Supply Chain Disruption Response and Recovery: The Role of Power and Governance

Abstract

How buyer-supplier relationships manage and recover from periods of distress is a critical managerial challenge. We examine this issue specifically by looking at buyer-supplier relationships that are recovering from a supply chain disruption. Governance studies have been central in the supplier management literature for some time, and we are motivated to understand the role of governance for relationships in distress and the impact of power dynamics in this context. We explore the impact of contractual and relational governance on disruption response and recovery and examine the moderating role of power that the buyer might leverage over their suppliers following a disruption. Power is conceptualised as threat of coercion and promise of reward, and thus reflects the two contrasting dimensions of power. Addressing common concerns with single respondent surveys, we used a cross-sectional survey to collect matched pair data from 239 US manufacturers and examined the dyadic perspectives of both buyers and suppliers, analysing the data using hierarchical OLS regression. We found that contractual and relational governance both enhance disruption response and recovery by encouraging supplier cooperation. We also report that threat of coercion from the buyer, and the promise of reward for a supplier, is not effective in reinforcing the positive impact that contractual governance has on disruption response and recovery performance. However, we find that the promise of a reward does enhance the effectiveness of relational governance in improving the response and recovery.

Keyword: Governance, power, supply chain disruption recovery, buyer–supplier dyads

1. Introduction

A supply chain disruption refers to an unforeseen event that interrupts a supply chain's normal flow of goods, exposing firms to financial and operational risks (Craighead *et al.*, 2007). Disruptions can have significant negative operational and financial impacts on companies directly, as well as on their extended supply network (Craighead *et al.*, 2007; Bode and Wagner, 2015). The Covid-19 pandemic is one example of how a disruption can have a global impact across sectors (Nikookar *et al.*, 2021; Knight *et al.*, 2022; Spieske *et al.*, 2022). Actors across supply chains had to find innovative and flexible ways of operating, with many buyer-supplier relationships challenged in ways that could not have been foreseen.

Whilst a pandemic is a high-impact, low-probability event, supply chains have always had to contend with a high frequency of disruptions, albeit mostly lower-impact. It is acknowledged that upstream in the supply chain can be a major source of these low-impact, high-probability events (Bode and Wagner, 2015), often caused by price fluctuations of raw materials and components, but most commonly due to failures in supplier(s)/or procurement activities (Wagner and Bode, 2009; Bode and Wagner, 2015).

Whilst mitigation of such disruptions is possible (Braunscheidel and Suresh, 2009; Ambulkar *et al.*, 2015; Lücker *et al.*, 2019), some disruptions are unavoidable (Craighead *et al.*, 2007). It follows then that firms' capability to respond and recover effectively becomes critical (Sodhi *et al.*, 2012). However, this disruption response and recovery phase of supply chain risk management (SCRM) has been largely overlooked in studies to date (Sodhi *et al.*, 2012). Following disruption, firms should have appropriate disruption recovery plans in place to minimise the negative impact and to facilitate a return to a normal operating situation (Craighead *et al.*, 2007; Ambulkar *et al.*, 2015; Olcott and Oliver, 2011; Braunscheidel and Suresh, 2009). In addition, responding to a supply-side disruption often requires collective resource mobilisation across the supply chain and sense-making with suppliers, highlighting the need for supplier participation and willingness to be involved in leveraging a successful response (Giunipero and Eltantawy, 2004; Craighead *et al.*, 2007; Olcott and Oliver, 2011; Whitney *et al.*, 2014).

However, when a supplier is asked to contribute to a buyer's disruption response efforts (e.g., requests to reconfigure/reschedule its production or to provide priority access to its inventory), there could be a degree of uncertainty about the reciprocal benefits, or compensation for the supplier's efforts once the disruption is resolved. This uncertainty may induce a passive but intentional form of supplier opportunism that involves withholding requested resources (Aron *et al.*, 2005; Handley and Benton, 2012). Such supplier action could jeopardise a rapid and effective disruption response. To control such behaviours, firms often leverage contractual and relational governance that serve to safeguard relationships (Wang *et al.*, 2020).

To date, most studies of governance have investigated relationships during 'steady state' or relatively normal periods of operation (e.g., Liu *et al.*, 2009; Van der Valk *et al.*, 2016; Ellram *et al.*, 2020). Disruptions of any duration or magnitude mean that relationships are continuously in motion, which can directly impact the enforcement and effectiveness of governance mechanisms (Keller *et al.*, 2021; Selviaridis and Spring, 2010). For example,

relational conflict, stress, and behavioural uncertainty can fester in buyer-supplier relationships (Bode *et al.*, 2011; Keller *et al.*, 2021) in the aftermath of a disruption, complicating collaborative efforts to recover. Thus, it is not surprising that governance mechanisms may not act as envisioned during disruptive situations; as such, we should pay more attention to exploring how governance mechanisms function across contexts. Furthermore, we argue that in order to better understand the impact of governance on response and recovery, it is relevant to examine the contingent use of power, given the role of power in influencing actions and motivating behaviour, especially in periods of distress (Handley and Benton, 2012; Skowronski *et al.,* 2022).

While a number of studies have suggested an association between power and governance in the supply chain (Handley and Benton, 2012; Brito and Miguel, 2017; Clauss and Bouncken, 2019), only a few have examined both in the same study, nor have they examined them both in the context of a relationship in distress (e.g., Handley and Benton, 2012; Clauss and Bouncken, 2019; Yang *et al.*, 2021). We respond to these gaps in understanding by posing the following two research questions: (1) Following a supply chain disruption, what impact does contractual and relational governance have on disruption response and recovery? (2) What is the contingent effect of buyer power on the relationship between governance and disruption response and recovery?

To explore the role of governance and the impact of power, we draw on Social Exchange Theory (SET) as a theoretical lens for understanding a firm's reaction to the power leveraged in their key relationships (Bandura, 1986; Emerson, 1976). By analysing responses from 239 buyer-supplier dyads from the US manufacturing sectors, we examine the robustness of contractual and relational governance for a relationship in distress. In addition, we investigate the interaction effect of power during the post-disruption period. Our findings contribute to the body of literature on governance and power in the buyer-supplier relationship as well as to the response part of SCRM literature.

2. Theoretical Background

2.1 Governing buyer-supplier relationships

Interorganisational relationships can be impacted by a range of exchange hazards (Poppo and Zenger, 2002). Opportunism, which refers to an actor acting for unilateral gains at the expense of its exchange partner (Williamson, 1975; Luo, 2007; Poppo and Zenger, 2002;

Son *et al.*, 2021), is a good example. The primary motive for opportunistic behaviour is self-interest seeking by economic actors (Williamson, 1975; Das and Teng, 1996), who tend to act opportunistically if a chance to do so becomes apparent (Joskow, 1985).

Opportunism can manifest in several ways (Deeds and Hill, 1999). It can evolve in a passive way, for example, when exchange partners deliberately withhold required resources and information for joint exchange activities (Aron *et al.*, 2005; Das and Teng, 1996; Eisenhardt, 1989; Luo, 2007; Handley and Benton, 2012; Son *et al.*, 2021). Another form of opportunistic behaviour that is more proactive in nature sees an exchange partner actively distorting and misrepresenting information to increase its unilateral gain (Deeds and Hill, 1999; Luo, 2007; Zheng *et al.*, 2008; Son *et al.*, 2021). In the context of SCRM, a supplier being reluctant to commit required resources (e.g., its redundant capacity) to respond to a disruption could be construed as a form of opportunism. There are two governance mechanisms widely discussed in the literature that are at the disposal of firms: (1) contractual governance, and (2) relational governance (Liu *et al.*, 2009; Nooteboom and Noorderhaven, 1997; Perry *et al.*, 2004; Poppo and Zenger, 2002; Liu and Wei, 2021; Eckerd *et al.*, 2022).

The first mechanism, contractual governance, coalesces around the use of contracts to help coordinate, organise, monitor and control transactions. A contract usually outlines the duties, obligations and role specifications of each actor (Lumineau and Henderson, 2012), as well as remedies for anticipated contingencies and procedures for resolving unforeseen ones (Poppo and Zenger, 2002). Firms often rely on formal contracts to suppress opportunistic behaviours through the creation of ex-post costs for such actions (Williamson, 1985; Artz and Brush, 2000; Eisenhardt, 1989; Poppo and Zenger, 2002). Due to resource constraints and bounded rationality, developing an effective contract covering all possible eventualities is often difficult (Lumineau and Henderson, 2012; Teece, 1986; Williamson, 1979). Moreover, the effectiveness of a contract in suppressing partner opportunism is contingent upon the availability of resources for continuous monitoring, as well as enforcement for contract breaches (Teece, 1986).

