information exchange, the commitments of the partners to the relationship are essential to the effectiveness of the information exchange. This is because commitment prevents partners from deteriorating the quality of communication by exchanging inaccurate and incomplete information. Moreover, relational commitment increases the respect between buyers and suppliers, instills trust in members (Yang et al., 2008), and consequently strengthens communication between members. In turn, trust can significantly enhance the aggregated working capital and reduce a firm's likelihood of bankruptcy (Hou et al., 2018). The importance of relational commitment between SC partners has been highlighted in the literature. For instance, it has been presented that commitment in the context of strategic alliances (e.g., Perry et al., 2004) and marketing (e.g., Morgan and Hunt, 1994) has a significant impact on relationship effectiveness (such as increased profitability, market share, and the accomplishment of original alliance objectives). Our findings align with and add to the extant research that examines relational commitment as an important antecedent of relational performance (Chang et al., 2021) when considering its direct relations with communication quality.

We also found that reciprocity positively affected communication quality. This result adds to the previous research that has examined reciprocity in relation to other phenomena but overlooked its role in communication quality. For example, Ganguly et al. (2019) stated that knowledge reciprocation positively affected tacit knowledge sharing, and Chang et al. (2015b) stated that reciprocity increased the tendency to share knowledge. SC members feel obligated to respond to the actions with reciprocal attitudes and behavior because a positive attitude reciprocates positive actions. Specifically, SC partners share information when they are confident that collaboration will enable greater shared understanding and lead to mutual benefits (Bock et al., 2005; Chang et al., 2015b). As it enables SC partners who share similar interests to accumulate valuable information and provides collaborative problem solving, reciprocity supports professional learning (Tsai and Kang, 2019). Given the recently highlighted role of knowledge management in

SCR (Ali et al., 2021), this finding indicates that reciprocity can contribute to SCR through increased knowledge sharing. Thus, it can be concluded that reciprocity can facilitate the identification of the mechanisms needed to assist in building resilience (Verghese et al., 2022).

In this study, the effect of relational commitment on SCR was insignificant. This finding somewhat contradicts earlier research that highlighted relational commitment as an instrumental requirement for effective SCM (Kwon and Sulh, 2005; Lai, 2009) as well as recent research in logistics and SCM that argues commitment reduces the negative effects of uncertainty (Ge et al., 2021). In addition, reciprocity was found to have no direct effect on SCR. This is counterintuitive and runs against the past research that connects interdependence—as a concept related to reciprocity—with SCR (Gölgeci and Ponomarov, 2015). Nonetheless, even though no direct effect of relational commitment and reciprocity on SCR could be detected, indirect effects were revealed.

Our research results also show that SCR positively affected SCRM performance. This result is consistent with the results of similar studies. For example, Can Saglam et al. (2021) found that SCR positively affects SCRM performance. SCR makes it easier to cope with unforeseen situations and adapt to new risk environments (Ali et al., 2021; Pettit et al., 2010). As a result, SCR will reduce the risks or help to better cope with the risks and ultimately increase SCRM performance.

Finally, our findings indicate that communication quality can function as a linking pin between relational commitment and SCR. Similarly, reciprocity has an indirect effect on SCR, and this effect was mediated through communication quality. The impacts of both relational commitment and reciprocity on SCR are fully mediated by and dependent on communication quality. Thus, our results highlight the pivotal role of communication quality in realizing the effects of relational commitment and reciprocity and conveying their influence on SCR. We show that relational commitment, reciprocity, and communication quality have a particular complementary influence on SCR, and communication quality is revealed to be instrumental in realizing the potential role of SET factors in explaining SCR.

5.1. Theoretical contributions

SET has been proposed as a highly relevant theoretical perspective in the SCM literature to examine relationship issues among SC partners (Jain et al., 2017; Mishra et al., 2016). Drawing on SET, we contribute to the SCM literature by expanding the social exchange aspects of SCM and investigating their role in SCR and performance consequences. In particular, our paper's first contribution is empirical testing of the links between relational commitment, reciprocity, communication quality, SCR, and SCRM. These concepts are important to better understand the enablers of SCR. Our research builds upon prior research which investigated the antecedents of SCR (e.g., Cheng and Lu, 2017; Gölgeci and Kuivalainen, 2020; Pettit et al., 2010). Unlike prior research, it explores the antecedents of SCR from a new angle and accounts for additional potential enablers of SCR by specifically and exclusively focusing on social factors in SCs.

