# Managing Supplier Sustainability Risk: An Experimental Study

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# Managing Supplier Sustainability Risk: An Experimental Study


## Abstract

**Purpose –** Buying firms are increasingly exposed to sustainability risk arising from negative conditions or potential events in their supply base that might provoke adverse stakeholder reactions. Procurement managers at these firms can pursue multiple strategies to address this risk with suppliers, including acceptance, monitoring-based mitigation, avoidance, and collaboration-based mitigation. Our conceptual model explains how perceived risk, supplier dependence, and financial slack resources contribute to the strategic preferences of these managers.

**Design/methodology/approach –** A vignette-based experiment with procurement managers is used to examine the factors affecting the managers' strategic preferences in managing supplier sustainability risk.

**Findings –** The empirical results revealed that the procurement managers' preference for avoidance or collaboration strategies was stronger when they perceived higher risk, but their preference varied based on the degree of supplier dependence. Specifically, when they perceived a high level of risk, procurement managers were more inclined toward a monitoring strategy with dependent suppliers and preferred an avoidance strategy when they dealt with independent ones. Financial slack was also an influential factor: managers with more slack at their disposal preferred to collaborate with suppliers to address the risk; on the other hand, limited slack shifted their preference toward an acceptance strategy, regardless of the level of risk.

**Originality/value –** This study helps to develop a more nuanced picture of how procurement managers make challenging and complex trade-offs when responding to supplier sustainability risk.


**Keywords:** supplier sustainability risk, risk perception, supplier dependence, financial slack, vignette-based experiment

**Paper Type:** Research paper

## 1. Introduction

A growing number of buying firms are experiencing greater exposure to several types of risk within their global supply chains. A particularly important topic is *supplier sustainability risk*, whereby risk originates from a supplier's poor environmental or social practices including careless waste disposal, unsafe products, or poor working conditions. If these practices are discovered by customers or non-governmental organizations (NGOs), the buying firms are often held accountable to mitigate damage or prompt improvement (Hofmann *et al.*, 2014), resulting in substantial market share loss, reduced revenue, adverse publicity, and damaged reputations (Kim *et al.*, 2019, Cousins *et al.*, 2020). On the other hand, improving a supplier's sustainability can positively influence a buying firm's financial performance through reduced risk-related costs and collaboration benefits (Busse, 2016).

Ideally, buying firms should proactively manage supplier sustainability risk like any other types of risk (Giannakis and Papadopoulos, 2016). Yet, recurring news about the controversial practices within the firms' supply chains illustrate that this risk is frequently managed in reactive ways. Repeated employment law violations by suppliers of high-tech companies like Apple and Amazon (Albergotti, 2019), continued modern slavery and child labour use by suppliers of the fashion and apparel industry brand holders like Gap and Marks & Spencer (Phung *et al.*, 2019), and continued deforestation practices by palm oil suppliers of the food industry global brands such as Kellogg's and Mondelez (Harvey, 2020) are just a few examples. It is possibly because some firms naively hope to avoid problems, emphasize 'damage control', or belatedly respond to short-term pressures; however, several other firms develop more collaborative relationships with their suppliers to improve their social or ecological performance, e.g., IKEA's IWAY (2016). What can explain this wide range of approaches to managing supplier sustainability risk?

Hajmohammad & Vachon (2016) conceptually detail four supplier sustainability risk management (SSRM) strategies including acceptance, monitoring-based mitigation, avoidance, and collaboration-based mitigation. Drawing on agency and resource dependence theories, they put forth a conceptual framework to explain how the buyer-supplier dependence structure moderated by the buying firms' perceived risk drives their preference among these strategies. Yet, their proposed framework does not include other factors, such as resource constraints, which may restrict or shift the buying firm's SSRM strategy preference. In addition, the validity of their proposed set of SSRM strategies and the predicting factors have not been empirically confirmed.

To address these gaps and ascertain the predictive validity and generalizability of the theory, we draw on the behavioural theory of the firm (BTF) (Cyert and March, 1963) to revisit, theoretically extend, and empirically examine Hajmohammad & Vachon's (2016) conceptual framework. In doing so, we specifically focus on their proposed effect of supplier dependence and theorize that perceived risk not only moderates this effect, but also, based on the BTF's shifting-focus model (March and Shapira, 1992), has a direct effect on the strategic decisions. We further apply the BTF's problemistic search model and its central concept of organizational slack (Gavetti *et al.*, 2012, Kirchoff *et al.*, 2016) to introduce financial slack as a key boundary condition to their propositions. We then examine our conceptual framework via a large-scale vignette-based experiment using procurement managers as participants.

This paper makes several important empirical and theoretical contributions to extant research. First, complementing other research that explores tensions among supply chain partners at the organizational level, this empirical work uses the lens of individual decision makers (i.e., procurement managers) to consider the supplier sustainability risk and SSRM strategies implemented at the operational level. Although many buying firms may have developed policies

and procedures to address such risks, procurement managers, who are directly responsible for the firm's suppliers, often have significant influence and discretion to decide what actions must be taken to deal with potential risks (Huq *et al.*, 2016, Villena, 2019). Unfortunately, the diffusion of sustainability through a buying firm's supply chains can be hindered by the perception of these individual managers about the risks involved (Mantel *et al.*, 2006, Ellis *et al.*, 2010). Conflicting internal and external pressures on top of the trade-offs they have to make given the resources available to them and performance levels expected of them often exacerbate these challenges (Kirchoff *et al.*, 2016).

Second, research on decision making and risk taking processes by realistic, boundedly rational managers has long relied on the BTF for theoretical underpinnings (Cyert and March, 1963). Surprisingly, however, the operations and supply chain management (OSCM) literature has only paid scant and indirect attention to this theory, although it continues to be foundational to topics such as managerial decisions related to sustainability (Audia and Greve, 2006, Kirchoff *et al.*, 2016). Specifically, financial slack has been rarely studied in relation to firms' social and environmental sustainability within the OSCM literature (Wiengarten *et al.*, 2017). Although some studies have considered how slack resources can be leveraged to mitigate the impacts of supply chain disruptions (Kleindorfer and Saad, 2005, Hendricks *et al.*, 2009) or venture failures (Azadegan *et al.*, 2013), to our knowledge, no research has evaluated the role of slack in managing sustainability-related risks within supply chains.

Finally, the OSCM literature has tended to focus on monitoring of suppliers or collaborative activities between buying firms and their suppliers (Pagell and Wu, 2009). Our study not only provides new empirical insights on why and under what conditions either of these strategies are used by buying firms, but also examines why some firms might pursue alternative

strategies (i.e., accepting the sustainability risk or avoiding it via supplier phase-out), which have been largely ignored in the literature.

## 2. Supplier sustainability risk

Much of the earlier work on supply chain risk has focused on coordination and disruption risks; however, recently, the scope of risk being considered has expanded to include risk derived from the sustainable performance of suppliers (Hartmann and Moeller, 2014), including those at lower tiers (Villena and Gioia, 2018). Supplier sustainability risk is broadly defined as a sustainability-related condition or a potential event among a buying firm's suppliers that may provoke harmful stakeholder reactions (Hofmann *et al.*, 2014). This risk originates from poor performance, misconduct, or inaction by a supplier(s) followed by detection by concerned stakeholders. It fully materializes when stakeholders regard the supplier's condition or behaviour to be illegitimate, hold the buying firm accountable, and protest, organize boycotts, or prompt new regulatory actions (Hartmann and Moeller, 2014).

Many buying firms attempt to proactively manage supplier sustainability risk to protect themselves against negative financial and reputational consequences (Giannakis and Papadopoulos, 2016, Kim *et al.*, 2019). To do so, they may pursue specific strategies in their relationships with suppliers to reduce the probability of their misconducts or, at least, detect them in a timely manner (Stevenson and Cole, 2018). Drawing on the supply chain risk management literature and anecdotal evidence, the conceptual study by Hajmohammad & Vachon (2016) identified four SSRM strategies pursued by a buying firm before the risk fully materializes, i.e., before the buying firm is held responsible for its supplier's poor social or environmental misconduct. These pre-event SSRM strategies include risk acceptance, monitoring-based risk mitigation, risk avoidance, and collaboration-based risk mitigation.