The second mechanism, relational governance, stems from SET, and is also referred to as a social control mechanism (Li *et al.*, 2010). SET contends that economic exchanges are embedded in a complex network of social ties (Deeds and Hill, 1999), and such embeddedness can act as an alternative or supplemental mechanism to a complex and often expensive contract in curbing opportunistic behaviours (Gulati, 1995; Uzzi, 1997). Relational governance has been represented as a multi-faceted construct (Nahapiet and Ghoshal, 1998), involving trust (Burkert

et al., 2012; Son *et al.*, 2021; Zhou and Xu, 2012), obligation (Coleman, 1994; Granovetter, 1992), and relational norms (Liu *et al.*, 2009; Hawkins *et al.*, 2013; Eckerd *et al.*, 2022).

Relational governance acts as an opportunism mitigation mechanism in the following ways. First, the central components of relational governance, namely trust and obligation, tend to be the main outcome of positive past relationships (Granovetter, 1992; Son *et al.*, 2016). Such relational outputs can both reduce partners' fear of opportunistic behaviour and foster reciprocity and openness (Kale *et al.*, 2000; Son *et al.*, 2021; Tsai and Ghoshal, 1998; Zaheer *et al.*, 1998). This also encourages partners to stick to agreed norms of interaction resulting in the suppression of opportunistic behaviour (Granovetter, 1992; Perry *et al.*, 2004; Zhao *et al.*, 2022). In addition, positive experiences from past relationships can create a sense that the relationship will continue in the future (Nooteboom and Noorderhaven, 1997; Luo, 2007). It is expected then that partners would refrain from behaving opportunistically to guard future gains from the relationship (Poppo and Zenger, 2002; Huang and Chiu, 2018). For relational governance to be effective, however, a firm should have a high level of embeddedness with its partner, which takes time to develop (Granovetter, 1990).

As discussed, supplier opportunism in a disruption response situation could be manifested in a rather passive but intentional form – that is, shirking – which involves becoming reluctant to contribute to the response effort and withholding resources/information requested by the buyer (Aron *et al.*, 2005; Handley and Benton, 2012). To date, the extent to which traditional governance mechanisms are effective following a disruption, and any associated relational distress, remains largely unknown.

2.2 Power as an influential mechanism

Power refers to "the ability of one individual or group to control or influence the behaviour of another" (Hunt and Nevin, 1974, p. 186), and is a central concept in understanding buyer-supplier relationships and behaviours (Handley and Benton, 2012; Morgan *et al.*, 2018). It is a central component of SET (Emerson, 1962) given that the seeking of rewards and avoidance of punishment is a key motivation for interaction (Bandura, 1986; Emerson, 1976). A buying firm's power can be considered as a mechanism that can be leveraged to influence the behaviours of its suppliers (Yeung *et al.*, 2009; Vos *et al.*, 2021; Liu *et al.*, 2022), for example, in the curbing of opportunistic behaviours or the encouragement of proactive cooperation.

The concept of power is based on French and Raven's (1959) seminal work in which they classified power into five sources: expert, referent, legitimate, coercive, and reward. A

number of studies have adopted this framework to explore power sources in supply chain research (e.g., Maloni and Benton, 2000; Benton and Maloni, 2005; Handley and Benton, 2012), with some studies distinguishing between mediated and non-mediated power (Zhao *et al.*, 2008; Nyaga *et al.*, 2013). Mediated power relates to more implicit actions (Maloni and Benton, 2000), whereby the recipient firm decides whether and how it will be influenced by the firm leveraging the power – coercive and reward power (Zhao *et al.*, 2008; Vos *et al.*, 2021), with non-mediated power sources more positive and relational in nature – legitimate, referent, and expert power (Nyaga *et al.*, 2013; Benton and Maloni, 2005; Liu *et al.*, 2022).

Mediated power, which is the focus of this paper, refers to explicit attempts to "bring about some direct action" (Benton and Maloni, 2005, p. 4). Coercive and reward power are a target-specific influence strategy (Benton and Maloni, 2005), deliberately controlled by the power-dominant firm. That is, unlike non-mediated power, where the recipient actor decides the degree to which they will be influenced, when it comes to coercive and reward power, the dominant firm can choose whether or not to exercise punishment and/or reward, and thus choose how to leverage their power over another actor (Zhao *et al.*, 2008). We assert that if a buyer faces an unexpected supply chain disruption, they will explore all possible means of influencing supply-side actors, including the use of power, and that it is more likely to be explicit, mediated forms of power given their ability to directly influence changes in the supplier's behaviour. Hence, mediated power is the focus of this study.

Coercive power refers to the ability of a firm to impose a sanction on other firms if they do not comply with the wishes of the dominant firm (Maloni and Benton, 2000; Nyaga *et al.*, 2013), and is exhibited as a form of threat (Yeung *et al.*, 2009; Liu *et al.*, 2010). Reward power, on the other hand, refers to the dominant firm providing its partners with benefits for cooperation, and compliance with expectations or requests (Nyaga *et al.*, 2013; Chae *et al.*, 2017). Unlike coercive power sources, which are viewed as explicit forms of coercion, reward power reflects implicit forms of coercion, which is withholding reward as an act of punishment for failure or non-compliance (Nyaga *et al.*, 2013).

In a buyer-supplier relationship, dominant firms can leverage their power to obtain favourable exchange terms, a larger share of benefits, or to coerce other supply chain actors into doing what they would not do otherwise (Nyaga *et al.*, 2013). Previous research, however, suggests that the use of coercive power potentially increases the economic and psychological cost of the target (Ireland and Webb, 2007; Yeung *et al.*, 2009; Pulles *et al.*, 2014), creating instability and conflict in a relationship (Pulles *et al.*, 2014; Ireland and Webb, 2007). The

long-term consequence of repeated use of coercive power, therefore, would be the erosion of social capital (Benton and Maloni, 2005; Chae *et al.*, 2017), hampering the growth potential of the relationship (Yeung *et al.*, 2009; Nyaga *et al.*, 2013).

On the other hand, the use of reward power can increase an actor's economic return from the relationship (Ramaseshan *et al.*, 2006). When supply chain partners receive a reward, they feel more benevolent and committed to the power holder (Zhao *et al.*, 2008; Pulles *et al.*, 2014; Chae *et al.*, 2017). This is because use of reward power represents their ability to contribute resources to a relationship; thus, it increases a supplier's trust by providing the perception that the powerful party has the capability of fulfilling the necessary obligations of a transaction (Ireland and Webb, 2007). Additionally, as reward power is based on the idea that actors cooperate in relationships with the expectation of giving and receiving rewards, this supports a norm of reciprocity (Pulles *et al.*, 2014).

When a buyer faces a rapid onset supply chain disruption and requires the collaboration of suppliers, it will explore all possible means of influencing them accordingly, including the use of power. To the best of our knowledge, however, how power interacts with governance, let alone for a relationship in distress, is rarely studied. Some studies suggest a potential association between the factors, but mostly focused on direct effects with potential interaction effects receiving less attention. For instance, Handley and Benton (2012) stated that buyers could rely on mediated power when a contractual mechanism is difficult to deploy, with Pilbeam *et al.* (2012) looking at relational governance as the preference when there are asymmetries in power. Focusing also on power asymmetries, Brito and Miguel (2017) also contend that powerful actors will prefer relational mechanisms, with less powerful firms seeking control mechanisms that reduce the risk of dependency. Looking then at direct effects, Hausman and Johnston (2010) state that coercive power is counterproductive to the creation of relational benefits, with Clauss and Bouncken (2019) examining power sources as antecedent factors to governance mechanisms. Only Yang *et al.* (2021) explored the interaction effect of power on governance mechanisms, but in the context of green customer integration. It follows then that there is a clear gap in understanding around how power interacts with governance mechanisms during times of distress.

3. Conceptual Model and Hypotheses

This paper investigates what impact contractual and relational governance has on

disruption response and recovery and what the contingent effect of buyer power is on the relationship between governance and disruption response and recovery. Effective disruption responses often require buyers and suppliers to work together for collective sense-making (Krause *et al.*, 2007; Johnson *et al.*, 2013) and resource mobilisation (Olcott and Oliver, 2011; Ambulkar *et al.*, 2015). When a buying firm is responding to a disruption that originated in its upstream supply chain, it often requires its supplier's collaboration for their resources and also information. When faced with such requests, the supplier is likely exposed to some uncertainty about the pay-out from the buyer to compensate their efforts once the disruption is dealt with. This could induce a passive form of supplier opportunism, perhaps by failing to commit to the recovery effort, or withholding requested resources/information. This uncertainty arises due to the following reasons. First, a supply chain disruption can often be a rapid on-set event where urgent resource mobilisation is needed. In this case, both the buyer and its supplier would not have sufficient time to draft an agreement on the details of works as well as related remuneration. Second, responding to a major supply chain disruption can be complex and challenging (Olcott and Oliver, 2011); this gives rise to "measurement difficulty" for the buying firm, which refers to the degree of difficulty in measuring the contribution of partners – in this case, the supplier's contribution to the disruption response effort (Eisenhardt, 1989; Poppo and Zenger, 2002). If the supplier perceives an increasing level of uncertainty around reward or reciprocal benefit, it might decide to limit its resources and contribution to the joint recovery effort (Eisenhardt, 1989; Poppo and Zenger, 2002).