To the best of our knowledge, very few studies in SCM literature have empirically investigated social relationships in managing SC risks and improving performance. This study fills the gaps in the literature on the impact of social relationships among SC members on SCR. The incorporation of the SET perspective in SCR and the examination of SET factors to better comprehend the antecedents of SCR is in line with recent arguments that promote a social and behavioral view of SCR in increasingly complex, nonlinear, and dynamic environments (Wieland and Durach, 2021). For example, Gölgeci and Kuivalainen (2020) focused on social capital, which is the sum of the actual and potential resources derived from relationships, and empirically found its relation to SCR. Cheng and Lu (2017) concentrated on the concept of trajectory, which comprises interactions involving multiple actors and contingencies, and found the role of trajectory in enhancing SCR. The common feature of these studies and the current study is that all investigate the antecedent of SCR and consider SCs as networks of social relationships. Our study differs from such past studies by focusing solely on the SET perspective and holistically examining the role of three major social relationship-based factors.

Our focus on the SET perspective is grounded in the notion that SCs are no longer seen as rigid and static but dynamic and transformational social-ecological systems (Wieland, 2021). Unlike the conventional view of logistics systems and SCs as static, rigid, and transaction-based systems, the new view—which better aligns with the current realities of the global business environment—highlights SCs as fluid social-ecological systems and stresses the importance of behavioral and relational elements. Thus, there are increasingly compelling reasons to account for SET factors to better understand SCR. Our research takes one of the early steps in this direction and incorporates the complementary roles of relational commitment, reciprocity, and communication quality in SCR.

Another theoretical contribution is the examination of the mediating role of communication quality in the relationship between relational commitment and SCR and between reciprocity and SCR. This contribution helps to understand the distinct role of communication quality in SC relationships. High communication quality is required to realize the potential influence of relational commitment and reciprocity on SCR because it enhances effective transactions between exchange parties (Shin et al., 2017). This finding enhances the research on the drivers of SCR which investigated its extant antecedents yet overlooked mediating mechanisms that serve as a conduit between social relationship-based factors and SCR. In particular, this study complements the recent research which highlights the role of knowledge management practices in achieving SCR (Ali et al., 2021) by highlighting communication quality in SCs as a pivotal relational element in enhancing SCR.

The last theoretical contribution of this study is that communication quality and reciprocity scales were adapted to risk management, and their validity and reliability were tested accordingly. Therefore, these scales can be used in future research on risk management. The literature encapsulates some significant studies grounded on SET to elucidate SCRM events (e.g., Jain et al., 2017; Mishra et al., 2016; Zelbst et al., 2009). However, a holistic, theoretical, and empirical examination of the social factors embedded in SCRM through SET is greatly needed. In this context, we contribute to SCM literature by providing a roadmap grounded on empirical investigation for communication quality and reciprocity scales.

In conclusion, in a departure from the previous research which examined the antecedents of SCR, we exclusively focused on social

factors as enablers of SCR, linked SET to research on SCR, and highlighted the distinct and complementary role of relational commitment, reciprocity, and communication quality in explaining SCR. Similarly, our research challenges current industrial practices of arm's length relationships, opportunistic behaviors in SCs, and the holding of strategic information amidst SC risks and disruptions (Gereffi et al., 2005) as it stresses collaborative rather than confrontational relationships as the key to succeeding against SC risks and to achieving SCR. It nonetheless corroborates industrial practices that follow the principles of collaborative, social relationships and emphasize commitment, reciprocity, and communication quality.

5.2. Managerial implications

This study offers several insights for managers. First of all, it suggests that to successfully administer SC risk, executives need to embrace an SET perspective, as SCRM comprises interrelationships between SC members. Our results highlight the importance and criticality of quality communication, commitment, and reciprocity among SC partners in enhancing SCR. They reveal unique benefits (beyond those of commonly known relational outcomes) of SC communication quality, commitment, and reciprocity for withstanding, recovering from, and adapting to adverse events and mitigating the negative effects of SC risks. First, this study demonstrates that effective risk communication quality between SC partners will facilitate the business's adaptation to changing conditions, reduce uncertainties and misunderstandings, and assist in solving various potential problems. Therefore, managers who want to improve SCR must enhance communication quality. In fact, risk communication in SCs is not a privilege but a requirement. SC partners should invest in state-of-the-art communication technologies to improve SC visibility and foster their managers' capabilities and willingness to run open and effective communication channels against disruptions that may arise at any point and time in SCs. The technical and behavioral aspects of improving communication quality across organizational boundaries must be on the strategic agendas of firms in order to enhance SCR.

