

# The mediating effect of environmental and ethical behaviour on supply chain partnership decisions and management appreciation of supplier partnership risks

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5 **The mediating effect of environmental and ethical behaviour on supply chain**  
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**The mediating effect of environmental and ethical behaviour on supply chain partnership decisions and management appreciation of supplier partnership risks**

**Abstract**

Green supply chain management and environmental and ethical behaviour (EEB), a major component of corporate responsibility (CR), are rapidly developing fields in research and practice. The influence and effect of EEB at the functional level, however, is under-researched. Similarly, the management of risk in the supply chain has become a practical concern for many firms. It is important that managers have a good understanding of the risks associated with supplier partnerships. This paper examines the effect of firms' investment in EEB as part of corporate social responsibility in mediating the relationship between supply chain partnership and management appreciation of the risk of partnering. We hypothesise that simply entering into a supply chain partnership does not facilitate an appreciation of the risk of partnering and may even hamper such awareness. However, such an appreciation of the risk is facilitated through CR's environmental and stakeholder management ethos. The study contributes further by separating risk into distinct relational and performance components. The results of a firm-level survey confirm the mediation effect, highlighting the value to supply chain strategy and design of investing in EEB on three fronts: building internal awareness, monitoring and sharing best practice.

**Keywords:** environmental and ethical behaviour; corporate responsibility; supplier partnerships; relational risk; performance risk; mediation.

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## 1. Introduction

In this paper we examine the relationship between supply chain partnership and two critical organisational risks – namely, relational and performance risks – and the mediating role of environmental and ethical behaviour (EEB). Corporate responsibility (CR) is an umbrella concept encompassing policies and practices that direct firms' relationships with a broad range of stakeholders and the environment (Ghobadian et al., 2007). Managers are increasingly called to make choices between keeping a transactional relationship with suppliers or adopting a partnership approach, and whether to adopt CR with a strong EEB component. In making these decisions managers need decision support that, for example, enables them to determine whether supply partnerships' impact on key risks is or is not independent of CR that encompasses clear EEB practices. Investigating these questions is important from an academic and a practical point of view because supply chain partnership is considered a cornerstone of strategic supply chain management, CR and the EEB practices it encompasses are growing in importance, and risk is a critical factor in supply chain management. Furthermore, as far as we have been able to ascertain the mediating role of EEB in relation to supply chain partnership and risk has not been studied empirically.

Developing partnership with suppliers is considered an important aspect of supply chain design and a driver of competitive advantage, and the concept has broad appeal (Mentzer et al., 2000; Gallea et al., 2012). Partnerships exist in order to create value for each of the parties involved, in essence meaning that one party exchanges some 'value package' that the other side finds worthwhile to reciprocate in the form of some other 'value package' (Lemke et al., 2003). The question: 'What makes a partnership more effective?' has been the subject of much research effort (e.g. Ren et al., 2010; Maheshwari et al., 2006), but the potential role of EEB in this respect has not been examined empirically in any depth. Hence, managers making decisions with regard to introducing or maintaining supply chain partnership are not clear whether or not introducing EEB in parallel is a help or a hindrance to the beneficial impacts of supply chain partnership.

Improving firms' environmental and ethical performance is among executives' top concerns (UNSRID, 2002; Cruz, 2009). The literature examining green manufacturing, green supply chains and more broadly corporate responsibility is developing rapidly (Kumar et al., 2012; Holt and Ghobadian, 2009; Rao and Holt, 2005; Waddock, 2004). Corporate responsibility, 'the strategies and operating practices that a firm deploys in its efforts to deal with and create relationships with its numerous stakeholders' (Surroca et al., 2010), has emerged and taken root since the mid to late 1990s (Waddock, 2004). Corporate responsibility encompasses policies and practices that direct firms' relationships with a broad range of stakeholders, which includes the physical environment because