In summary, an acceptance strategy knowingly retains risk and hopes (optimistically) for no event or detection, although the precise nature, magnitude, or likelihood of any risk might remain poorly understood. Simultaneously, management might also plan contingencies to any fallout that occurs if a negative event were to subsequently materialize (Sodhi and Tang, 2012). Monitoring-based mitigation also accepts pre-existing risks but performs 'due diligence.' This marginally more proactive strategy involves responsible sourcing and supplier selection (Zorzini *et al.*, 2015) with buying firms explicitly communicating their expectations for suppliers to meet particular standards (Hannibal and Kauppi, 2019) and periodically assessing suppliers' compliance to social and environmental standards and requirements (Gualandris *et al.*, 2015) or enhancing the supply chain visibility (Busse *et al.*, 2017b). Alternatively, rather than monitoring a supplier and pressing for improvement to address deficiencies, buying firms might proactively drop the supplier (i.e., avoidance) and source from a better supplier, despite switching costs (Cho *et al.*, 2019). In fact, buying firms face frequent calls by NGOs and other stakeholders, such as activist groups and media, to boycott using offending suppliers. Finally, with collaboration-based mitigation, buying firms seek to improve environmental and social performance of suppliers through jointly-developed solutions that often are aligned with other aspects of supplier development (Golicic and Smith, 2013). Training of supplier's employees, incentivizing suppliers through contingency payments, guaranteeing purchase volumes or subsidizing supplier costs to meet sustainability performance expectations (Chen and Lee, 2017), or augmenting information sharing with suppliers (Busse *et al.*, 2017a) are a few examples of such collaborative solutions.

While the relevance of these SSRM strategies has case-based support – usually studied individually or in contrasting pairs, e.g., monitoring vs. collaboration (Huq *et al.*, 2016) – the criteria used by procurement managers to select among them are largely unexplored, including the

factors that motivate their preference.

## 3. Procurement managers and their SSRM strategy preference

In their paper, Hajmohammad & Vachon (2016) propose a conceptual model to explain the direct effect of buyer-supplier dependence moderated by procurement managers' perceived risk on their SSRM strategy preference. In this paper, however, we draw on the BTF to theoretically extend their framework and propose that (i) perceived risk has a direct effect (in addition to its moderating effect) and (ii) financial slack available to procurement managers is a boundary condition on what they may prefer as their SSRM strategy.

### *3.1. Supplier dependence*

Drawing on the resource dependence theory, Hajmohammad & Vachon (2016) argue that as supplier dependence increases, the buying firm's power increases, enabling the procurement managers to more strongly influence the actions and behaviours of the supplier in an attempt to mitigate the supplier sustainability risk. Specifically, higher supplier dependence relative to that of the buying firm enhances the procurement managers' ability to effectively monitor the supplier or push the supplier toward a more collaborative relationship where new practices are introduced at the supplier's facilities beyond the manager's direct control (Hoejmose *et al.*, 2013). In contrast, when the supplier has low dependence on the buying firm, the procurement managers have limited influence, thereby limiting their ability to impose monitoring or encourage collaboration (Parmigiani *et al.*, 2011). As a result, they must accept the relationship 'as is' or terminate the relationship and seek a supplier with lower risk. In line with the untested propositions of Hajmohammad & Vachon (2016), we hypothesize that:

*H1a: The procurement managers' preference for a monitoring-based or collaboration-based mitigation strategy increases when the supplier dependence is high.*

*H1b: The procurement managers' preference for an acceptance or avoidance strategy increases when the supplier dependence is low.*

### *3.2. Perceived risk*

The behavioural theory of the firm (Cyert and March, 1963) suggests that boundedly-rational and satisficing managers take strategic decisions primarily based on two different measures: performance levels they aspire to achieve (aspirations) and the present conditions (internal and external) of their organization (Bateman and Zeithaml, 1989). Organizational aspirations, frequently referred to as goals, are the desired performance levels in specific organizational outcomes (Shinkle, 2012). According to the BTF, *failure* in meeting an aspiration level prompts a *problemistic search* (or search for solutions) that results in change. In other words, if performance is higher than aspiration level, decision makers will make few, if any, changes and continue the status quo; alternatively, if performance falls below aspiration level, this gap in performance creates a sense of crisis and calls for change, i.e., new strategies, techniques, or procedures to improve the situation (Bromiley, 1991, Audia and Greve, 2006). The BTF's *shifting-focus model* (March and Shapira, 1992) further elaborates that decision makers evaluate their firms' performance not only relative to an aspiration level but also a survival point (i.e., performance so low that the firm might fail). Focusing on survival point induces decision makers to be more risk averse because they interpret low performance as a step toward failure. In contrast, focusing on the firm's low performance relative to an aspiration level can be interpreted as repairable, reducing the degree of risk aversion. The model also suggests that the decision makers' reference point shifts between survival and aspiration points, depending on which is perceived to be closer to actual performance (Audia and Greve, 2006).

By extension, we argue that procurement managers are more likely to search for actions to improve supplier performance and change the status quo when the supplier performance falls short from their aspirational levels – in our case, when they perceive a supplier sustainability risk.

Supplier sustainability risk can dramatically hurt a firm's reputation and require significant costs to remediate if the firm is held accountable for its suppliers. For many procurement managers, the likelihood of this extreme outcome (i.e., their perceived risk) is quite low and survival is less of a concern; therefore, to them, supplier sustainability risk can be managed by a reactive monitoring (Handley and Benton, 2013), or even accepting the small perceived risk (Van Tulder *et al.*, 2009): basically, postponing the action until events unfold and the uncertainty is resolved (Kirchoff *et al.*, 2016). However, when clear unambiguous signals emerge, for example, based on poor prior supplier behaviour with other buying firms, the likelihood and the magnitude of potential reputational and financial losses perceived by the procurement managers arguably increase dramatically. The high level of perceived risk in such situations shifts the managers' attention and concern toward taking actions to survive and avoid failure and loss, rather than meet certain performance levels. Therefore, a higher level of perceived supplier sustainability risk fosters risk averse and more proactive strategies (March and Shapira, 1992). One option is phasing out the problematic supplier to avoid the risk (Foerstl *et al.*, 2010); another is to initiate collaboration to mitigate the risk by prompting the supplier to improve performance (Cheng *et al.*, 2012). Therefore, we hypothesize that:

*H2a: The procurement managers' preference for an avoidance or collaboration-based mitigation strategy increases with a high degree of perceived sustainability risk for a supplier.*

*H2b: The procurement managers' preference for an acceptance or monitoring-based mitigation strategy increases with a low degree of perceived sustainability risk for a supplier.*

In addition, drawing on the agency theory, Hajmohammad & Vachon (2016) propose that the degree of supplier sustainability risk perceived by procurement managers moderates the hypothesized relationships in H1 between supplier dependence and the procurement managers' strategic preference. Therefore, similar to their untested propositions, we hypothesize that:

*H3: The degree of procurement managers' perceived supplier sustainability risk for a supplier moderates the relationship between the supplier dependence and the managers' preferred SSRM strategy, as follows:*

*(a): When the supplier dependence is high, the procurement managers' preference for a monitoring-based mitigation strategy increases with a low degree of perceived sustainability risk.*

*(b): When the supplier dependence is high, the procurement managers' preference for a collaboration-based mitigation strategy increases with a high degree of perceived sustainability risk.*

*(c): When the supplier dependence is low, the procurement managers' preference for an acceptance strategy increases with a low degree of perceived sustainability risk.*

*(d): When the supplier dependence is low, the procurement managers' preference for an avoidance strategy increases with a high degree of perceived sustainability.*

### *3.3. Financial slack*

In its simplest form, organizational slack is the resources in excess of what is needed to fulfil an organization's day-to-day operations (Bourgeois, 1981). They are generally characterized as unabsorbed or absorbed (Tan and Peng, 2003). Unabsorbed financial slack resources include the discretionary budgets and financial reserves that are readily available to managers ('liquid') for allocation and deployment at short notice (Goldstein and Iossifova, 2012). Absorbed slack resources, however, are not as liquid as they are already invested in the current operations, in the form of management time, excess labour, or unused capacity (Kovach *et al.*, 2015).

The concept of slack resources is central to the BTF (Cyert and March, 1963) as it can significantly influence the managerial decision making process and outcomes (Argote and Greve, 2007). The strategy literature has widely explored the role of organizational slack in decisions pertaining to R&D investments (Greve, 2003) and technology sourcing (Steensma and Corley, 2001). In a broad sense, possessing more slack resources, at least to some extent, has positive benefits for organizational performance, growth, and survival (Paeleman and Vanacker, 2015). The concept has been generally associated with firm's experimentation capacity particularly when responding to external pressures and shocks (Cyert and March, 1963, Bromiley, 1991), and is used

to explain innovation competencies (Danneels, 2008) and learning capabilities (Wiersma, 2007). For example, Fredrich et al. (2019) found a relationship between organizational slack and firms' absorptive capacity in coopetition alliances.