While sharing risk-related information will benefit SC members, some threats and vulnerability to opportunism may arise as a result. Some businesses may thus hesitate to share risk-related information and information on imminent SC risks. However, reciprocity and relational commitment can complement communication quality by eliminating these hesitations. We suggest that SC managers can emphasize and enhance reciprocity and commitment to alleviate opportunism and the hazards of not sharing SC risk information. In addition, by enhancing relational commitment and reciprocity, supportive and collaborative behavior among SC partners will be encouraged. We also reveal that commitment and reciprocity indirectly affect SCR through communication quality. Therefore, managers need to improve communication quality to better convey the role of commitment and reciprocity in enhancing SCR. Adhering to the core principle of fair give-and-take relationships and showing unwavering commitment to SC partners in difficult times is critical for withstanding SC disruptions in the short term and adapting to a changing SC landscape in the long run.

Finally, businesses face many risks every day, and it is impossible to prevent every risk. Therefore, businesses need to be proactive and improve their ability to cope with SC risks. Managers who want to improve SCRM performance must focus on enhancing SCR in the first place. Especially the recent conceptualizations (Wieland, 2021) of SCR make it clear that SCR is not only about how businesses react to disruptions after they hit but is also about what proactive and transformative measures are implemented to steer SCs through turbulent waters worldwide. Thus, managers should adopt a proactive approach to SCRM and invest continuously in and be dedicated to SC relationships as preemptive tools against uncertainties and risks. Only SC partners that invest in such relationships in good times can reap the benefits in hard times.

5.3. Limitations and directions for future research

This study has certain limitations that need to be addressed in future research. Although the study meets many of its ambitious purposes, there are numerous factors that remain unexplored. Because the background of SET is scarcely applied to SCRM incidents, there are ineluctably more concepts within SET that need to be investigated in relationships with SCR. During the literature review, we selected the concepts of relational commitment, reciprocity, and communication quality to be the antecedents of SCR. However, various factors regarding collaboration, such as trust (Hou et al., 2018), long-term orientation (Chang et al., 2015), and many concepts concerning SET (Blau, 1964; Morgan and Hunt, 1994) can be used in future studies to grasp SCR more deeply.

The findings of the research lack generalizability because of the narrow focus of our sample characteristics. Since our study was carried out in Turkey, our findings may not apply to other countries. Therefore, there is a need for future research to examine the applicability of our model in the context of different countries.

As SCs are a combination of social relationships, research on SCR can benefit from methodologies beyond survey-based research. For example, an explanatory case study (ECS) facilitates the investigation of the "how" and "why" of incidents more profoundly (Can Saglam et al., 2020). Thus, ECS can be applied to determine alternative routes to successful SCR as it may help researchers elucidate the underlying force of SC member behaviors.

Research findings indicate that communication quality, namely effective and accurate risk information sharing, plays an essential role in developing SCR. Extant literature about information management may provide intriguing research areas for further investigation of the relationship between communication quality and SCR. For instance, the theory of diffusion of innovation may set an example, as it enucleates why and how knowledge is disseminated. It may prove beneficial in understanding the collaboration in SCRM. As a result, SCR and its relation to diffusion of innovation theory needs more evidence, particularly in SCM research.

CRedit authorship contribution statement

Yesim Can Saglam: Conceptualization. **Sibel Yildiz Çankaya:** Methodology. **Ismail Golgeci:** Conceptualization, Writing – review & editing. **Bulent Sezen:** Conceptualization and Writing. **Selim Zaim:** Methodology.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