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3 all stakeholders have a shared interest in the natural environment (Waddock, 2008). We contend  
4 that CR embraces environmental policies of the firm including its effort to 'green' the elements of  
5 the supply chain (Cruz and Matsypura, 2009). Growing evidence suggests that shrewd firms investing  
6 in CR are likely to have a competitive advantage over those that do not (Paine 2003; Heal, 2008;  
7 Shavit and Adam, 2011; Lu et al., 2013). Shavit and Adam (2011) go as far as to argue that for  
8 prospective investors the attractiveness of a firm is contingent on its (visible) commitment to CR and  
9 that it 'seems that the choice to invest in CR is to some extent no longer an open option', instead  
10 'the focus is [now] on the extent to which a firm will make the choice of allocating its resources  
11 towards CR'. Hart (1995) argued that competitive advantage is rooted in capabilities that facilitate  
12 environmentally sustainable economic activity. To this end, in this study we are concerned with CR  
13 practices with a focus on environmentally friendly and ethical behaviour of supply chains.  
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21 Similarly, the management of risk at an operational level has become a practical concern for many  
22 firms across manufacturing and service sectors alike (Schwartz and Gibb, 1999; Lewis, 2003). Risk is  
23 now a key strategic management focus (Arnold et al., 2010). Cruz (2013) notes that the need to  
24 incorporate risk in analysis and decision-making within supply chains is indisputable (Zsidisin, 2003;  
25 Johnson, 2001). This is not least because of risk's strong correlation with the increasingly prominent  
26 concept of supply chain vulnerability (Christopher and Peck, 2004; Colicchia and Strozzi, 2012).  
27 Jüttner et al. argued in 2003 that despite firms' awareness for some considerable time of the need  
28 for risk management in general, and the appearance of a wide and diverse body of accompanying  
29 literature in varied fields such as strategic management and economics, there were very few  
30 systematic and structured approaches to conceptualising supply chain risks. Nearly a decade later,  
31 Arnold et al. (2010) noted that relatively little is still known about the processes used to minimise  
32 risks for supply chain members. This led them to propose that substantial research is needed in order  
33 to better understand the various influences on risk in supply chain relationships. The question  
34 therefore arises: 'What can cultivate within firms a better appreciation of these risks?' Because risk is  
35 inevitable when stakeholders enter into transactions with each other, but firms have too often been  
36 found to have failed to deal with risks (Hendricks and Singhal, 2005; Khan and Burnes, 2007), it is  
37 important that research is undertaken to understand which factors facilitate a deeper appreciation  
38 of the risks associated with stakeholder relationships, notably supply partnerships.  
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51 In this paper we examine the mediating role of firms' EEB attitudes, policies and practices (under the  
52 umbrella of CR) between supply chain partnership (independent variable) and appreciation of  
53 relational and performance risks (dependent variables). A great deal of research has considered CR  
54 and by implication EEB at the organisational level, including its interaction with corporate and/or  
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3 business strategy (Laplume et al., 2008). Furthermore, at the corporate level, it is widely  
4 acknowledged that CR, and by implication its EEB elements, helps firms to reduce their exposure to  
5 risk (Salama et al., 2011; Jo and Na, 2012). Salama et al. (2011), using the largest dataset assembled  
6 (at that time) of environmental and community responsibility rankings for all rated UK companies,  
7 found that developing a reputation for good environmental and social performance also amounts to  
8 good risk management.  
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13 Strategy at a functional level generally focuses on the maximisation of resource productivity within  
14 or through the function in question, not least within the operations and marketing functions of a  
15 firm (Hofer and Schendel, 1978). However, the effect of CR and EEB at the functional level of the firm  
16 (with the possible exception of marketing/branding, e.g. Lacey et al., 2010; Vancheswaran and  
17 Gautam, 2011) and particularly in conjunction with risk, has seldom been considered or tested. In  
18 this paper we address this gap in the literature. Our study is located within what is now recognised  
19 as a core functional strategy of the firm, namely the purchasing and supply management function  
20 (Virolainen, 1998; Baier et al., 2008), with a specific focus on supply chain partnership and the role of  
21 EEB in mediating the relationship between partnership and risk.  
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29 In this study we take our lead from Waddock (2004), by viewing CR as a portfolio of actions  
30 undertaken by an organisation to develop or enhance its legitimacy or to bolster its competitiveness.  
31 These policies include environmental and ethical policies of the firm often referred to as 'greening of  
32 the supply chain'. Many of the measures we deploy in this study firmly fall within the greening area  
33 (see Appendix 1). Trust plays a key role in the longevity and success of supply chain partnerships (He  
34 et al., 2011; Wu et al., 2012). Despite the fact that trust is considered critical, there are very few  
35 studies that examine how trust can be developed and offer a decision support mechanism to  
36 managers. The rationale for introducing supply chain EEB in the context of CR leads us to the  
37 institutional theory. Institutional theory argues that organisations develop structural rules and  
38 procedures to enhance legitimacy with external parties (DiMaggio and Powell, 1983; Suchman, 1995;  
39 Meyer and Rowan, 1983). Therefore according to institutional theory, supply chain EEB can be  
40 viewed as actions undertaken by an organisation to enhance its legitimacy among its suppliers.  
41 Legitimacy and trust are unidirectional and highly correlated (Lagenspetz, 1992). Trust plays an  
42 important role in collaborative type strategies such as supply chain partnership (Mesquita, 2007;  
43 Krishnan et al., 2006) and it is popularly defined as 'confident positive expectations regarding  
44 another's conduct' (Lewicki et al., 1998, p. 439). There are two main conditions that must exist to  
45 give rise to trust – risk and interdependence (Rousseau et al., 1998). Hillenbrand, et al. (2013)  
46 showed that self-related CR experiences significantly impact on belief and trust towards an  
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3 organisation. Taking these arguments together, we theorise that EEB mediates the relationship  
4 between supply chain partnership and appreciation of two types of risk. Suppliers participating in  
5 supply chain partnership with firms practicing EEB as part of their CR programme will experience the  
6 buyers' EEB practices, resulting in greater legitimacy and growing trust for the buyer from the  
7 supplier. Risk is the possibility of loss, as subjectively determined by the decision maker, and it can  
8 be better assessed and guarded against with the availability of greater and better information (Chiles  
9 and McMackin, 1996). We theorise that a greater trust for the buyer from the supplier, derived from  
10 EEB practices, will lead to a more open relationship and greater and more reliable flow of  
11 information from buyer to supplier enabling buying firm managers to develop a better appreciation  
12 of relational and performance risk in relation to their supply chain supply partner. In other words, we  
13 theorise that the benefits of partnership are enhanced because buyers' EEB increase its legitimacy  
14 among its supply chain partners, resulting in a better and more reliable flow of information, which in  
15 turn enhances appreciation of the two types of risk. Hence, 'supply chain partnership' is more  
16 effective in organisations that practice 'supply chain EEB' compared to organisations that solely  
17 practice the former.  
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20 It is therefore the contention of this study that increased levels of EEB internal awareness, EEB  
21 monitoring and EEB best practice sharing will result in greater levels of management appreciation  
22 (i.e. awareness and recognition) of the risk of partnership. Accordingly, in this study we were  
23 specifically concerned with relational and performance risk. Relational risk is important because  
24 partnership is about relationships, and if relationships break down the partnership is likely to break  
25 down. If the firm has a good appreciation of the relational risks they can mitigate against them.  
26 Performance risk is important because ultimately firms enter partnerships to improve their  
27 performance. The main proposition of this paper is that EEB mediates the relationship between a  
28 partnership orientation and management's appreciation of relational and performance risks. We  
29 hypothesise that there is no direct relationship between partnership orientation and management's  
30 appreciation of relational risk and performance risk. Instead, that providing that the firm has a  
31 proclivity towards a partnering ethos, management's appreciation of the risk of partnership will be  
32 facilitated and greatly enhanced through the implementation of EEB attitudes, policies and practices.  
33 In doing so, this paper contributes to the increasingly significant area of research concerned with  
34 green supply chain design and operations. Our research model (Figure 1) depicts the proposed  
35 mediating relationship.  
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54 [Take in Figure 1. Research Model about here.]  
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3 Through these efforts, we attempt to enrich the understanding of how firms' EEB supports or  
4 otherwise the development of more risk responsive and better risk managed, and therefore more  
5 sustainable, partnerships in the supply chain.  
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9 This paper is organised as follows. Section 2 presents our research framework and the research  
10 hypotheses based on examination of the extant literature. In Section 3 we describe the methodology  
11 of the study. Section 4 presents our findings. Section 5 concludes with discussion of the findings and  
12 their managerial implications, and with recommendations of directions for future research.  
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## 15 16 **2. Conceptual development**