3.1 Governance mechanisms and disruption recovery performance

A solid contract should detail the obligations and duties of the firm and its partner (Williamson, 1985; Lumineau and Henderson, 2012). Such contracts should also contain clauses to address foreseeable contingencies and agreed steps to tackle unforeseen contingencies (Poppo and Zenger, 2002; Liu *et al.*, 2009). It follows that if a relationship is accompanied by an adequate contract that provides a basis for dealing with contingencies such as a disruption response, the supplier would face less uncertainty regarding the reward. This will likely result in an increased willingness to commit resources, support, and information to the response and recovery efforts. Moreover, an appropriate contract would deter the supplier from behaving opportunistically by clearly specifying the consequences of non-compliance (Caniëls *et al.*, 2010). Therefore, we hypothesise:

H_1: The extent of contractual governance for the relationship prior to the disruption is positively related to the effectiveness of the supply chain disruption response and recovery performance.

Relational governance, as the result of repeated, positive, past interactions, would foster the supplier's trust in the buying firm, which would alleviate its pay-out uncertainty related fear. SET contends that relational governance, and the trust and norms of reciprocity that it imbues, encourages actors to share expected patterns of behaviour, and to work more collaboratively, openly and without fear of reprisal, reducing the need for more authoritarian behaviour in the relationship to minimise opportunism (Pulles *et al.*, 2014). Trust facilitates rapid access to resources and information even in an insecure situation (Krause *et al.*, 2007; Johnson *et al.*, 2013), without the necessity for formal or contractual requisitions (Johnson and Elliott, 2011). The development of trust in a relationship positively influences a firm's willingness to cooperate with parties even in a disruptive situation, thereby increasing the likelihood of the parties making an effort to address the situation (Dyer, 1996; Joshi and Stump, 1999).

Additionally, relational governance engenders an environment of reciprocity toward the buying firm (Zaheer *et al.*, 1998; Tsai and Ghoshal, 1998; Kale *et al.*, 2000). Reciprocity in the relationship serves to reinforce the sense of obligation and shared social norms, and stimulates the supplier to respond positively in a way that benefits the buyer (Pulles *et al.*, 2014). Therefore, a sufficient level of relational governance accumulated prior to the disruption would reduce supplier opportunism, in the form of withholding resources, information or their reactive capabilities from the joint response efforts. Also, the expectation of the continuity of the relationship would incentivise the supplier to commit its resources for the joint recovery efforts. Therefore, we hypothesise:

H_2: The extent of relational governance in the relationship prior to the disruption is positively related to the effectiveness of the supply chain disruption response and recovery performance.

3.2 The moderating role of power on the relationship between contractual governance and disruption response and recovery performance

Relationships are complex processes and will be impacted by behavioural forces beyond the

governance mechanisms put in place to manage, coordinate and monitor them. Power is one such force that can be leveraged for the good, or otherwise, in buyer-supplier relationships. Handley and Benton (2012) report that when contractual mechanisms are difficult to deploy, buyers often rely on mediated power to instigate action in suppliers. SET warned that the use of coercive power can gain only short-term compliance at the expense of damaging the relationship (Kumar, 2005; Lawler and Yoon, 1996; Ireland and Webb, 2007; Pulles *et al.*, 2014), although there are examples in which coercive approaches have had a positive effect for the buying firm (e.g., Zhao *et al.*, 2008; Yeung et al, 2009; Pulles *et al.*, 2014). Referring to the central elements of SET, a buyer's coercive power may be a positive force that indicates the punishment, or consequences, of not adhering to requests, meaning that behaviours are directly adjusted. For example, a supplier would be more inclined to co-operate with a buyer who threatens to reduce business volumes if the supplier does not comply with its wishes (Pulles *et al.*, 2014).

With regard to contractual governance, coercive power can serve to support contracts in rallying supplier support for disruption response and recovery exercises. Given the ambiguity of some contingency-related terms in contracts, suppliers may be hesitant to follow the letter of the contract given inherent vagaries around their contractual obligations and commitments following a disruption. Coercive power can be effective in a situation of distress where actors are encouraged to look beyond legal technicalities perhaps and consider the consequences of not acting in line with how a buying firm might anticipate support from their suppliers, who are effectively connected by virtue of the chain in which they reside. Coercive power, with its direct and explicit style, can serve to highlight the terms of contracts and the clauses that outline expectations and obligations, which are important to compiling a disruption response, thereby expediting the effort. In cases where a supplier might be shirking their obligations and not be compliant with the contingency-related terms in the contract, the buyer can use coercive power to manifest its willingness and determination to legally enforce the contractual terms. Such use of coercive power serves as a powerful reminder to the supplier that a breach of the contract may be retaliated against, with possible economic and relational consequences (Caniëls *et al.*, 2010). Therefore, we hypothesise:

H_{1a}: The buyer's threat of coercion towards a supplier (following a disruption) positively moderates the relationship between contractual governance and disruption response and recovery performance.

We contend that the buyer's use of reward power can also increase the effectiveness of contractual governance. When the contingency-related terms for pay-out for suppliers in a contract contains a high level of ambiguity, the supplier could consider shirking its obligations in the disruption response effort due to this uncertainty. If the buyer leverages reward power in the form of providing more details of the pay-out for compliance and additional incentives, this signals its ability and willingness to contribute resources to the relationship (Ireland and Webb, 2007), and in doing so supports the contract in dealing with the disruption response and recovery. This means the supplier's concerns will be significantly reduced (e.g., worry about non-pay-out, and opportunity cost of resources committed), and they are more likely to be cooperative as they can understand the tangible, reciprocal benefit they will attain. Building on SET, suppliers receiving a promise of reward will then feel obligated to perform according to the expectations of the buyer (Nyaga *et al.*, 2013; Chae *et al.*, 2017), which, in turn, provides a strong motivation to the supplier to not breach the formal contract even if the situation is uncertain. Therefore, we hypothesise:

H_{1b}: The buyer's promise of reward towards a supplier (following a disruption) positively moderates the relationship between contractual governance and disruption response and recovery performance.

3.3 The moderating role of power on the relationship between relational governance and disruption response and recovery performance

SET contends that a certain type of power can be a damaging force in relationships between firms (Blau, 1964; Zhao *et al.*, 2008; Nyaga *et al.*, 2013), given that it often entails the use of approaches and tactics that extract unfair concessions, which leads to acrimonious situations where actors seek ways to resist (Kumar, 1996). Furthermore, as relationships between firms are shaped not only by economic motives, but also social norms such as reciprocity and fairness, when power is exercised it can create negative sentiment, resentment, and ultimately relationship disengagement (Pulles *et al.*, 2014), given the erosion of some of the social capital that was developed.

When a buyer uses coercive power to compel the supplier to participate in a joint response and recovery effort, the supplier could perceive this as a more powerful partner taking advantage of their dependency on them (Ke *et al.*, 2009; Nyaga *et al.*, 2013). Such a sense of

violation would weaken relationships and deteriorate related benefits (Yeung *et al.*, 2009; Nyaga *et al.*, 2013; Pulles *et al.*, 2014). Considering this, exercising coercive power, especially if the supplier perceives the use as illegitimate, would greatly undermine the efficacy of the relational governance by damaging its components, such as trust, expectation of continuity, and commitment (Benton and Maloni, 2005; Yeung *et al.*, 2009; Nyaga *et al.*, 2013; Chae *et al.*, 2017). It follows that we hypothesise:

H_{2a}: The buyer's threat of coercion towards a supplier (following a disruption) negatively moderates the relationship between relational governance and disruption response and recovery performance.

SET suggests that actors in supply chain relationships actively seek rewards and try to avoid punishments (Nyaga *et al.*, 2013). Hence, unlike coercive power, reward power – and the reward and sentiment of appreciation it imbues – is likely to be more positively perceived by the supplier (Nyaga *et al.*, 2013), making them more amenable to making adjustments, alterations and taking cooperative action, on the buyer's wish or request (Pulles *et al.*, 2014). When the relationship is going through the stressful period following a supply chain disruption, it is reasonable to assume that some suppliers may doubt if the existing relational securities (governance) are sufficient to assure the expected reciprocated benefit if they are asked to take part in the response and recovery effort. Them, the buyer's use of reward power during the disruption response stage can serve to support and supercharge the trust that already exists (Ireland and Webb, 2007; Maloni and Benton, 2000; Pulles *et al.*, 2014) and enhance the norms of reciprocity in the relationship (Nyaga *et al.*, 2013; Pulles *et al.*, 2014). Considering this, the use of reward power can further reduce the supplier's pay-out-related fear by enhancing the elements of the relational governance. Therefore, we hypothesise:

H_{2b}: The buyer's promise of reward towards a supplier (following a disruption) positively moderates the relationship between relational governance and disruption response and recovery performance.