- Afum, E., Agyabeng-Mensah, Y., Sun, Z., Frimpong, B., Kusi, L.Y., Acquah, I.S.K., 2020. Exploring the link between green manufacturing, operational competitiveness, firm reputation and sustainable performance dimensions: a mediated approach. *J. Manufact. Technol. Manage.* 31 (7), 1417–1438. <https://doi.org/10.1108/JMTM-02-2020-0036>.
- Agarwal, U.A., Narayana, S.A., 2020. Impact of relational communication on buyer-supplier relationship satisfaction: role of trust and commitment. *Benchmarking: An Int. J.* 27 (8), 2459–2496. <https://doi.org/10.1108/BJL-05-2019-0220>.
- Agyabeng-Mensah, Ahenkorah, E., Afum, E., Owusu, D., 2020. The influence of lean management and environmental practices on relative competitive quality advantage and performance. *J. Manufact. Technol. Manage.*, 31(7), 1351–1372. <https://doi.org/10.1108/JMTM-12-2019-0443>.
- Akhavan, P., Hosseini, S.M., Abbasi, M., Manteghi, M., 2015. Knowledge-sharing determinants, behaviors, and innovative work behaviors: an integrated theoretical view and empirical examination. *Aslib J. Inform. Manage.* 67 (5), 562–591. <https://doi.org/10.1108/AJIM-02-2015-0018>.
- Ali, I., Golgeci, I., Arslan, A., 2021. Achieving resilience through knowledge management practices and risk management culture in agri-food supply chains. *Supply Chain Manage.: Int. J.* (ahead-of-print). <https://doi.org/10.1108/SCM-02-2021-0059>.
- Ambrose, E., Marshall, D., Lynch, D., 2010. Buyer supplier perspectives on supply chain relationships. *Int. J. Operat. Product. Manage.* 30 (12), 1269–1290. <https://doi.org/10.1108/01443571011094262>.
- Anderson, R.D., Jerman, R.E., Crum, M.R., 1998. Quality management influences on logistics performance. *Transport. Res. E: Logist. Transport. Rev.* 34 (2), 137–148. [https://doi.org/10.1016/S1366-5545\(98\)00008-8](https://doi.org/10.1016/S1366-5545(98)00008-8).
- Arnold, V., Benford, T., Hampton, C., Sutton, S.G., 2010. Competing pressures of risk and absorptive capacity potential on commitment and information sharing in global supply chains. *Eur. J. Inform. Syst.* 19 (2), 134–152. <https://doi.org/10.1057/ejis.2009.49>.
- Blau, P.M., 1964. *Exchange and power in social life*. John Wiley and Sons, New York.
- Bock, G.-W., Zmud, R.W., Kim, Y.-G., Lee, J.-N., 2005. Behavioral intention formation in knowledge sharing: examining the roles of extrinsic motivators. *Social-Psychol. Forces Org. Climate MIS Quarterly* 29 (1), 87–111. <https://doi.org/10.2307/25148669>.
- Can Saglam, Y., Sezen, B., Çankaya, S.Y., 2020. The inhibitors of risk information sharing in the supply chain: a multiple case study in Turkey. *J. Contingencies Crisis Manage.* 28 (1), 19–29. <https://doi.org/10.1111/1468-5973.12285>.
- Can Saglam, Y., Yildiz Çankaya, S., Sezen, B., 2021. Proactive risk mitigation strategies and supply chain risk management performance: an empirical analysis for manufacturing firms in Turkey. *J. Manufact. Technol. Manage.* 32 (6), 1224–1244. <https://doi.org/10.1108/JMTM-08-2019-0299>.
- Chang, Y.W., Hsu, P.Y., Shiau, W.L., Tsai, C.C., 2015b. Knowledge sharing intention in the United States and China: a cross-cultural study. *Eur. J. Inform. Syst.* 24 (3), 262–277. <https://doi.org/10.1057/ejis.2014.28>.
- Chang, H.H., Tsai, Y.C., Chen, S.H., Huang, G.H., Tseng, Y.H., 2015a. Building long-term partnerships by certificate implementation: a social exchange theory perspective. *J. Bus. Ind. Market.* 30 (7), 867–879. <https://doi.org/10.1108/JBIM-08-2013-0190>.
- Chang, H.H., Hung, C.J., Huang, C.Y., Wong, K.H., Tsai, Y.J., 2017. Social capital and transaction cost on co-creating IT value towards inter-organizational EMR exchange. *Int. J. Med. Inf.* 97, 247–260. <https://doi.org/10.1016/j.ijmedinf.2016.10.015>.
- Chang, Y., Wang, X., Su, L., Cui, A.P., 2021. B2B brand orientation, relationship commitment, and buyer-supplier performance. *J. Business Industrial Market.* 36 (2), 324–336. <https://doi.org/10.1108/JBIM-10-2019-0454>.