In the OSCM literature, organizational slack is mostly viewed as a flexibility capability that enables firms to respond to business uncertainties (Hendricks *et al.*, 2009). It has recently been used to explain sticky spending (Zhang *et al.*, 2021), the impact of coopetition on environmental performance (Modi and Cantor, 2021), and safety performance (Wiengarten *et al.*, 2017). Specifically, financial slack is determined as a critical element in transferring sustainability through multiple tiers of a supply chain (Villena, 2019). Yet, while several studies in this literature have considered how absorbed operational slack can be leveraged to mitigate risks, such as supply chain disruptions (Kleindorfer and Saad, 2005, Hendricks *et al.*, 2009) or venture failures (Azadegan *et al.*, 2013), to our knowledge, no research has evaluated the role of unabsorbed financial slack in managing supply chain risks, specifically those rooted in sustainability performance.

*3.3.1. Financial slack and SSRM strategies*

As discussed earlier, according to the BTF (Cyert and March, 1963), procurement managers are likely to initiate a search for solutions (i.e., *problemistic search*) to improve supplier performance and remedy the threat when they perceive a supplier sustainability risk. Beyond the contextual elements discussed so far (i.e., supplier dependence and the perceived risk), more abundant financial slack resources can provide the procurement managers with a larger set of possible solutions (Latham and Braun, 2009). Conceivably, abundant slack resources enable the sizeable investments these managers need to build a collaborative relationship with the suppliers, or to switch to lower risk suppliers, as such strategies require changes to the scope and/or volume of

their supplier management processes and activities. However, the BTF suggests that more abundant financial slack also allows for more extensive search processes to find solutions to the observed shortfall in performance (Paeleman *et al.*, 2017, Titus Jr *et al.*, 2021). In other words, financial slack is more than just the resources needed to adopt a new strategy or set of practices; it also impacts the decision-makers behaviourally in two different ways when they examine different paths forward.

First, financial slack can be instantly deployed to act as a buffer against uncertainties and shocks, to facilitate experimentation that generates new ideas and strategies, and to increase managerial discretion to refine established norms, relationships, and processes (Ocasio, 1997, Bradley *et al.*, 2011). Greater financial slack reduces firm's vulnerability: it provides a buffer that helps absorb the short-term effects of failure (Bromiley, 1991), extending managers' time horizon and allowing them to seek more sustainable solutions with longer payback periods, such as supplier collaboration or risk avoidance by switching to lower risk suppliers (Martin *et al.*, 2016).

Second, based on the BTF, financial slack significantly influences managerial risk-taking behaviour (March and Shapira, 1992). When unabsorbed slack resources available to procurement managers are scarce, they become more passive and open to accepting the risk (Wiseman and Bromiley, 1996). Analogously, Goldstein and Iossifova (2012) reported that the availability of unabsorbed slack resources significantly enhanced the effective implementation of quality management initiatives with longer term objectives. Given that collaboration-based practices imply greater outcome uncertainty and require a longer-term perspective than policing through monitoring, the availability of slack resources will impact the likelihood of procurement managers to adopt collaboration rather than opting for monitoring. A similar implication emerges when avoidance strategy (e.g., switching suppliers) is contrasted to a more passive strategy like

acceptance.

Accordingly, we hypothesize that the degree of unabsorbed financial slack provides a better delineation of the relationships set forth in H1 and H2. In situations where slack resources are abundantly available to the procurement managers, their expected decisions as stated in H1 (for the degree of supplier dependence) and H2 (for the degree of perceived risk) will remain the same. However, in situation of low slack resources availability to procurement managers, they will aim for more passive and short-term strategies as hypothesized below:

*H4: The level of financial slack resources availability to procurement managers moderates the relationships between the supplier dependence and the managers' perceived supplier sustainability risk for a supplier with their preferred SSRM strategy, as follows*

*H4a: In situation of low financial slack resources availability, a high supplier dependence makes procurement managers lean toward a monitoring-based mitigation strategy as opposed to a collaboration-based mitigation strategy.*

*H4b: In situation of low financial slack resources availability, a low supplier dependence makes procurement managers lean toward an acceptance strategy as opposed to an avoidance strategy.*

*H4c: In situation of low financial slack resources availability, a high degree of perceived sustainability risk for a supplier makes procurement managers lean toward an avoidance strategy as opposed to a collaboration-based mitigation strategy.*

*H4d: In situation of low financial slack resources availability, a low degree of perceived sustainability risk for a supplier makes procurement managers lean toward an acceptance strategy as opposed to a monitoring-based mitigation strategy.*

## 4. Methodology

Multiple empirical methods have been used to explore aspects of supply chain risk, including case studies, experimental studies, surveys, and time-series archival data. We used a vignette-based experiment to examine the factors affecting the procurement managers' SSRM strategy preference (Rungtusanatham *et al.*, 2011).

### *4.1. Vignette development and experimental design*

Drawing from events reported in the media, we developed two scenarios about fictitious mid-sized

multinational companies. In Scenario A, a firm in the apparel retail industry recently extended its safety policies to include suppliers' operations; in Scenario B, a firm in the food industry expanded its environmental policies to suppliers' operations (Appendix B). Participants were asked to adopt the role of Procurement Management Director, review the profile of one supplier, and then indicate the likelihood of a set of actions they would take regarding the safety or environmental issues at that supplier's facilities. The vignettes for each scenario were carefully designed to allow the manipulation of procurement managers' perception of supplier sustainability risk (PR), supplier dependence (SD), and financial slack resources (FS) available to procurement managers at two levels (Appendix B). All other descriptive elements remained unchanged. As illustrated on Table I, we employed a 2 x 2 x 2 full-factorial design, resulting in eight vignettes for each scenario (totalling 16 vignettes) that encompassed all possible combinations of the three treatment factors.

--- Insert Table I here ---

Each participant received an introductory letter which included a brief explanation of the purpose of the study, an invitation to participate, information about the confidentiality and voluntary nature of participation, and instructions on how to complete the survey. The letter also informed them that by completing and submitting the online survey, they were providing their informed consent. The participants were then randomly assigned one vignette from each scenario. After reading each vignette, they responded to a set of items that captured their likelihood of taking a list of possible actions (Likert-type scales; Appendix A). Next, they were asked to choose one of four SSRM strategies as their major and ultimate approach to manage the supplier (forced-choice categorical variable). A third section assessed the treatment manipulations. Finally, participants reported demographic information about themselves and their employers and responded to scales that assessed their levels of risk propensity and sustainability knowledge.

The experimental cells included eight possible combinations of vignettes: A1+B8, A2+B7, A3+B6, A4+B5, A5+B4, A6+B3, A7+B2, and A8+B1. To control for potential ordering effects, the sequence of A and B vignettes was rotated among participants.

*4.1.1. Perceived risk*

As noted earlier, supplier sustainability risk is derived from the cumulative probabilities and consequences of three sequential events: (1) occurrence of a sustainability-related misconduct by a supplier; (2) stakeholders' detection of that misconduct; and (3) stakeholders' attribution of responsibility to the buying firm. Thus, we manipulated perceived risk with three analogous elements of the vignettes: supplier's track records (Foerstl *et al.*, 2010); supplier's size, proxied by the potential visibility of supplier's misconduct (Klassen and Vereecke, 2012); and stakeholder salience based on legitimacy (Mitchell *et al.*, 1997), as reputable international activists have higher saliency than a supplier's local authorities (Thijssens *et al.*, 2015).

The procurement managers' perception of supplier sustainability risk was manipulated in Scenario A as low (PR-) by noting that a small supplier had received one safety violation citation from local government authorities due to unsafe work conditions at their facilities. Conversely, high risk (PR+) was manipulated by noting that a large supplier was targeted by a reputable, international human rights group because of unsafe work conditions at their facilities. For each vignette, the buying firm had not yet been the target of stakeholders' actions (i.e., supplier sustainability risk had not materialized), hence, SSRM strategies were pre-event for the buying firm. Analogous manipulations were used for environmental risk in Scenario B.

*4.1.2. Supplier dependence*

As the proportion of a supplier's sales made to a specific buying firm increases, its dependence on that firm also increases (Carr *et al.*, 2008). Inspired by Lanier et al. (2010), supplier dependence

was manipulated as high (SD+) by describing a supplier of which 90% of its total sales were to the buying firm versus low (SD-) with only 10% of its total sales.

*4.1.3. Financial slack*

Financial slack was captured as unallocated funds that could be easily deployed to a wide range of activities (e.g., investment in new technologies, recruitment of specialized staff, etc.) (George, 2005). Participants assigned to the high level of financial slack resources (FS+) condition were informed that the CEO had allocated a special annual budget to their department for making the necessary changes to supplier management activities. In contrast, the low level of financial slack resources (FS-) condition described the CEO as asking participants to make necessary changes to supplier management activities within their current budget limits.