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18 In this study we were particularly interested in supply chain partnerships for two, arguably inter-  
19 connected, reasons. Firstly, because of their prevalence (Trent, 2005) and, secondly, because of their  
20 features, which distinguish them from other types of inter-organisational relationships. The latter  
21 undoubtedly explains the former. Unlike other types of inter-organisational relationships such as  
22 strategic alliances or joint ventures, supply chain partnerships are much more loosely organised in  
23 terms of contractual agreements (Wilson, 1995; Frankel et al., 1996; Lambert et al., 1996b). To this  
24 end, it has been noted that the strongest partnerships often have the shortest and least specific  
25 agreements or even none at all (Lambert et al., 1996a). Partnerships seldom have any direct equity  
26 investment (Stuart, 1997) or any legal structures defining their boundaries (Wilson, 1995).  
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29 Furthermore, the lack of contractual agreements means that, similarly, the firms involved rarely have  
30 specific (written) tangible or quantifiable requirements in terms of the benefits and returns expected  
31 (Wilson, 1995; Li et al., 2006). Unlike other types of inter-organisational relationships in  
32 manufacturing supply chains such as strategic/R&D alliances or licensing agreements, which involve  
33 horizontal complementarities and cooperation (Pekar and Allio, 1994), with partnerships the  
34 cooperation tends mostly to be across vertical interfaces (Maloni and Benton, 1997), and hence its  
35 common positioning as a type of buyer–supplier relationship.  
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38 Many different definitions of risk can be found in the literature (e.g. Mitchell, 1995). Nevertheless,  
39 there is generally broad agreement as Lewis (2003) notes that in the context of the operations  
40 management field, 'risk is the potential for realising unwanted negative consequences from causal  
41 events' (Rowe, 1977, p. 23). This popular definition highlights the two dimensions characterising risk,  
42 namely the impact and the likelihood of occurrence (Faisal et al. 2006; Colicchia and Strozzi, 2012). A  
43 review of the operations management and risk management literature indicates that the subject is  
44 still relatively under-researched (Lewis, 2003).  
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Corporate responsibility is described by Waddock (2004) as 'the degree of (ir)responsibility manifested in a company's strategies and operating practices as they impact stakeholders and the natural environment day to day'. We adopted Waddock's (2004) definition for this study as it explicitly recognises that the natural environment forms part of the organisation's CR activities. Furthermore, a focus on strategies and operating practices offers greater opportunity to operationalise the constructs objectively by identifying actual CR-related routines including those that are relevant to green supply chain management. Our examination of the literature identified three key components of CR germane to EEB: *developing EEB internal awareness, monitoring EEB performance* and *sharing EEB best practice*. It was important that we operationalised EEB through tangible practices/activities. Accordingly, the salience of these components is also supported by environmental/ethical responsibility development processes proposed in the literature (Carlisle and Faulkner, 2004; Vachon and Klassen 2006). Vachon and Klassen (2006) identified monitoring (an internalisation practice) and collaboration/sharing (an externalisation practice) as two sets of environmental practices/activities supporting greater integration, during their work examining how green practices can be extended from firms to their supply chain partners. Carlisle and Faulkner (2004) identified a process comprising structural changes coupled with increasingly effective practices to promote responsible behaviour. The process starts with developing and promoting awareness, leading to initial implementation that includes developing quantifiable measures, and consolidates with mainstreaming (e.g. collaboration/effective practices). Identification of the three EEB study variables thus leads us to present our study hypotheses.