- Cheng, J.H., Lu, K.L., 2017. Enhancing effects of supply chain resilience: insights from trajectory and resource-based perspectives. *Supply Chain Manage.: Int. J.* 22 (4), 329–340. <https://doi.org/10.1108/SCM-06-2016-0190>.
- Chin, W., 1998. The partial least squares approach to structural equation modeling. In: Marcoulides, G.A. (Ed.), *Modern Methods for Business Research*. Erlbaum, Mahwah and London, pp. 295–336.
- Choi, T.-M., 2021. Risk analysis in logistics systems: A research agenda during and after the COVID-19 pandemic. *Transport. Res. E: Logist. Transport. Rev.* 145, 102190 <https://doi.org/https://doi.org/10.1016/j.tre.2020.102190>.
- Cohen, J., 1988. *Statistical Power Analysis for the Behavioral Sciences*, 2nd ed. Lawrence Erlbaum Associates Inc., Hillsdale, NJ.
- De Clercq, D., Dimov, D., Thongpapanl, N.T., 2010. The moderating impact of internal social exchange processes on the entrepreneurial orientation–performance relationship. *J. Bus. Ventur.* 25 (1), 87–103. <https://doi.org/10.1016/j.jbusvent.2009.01.004>.
- Ellinger, A.E., Daugherty, P.J., Plair, Q.J., 1999. Customer satisfaction and loyalty in supply chain: the role of communication. *Transport. Res. E: Logist. Transport. Rev.* 35 (2), 121–134. [https://doi.org/10.1016/S1366-5545\(99\)00006-X](https://doi.org/10.1016/S1366-5545(99)00006-X).
- Ganguly, A., Talukdar, A., Chatterjee, D., 2019. Evaluating the role of social capital, tacit knowledge sharing, knowledge quality and reciprocity in determining innovation capability of an organization. *J. Knowledge Manage.* 23(6), 1105–1135. <https://doi.org/10.1108/JKM-03-2018-0190>.
- Ge, Z., Hu, Q., Goh, C.-H., Zhao, R., 2021. Action-dependent commitment in vertical collaborations: the effect of demand-creating innovations in a supply chain. *Transport. Res. E: Logist. Transport. Rev.* 147, 102164 <https://doi.org/https://doi.org/10.1016/j.tre.2020.102164>.
- Gereffi, G., Humphrey, J., Sturgeon, T., 2005. The Governance of Global Value Chains. *Rev. Int. Polit. Econ.* 12 (1), 78–104 <http://www.jstor.org/stable/25124009>.
- Gligor, D.M., Pillai, K.G., Golgeci, I., 2021. Theorizing the dark side of business-to-business relationships in the era of AI, big data, and blockchain. *J. Bus. Res.* 133, 79–88. <https://doi.org/10.1016/j.jbusres.2021.04.043>.
- Gölgeci, I., Kuivalainen, O., 2020. Does social capital matter for supply chain resilience? The role of absorptive capacity and marketing-supply chain management alignment. *Ind. Mark. Manage.* 84, 63–74. <https://doi.org/10.1016/j.indmarman.2019.05.006>.
- Gölgeci, I., Gligor, D.M., Tatoglu, E., Arda, O.A., 2019. A relational view of environmental performance: what role do environmental collaboration and cross-functional alignment play? *J. Business Res.* 96, 35–46. <https://doi.org/10.1016/j.jbusres.2018.10.058>.
- Gölgeci, I., Ponomarev, S.Y., 2015. How does firm innovativeness enable supply chain resilience? The moderating role of supply uncertainty and interdependence. *Technol. Anal. Strategic Manage.* 27 (3), 267. <https://doi.org/10.1080/09537325.2014.971003>.
- Griffith, D.A., Harvey, M.G., Lusch, R.F., 2006. Social exchange in supply chain relationships: the resulting benefits of procedural and distributive justice. *J. Oper. Manage.* 24 (2), 85–98. <https://doi.org/10.1016/j.jom.2005.03.003>.
- Guo, Y., Yu, J., Allaoui, H., Choudhary, A., 2022. Lateral collaboration with cost-sharing in sustainable supply chain optimisation: a combinatorial framework. *Transport. Res. E: Logist. Transport. Rev.* 157, 102593 <https://doi.org/https://doi.org/10.1016/j.tre.2021.102593>.
- Hair, J.F., Tomas, G., Hult, M., Ringle, C.M., Sarstedt, M., 2014. *A Primer on Partial Least Square Structural Equations Modeling (PLS-SEM)*. Sage, Los Angeles.
- Han, Y., Chong, W.K., Li, D., 2020. A systematic literature review of the capabilities and performance metrics of supply chain resilience. *Int. J. Prod. Res.* 58 (15), 4541–4566. <https://doi.org/10.1080/00207543.2020.1785034>.
- Harper, J., 2021. Suez blockage is holding up \$9.6bn of goods a day. BBC.