Figure 1. Conceptual Model

4. Methodology

4.1 Survey administration and data collection

For this study, matched pair data of 239 buyer-supplier dyads from the US manufacturing sector was used. To ensure the validity and reliability of our research using matched pair data, we reduce exception fallacy, which refers to "an erroneous finding where researchers draw biased aggregate or group conclusions among stakeholders on the basis of a single rater" (Rho *et al.*, 2013, p712). This is a particularly pertinent issue in this study, given the nature of the constructs examined: relational governance, which accumulates through the histories of transactions between parties and cannot be accrued by one party (Adler and Kwon, 2002), and power, where the opinion of buyers (the power holders) and suppliers (the targets) can be significantly different. Using a multi-stakeholder sample, such as matched-pair data, is one of the ways to address this issue. Typically, matched-pair data is obtained by asking a buyer and a supplier for different dimensions of the same relationship (e.g., Handley and Benton, 2013; Wang *et al.*, 2016).

In order to reduce survey error and increase the response rate, the following procedures were used. First, using the Institute for Supply Management (ISM) membership directory (e.g., Chen *et al.*, 2004; Braunscheidel and Suresh, 2009; Craighead *et al.*, 2009; Krause *et al.*, 2007; Paulaj *et al.*, 2008), we based our buyer-side sampling frame using companies from US manufacturing industries (two-digit SIC between 20 and 39) (e.g. Chen *et al.*, 2004; Ellis *et al.*, 2010; Mantel *et al.*, 2006). We created the buyer-side sampling frame containing Title 2 and Title 3 purchasing professionals, who are mostly mid-level or above purchasing professionals, with titles such as buyer, purchasing/supply chain manager and senior buyer. This is to ensure that respondents are knowledgeable about the supply chain, supply chain relationships and other phenomena of interest in the study. Then, from the buyer sampling frame, we randomly selected 701 purchasing professionals and they were contacted to ask if they had experienced supply chain disruption recently (within the past three years), and wished to participate in the survey. In total, 433 buyer firms agreed to participate in the survey. We sent them detailed instructions for selecting a supply chain disruption (i.e., critical impact to the company's operations), and the supplier involved with this disruption with them. At the end, 397 usable responses were received from buyers, representing a buyer-side response rate of 56.633%.

Upon receiving a buyer's response, a customised supplier version of the questionnaire was sent to the selected supplier. 256 supplier questionnaires were received, representing a response rate of 64.484%. Out of 256 paired questionnaires, 17 pairs were excluded due to

quality issues and missing data, leaving a complete dataset of 239 dyads.

Non-response bias was examined by comparing early and late groups of returned surveys (Armstrong and Overton, 1977). Returned surveys were compared across all the variables of both buyer and supplier version questionnaires using two-tailed t-statistics. Statistically significant differences were not identified among the variables, indicating that non-response bias should not be a concern. Since the respondents were asked to recall their experience of a supply chain disruption in the past, there was a risk of recall bias – a systematic error due to differences in completeness or accuracy of recall to the memory of past experiences or events (Raphael, 1987). To minimise this bias, the respondents were asked to report on a recent supply chain disruption they had experienced (e.g., Robinson and Clore, 2002), citing the exact month it occurred (Bode *et al.*, 2011). Asking them about recent and specific information improved the accuracy of introspective reports by reducing retrospective recall (Robinson and Clore, 2002; Scott *et al.*, 2014).

Since self-reported responses were used, and the same respondents responded to the questions on both disruption response and recovery performance, the following steps were taken to avoid common method bias. First, special efforts were made to ensure that questionnaire items were straightforward and double-barrelled questions were avoided. Then, we ensured that respondents were mid- to senior-level managers in charge of procurement activities (title 2 and title 3 ISM members), and detailed information about the key informants' necessary qualifications was provided in the questionnaires. The influence of social desirability was reduced by assuring the respondents that they would remain anonymous (Podsakoff *et al.*, 2003). This was followed by Harman's one-factor test and marker variable analysis (Lindell and Whitney, 2001) to assess the potential existence of common method bias (see section 4.3).

Table 1. Respondent profile – Buyer & Supplier

4.2 Measurement development

To ensure the quality of measurement items, most measures in the study were adapted from the extant literature. To better reflect the respondents' subjective evaluation of questionnaires (Finstad, 2010) and improve reliability and validity (Chang, 1994), all the measurement items were measured on a 7-point Likert scale ranging from "Strongly Disagree", to "Strongly Agree" or "Not at all", to "A very great extent" as appropriate. All items are listed in Appendix A. In order to create a matched-pair data set of the buyer and the supplier, 24 common questions were used for the two different versions of the questionnaire. To

operationalise the mutual perspective on the relevant factors, the method of consolidating both parties' responses by calculating the mean responses to each of the 24 common questions was used. This combination approach has frequently been adopted by similar papers using buyer-supplier matched pair data (see Straub *et al.*, 2004; Johnston *et al.*, 2004; Klein *et al.*, 2007).

We used a four-item scale to measure the level of relational governance. The scale assessed the level of trust (Zhaheer and Venkatraman, 1995; Abdi and Aulakh, 2014), respect (Carey *et al.*, 2011), reciprocity (Zhaheer and Venkatraman, 1995; Zaheer *et al.*, 1998; Tsai and Ghoshal, 1998; Kale *et al.*, 2000), and degree of friendship in the relationship prior to the disruption (Carey *et al.*, 2011). We used a six-item scale to measure the extent of contractual governance in a relationship. The scale captured the extent of formal written agreement in their relationship prior to the disruption assessed by both the buyer and the supplier in terms of roles, responsibilities, performance expectation, legal ramification of failure, contingencies, and dispute resolution (Carey *et al.*, 2011).

The buyer's threat of coercive power was measured using a four-item scale, focusing on both parties' view on the extent of the buying firm's threat to use such power toward the supplier during the disruption response/recovery (Zhao *et al.*, 2008; Maloni and Benton, 2000; Pulles *et al.*, 2014). The four items captured the buyer's threat of (1) unspecific retaliation in the future (Zhao *et al.*, 2008), (2) reducing the supplier's profit (Zhao *et al.*, 2008; Maloni and Benton, 2000; Pulles *et al.*, 2014), (3) withdrawing its services from the supplier (Zhao *et al.*, 2008; Maloni and Benton, 2000; Pulles *et al.*, 2014), and (4) complication of the relationship (Zhao *et al.*, 2008; Maloni and Benton, 2000; Pulles *et al.*, 2014). Similarly, a three-item scale was used to measure the extent of the buyer's promise of reward power during the disruption response/recovery. Both parties were asked to report their opinion on the level of the buyer's promise during the disruption period for the supplier's co-operation in the form of incentives (Maloni and Benton, 2000; Zhao *et al.*, 2008; Pulles *et al.*, 2014), favour (Maloni and Benton, 2000; Zhao *et al.*, 2008; Pulles *et al.*, 2014), and reward (Maloni and Benton, 2000; Zhao *et al.*, 2008; Pulles *et al.*, 2014).

Regarding the disruption response and recovery, we measured response and recovery as one construct following Spiefler *et al.* (2016) and Chowdhury *et al.* (2013)'s view that measured response and recovery by the time and cost taken to get back to a normal operating situation. Both the response and recovery phase refer to post-disruption activities that aim to control the situation and share the same goals to bounce back from a post-disruption state. The response and recovery phases are interdependent (Chowdhury and Quaddus, 2016) – a firm's

quick response can lead to a quick recovery from the disruption (Blackhurst *et al.*, 2011; Bode *et al.*, 2011; Bode and Macdonald, 2017). Thus, we view the response and the recovery as one construct in this study (e.g., Azadegan *et al.*, 2020; Duong and Chong, 2020). The disruption recovery and response performance were examined using a seven-item scale adapted from the extant literature. Both the buyer and the supplier were asked to assess the recovery/response performance in terms of: (1) material flow restoration speed (Macdonald and Corsi, 2013), (2) operating performance restoration speed (Chowdhury and Quaddus, 2016; Macdonald and Corsi, 2013), (3) the required efforts (Chowdhury and Quaddus, 2016; Ambulkar *et al.*, 2015), (4) the response efficiency (Ambulkar *et al.*, 2015), and (5) the management of the financial distress (Chowdhury and Quaddus, 2016).