*4.1.4. Dependent variable (DV): Procurement managers' preferred strategy*

Procurement managers were asked to (i) indicate the likelihood of taking 16 actions (Likert scale) associated with the four SSRM strategies, and (ii) choose one of four SSRM strategies as their major and ultimate strategy (forced-choice scale). These scales are listed in Appendix A.

### *4.2. Pre-test*

The content of the scenarios and experimental conditions was validated by an expert panel of five purchasing and supply management professionals, prompting several adjustments for clarity. Next, two rounds of pre-tests were conducted at two major business schools (54 participants, two vignettes each; 39 participants; one vignette each). Both scenarios were evaluated to be plausible (Eckerd *et al.*, 2013): realistic, believable, and engaging (minimum average = 5.40 on 7-point scale). In addition, the effectiveness of manipulations was confirmed: the level of perceived risk, supplier dependence, and level of financial slack resources varied significantly between vignettes as intended (mean responses for the two treatment levels of each manipulated factor were

significantly different). Finally, pre-test participants responded to the list of possible actions for the buying firm for each vignette. An exploratory factor analysis (EFA) of the pre-test data identified four factors underlying the managerial actions, with low loadings or high cross-loadings on four items, which were subsequently dropped in the main experiment (Appendix A).

### *4.3. Sample and data collection*

Perception and experience play a major role in evaluating the risks associated with complex supply chain relationships, and managers with real-world experience provide an ideal subject pool (Mantel *et al.*, 2006). Full-time procurement managers working for modest-sized companies (>100 employees) in the U.S. were targeted, and our sample was drawn from an internet panel of participants recruited by Qualtrics (www.qualtrics.com). To ensure the relevance of the vignettes to potential participants, we limited the participant pool to two sectors which face clear social and environmental issues: manufacturing and retail trade sectors. The experiment survey link was shared with 1,064 participants who were deemed qualified according to Qualtrics records, aiming to collect a minimum of 24 responses for each vignette. The survey was open for two weeks, after which our targeted sample size (200 complete responses) was achieved (19% response rate).

Recently, there has been a growing trend towards utilizing panel services provided by various companies, including Qualtrics, for the purpose of gathering survey or experiment data within the OSCM field (Kaufmann *et al.*, 2018, Bentley *et al.*, 2022, Seepana *et al.*, 2022a, Seepana *et al.*, 2022b). Unlike the participants in conventional surveys, online panelists are often perceived to be primarily motivated by incentives rather than a genuine intention to provide high-quality responses and consequently, more inclined to display three common response patterns: speeding through the survey, random guessing, and providing responses in a straight-line manner (Smith *et al.*, 2016). During the data collection process, we took rigorous control measures (Schoenherr *et*

*al.*, 2015) to detect and remove responses that exhibited these potential patterns, thus ensuring the integrity and quality of the collected data. At the beginning of the survey, participants were presented with a set of qualifying questions to confirm their eligibility. These questions covered various aspects such as their employment status (full-time, part-time, retired, etc.), country and state of residence, sector, company size, affiliated department, and purchasing knowledge. Participants were not permitted to proceed with the survey if they did not meet the required criteria. In addition, two attention-check questions were included with each vignette to identify and exclude participants who were attempting to complete the survey without reasonable reflection (Abbey and Meloy, 2017). Lastly, responses from participants who rushed through the survey (quicker than one-third of the mean completion time) or who had duplicate IP addresses or longitude/latitude coordinates (automatically captured by Qualtrics) were screened out and not included in the count of 200 complete responses quota. After conclusion of data collection, we discarded two of the complete responses because of their poor response patterns (e.g., straight-lining), yielding 198 complete responses (396 vignettes). Participants who finished the survey without being termed out received cash payments of $25, according to their agreement with Qualtrics.

The number of complete responses received for each vignette is reported in Table I. A summary of the participants' demographic information is provided in Table II.

--- Insert Table II here ---

## 5. Data analysis and results

As with the pre-test, manipulation checks for each factor were significantly different between vignettes ($p < 0.01$). Confirmatory factor analysis (CFA) was used to validate the measures of four SSRM strategy constructs in this study and offered an acceptable fit for the measurement model ($\chi^2 = 230.554$, df = 49, $p<0.001$; CFI = 0.927; PGFI = 0.574; RMSEA = 0.097). The constructs'

composite reliability ranged from 0.79 to 0.90, with individual item loadings greater than 0.60 ($p<0.001$). AVE scores ranged from 0.58 to 0.70, indicating that a high proportion of the variance for each construct was captured. Furthermore, point-biserial correlations between the four strategy constructs (i.e., average of scale items) and each forced-choice SSRM strategy were positive and significant, with the magnitude being higher than the negative correlations among other strategies.

Because our study design requested participants to indicate the extent to which multiple actions were to be used, the four SSRM strategies were initially modelled using multivariate analysis of variance (MANOVA, Table III). Accordingly, all treatment factors and the hypothesized interactions (the exception being the interaction of perceived risk and financial slack; rejecting H4c/d) were significantly related to the SSRM strategies. Partial eta squared values — interpreted as the amount of variance in dependent variables that is explained by the factors — demonstrated that 21.3% of the variance for the likelihood of using these SSRM strategies was explained by procurement managers' perceived risk, 9.5% by supplier dependence, and 6.3% by financial slack available to procurement managers. Furthermore, 3.7% was explained by the interaction between perceived risk and supplier dependence, and 5.7% by the interaction between financial slack and supplier dependence.

--- Insert Table III here ---

Next, the hypotheses were assessed individually using regression models with three sub-models for each DV with control variables only (A), then experimental conditions (B), and finally, interactions between experimental conditions (C) (Table IV). In support of H2a, the procurement managers' perception of risk had a significant effect, as they increasingly preferred Avoidance (Model 3B, $B=0.561$, $p<0.001$) and Collaboration-Based Mitigation (Model 4B, $B=0.481$, $p<0.001$) strategies when they perceived a high risk. For H2b, higher perceived risk significantly

reduced managers' preference for Acceptance (Model 1B, B=-1.287, p<0.001) and Monitoring-Based Mitigation (Model 2B, B=-0.220, p<0.05) strategies, although the latter was moderated by supplier dependence.

Testing for supplier dependence (H1) yielded mixed results. Statistically, significant support was found for H1b, with managers increasingly preferring Acceptance and Avoidance strategies when supplier dependence was low (Model 1B, B=-1.123, p<0.001; Model 3B, B=-0.326, p<0.01; respectively). While no direct relationship was detected between high supplier dependence and the managers' preference for either Monitoring-Based or Collaboration-Based Mitigation strategies (H1a), by considering the interaction with perceived risk, we do see evidence of a more complex relationship (H3). The procurement managers' preference for a Monitoring-Based Mitigation strategy significantly increased as supplier dependency increased only with a low level of perceived risk as predicted in H3a (Model 2C, B=0.948, p<0.001); no such relationship was detected for a high level of perceived risk (Model 2C, B=0.948-0.673, p>0.1; and Figure 1-A). While the interaction term in Model 1C (Acceptance strategy) was statistically significant, at p<0.05, its inclusion did not significantly change the overall variance explained, as evidenced by a non-significant $\Delta R^2$ between Models 1B and 1C.

Overall, as financial slack increased, managers preferred a Collaboration-Based Mitigation strategy (Model 4B, B=0.471, p<0.001); and with a low level of financial slack, managers preferred an Acceptance strategy (Model 1B, B=-0.692, p<0.001). Yet, no evidence was found that the level of financial slack, on average, influenced the managers' preference for Avoidance or Monitoring-Based Mitigation strategies.

However, evidence of an interaction between financial slack and supplier dependence (H4a) was detected (Model 2C, B=-0.985, p<0.001, and Figure 1-B). With a low level of financial

slack, the procurement managers' preference for a Monitoring-Based Mitigation strategy significantly increased as supplier dependence increased (Model 2C, B=0.948, p<0.001). This finding paralleled that of low perceived risk, suggesting that both have similar effects on the preference for a Monitoring-Based Mitigation. Thus, managers might be weighing both the current and future costs (i.e., monitoring now and risk of mishap, respectively) against the likelihood that they can influence the supplier. Collectively, this evidence finds support for at least one three-way interaction effect among perceived risk, supplier dependence, and financial slack resources. This complexity illustrates the variety of factors that managers consider as they develop and resource strategies for managing supplier risk.