- Henseler, J., Ringle, C.M., Sinkovics, R.R., 2009. The use of partial least square path modeling in international marketing. *Adv. Int. Market.* 20, 277–319. [https://doi.org/10.1108/S1474-7979\(2009\)0000020014](https://doi.org/10.1108/S1474-7979(2009)0000020014).
- Henseler, J., Ringle, C., Sarstedt, M., 2015. A new criterion for assessing discriminant validity in variance-based structural equation modeling. *J. Acad. Mark. Sci.* 43, 115–135. <https://doi.org/10.1007/s11747-014-0403-8>.
- Holm, D.B., Eriksson, K., Johanson, J., 1999. Creating value through mutual commitment to business network relationships. *Strateg. Manage. J.* 20 (5), 467–486.
- Hosseini, S., Ivanov, D., Dolgui, A., 2019. Review of quantitative methods for supply chain resilience analysis. *Transport. Res. E: Logist. Transport. Rev.* 125, 285–307. <https://doi.org/10.1016/j.tre.2019.03.001>.
- Hou, Y., Wang, X., Wu, Y.J., He, P., 2018. How does the trust affect the topology of supply chain network and its resilience? An agent-based approach. *Transport. Res. E: Logist. Transport. Rev.* 116, 229–241. <https://doi.org/10.1016/j.tre.2018.07.001>.
- Jain, V., Kumar, S., Soni, U., Chandra, C., 2017. Supply chain resilience: model development and empirical analysis. *Int. J. Prod. Res.* 55 (22), 6779–6800. <https://doi.org/10.1080/00207543.2017.1349947>.
- Jajja, M.S.S., Asif, M., Montabon, F., Chatha, K.A., 2020. The indirect effect of social responsibility standards on organizational performance in apparel supply chains: a developing country perspective. *Transport. Res. Part E: Logist. Transport. Rev.* 139, 101968. <https://doi.org/10.1016/j.tre.2020.101968>.
- Johnson, J.L., Sohi, R.S., 2001. The influence of firm predispositions on interfirm relationship formation in business markets. *Int. J. Res. Mark.* 18 (4), 299–318. [https://doi.org/10.1016/S0167-8116\(01\)00042-8](https://doi.org/10.1016/S0167-8116(01)00042-8).
- Khalid, S., Ali, T., 2017. An integrated perspective of social exchange theory and transaction cost approach on the antecedents of trust in international joint ventures. *Int. Bus. Rev.* 26 (3), 491–501. <https://doi.org/10.1016/j.ibusrev.2016.10.008>.
- Lai, K.H., 2009. Linking exchange governance with supplier cooperation and commitment: a case of container terminal operations. *J. Business Logist.* 30 (1), 243–263.
- Lai, C., Singh, B., Alshwer, A.A., Shaffer, M.A., 2014. Building and leveraging interpersonal trust within and across MNE subsidiaries: a social exchange perspective. *J. Int. Manage.* 20 (3), 312–326. <https://doi.org/10.1016/j.intman.2014.02.001>.
- Lancastre, A., Lages, L.F., 2006. The relationship between buyer and a B2B e-marketplace: cooperation determinants in an electronic market context. *Ind. Mark. Manage.* 35 (6), 774–789. <https://doi.org/10.1016/j.indmarman.2005.03.011>.
- Li, X., Wu, Q., Holsapple, C.W., Goldsby, T., 2017. An empirical examination of firm financial performance along dimensions of supply chain resilience. *Manage. Res. Rev.* 40 (3), 254–269. <https://doi.org/10.1108/MRR-02-2016-0030>.
- Lin, Y., Fan, D., Shi, X., Fu, M., 2021. The effects of supply chain diversification during the COVID-19 crisis: evidence from Chinese manufacturers. *Transport. Res. E: Logist. Transport. Rev.* 155, 102493. <https://doi.org/10.1016/j.tre.2021.102493>.
- Liu, C.L., Shang, K.C., Lirn, T.C., Lai, K.H., Lun, Y.H.V., 2018. Supply chain resilience, firm performance, and management policies in the liner shipping industry. *Transp. Res. Part A* 110, 202–219. <https://doi.org/10.1016/j.tra.2017.02.004>.
- Lu, G., Ding, X.D., Peng, D.X., Chuang, H.H.C., 2018. Addressing endogeneity in operations management research: Recent developments, common problems, and directions for future research. *J. Oper. Manage.* 64, 53–64. <https://doi.org/10.1016/j.jom.2018.10.001>.
- Luo, J., Chong, A.Y.L., Ngai, E.W., Liu, M.J., 2015. Reprint of “Green Supply Chain Collaboration implementation in China: the mediating role of guanxi”. *Transport. Res. Part E: Logist. Transport. Rev.* 74, 37–49. <https://doi.org/10.1016/j.tre.2014.09.005>.
- Malhotra, N., Kim, S., Patil, A., 2006. Common method variance in IS research: a comparison of alternative approaches and a reanalysis of past research. *Manage. Sci.* 52 (12), 1865–1883. <https://www.jstor.org/stable/20110660>.
- Memor, M.A., Cheah, J.-H., Ramayah, T., Ting, H., Chuah, F., 2018. Mediation analysis issues and recommendations. *J. Appl. Struct. Equat. Model.* 2 (1), i–ix. <https://doi.org/10.1016/j.indmarman.2005.03.011>.
- Merminod, V., Le Dain, M.A., Frank, A.G., 2021. Managing glitches in collaborative product development with suppliers. *Supply Chain Manage.: Int. J. (ahead-of-print)*. <https://doi.org/10.1108/SCM-01-2020-0042>.
- Merschmann, U., Thonemann, U.W., 2011. Supply chain flexibility, uncertainty and firm performance: an empirical analysis of German manufacturing firms. *Int. J. Prod. Econ.* 130 (1), 43–53. <https://doi.org/10.1016/j.ijpe.2010.10.013>.