To ensure the robustness of results, several control variables were included: (1) the difference in firm size by the number of employees, (2) the severity of the disruption (measured by each party's reported financial loss), (3) the duration of the disruption to which the buyer was exposed, (4) types of disruption, (5) the buyer's dependency on the supplier (6), the frequency of a disruption (assessed by the buyer), and (7) the buyer's industry.

4.3 Measurement validity and reliability

In order to assess the constructs' discriminant and convergent validity and reliability, AMOS version 20 was used (Table 2). First, convergent validity was examined by the factor loadings, and all loadings were greater than 0.4 (range: 0.472–0.997). Additionally, all average variance extracted (AVE) values exceeded 0.5, ranging from 0.509 to 0.684, presenting a strong case for the convergent validity of the measures used. In order to assess each construct's reliability, composite reliabilities (CR) were examined; all constructs exceeded 0.7, suggesting that reliability is not a concern. To examine discriminant validity, each factor's square-rooted AVEs were compared with the correlations between the constructs. All were greater than the correlations in both models (Table 2), thus confirming no discriminant validity issues in the measurement.

Table 2. Construct analysis & Construct level correlation analysis

In order to avoid common method bias, this study conducted Harman's one-factor test and marker variable analysis. The results from the unrotated factor solution showed that the largest factor accounted for 27.7%, suggesting that common method bias was not a problem (Malhotra *et al.*, 2005). Additionally, the marker variable technique was also used, whereby a

marker variable (a buyer's position in its supply chain), which has no strong theoretical relationship with other variables, was adopted (Lindell and Whitney, 2001). The correlations varied –0.111 to 0.050 (all ns), and none of them were significantly correlated with other variables in both models. Moreover, the correlations between the constructs that were hypothesised to be significant remained significant for both models, suggesting that common methods bias was not a problem in this study.

5. Results

Our model examines the efficacy of governance mechanisms (contractual and relational governance) for buyer-supplier relationships in distress, by considering how both mechanisms impact recovery performance from a supply chain disruption. Additionally, we explore how mediated power (coercive and reward) influences the effectiveness of contractual and relational governance. The data was examined using hierarchical OLS regression techniques in SPSS 25, with the results presented in Table 3 (relational and contractual governance models, respectively). Hierarchical OLS regression is a standard approach when a model contains moderator variables (Field, 2017). In order to reduce potential multicollinearity, we mean centred the independent variables and the moderating variables before creating the interaction terms (Cohen and Cohen, 1983; Aiken and West, 1991).

First, hypotheses 1 and 2 postulated that a positive relationship exists between each type of governance prior to the disruption and the disruption response and recovery performance. The results indicate a positive and significant effect of contractual governance (β= 0.209** in the model 2; 0.219** in the model 3, support H_1) and relational governance (β= 0.541*** in the model 2; 0.567*** in the model 3, support H_2) on disruption response and recovery performance. These findings indicate support for our contention that both governance mechanisms – contractual and relational – are effective for relationships during times of distress, in that they support disruption response and recovery efforts.

As dimensions of power, Hypotheses 1_a and 1_b postulated that a buyer's threat of coercion (H_{1a}) and promise of reward (H_{1b}) positively moderate the relationship between contractual governance and disruption response and recovery performance. The coefficients for both H_{1a} and H_{1b} (β= -0.086, ns; β= 0.031, ns, respectively) were insignificant, suggesting that neither threat of coercion nor promise of a reward from the buyer were effective in supporting the impact that contractual governance has on disruption response and recovery performance. Hypotheses 2_a and 2_b argued a negative moderation effect of coercive power, and

a positive moderation effect of reward power on the relationship between relational governance and disruption response and recovery performance.

The coefficient for H_{2a} was insignificant (β= -0.073, ns), with H_{2b} reporting a significant coefficient (β= 0.305***), suggesting that the buyer's promise of reward can enhance the effectiveness of relational governance, thereby enabling them to achieve an improved disruption response and recovery performance.

To probe the moderation effects further, interaction effects were plotted and calculated for the relationship between relational governance and disruption recovery performance at low and high levels of reward power (H_{2b}). Low and high values have been defined as plus and minus one standard deviation from the mean (Cohen and Cohen, 1983). As in Figure 2, the significant simple slope calculation (β =0.734**) illustrates that high levels of reward power positively reinforce the relationship between relational governance and disruption recovery performance. Conversely, low levels of reward power have no significant effect (β=0.426, ns). Hence, support is found for H_{2b} relating to the positive moderating effect of high levels of reward power on the relationship between relational governance and disruption recovery performance.

Table 3. Results of regression analysis for moderation – Relational & Contractual Governance

Figure 2. Relational governance and disruption response and recovery performance by reward power

6. Discussion

6.1 Theoretical contributions

Any buying firm's response to an upstream supply chain disruption often requires a combination of suppliers' co-operation, time, resources and information. When faced with such requests, however, the supplier has a choice and can opt not to engage in the disruption response and recovery effort. This is because a supply chain disruption is characterised as a rapid-onset event (Van Wassenhove, 2006), and this may not allow the supplier sufficient time to devise a way of protecting itself from the uncertainty about pay-out for their efforts, the opportunity cost of the resources they might commit, or the extent to which they might be locked in with this buyer.

It follows that effective governance is pivotal for a successful disruption response. Extant empirical studies on governance in buyer-supplier relationships, however, mostly focus

on investigating its effectiveness in a relationship operating under normal conditions, with limited attention given to relationships in distress. Moreover, it is still not clear how these governance mechanisms interact with a commonly leveraged source of control in this regard – that of power. The main theoretical contributions of this paper coalesce in these areas.

Our analysis shows that the contractual and relational governance established prior to the disruption is positively related to the response/recovery performance. That is, both contractual and relational governance mechanisms, traditionally studied in normal periods of operation, are also effective for relationships during times of distress (e,g., Eckerd *et al.*, 2022). These findings align with previous studies on governance, which contend that a solid contract, with details of obligations and duties for dealing with contingencies including a supply chain disruption, reduces the pay-out-related uncertainty for suppliers (Eisenhardt, 1989; Poppo and Zenger, 2002).

A disruption in a supply chain, however, can impact both the buyer and the supplier in ways not anticipated, limiting the ability of a contract to explicate all contingencies and be complete when it comes to detailing how different actors are obligated to act under different conditions. This is where the relational governance can be useful in inducing a supplier's co-operation by complementing the incompleteness and inflexibility of contractual governance (Poppo and Zenger, 2002; Liu *et al.*, 2009; Lumineau and Henderson, 2012). Our results showed that relational governance developed through a series of repeated transactions is still effective during times of distress. As discussed, SET suggests that relational governance reduces supplier opportunism by alleviating its pay-out-related concerns (Zaheer *et al.*, 1998; Tsai and Ghoshal, 1998; Kale *et al.*, 2000), as well as increasing the expectation that the business with this buyer will continue (Nooteboom and Noorderhaven, 1997; Artz and Brush, 2000; Luo, 2007). This result also affirms the previous studies' findings that relational governance can increase willingness to cooperate with parties even in an uncertain situation, thereby increasing the likelihood of the parties making an effort to address the situation (Dyer, 1996; Joshi and Stump, 1999).

The first theoretical contribution of this paper is on the governance literature by providing empirical evidence that an existing, detailed contract, and a sufficient level of relational governance, are still robust and functional in times of distress and uncertainty following a supply chain disruption, and enhance the response and recovery performance by inducing supplier co-operation. This implication is valuable as most studies on governance for opportunism mitigation investigated relationships during 'steady state' or relatively normal

periods of operation, hence do not provide empirical evidence if such mechanisms would be still functioning when the uncertainties are prevailing and exchange relationships are continuously in motion (Keller *et al.*, 2021; Selviaridis and Spring, 2010).

Our second theoretical contribution is also on the governance literature that this paper uncovers, which is how power, another influential mechanism available for buyers during a crisis time, interacts with these central governance mechanisms. Focusing on mediated, explicit forms of power, our findings suggest that neither the threat of coercion nor the promise of reward from the buyer have a significant role to play in reinforcing the positive impact of contractual governance on the disruption response and recovery. In terms of coercion, this insignificant result is interesting as other studies have suggested that buyer coercion can be effective in ensuring supplier compliance (Pulles *et al.*, 2014).