--- Insert Figure 1 and Table IV here ---

To examine the robustness of these results, three additional sets of analyses were conducted. First, a Roy-Bargmann stepdown analysis was conducted to ensure the estimated regression parameters were not biased due to the modest correlation (correlation = 0.30, p<0.01) between two dependent variables, i.e., Monitoring- and Collaboration-Based Mitigation strategies. This analysis tests whether the set of independent variables have a significant impact on individual correlated dependent variables after accounting for the effects of other dependent variables in the model (Finch, 2007). Hence, when the MANOVA is found to be statistically significant for a categorical independent variable, the dependent variables are tested individually using a series of univariate analysis of variance (ANOVA) and analysis of covariance (ANCOVA). For instance, Collaboration-Based Mitigation strategy is first tested in ANOVA, with Monitoring-Based Mitigation strategy being tested by ANCOVA with Collaboration-Based Mitigation strategies as the covariate. Homogeneity of regression was achieved for the components of the stepdown analysis. The results obtained from the stepdown analysis were in agreement with the regression

results presented in Table IV, in terms of the significance of the independent variables and their interactions.

Second, because every participant responded to two vignettes, their experience responding to the first might influence their responses to the second. While we controlled for this order effect by balancing and reversing the order of treatments, we also reran the analysis with only the first vignette data with similar results. Third, the analysis was re-specified as a multinomial logit model, using the forced-choice scale as the dependent variable. In doing so, the likelihood of choosing each SSRM strategy, relative to others, was assessed and these findings also were consistent with those reported for the regressions.

The control variables included in the models highlight some interesting considerations that are exploratory, yet informative. Looking at organizational characteristics, the size and industry of participants' employer firm significantly affected their inclination toward certain SSRM strategies, after accounting for the treatment factors. Procurement managers in manufacturing industries more strongly preferred a Collaboration-Based Mitigation strategy, relative to managers in retail industries, and managers in small- and medium-sized firms exhibited different preferences. For example, managers working in medium-sized firms preferred Acceptance and Collaboration-Based Mitigation strategies, relative to managers in small-sized firms. Also, managers working in small-sized firms preferred an Avoidance strategy, relative to managers in medium-sized firms. One might speculate that these managers were implicitly factoring in the firm's likely ability to weather a social or environmental controversy.

Several personal characteristics of managers influenced their strategic preference. First, as the managers' sustainability-related knowledge increased, their preference for an Acceptance strategy decreased. Second, the managers' age was a significant factor, for example, with the

young managers (21-40 years old) showing a stronger preference for an Avoidance strategy than older managers. Also, the oldest demographic (over 60 years old) preferred an Acceptance strategy significantly more than young managers. Third, participants' risk propensity was associated with a stronger preference for a Collaboration-Based Mitigation strategy. No significant relationship was detected between a participant's gender, work experience, education or certification, and their preference for each strategy, and the estimates of the regression coefficients changed little with their inclusion.

## 6. Discussion

### *6.1. Theoretical contributions*

In this paper, we drew on the BTF and identified financial slack as the boundary condition that moderates Hajmohammad & Vachon's (2016) proposed relationships between procurement managers' preferred SSRM strategies and their predictors. We also proposed that managers' perceived risk had a direct impact on their preferred SSRM strategies beyond its moderating effect proposed by Hajmohammad & Vachon's (2016). Part of the inherent challenge of doing so was the untested nature of original propositions and the complex interactions.

Our theoretical extension, experimental design, and findings extend the OSCM literature in a number of important ways. First, previous studies considering organizational slack have taken a rather limited view of both the construct and any relationship to potential outcomes. They have mainly explored the role of operational slack in minimizing firm's risk and maximizing economic performance, largely overlooking implications for social or environmental sustainability risk and performance (Wiengarten *et al.*, 2017). In this paper, we extend earlier work to include unabsorbed financial slack in our theoretical development and experimental design. Our empirical results support both new and prior theoretical predictions, indicating that unabsorbed financial slack has

significant bearing on risk management decision making: with low levels of slack, managers are more likely to pursue risk acceptance, and less likely to mitigate the risk through collaboration with the supplier even when inter-organizational dependency enabled them to act more proactively (Hoejmose *et al.*, 2013). This finding is aligned with earlier research (Meszaros, 1999) showing that managers utilize a form of threshold-based short-term oriented heuristic, namely, an 'affordability heuristic', in their decision making, thereby preferring actions that are not perceived to deteriorate their organizations' profitability. However, while attempting to work with tightly constrained financial resources, they may ignore the hidden longer-term costs and risks embedded in such strategies. For example, an acceptance strategy simply turns a blind eye to real risks (implicitly hoping for the best). In contrast, seeking additional financial resources from senior management allows procurement managers to implement either collaboration- or monitoring-based strategies (the latter when supplier dependence is low).

In addition, only a handful of studies have investigated the implications of slack resources, although merely its direct effects, in the context of sustainability-related initiatives, such as socially responsible funds (Peillex and Ureche-Rangau, 2016), social engagement and corporate social responsibility expenditure (Surroca *et al.*, 2010), and sustainable supply markets (Hofer *et al.*, 2012). Our study, however, advances this line of inquiry by drawing attention to the insight that slack resources may act as a moderator to strengthen or weaken the effects of other predictors. For example, scarce financial slack increased the likelihood of short-term oriented and reactive strategies like supplier monitoring even when inter-organizational dependency enabled managers to act more proactively through collaborative actions.

Recall that procurement managers' preference strongly shifted away from acceptance to avoidance as their perception of risk increased. Surprisingly, this preference did not change

depending on the availability of financial slack resources. Just as important, collaboration-based mitigation strategy was preferred as either the level of risk increased, or the availability of financial slack resources increased. Particularly, they would still prefer to collaborate with high-risk suppliers or avoid them (i.e., replace them) even when they lacked proper sustainability training and were under time pressure. Thus, there was no evidence found that financial slack and the level of perceived risk interacted to influence the preference for these strategies, suggesting that managers must resort their internal priorities (e.g., reallocating existing scarce resources) to confront the immediate risk facing the organization. This counter-intuitive finding can be explained in two ways: (i) The managers may be relying on their power to shift obligations to suppliers and thus, leverage supplier resources to develop and implement the collaboration strategy, and they may not see the avoidance strategy to be financially resource intensive, (ii) Given that low financial slack did not deter collaboration in a high-risk scenario, the depth and effectiveness of any collaboration might be limited, as procurement personnel must continue to balance multiple operational aspects (Villena, 2019).

Second, the OSCM scholars have been exploring whether monitoring and collaboration strategies are substitutable or complementary (i.e., synergistic) for some time. Some studies have pointed out monitoring as a prerequisite and an enabler of collaboration (Modi and Mabert, 2007), or that a combination of these strategies was beneficial (Gimenez and Sierra, 2013). Yet, others indicate that the existence of one strategy might deter the adoption of the other, i.e., a monitoring mindset may prevent the development of the trust necessary for a collaborative relationship. Conversely, close collaboration might diminish the need for monitoring (Lado *et al.*, 2008). If so, collaboration should be favored over monitoring (Paulraj and Blome, 2017). Yet, the preference and development of these strategies cannot be done in isolation without considering important

contextual factors. Our findings shed light on how multiple contextual factors, e.g., the level of perceived supplier sustainability risk, supplier dependency and financial slack resources, influence procurement managers' preferences toward either of these strategies. For example, monitoring strategy was preferred in low-risk situations and specifically with dependent suppliers. Collaboration strategy, however, was appealing to managers in high-risk situations in general, regardless of the supplier dependency. Together, these findings suggest that monitoring and collaboration strategies are viewed as alternatives only when the procurement managers deal with dependent suppliers, whereas the two strategies are viewed as substitutes as the level of perceived supplier sustainability risk varies.

Third, this study contributes to the literature on the BTF by extending beyond the traditional consideration of intra-firm contexts (Gavetti *et al.*, 2012) to individual-level decision making within inter-organizational buyer-supplier dyads. Furthermore, we considered how the BTF might apply to the management of sustainability risk, including the concepts of slack resources, problemistic search, and shifting focus (Cyert and March, 1963). Here, the level of perceived risk served as a reference point for managers, around which they could shift from survival to aspirational levels of performance. More specifically, with a high level of perceived risk, management attention emphasizes survival, which increases their willingness to be more proactive with strategies like buyer-supplier collaboration; whereas with a low level of perceived risk, management attention emphasizes on aspiration, which increases their preference for passive strategies like risk acceptance.

Lastly, employing vignette-based experiment enabled the controlled examination of the hypothesized relationships with a sample of practicing procurement managers. While this work investigates procurement managers' decision-making regarding supplier sustainability risk, the

empirical validation of vignettes, manipulations, and measurement scales for four SSRM strategies using data from an independent and large-scale participant sample can be leveraged in other studies exploring similar operational or sustainability challenges involving risk, supplier dependence, or financial slack resources.