- Mishra, D., Sharma, R.R.K., Kumar, S., Dubey, R., 2016. Bridging and buffering: Strategies for mitigating supply risk and improving supply chain performance. *Int. J. Prod. Econ.* 180, 183–197. <https://doi.org/10.1016/j.ijpe.2016.08.005>.
- Mohr, J., Nevin, J.R., 1990. Communication strategies in marketing channels: a theoretical perspective. *J. Market.* 54 (4), 36–51. <https://doi.org/10.2307/1251758>.
- Morgan, R.M., Hunt, S.D., 1994. The commitment-trust theory of relationship marketing. *J. Market.* 58 (3), 20–38. <https://doi.org/10.2307/1252308>.
- Park, S., Gupta, S., 2012. Handling endogenous regressors by joint estimation using copulas. *Market. Sci.* 31, 567–586. <https://www.jstor.org/stable/41687947>.
- Park, J., Lee, J., Lee, H., Truex, D., 2012. Exploring the impact of communication effectiveness on service quality, trust and relationship commitment in IT services. *Int. J. Inf. Manage.* 32 (5), 459–468. <https://doi.org/10.1016/j.ijinfomgt.2012.02.005>.
- Paulraj, A., Lado, A.A., Chen, I.J., 2008. Inter-organizational communication as a relational competency: antecedents and performance outcomes in collaborative buyer-supplier relationships. *J. Oper. Manage.* 26 (1), 45–64.
- Perry, M.L., Sengupta, S., Krapfel, R., 2004. Effectiveness of horizontal strategic alliances in technologically uncertain environments: are trust and commitment enough? *J. Business Res.* 57 (9), 951–956. [https://doi.org/10.1016/S0148-2963\(02\)00501-5](https://doi.org/10.1016/S0148-2963(02)00501-5).
- Pettit, T.J., Fiksel, J., Croxton, K.L., 2010. Ensuring supply chain resilience: development of a conceptual framework. *J. Bus. Logist.* 31 (1), 1–21. <https://doi.org/10.1002/j.2158-1592.2010.tb00125.x>.
- Podsakoff, P., Mackenzie, S., Podsakoff, N., Lee, J., 2003. Common method biases in behavioral research: a critical review of the literature and recommended remedies. *J. Appl. Psychol.* 88 (5), 879–903. <http://repo.uum.edu.my/id/eprint/25557>.
- Ramsey, J.B., 1969. Tests for specification errors in classical linear least-squares regression analysis. *J. Roy. Statist. Soc. Series B (Methodological)* 31, 350–371.
- Saris, W., Gallhofer, I., 2020. Designing better questions for complex concepts with reflective indicators. *Int. Survey Res. Methods* 14 (3), 253–266.
- Sarstedt, M., Ringle, C.M., Cheah, J.H., Ting, H., Moisescu, O.I., Radomir, L., 2019. Structural model robustness checks in PLS-SEM. *Tourism Economics*. 1–24. <https://doi.org/10.1177/1354816618823921>.
- Sarstedt, M., Ringle, C.M., Cheah, J.H., Ting, H., Moisescu, O.I., Radomir, L., 2020. Structural model robustness checks in PLS-SEM. *Tourism Economics* 26 (4), 531–554. <https://doi.org/10.1177/1354816618823921>.
- Scholten, K., Sharkey Scott, P., Fynes, B., 2014. Mitigation processes—antecedents for building supply chain resilience. *Supply Chain Manage.: Int. J.* 19 (2), 211–228. <https://doi.org/10.1108/SCM-06-2013-0191>.
- Sherman, E., 2020. 94% of the Fortune 1000 are seeing coronavirus supply chain disruptions: Report. <<https://fortune.com/2020/02/21/fortune-1000-coronavirus-china-supply-chain-impact/>> (accessed 01.02.2022).
- Shin, J.T., Jeong, M., Oh, H., Tierney, E., 2017. Exploring determinants of meeting planners' commitment to the business relationships with destination management companies. *J. Convent. Event Tourism* 18 (2), 135–158. <https://doi.org/10.1080/15470148.2016.1237317>.
- Söllner, A., 1999. Asymmetrical commitment in business relationships. *J. Bus. Res.* 46 (3), 219–233. [https://doi.org/10.1016/S0148-2963\(98\)00039-3](https://doi.org/10.1016/S0148-2963(98)00039-3).
- Stekelorum, R., Laguir, I., Lai, K.-H., Gupta, S., Kumar, A., 2021. Responsible governance mechanisms and the role of suppliers' ambidexterity and big data predictive analytics capabilities in circular economy practices improvements. *Transport. Res. E: Logist. Transport. Rev.* 155, 102510.
- Tsai, J.C.A., Kang, T.C., 2019. Reciprocal intention in knowledge seeking: Examining social exchange theory in an online professional community. *Int. J. Inf. Manage.* 48, 161–174. <https://doi.org/10.1016/j.ijinfomgt.2019.02.008>.
- Tukamuhabwa, B.R., Stevenson, M., Busby, J., Zorzini, M., 2015. Supply chain resilience: definition, review and theoretical foundations for further study. *Int. J. Prod. Res.* 53 (18), 5592–5623. <https://doi.org/10.1080/00207543.2015.1037934>.
- Vergheze, A.J., Koufteros, X., Polyviou, M., Jia, X., 2022. In pursuit of supplier resilience: The explanatory role of customer leadership style. *Transport. Res. E: Logist. Transport. Rev.* 159, 102626. <https://doi.org/10.1016/j.tre.2022.102626>.
- Voss, K.E., Tanner, E.C., Mohan, M., Lee, Y.-K., Kim, H.K., 2019. Integrating reciprocity into a social exchange model of inter-firm B2B relationships. *J. Bus. Ind. Market.* 34 (8), 1668–1680. <https://doi.org/10.1108/JBIM-07-2018-0219>.