One possible explanation is that the likelihood of a buyer succeeding in coercing its supplier to co-operate is largely contingent upon the extent of the dependence asymmetry with the supplier. Emerson (1962) suggested that the power capability of an actor to the target is the inverse of the target's dependence, which is in proportion to the buyer's need for the supplier's resources. Responding to an upstream supply chain disruption often requires the supplier's resources, and this means the buyer's dependence on the supplier will probably increase temporarily. This temporary change in the relational dynamic could undermine its efforts to coerce its supplier into joining the response/recovery efforts. When the buyer is in desperate need of the supplier's assistance (for example, gaining priority access to its inventory), the explicit threat of pursuing legal action for non-compliance of the contract would not have the desired effect. As for the use of reward power, our results suggest that it does not enhance, nor indeed undermine, the effectiveness of contractual governance. The extant literature suggests that any attempt by a buyer to reduce the supplier pay-out-related ambiguity in a contract, such as promising or reassuring rewards, should enhance the effectiveness of the contract; however, finding a plausible explanation for the results requires further research.

Considering now the moderating effect of power on relational governance, our results suggest that reward power does enhance the effectiveness of the relational governance in achieving response/recovery performance. This result is consistent with the SET literature whereby a promise of a reward from the buyer would increase the economic return for the supplier (Ramaseshan *et al.*, 2006). This would serve to reinforce the role of relational governance such as trust (Maloni and Benton, 2000; Ireland and Webb, 2007) in reducing its doubts about pay-out as well as increasing the willingness to reciprocate (Nyaga *et al.*, 2013).

This result provides evidence that relationships can actually be improved when power is not used coercively or exploitatively (Maloni and Benton, 2000; Cox, 2001; Ireland and Webb, 2007). This finding is in line with the studies showing that reward power can act as a coordination mechanism (Zhao *et al.*, 2008) by reducing risk of conflict (Belaya *et al.*, 2009) and encouraging further collaboration (Ireland and Webb, 2007; Pulles *et al.*, 2014). We contribute to the body of literature in SET that presents power as a multidimensional construct. We challenge traditional connotations of power whereby the more powerful actor will 'win' at the expense of another, by showing that reward power can be a positive force for both actors (e.g., Ireland and Webb, 2007; Zhao *et al.*, 2008; Pulles *et al.*, 2014), even when a relationship is in distress. Coercive power, on the other hand, does not deteriorate or enhance the effectiveness of relational governance in leveraging supplier co-operation. Relational governance, to become functional, requires many years of repeated positive interactions between partners (Zaheer *et al.*, 1998; Tsai and Ghoshal, 1998; Kale *et al.*, 2000). Our results imply that relational governance is rather robust and that its effectiveness may not be undermined by a one-off threat of coercion by the buyer in a stressful situation.

By providing empirical evidence that power is an effective influencing mechanism available to buying firms during a time of distress, we contribute to the body of SET literature, which has largely overlooked the link between governance and power. Given the increasing frequency of supply chain disruptions, it is imperative that we explore behavioural factors in the context of uncertainty so that we can better understand how to manage supplier relationships and how different relational forces (such as power) can influence actors in the relationship. Considering now the risk management literature, we focus our study on the response and recovery phase of SCRM – the least investigated area in supply chain disruption studies (Sodhi *et al.*, 2012). This phase allows us to observe behaviours at a time of distress, when actors might not necessarily act rationally or when self-interested behaviours are more prevalent. This is important given the nature of the constructs at the centre of our study – power and governance – as they can be reactively used as defensive mechanisms during such times.

6.2 Managerial implications

Recently, there has been a significant amount of research that helps managers better understand what capabilities they should invest in in order to facilitate supply chain disruption response and recovery, which, it is well accepted, are on the rise. However, such efforts by a buying firm, e.g., building resilience, could be fairly resource-intensive and require specific

prerequisite capabilities such as flexibility (Chowdhury and Quaddus, 2016). We assert that an effective disruption response and recovery strategy may not be achieved by the sole efforts by the buying firm and that the assistance of other partners in their network can be the differentiating factor in how successful the response effort might be. Specifically, referring to the body of work on the benefits derived from close supplier relationships, we contend that close supplier relationships can be a critical resource for buying firms during a time of disruption, given their resource set and access to information (Olcott and Oliver, 2011; Ambulkar *et al.*, 2015). Considering this, it is important to highlight the importance of relationship governance, as highlighted by this study, in facilitating an effective disruption response.

We know already that contractual and relational governance are important mechanisms in relationship management, but we can find evidence that the approach to governance is also an important determinant of how effectively buyers recover from disruption. It follows then that managers should place emphasis on doing the basics well, such as adding detailed contingency-related terms when drafting a contract as well as fostering close social ties (embodied in relational capital) with its suppliers. In relation to our findings concerning power, caution should be exercised in the use of mediated power in stressful situations. There is a risk that leveraging such threatening dynamics adversely impacts the relationship and has no useful effect on the ability of either governance mechanism to improve the recovery performance. However, as discussed, the promise of reward would be effective in the disruption situation by supporting the relational governance already in existence. Therefore, procurement and supply chain managers need to acknowledge that promising rewards, in order to influence another party to go along with expressed wishes, would be a more fruitful approach than using punitive measures for motivating suppliers in a disruption situation.

6.3 Conclusion

While a number of studies have suggested the potential association of power and governance in the supply chain (Handley and Benton, 2012; Brito and Miguel, 2017; Clauss and Bouncken, 2019), prior studies have mostly focused on the sole effect, with little attention being paid to the potential interaction effect. Furthermore, the majority of the previous studies investigated these mitigation mechanisms on relationships not necessarily going through distress. This study employs matched pair data of 239 US manufacturers that was analysed using hierarchical OLS regression. The study is believed to be the first attempt to provide

empirical evidence to understand how power interacts with governance in relationships in distress.

Our results indicate that, following a supply disruption, contractual and relational governance enhance the recovery performance by inducing supplier co-operation. That is, detailed contracts and a sufficient level of relational governance are still robust mechanisms to control and manage a relationship in distress. Additionally, our findings shed a light on how power levied interacts with governance mechanisms during these periods. Results indicate that the buyer's threat of coercion and promise of reward toward a supplier are not effective in reinforcing contractual governance in improving disruption recovery performance. This study suggests that using the promise of rewards to influence the other party would appear to be a better approach than using punitive measures for motivating the supplier in a disruption situation. Specifically, the promise of reward enhances the effectiveness of relational governance in achieving recovery performance. Based on the study findings, we derived several important practical implications for policymakers and practitioners.

Our study opens up several avenues for future research. While some of the studies focus on supply chain relationships in distress, for instance, studies on natural resource scarcity (Kalaitzi *et al.*, 2018; 2019) and financial distress (Bode *et al.*, 2014; Essuman *et al*., 2021), examinations of close supply chain relationships have, to date, largely focused on steady-state relationships. It is imperative that we broaden out the scope of this field to look at how relationships function during periods of distress and disruption. There is potential to look at testing many of the 'knowns' from the supply chain literature, in a context such as we have focused on here: supply chain disruptions. We have looked at one set of conditions, but there is abundant opportunity to consider other relational and emotional variables in this context: blame, anger, distrust, and contract violation, for example. From a methodological perspective, cross-sectional data were adopted for the analysis, which thus limits the depth of understanding of the buyer-supplier relationship, especially regarding relational governance, since such behavioural characteristics typically develop over time.

Additionally, while we adopted a number of approaches to minimise biases that related to the respondents' use of memory, it is impossible to avoid such bias completely. Hence, future research should include longitudinal data to understand how the relationships among the dyadic constructs develop and change over time and provide more precise data from the past, thereby solving the issue of respondents' memory/recall and building on the findings of the current research as well. Also, using this data set in various other ways could add new insight to future

studies. For instance, examining each perspective and comparing them thoroughly (e.g., Um and Oh, 2020; Roh *et al.*, 2013) or focusing on the differences, such as dissonance between the buyer and supplier in the data (e.g., Son *et al.*, 2016) could prove beneficial when examined. Whilst both contractual and relational mechanisms can coexist and be used simultaneously, this study did not explore them. Our future study could consider both mechanisms in the same model or investigate the interaction effect between those governance mechanisms. Lastly, despite several control variables in the model, the study may not fully account for all the contingencies that affect the relationship between governance and power. Future research could consider transaction-related control variables such as asset specificity and uncertainty.