### *6.2. Managerial implications*

This study offers some intriguing evidence for the direct and moderating effects of two firm-level barriers that are partly under the control of management, namely, supplier dependence and the slack resources available to mid-level procurement managers. Specifically, the lack of buying firm's relative power and limited financial resources significantly increased the likelihood of passive actions like risk acceptance, which could be a warning sign of complacency. These findings imply that small- and medium-sized firms might be best served by seeking smaller suppliers over whom they can wield greater influence as a means of mitigating sustainability risk.

The results also point to several implications for procurement managers who are developing and fine-tuning strategies to reduce supplier sustainability risk. Individual factors, including managers' prior sustainability-related knowledge and risk propensity, can influence their decision making. Reassuringly, greater sustainability-related knowledge increasingly dissuades a manager from accepting the risk, and strongly favors a collaboration-based mitigation strategy. However, a second factor is more concerning. Evidence indicated that managers' higher risk propensity increases their preference for acceptance and collaboration, with the concern being that the managers may be overly optimistic about their chances of a high-risk supplier dodging an environmental or social mishap, or about the degree of improvement likely to occur with that supplier. Age and work experience also influence preferences. Thus, when reviewing staff decisions in procurement, senior managers should consider how the personal characteristics of key

managers might sway their decision making on social and environmental policies and risks. Furthermore, to encourage action in the intended direction, senior management must develop training and systems to shape and inform the views of procurement managers, and to provide feedback as the sustainability-related risks evolve.

Looking ahead, senior managers must also support the rigorous development of (i) systems to identify new pressures and threats being raised by key stakeholders (e.g., NGOs) and to collect information about the sustainability characteristics and performance of suppliers; and (ii) frameworks to translate such information into risk-oriented strategies, along with a wide variety of possible actions that account for supplier-specific and industry-specific nuances. Not surprisingly, this support must extend to significant resourcing, particularly when some industries or competitive settings are perceived to be high risk. In doing so, managers need to better articulate and justify the need for additional resources to investors and shareholders to ensure that risks are effectively managed.

Lastly, previous studies have investigated multiple barriers that prompt or hinder management's efforts to adopt better practices, with one objective being the adoption of more proactive environmental conduct (Delgado-Ceballos *et al.*, 2012). Many of these studies have confirmed that the intensity of stakeholder pressure is a major trigger (Sarkis *et al.*, 2010). Our experimental design extends the consequences of stakeholder pressure to inter-firm strategies. Based on the level of risk perceived by the managers, as reflected by attention from either an international NGO or local authorities, higher-profile international scrutiny of supplier misconduct prompts procurement managers to take more proactive actions, such as avoidance or supplier collaboration.

## 7. Limitations and future research

We acknowledge that our conceptual development and empirical study have certain limitations that provide opportunities for future research. First, while our study established that the procurement managers' strategic preference is strongly driven by their perception of risk, much more work is needed to understand the factors that shape their perception of sustainability risk, along with the degree to which the managers' perception under- or over-estimates the objective level of risk. If poorly estimated, procurement managers might inadvertently ignore substantial risks or over-invest in high-cost mitigation strategies when little objective risk is present.

Second, while a procurement manager's perception of supplier sustainability risk was considered a major influential predictor, other potential factors— such as the supplier's size, ownership, or its slack resources (Klassen and Vereecke, 2012) or the procurement manager's perceived accountability for sustainability issues in their supply base (Parmigiani *et al.*, 2011) — merit further investigation. Specifically, in their evaluation and selection among different alternatives and options that result from the problemistic search process, the boundedly rational procurement managers may also rely on the expected outcome from each alternative (Levinthal and March, 1981). In other words, the procurement managers' willingness to contribute resources to take a collaborative approach in managing supplier sustainability risk may depend on how much they expect that the suppliers would also contribute and not exploit their (i.e., the buying firms') contributions. Considering the supplier as an active player in this context can be enriched in multiple ways. For example, given that empirical evidence is now available to differentiate among the strategies using multiple actions and the influential factors affecting managerial preferences, future research might explore multi-period situations whereby additional information is revealed, suppliers take follow-up actions, or multiple suppliers are compared. Moreover, many

sustainability-related challenges in global supply chains are caused by second- or lower-tier suppliers (Touboulic *et al.*, 2014) with accountability shared by the focal firm and its first-tier supplier (Wilhelm *et al.*, 2016). Extending this study to investigate strategies that might be jointly adopted by a buying firm and a first-tier supplier would expand our understanding of the "riskiest suppliers in a supply network" (Villena and Gioia, 2018).

Lastly, risk management is an iterative process of identification, evaluation, acceptance-mitigation-avoidance actions, at times combined with simultaneous monitoring. For example, as buying firms monitor risk broadly in their supply chains, their preferred strategy might change over time to reflect changes in their internal strategy, organizational learning, or competitive setting (Tummala and Schoenherr, 2011). While this study was an initial attempt to capture the managers' risk-related preferences at one point in time with a specific buyer-supplier relationship as the focus, subsequent research can build upon this and investigate more complex combinations of strategic options.

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**Appendix A: Scales for SSRM Strategies**

**Procurement manager's SSRM actions: Likert-type items**

Given the information provided in the scenario, to what extent are you likely to take the following actions with regard to B.A.P. Ltd.? (1=very unlikely, 7=very likely)

**Risk Acceptance**

Q-1: Take no new actions regarding health & safety issues at their facilities.

**Monitoring-Based Risk Mitigation (Adapted from Vachon & Klassen (**2006**) and Gimenez & Sierra (**2013**))**

Q-2: Include health & safety measures such as incident/accident rates in evaluating their performance.

Q-3: Send out a questionnaire asking them to report on their health & safety measures such as incident/ accident rates or the use of overtime.

Q-4: Regularly send your staff to perform workplace health & safety audits at their facilities.

Q-5: Provide them with feedback about the results of audits and performance evaluations.

Q-6: Require them an international health & safety standard certification (e.g., OHSAS 18001).

**Collaboration-Based Risk Mitigation (Adapted from Jiang (**2009**))**

*Q-7: Allow an open two-way dialogue to jointly establish proper goals/targets regarding health & safety issues. (Dropped)*

Q-8: Work closely with them to improve their health & safety performance (e.g., joint investment).

Q-9: Provide training/education to their personnel to improve their health & safety performance.

Q-10: Put incentives in place to improve their health & safety performance (e.g., financial rewards).

Q-11: Invest resources in developing their capabilities and improving their health & safety performance (e.g., financial aid).

**Risk Avoidance (Adapted from Bharadwaj & Matsuno (**2006**))**

*Q-12: Continue the business with them for a long time. (Dropped)*

Q-13: Look for another supplier to replace them.

*Q-14: Imply in your negotiations with them that they are in danger of losing the business unless their health & safety [environmental] issues are properly managed. (Dropped)*

*Q-15: Renew the relationship once the current contract expires. (Dropped)*

Q-16: Terminate the relationship.

**SSRM strategies: Forced-choice scale**

Given the information provided in the scenario, which one of the following four strategies would you choose as your MAJOR and ULTIMATE approach in managing your supplier, B.A.P. Ltd.?

a) You will terminate the relationship with them and switch to another supplier.
b) You will start collaborating with them to improve their health & safety performance, e.g., through training and education of their personnel, providing financial aids, etc.
c) You will start monitoring their health & safety performance, e.g., through self-evaluations, audits, third party certifications, etc.
d) You will continue working with them without taking any new actions regarding health & safety issues at their facilities.

*Note: **Bold headings** were not included in the survey.*

**Appendix B: Description of Scenarios and Manipulation of Treatment Factors**

**Scenario A**

Kojak Inc. is a mid-sized apparel retailer based in the United States, offering stylish and affordable clothing and accessories for men and women. The Kojak brand is available online and in more than 400 stores across North America. With only 20% of its clothing made locally, the company has a large international supply base located in Asia (about 50%) and South America (about 30%). In 2013, Kojak spent about $500 million on purchasing finished goods from suppliers. Sales in North America have been growing slowly with modest profitability in recent years. In the past few years, a number of companies operating in the apparel industry have experienced negative publicity and reputational damage due to the unsafe and unhealthy work conditions at their suppliers' facilities. To avoid similar problems, Kojak's CEO has recently extended Kojak's health and safety policy to include the suppliers' premises.

Currently, Kojak has no formal processes to monitor, manage, or improve health- and safety-related measures in place at its suppliers' facilities. The CEO has **[*allocated a special annual budget of $5 million to your department for making the necessary changes to the supplier management activities*** vs. ***asked you to make the necessary changes to the supplier management activities within your department's current budget limits and stated that no budget adjustments will be approved*]**. To comply with Kojak's new policy, you plan to look into all supplier profiles from a workplace health and safety perspective and decide what action, if any, to take with each of them. One supplier has been brought to your attention by a junior staff person.