- Wiedmer, R., Rogers, Z.S., Polyviou, M., Mena, C., Chae, S., 2021. The dark and bright sides of complexity: a dual perspective on supply network resilience. *J. Bus. Logist.* 42 (3), 336–359 <https://doi.org/https://doi.org/10.1111/jbl.12264>.
- Wieland, A., 2021. Dancing the supply chain: toward transformative supply chain management. *J. Supply Chain Manage.* 57 (1), 58–73. <https://doi.org/10.1111/jscm.12248>.
- Wieland, A., Durach, C.F., 2021. Two perspectives on supply chain resilience. *J. Business Logist.* 42 (3), 315–322. <https://doi.org/10.1111/jbl.12271>.
- Yang, Q., Geng, R., Jiang, Y., Feng, T., 2021. Governance mechanisms and green customer integration in China: the joint effect of power and environmental uncertainty. *Transport. Res. E: Logist. Transport. Rev.* 149, 102307.
- Yang, J., Wang, J., Wong, C.W., Lai, K.H., 2008. Relational stability and alliance performance in supply chain. *Omega* 36 (4), 600–608. <https://doi.org/10.1016/j.omega.2007.01.008>.
- Yu, W., Jacobs, M.A., Chavez, R., Yang, J., 2019. Dynamism, disruption orientation, and resilience in the supply chain and the impacts on financial performance: a dynamic capabilities perspective. *Int. J. Prod. Econ.* 218, 352–362. <https://doi.org/10.1016/j.ijpe.2019.07.013>.
- Zelbst, P.J., Green Jr, K.W., Sower, V.E., Reyes, P., 2009. Impact of supply chain linkages on supply chain performance. *Ind. Manage. Data Syst.* 109 (5), 665–682. <https://doi.org/10.1108/02635570910957641>.