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Table 1. Demographic profile – Buyer & Supplier

	Buyer		Supplier	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Size (No. of personnel employed)				
Small-sized (<250 employees)	182	76.15%	173	72.38%
Medium-sized (between 250 and 500 employees)	28	11.72%	60	25.10%
Large-sized (>500 employees)	29	12.13%	6	2.51%
Total	239	100%	239	100%
Total annual sales (US Dollars in Millions)				
<2	3	1.26%	36	15.06%
2-3.99	52	21.76%	67	28.03%
4-4.99	31	12.97%	9	3.77%
5-9.99	57	23.85%	31	12.97%
10-19.99	40	16.74%	50	20.92%
>20	56	23.43%	45	18.83%
Total	239	100%	239	100%
Respondent profile				
CEO/general director /Senior Vice President	7	2.93%	43	17.99%
Supply chain director	80	33.47%	55	23.01%
Supply chain manager	152	63.60%	141	59.00%
Total	239	100%	239	100%
Industrial sector				
Automotive[1]	75	31.38%		
Electronics[2]	71	29.71%		
Food & beverage[3]	34	14.23%		
Fabricated metal products[4]	26	10.88%		
Machinery[5]	2	0.84		
Etc[6].	31	12.97%		
Total	239	100%		

[1](SIC 37: Transportation Equipment); [2](SIC 36: Electronics & other Electronic Equipment); [3](SIC 20: Food & Kindred Product); [4](SIC 34: Fabricated metal products); [5](SIC 35: Industrial Machinery & Equipment); [6](SIC 23: Apparel/textile; SIC 39: Miscellaneous Manufacturing Industries; SIC 27: Printing, Publishing and Allied Industries; SIC 28: Chemicals and Allied Products)

Table 2. Construct analysis and Construct level correlation analysis

Construct analysis					
	Construct	Factor Loadings	Average Variance Extracted	Composite Reliability	Cronbach alpha
Relational Governance (RG)[a]	RG2	0.937			
	RG3	0.914	0.684	0.872	0.653
	RG4	0.643			
	RG5	0.781			
Contractual Governance (CG)	CG1	0.880			
	CG2	0.704			0.651
	CG3	0.733	0.509	0.911	
	CG4	0.702			
	CG5	0.708			
	CG6	0.500			
Buyer's threat of Coercion(CP)	CP1	0.893			
	CP2	0.727	0.547	0.849	0.643

	CP3	0.568			
	CP4	0.734			
Buyer's promise of	RP1	0.997			
Reward (RP)	RP2	0.512	0.605	0.804	0.662
	RP3	0.747			
Response and recovery	RRP1	0.472			
performance (RRP)[a]	RRP2	0.800			
	RRP3	0.788	0.545	0.872	0.670
	RRP4	0.840			
	RRP6	0.732			

Construct level correlation analysis

Constructs	(RG)	(CG)	(CP)	(RP)	(RRP)
Relational Governance (RG)	0.684	-	-	-	-
Contractual Governance (CG)	0.179	0.509	-	-	-
Buyer's threat of Coercion (CP)	0.154	0.312	0.547	-	-
Buyer's promise of Reward (RP)	0.081	0.232	0.317	0.605	-
Response and recovery performance (RRP)	0.158	0.162	0.155	0.081	0.545

Chi-square: 120.1 (df =84); CFI = 0.907; TLI = 0.935, GFI = 0.907; AGFI = 0.865; and RMSEA= 0.046

[a]: RG1, RRP5, RRP7 was deleted due to the low loadings

P <0.001***, P<0.05**

Table 3. Results of regression analyses – Relational Governance & Contractual Governance

Contractual Governance Model

	Model 1		Model 2		Model 3	
	β	*(std β)*	*β*	*(std β)*	*β*	*(std β)*
Control						
[a] Automotive Industry	-0.100	(-0.094)	-0.071	(-0.066)	-0.083	(-0.077)
[a] Electronics Industry	-0.019	(-0.014)	-0.036	(-0.025)	-0.047	(-0.033)
[a] Food Industry	-0.006	(-0.006)	-0.052	(-0.048)	-0.063	(-0.058)
[a] Metal fabrication Industry	-0.028	(-0.018)	-0.010	(-0.006)	-0.015	(-0.009)
[b] Delay disruption	0.060	(0.023)	0.121	(0.046)	0.098	(0.037)
[b] Delivery failure	-0.054	(-0.049)	0.040	(0.036)	0.025	(0.022)
[b] Quality problem	-0.072	(-0.063)	0.010	(0.008)	-0.007	(-0.006)
[b] Inventory shortage	-0.040	(-0.037)	0.067	(0.062)	0.052	(0.049)
[b] ETC disruption	-0.439	(-0.098)	-0.522	(-0.117)	-0.502	(-0.112)
Disruption Frequency	0.034**	(0.099)	0.036**	(0.106)	0.035**	(0.104)
Duration of disruption	0.092	(0.152)	0.065	(0.107)	0.076**	(0.126)
Buyer's Financial loss	0.000	(-0.009)	0.000	(-0.015)	0.000	(-0.013)
Supplier's Financial loss	0.000	(-0.004)	0.000	(0.054)	0.000	(0.056)
Buyer's Dependence	0.146***	(0.165)	0.056	(0.063)	0.056	(0.063)
Size difference	0.043**	(0.102)	0.068**	(0.162)	0.067**	(0.159)
Relational governance	0.586***	(0.685)	0.541***	(0.632)	0.540***	(0.632)
Main effect						
Contractual Governance			0.209**	(0.152)	0.219**	(0.160)
Threat of Coercion			0.096	(0.084)	0.094	(0.083)
Promise of Reward			0.039	(0.039)	0.044	(0.043)
Interaction effect						
Contractual Governance X Threat of Coercion					-0.086	(-0.058)
Contractual Governance X Promise of Reward					0.031	(0.023)

S.E	0.313		0.304		0.305	
Overall R^2	0.631		0.657		0.658	
Adj R^2	0.605		0.627		0.625	
Overall model F	23.776***		22.096***		19.881***	
Relational Governance Model						
	Model 1		Model 2		Model 3	
	β	*(std β)*	*β*	*(std β)*	*β*	*(std β)*
Control						
[a] Automotive Industry	-0.194	(-0.181)	-0.071	(0.077)	0.000	(0.000)
[a] Electronics Industry	-0.091	(-0.064)	-0.036	(0.085)	0.027	(0.019)
[a] Food Industry	-0.063	(-0.058)	-0.052	(0.077)	0.004	(0.004)
[a] Metal fabrication Industry	-0.047	(-0.030)	-0.010	(0.090)	0.062	(0.039)
[b] Delay disruption	0.077	(0.030)	0.121	(0.208)	0.085	(0.033)
[b] Delivery failure	0.054	(0.049)	0.040	(0.176)	0.035	(0.031)
[b] Quality problem	0.004	(0.004)	0.010	(0.175)	-0.004	(-0.003)
[b] Inventory shortage	0.074	(0.069)	0.067	(0.170)	0.050	(0.047)
[b] ETC disruption	-0.813	(-0.182)	-0.522	(0.243)	-0.400	(-0.090)
Disruption Frequency	0.038	(0.111)	0.036**	(0.016)	0.033	(0.097)
Duration of disruption	0.019	(0.031)	0.065	(0.033)	0.034	(0.055)
Buyer's Financial loss	0.000	(-0.044)	0.000	(0.000)	0.000	(-0.032)
Supplier's Financial loss	0.000	(-0.009)	0.000	(0.000)	0.000	(0.051)
Buyer's Dependence	0.132**	(0.150)	0.056	(0.049)	0.072	(0.081)
Size difference	0.074**	(0.175)	0.068**	(0.020)	0.073***	(0.173)
Contractual governance	0.566***	(0.413)	0.209**	(0.092)	0.220**	(0.160)
Main effect						
Relational Governance			0.541***	(0.039)	0.567***	(0.662)
Threat of Coercion			0.096	(0.075)	0.087	(0.076)
Promise of Reward			0.039	(0.071)	0.024	(0.023)
Interaction effect						
Relational Governance X Threat of Coercion					-0.073	(-0.041)
Relational Governance X Promise of Reward					0.305**	(0.204)
S.E	0.422		0.304		0.295	
Overall R^2	0.332		0.657		0.680	
Adj R^2	0.284		0.627		0.649	
Overall model F	6.891***		22.096***		21.949***	

Dependent Variable: response and recovery performance
Disruption Frequency: buyer firm's frequency of disruption
Duration of disruption: buyer firm's duration of disruption exposed
Buyer's (Supplier's) Financial loss (severity of the disruption): Buyer's financial loss due to the disruption
Buyer's Dependence: Buyer's dependence on the relationship with the supplier
[a] Automotive; Electronics; Food; Metal fabrication Industry: Buyer's industry
[b] Delay disruption; Delivery failure; Quality problem; Inventory shortage; ETC disruption: Types of disruption experienced
Size difference: Number of employee differences between the buyer and the supplier (buyer – supplier; natural logarithm)
P <0.001***, P<0.05**