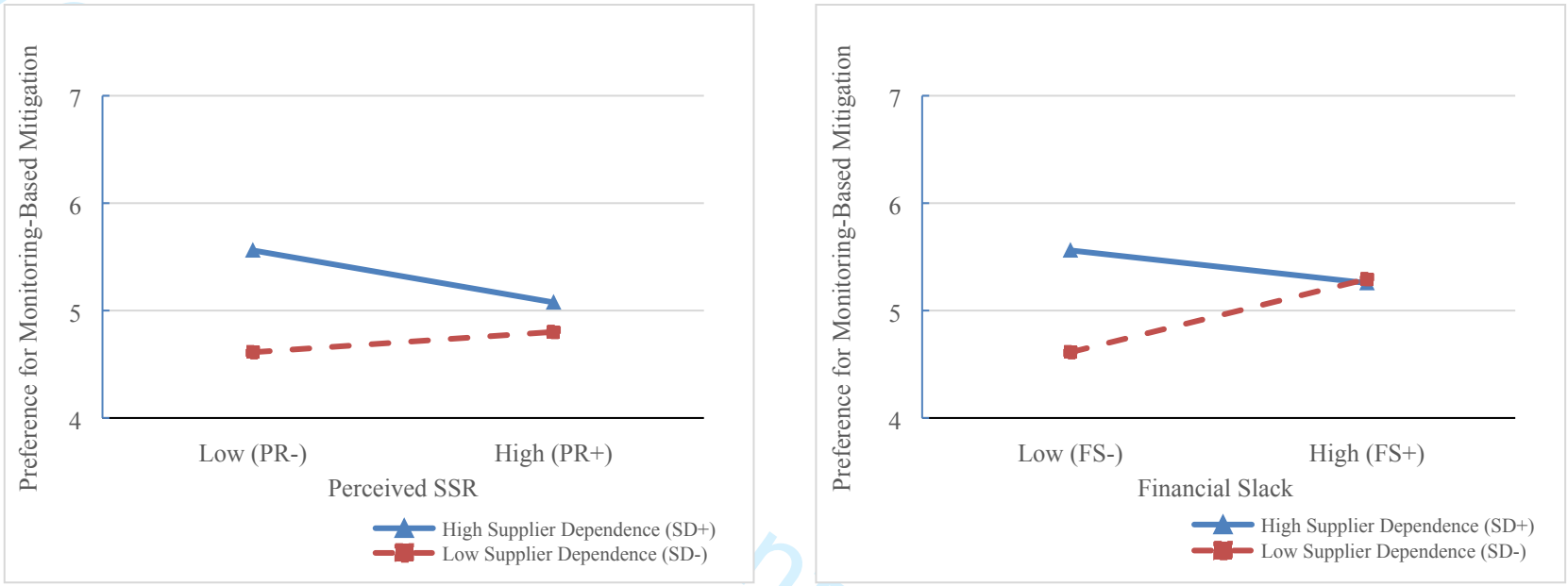
B.A.P. Ltd. is located in a developing country in Southeast Asia. During the past year, this company **[*received one safety violation citation from the local government authorities*** vs. ***was targeted by a reputable international human rights activist group and highlighted on their website*]** because of the unsafe and unhealthy work conditions at their facilities. Because of their **[*small size (120 employees)*** vs. ***large size (1,100 employees)*]**, it **[*is not* vs. *is*]** likely that they will draw **[*any* vs. *more*]** attention from the activist groups, non-government organizations (NGOs), or media in the future. Approximately **[*90%* vs. *10%*]** of B.A.P. total sales are to Kojak, which accounts for nearly one-tenth of Kojak's purchased goods.

**Scenario B**

ChocoYum Inc., headquartered in Chicago, is a mid-sized confectionery producer with over 700 employees. Established in 1995, the company now manufactures chocolates, snacks, and refreshment products at five plants spread across the United States. These products are distributed and sold in North America. Palm oil is one of the major ingredients of ChocoYum chocolate products. Oil palms grow in equatorial conditions in Asia, Latin America, and Africa. ChocoYum's oil suppliers are mainly based in Asia. In 2013, ChocoYum spent about $200 million for the imported palm oil. During the past few years, a number of companies operating in this industry have experienced negative publicity and reputational damage because one or more of their suppliers have sourced palm oil from regions of the world experiencing rainforest deforestation. Such deforestation has been linked to climate change and destruction of rainforest ecosystems. To avoid similar problems, ChocoYum's CEO has recently extended ChocoYum's environmental policy to include the suppliers' processes and activities.

Currently, ChocoYum has no formal processes to monitor, manage, or improve the environmental measures in place at its suppliers' facilities. The CEO has **[*allocated a special annual budget of $2 million to your department for making the necessary changes to the supplier management activities*** vs. ***asked you to make the necessary changes to the supplier management activities within your department's current budget limits and stated that no budget adjustments will be approved*]**. To comply with ChocoYum's new policy, you plan to look into how suppliers source palm oil from an environmental sustainability perspective and decide what action, if any, to take with each of them. One supplier has been brought to your attention by a junior staff person.

P.O.P. Ltd., one of the palm oil suppliers, is an Indonesian firm. Last year, this company was **[*found guilty and ordered to pay a fine by an Indonesian court* vs. *targeted by a reputable environmental activist group and highlighted on their website*]** for violating the environmental laws and clearing an area of protected peat forest. Because of their **[*small size (120 employees)* vs. *large size (1,100 employees)*]**, it **[*is not* vs. *is*]** likely that they will draw **[*any* vs. *more*]** attention from the activist groups, non-government organizations (NGOs), or media in the future. Approximately **[*90%* vs. *10%*]** of P.O.P. total sales are to ChocoYum, which accounts for nearly one tenth of ChocoYum's palm oil supply.




**A. Moderating Effect of Perceived SSR**

**B. Moderating Effect of Financial Slack**

**Figure 1. Moderating Effects of Perceived SSR and Financial Slack on Preference for a Monitoring-based Mitigation Strategy**

| Vignette ID | Perceived Risk (PR) | Supplier Dependence (SD) | Financial Slack (FS) | # Complete Responses A / B |
|---|---|---|---|---|
| A1 [a] /B1[b] | high (PR+) | high (SD+) | high (FS+) | 25 / 25 |
| A2 / B2 | high (PR+) | high (SD+) | low (FS-) | 25 / 25 |
| A3 / B3 | high (PR+) | low (SD-) | high (FS+) | 24 / 25 |
| A4 / B4 | high (PR+) | low (SD-) | low (FS-) | 25 / 24 |
| A5 / B5 | low (PR-) | high (SD+) | high (FS+) | 24 / 25 |
| A6 / B6 | low (PR-) | high (SD+) | low (FS-) | 25 / 24 |
| A7 / B7 | low (PR-) | low (SD-) | high (FS+) | 25 / 25 |
| A8 / B8 | low (PR-) | low (SD-) | low (FS-) | 25 / 25 |
| | | | | **Total: 198 / 198 = 396 Complete Vignettes** |

[a]*A1-8 are the vignettes constructed using a supplier with safety problem in apparel industry.*
[b]*B1-8 are the vignettes constructed using a supplier with an environmental problem in food industry.*

**Table I. Vignettes, Manipulation of Treatment Factors, and Number of Complete Responses**

| Size (no. of employees) | % of sample | Industry | % of sample |
|---|---|---|---|
| 100-1,000 | 33.5 | Manufacturing | 70.5 |
| 1,001-10,000 | 50.0 | Retail | 29.5 |
| > 10,000 | 16.5 | | |
| **Education** | **% of sample** | **Age (years)** | **% of sample** |
| High School | 6.0 | 21-40 | 38.0 |
| Undergraduate | 59.5 | 41-60 | 55.0 |
| Graduate | 34.5 | > 60 | 7.0 |
| **Experience (y)** | **% of sample** | **Purchasing experience (y)** | **% of sample** |
| 0-10 | 13.0 | 0-10 | 38.0 |
| 11-20 | 35.0 | 11-20 | 38.0 |
| > 20 | 52.0 | > 20 | 24.0 |
| **Gender** | **% of sample** | **Purchasing certification** | **% of sample** |
| Male | 62.5% | Yes | 41.5% |
| Female | 37.5% | No | 58.5% |
| **Other control variables** | **Mean (SD)** | | |
| Sustainability knowledge | 5.38 (1.11) | | |
| Risk propensity | 3.89 (1.34) | | |

**Table II. Demographic Information of Experiment Participants**

| Independent Variables | MANOVA I[a] *F-value ($\eta^2$)* | MANOVA II[a] *F-value ($\eta^2$)* |
|---|---|---|
| Risk Perception (PR)[b] | 25.80*** (.210) | 26.08*** (.213) |
| Supplier Dependence (SD)[b] | 10.14*** (.094) | 10.11*** (.095) |
| Financial Slack (FS)[b] | 6.55*** (.063) | 6.52*** (.063) |
| SD x PR | | 3.72** (.037) |
| PR x FS | | 0.93 (.010) |
| SD x FS | | 5.86*** (.057) |