Appendix A. Measurement items

	Scales	Sources
	Relational Governance (RG)	
	(1: not at all – 7: to a very large extent)	
(RG1) [a]	We respected (the name of the supplier) supplier (We respected this customer)	Carey *et al*. (2011)
(RG2)	We trusted this supplier (We trusted this customer)	Zaheer and Venkatraman, 1995; Abdi and Aulakh, 2014;
(RG3)	The relationship with this supplier was characterised by high levels of reciprocity (The relationship with this customer was characterised by high levels of reciprocity)	Zaheer and Venkatraman, 1995 Kale *et al*, 2000; Tsai and Ghoshal, 1998; Zaheer *et al*., 1998
(RG4)	We had a good friendship with this supplier (We had a good friendship with this customer)	Carey *et al*., 2011
	Contractual Governance (CG)	
	(1: Strongly disagree – 7: Strongly agree)	
(CG1)	Formal written agreements with the supplier define the role of each party? (Formal written agreements with the customer define the role of each party?)	
(CG2)	Formal written agreements with the supplier define the responsibilities of each party? (Formal written agreements with the customer define the responsibilities of each party?)	
(CG3)	Formal written agreements with the supplier state how each party was to perform? (Formal written agreements with the customer state how each party was to perform?)	
(CG4)	Formal written agreements with the supplier state the legal ramifications for failure to perform? (Formal written agreements with the customer state the legal ramifications for failure to perform?)	Carey *et al*., 2011
(CG5)	Formal written agreements with the supplier state what would happen in the case of events occurring that were not planned? **(**Formal written agreements with the customer state what would happen in the case of events occurring that were not planned? **)**	
(CG6)	Formal written agreements with the supplier state how disagreements would be resolved? (Formal written agreements with the customer state how disagreements would be resolved?)	
	Buyer's threat of Coercive (CP)	
	(1: Strongly disagree – 7: Strongly agree)	
(CP1)	We often implied that our firm's personnel would somehow get back at this supplier, if they did not do as we asked and we found out (This customer often implied that they would somehow get back at us, if we did not do as they had asked and they found out)	Zhao *et al*., 2008
(CP2)	We often hinted that we would take action that would reduce this supplier's profits. if they did not go along with our requests (This customer often hinted that they would take actions that would reduce our profits, if we did not go along with their requests)	Maloni and Benton, 2000; Zhao *et al*., 2008; Pulles *et al*., 2014
(CP3)	We often implied that we might have withdrawn certain needed services from this supplier, if they did not go along with us (This customer often implied that they might have withdrawn	Maloni and Benton, 2000; Zhao *et al*., 2008; Pulles *et al*., 2014

	certain needed services from us, if we did not go along with them)	
(CP4)	We often implied that we could made things more difficult for this supplier, if they did not agree to our suggestions (This customer often implied that they could made things more difficult for us, if our organisation did not agree to their suggestions)	Maloni and Benton, 2000; Zhao *et al*., 2008; Pulles *et al*., 2014
Buyer's promise of Reward (RP)		
(1: Strongly disagree – 7: Strongly agree)		
(RP1)	We offered incentives to this supplier for their cooperation (This customer offered incentives to us for our cooperation)	Maloni and Benton, 2000; Zhao *et al*., 2008
(RP2)	We implied that we would favour this supplier in the future, if they went along with our requests (This customer implied that they would favour us in the future, if we went along with their requests)	Maloni and Benton, 2000; Zhao *et al*., 2008; Pulles *et al*., 2014
(RP3)	We offered this supplier rewards, if they went along with our wishes (This customer offered us rewards, if we went along with their wishes)	Maloni and Benton, 2000; Zhao *et al*., 2008; Pulles *et al*., 2014
Supply chain disruption Response and Recovery Performance (RRP)[b]		
(1: Strongly disagree – 7: Strongly agree)		adopted from…
(RRP1)	Compare to the similar disruption, material flow was restored more quickly	Macdonald and Corsi, 2013
(RRP2)	Compare to the similar disruption, normal operating performance was more quickly restored	Chowdhury and Quaddus, 2016; Macdonald and Corsi, 2013
(RRP3)	Compare to the similar disruption, the supply chain more easily recovered to its original state	Chowdhury and Quaddus, 2016; Ambulkar *et al*., 2015
(RRP4)	Compare to the similar disruption, the disruption was dealt with more efficiently	Ambulkar *et al*., 2015
(RRP5)[a]	Compare to the similar disruption, Satisfied with the outcomes of the recovery effort for this disruption	Chowdhury and Quaddus, 2016
(RRP6)	Compare to the similar disruption, the financial distress due to the disruption was more successfully dealt with when compared with similar disruptions	Chowdhury and Quaddus, 2016
(RRP7)[a]	Compare to the similar disruption, production costs were better controlled when compared with similar disruptions	Chowdhury and Quaddus, 2016; Macdonald and Corsi, 2013

[a]: RG1, RRP5, RRP7 was deleted due to the low loadings

[b]: Identical set of questions was asked to both parties for RRP

Appendix B. Correlation table

	RG	CG	CP	RP	RRP	Sales difference	Size difference	Disruption Frequency	Buyer's financial loss	Supplier's financial loss	Buyer's dependence
RG	1	-	-	-	-	-	-	-	-	-	-
CG	.386**	1	-	-	-	-	-	-	-	-	-
CP	.380**	.742**	1	-	-	-	-	-	-	-	-
RP	.344**	.609**	.644**	1	-	-	-	-	-	-	-
RRP	.739**	.476**	.439**	.374**	1	-	-	-	-	-	-
Sales difference	.185**	.085	.069	.159*	.139*	1	-	-	-	-	-
Size difference	-.112	-.252**	-.202**	-.268**	.000	.234**	1	-	-	-	-
Disruption Frequency	.156*	.221**	.121	.127*	.263**	-.069	-.092	1	-	-	-
Buyer's financial loss	-.161*	-.186**	-.152*	-.274**	-.175**	.046	.011	-.159*	1	-	-
Supplier's financial loss	-.165*	-.237**	-.232**	-.290**	-.139*	-.317**	-.098	.048	.142*	1	-
Buyer's dependence	.275**	.533**	.473**	.578**	.366**	-.077	-.174**	.198**	-.237**	-.052	1
Descriptive statistics (n=239)											
Mean	5.277	5.268	5.168	5.147	5.222	0.009	-0.093	2.971	2.929	2.884	-0.172
(std)	(0.583)	(0.364)	(0.438)	(0.490)	(0.499)	(0.684)	(1.185)	(1.462)	(0.280)	(0.518)	(0.828)

** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed).
Disruption Frequency: buyer firm's frequency of disruption
Buyer's (Supplier's) Financial loss: Buyer's financial loss due to the disruption (severity of the disruption)
Buyer's Dependence: Buyer's dependence on the relationship with the supplier
Automotive; Electronics; Food; Metal fabrication industry: Buyer's industry
CG: Mutual level of contractual governance in the relationship
RG: Mutual level of relational governance in the relationship
CP: Mutual level of buyer's threat of using coercive power
RP: Mutual level of buyer's promise of using reward power
RRP: Mutual disruption response and recovery performanc

Figure 1. Conceptual model

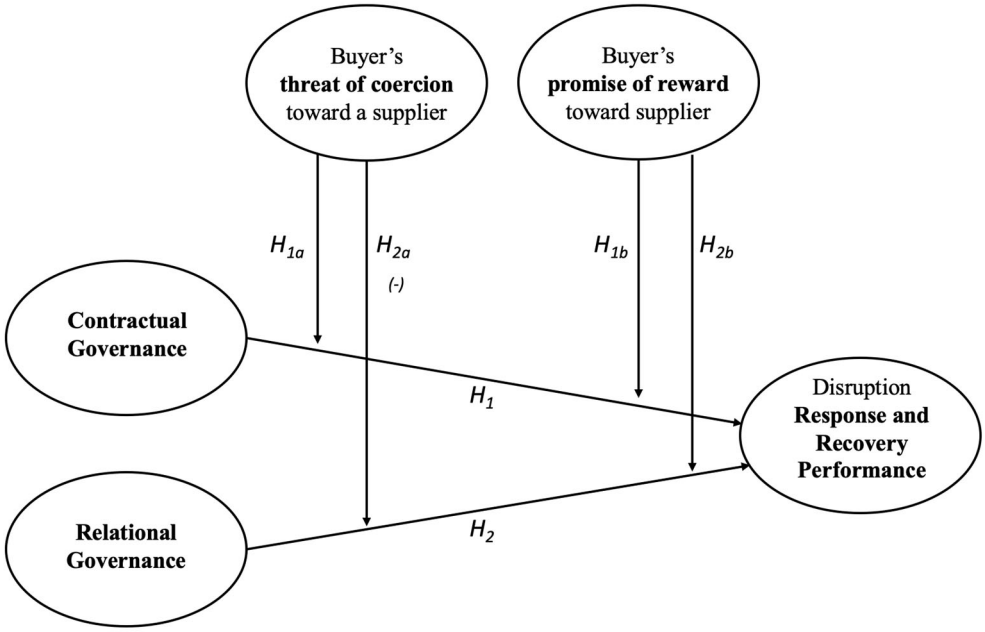

Figure 2. Relational governance and disruption response and recovery performance by the buyer's promise of reward toward the supplier