*a. Dependent variables: SSRM strategies; F and partial eta-squared values are based on Wilks' lambda approach.*
*b. Reference group for experimental comparison: PR-, SD-, and FS-.*

**Table III. MANOVA Results**

| Independent Variables | Acceptance | | | | | | Monitoring-Based Mitigation | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Model 1A | | Model 1B | | Model 1C | | Model 2A | | Model 2B | | Model 2C | |
| | B | S.E. | B | S.E. | B | S.E. | B | S.E. | B | S.E. | B | S.E. |
| Intercept | 3.411*** | .944 | 4.962*** | .866 | 5.170*** | .873 | 4.853*** | .507 | 4.846*** | .515 | 4.519*** | .504 |
| Risk Perception (PR)[a] | | | -1.287*** | .193 | -1.792*** | .342 | | | -.220* | .115 | .189 | .197 |
| Supplier Dependence (SD)[a] | | | -1.123*** | .193 | -1.661*** | .343 | | | .118 | .115 | .948*** | .198 |
| Financial Slack (FS)[a] | | | -.692*** | .193 | -.923** | .336 | | | .116 | .115 | .681** | .194 |
| SD x PR | | | | | .812* | .399 | | | | | -.673** | .230 |
| PR x FS | | | | | .199 | .399 | | | | | -.145 | .230 |
| SD x FS | | | | | .262 | .393 | | | | | -.985*** | .227 |
| Industry[b] -Manufacturing | .041 | .249 | .041 | .224 | .003 | .225 | -.113 | .133 | -.113 | .133 | -.053 | .130 |
| Firm size[c] -Medium | .626* | .269 | .626* | .242 | .644** | .242 | .188 | .144 | .188 | .144 | .169 | .140 |
| -Large | .115 | .345 | .115 | .310 | .168 | .311 | .068 | .185 | .068 | .184 | .008 | .180 |
| Gender[d] -Female | -.097 | .242 | -.097 | .218 | -.038 | .219 | .153 | .130 | .153 | .129 | .090 | .126 |
| Age[e] -41-60 y | .315 | .345 | .315 | .311 | .320 | .316 | .036 | .185 | .036 | .185 | .063 | .183 |
| - > 60 y | 1.151* | .559 | 1.151* | .503 | 1.226* | .504 | .075 | .300 | .075 | .299 | -.024 | .291 |
| Education[f] -Undergraduate | -.031 | .476 | -.031 | .429 | .008 | .428 | .431 | .256 | .431 | .255 | .363 | .247 |
| -Graduate | -.076 | .506 | -.076 | .456 | .032 | .458 | .427 | .272 | .427 | .271 | .266 | .264 |
| Experience[g] -11-20 y | -.181 | .384 | -.181 | .345 | -.143 | .346 | .069 | .206 | .069 | .205 | -.003 | .200 |
| - >20 y | -.561 | .504 | -.561 | .453 | -.523 | .456 | .003 | .270 | .003 | .269 | -.116 | .263 |
| Purchasing experience[g]-11-20 y | -.333 | .305 | -.333 | .274 | -.376 | .275 | -.139 | .163 | -.139 | .163 | -.100 | .159 |
| - >20 y | -.282 | .393 | -.282 | .354 | -.379 | .356 | -.247 | .211 | -.247 | .210 | -.123 | .206 |
| Professional certificate[h] | .381 | .262 | .381 | .235 | .390 | .236 | -.061 | .140 | -.061 | .140 | -.052 | .136 |
| Sustainability knowledge | -.209 | .107 | -.209* | .096 | -.193* | .096 | .051 | .057 | .051 | .057 | .039 | .056 |
| Risk propensity | .163 | .093 | .163 | .084 | .148 | .084 | -.048 | .050 | -.048 | .050 | -.030 | .048 |
| F | 2.184** | | 7.367*** | | 6.571*** | | .837 | | 1.022 | | 2.226** | |
| $R^2$ | .079 | | .260 | | .270 | | .032 | | .047 | | .111 | |

*a. Reference group for experimental comparison: PR-, SD-, and FS-*
*b. Industry (reference group): Retail*
*c. Firm size: Small (reference group): 100-1,000 employees; Medium: 1,001-10,000 employees; Large: > 10,000 employees*
*d. Gender (reference group): Male*
*e. Age (reference group): 21-40 years*
*f. Education (reference group): Highschool*
*g. Experience (reference group): 0-10 years*
*h. Purchasing professional certificate (reference group): No*
*i. N=396 for all models. *** p-value < 0.001; ** p-value < 0.01; * p-value < 0.05*

**Table IV. Hierarchical Regression Analysis of SSRM Strategies**

| Independent Variables | Avoidance | | | | | | Collaboration-Based Mitigation | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Model 3A | | Model 3B | | Model 3C | | Model 4A | | Model 4B | | Model 4C | |
| | B | S.E. | B | S.E. | B | S.E. | B | S.E. | B | S.E. | B | S.E. |
| Intercept | 4.745*** | .575 | 4.682*** | .569 | 4.727*** | .576 | 4.506*** | .552 | 3.924*** | .540 | 3.986*** | .547 |
| Risk Perception (PR)[a] | | | .561*** | .127 | .438 | .226 | | | .481*** | .120 | .297 | .214 |
| Supplier Dependence (SD)[a] | | | -.326** | .127 | -.477* | .227 | | | .211 | .120 | .176 | .215 |
| Financial Slack (FS)[a] | | | -.109 | .127 | -.132 | .222 | | | .471*** | .120 | .341 | .211 |
| SD x PR | | | | | .250 | .263 | | | | | .090 | .250 |
| PR x FS | | | | | -.003 | .263 | | | | | .280 | .250 |
| SD x FS | | | | | .051 | .259 | | | | | -.020 | .246 |
| Industry[b] -Manufacturing | -.151 | .151 | -.151 | .147 | -.157 | .149 | .354* | .145 | .354* | .140 | .337* | .141 |
| Firm size[c] -Medium | -.464** | .164 | -.464** | .159 | -.458** | .159 | .390* | .157 | .390* | .151 | .392* | .151 |
| -Large | -.265 | .210 | -.265 | .204 | -.247 | .205 | .168 | .201 | .168 | .194 | .166 | .195 |
| Gender[d] -Female | -.234 | .147 | -.234 | .143 | -.218 | .145 | .008 | .141 | .008 | .136 | .022 | .137 |
| Age[e] -41-60 y | -.926*** | .210 | -.926*** | .204 | -.933*** | .209 | .001 | .202 | .001 | .194 | .041 | .198 |
| - > 60 y | -1.295*** | .341 | -1.295*** | .330 | -1.279*** | .333 | .165 | .327 | .165 | .314 | .196 | .316 |
| Education[f] -Undergraduate | -.237 | .290 | -.237 | .281 | -.228 | .283 | -.016 | .278 | -.016 | .267 | -.008 | .268 |
| -Graduate | -.205 | .308 | -.205 | .299 | -.175 | .302 | -.107 | .296 | -.107 | .284 | -.097 | .287 |
| Experience[g] -11-20 y | .087 | .234 | .087 | .227 | .098 | .228 | .210 | .224 | .210 | .215 | .209 | .216 |
| - >20 y | .671* | .307 | .671* | .298 | .686* | .301 | .017 | .294 | .017 | .283 | -.009 | .286 |
| Purchasing experience[g]-11-20 y | -.030 | .186 | -.030 | .180 | -.039 | .181 | -.158 | .178 | -.158 | .171 | -.175 | .172 |
| - >20 y | -.317 | .240 | -.317 | .232 | -.342 | .235 | -.090 | .230 | -.090 | .221 | -.110 | .223 |
| Professional certificate[h] | .242 | .159 | .242 | .155 | .243 | .155 | .001 | .153 | .001 | .147 | .013 | .148 |
| Sustainability knowledge | .103 | .065 | .103 | .063 | .108 | .064 | -.102 | .062 | -.102 | .060 | -.098 | .060 |
| Risk propensity | .067 | .057 | .067 | .055 | .062 | .055 | .112* | .054 | .112* | .052 | .111* | .052 |
| F | 3.004*** | | 4.150*** | | 3.582*** | | 2.033* | | 3.758*** | | 3.273*** | |
| $R^2$ | .106 | | .165 | | .167 | | .074 | | .152 | | .155 | |

**Table IV. (Continued). Hierarchical Regression Analysis of SSRM Strategies**