## **2.1 Hypotheses**

### **2.1.1 Supply chain partnership and environmental and ethical behaviour**

The literature supports the proposition that firms that are inclined to see the value in a partnership approach with their main suppliers and develop such partnerships are, by virtue of their externally facing mind-set, also the type of firm that is more inclined to proactively embrace EEBs (Cheung et al., 2009).

*Internal awareness* refers to employees' familiarity with the firm's EEB values and orientation (Hopkins, 2005). It can be created through various mechanisms ranging from the appointment of a champion to oversee EEB policy (Carlisle and Faulkner, 2004), publishing and disseminating green (environmental and ethical) reports (Carlisle and Faulkner, 2004), and developing and communicating clear policy statements on acceptable practices (Park-Poaps and Rees, 2010), all of

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3 which can be linked to a mission statement and can be cascaded through internal training (Madsen  
4 and Ulhoi, 2001). Thus:

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7 **H1a:** A greater partnership orientation has a positive impact on EEB internal awareness.

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10 *Monitoring* in the EEB context is associated both with compliance and with pre-emptive  
11 /preventative planning. It involves the firm monitoring their existing behaviour (and indeed that of  
12 /salient stakeholders) (Mitchell et al., 1997) in order to ascertain, and ultimately to help ensure, that  
13 the behaviour is acceptable and meets or exceeds what is expected (Lebas, 1995). Waddock et al.  
14 (2002) emphasise that the literature strongly agrees that monitoring is crucial to the enhancement of  
15 responsible behaviour in organisations. Thus:

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19 **H1b:** A greater partnership orientation has a positive impact on EEB monitoring.

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22 The sharing of know-how is an increasingly important practice in supply chain management (Akacum  
23 and Dale, 1995), not least the *sharing of best practice*, which goes beyond knowledge exchange  
24 geared for general efficiency improvement and that is concerned with the development of joint,  
25 mutually beneficial capabilities. Environmental and ethical behaviour best practices that promote  
26 two-way exchange and the problem solving ethos that underpins risk management include the  
27 engagement of suppliers as equal partners in joint training programmes (Carr et al., 2008), supplier  
28 participation in ISO 14000 Environmental Management Systems Standards accreditation, and the  
29 inclusion of environmental and ethical standards in collaborative activities (Zineldin and Bredenlow,  
30 2003). Thus:

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37 **H1c:** A greater partnership orientation has a positive impact on EEB sharing best practice.

#### 38 39 40 *2.1.2 Environmental and ethical behaviour and appreciation of risk*

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42 At the corporate level, the relationship between CR and risk reduction is widely acknowledged.  
43 Alongside enhancing their reputation (Fombrun, 2005), generating customer loyalty (Bhattacharya  
44 and Sen, 2001) and avoiding legal sanction (Parker, 2002) for example, firms engage in CR activities  
45 as a way of managing their risk (Husted, 2005; Cruz, 2009). Cruz's (2013) study found that CR  
46 activities can potentially be used to mitigate risk within global supply chains. This view is shared by  
47 Welford and Frost (2006) who argue that one of the benefits of CR is risk reduction. Feldman et al.  
48 (1997) found that adopting a more environmentally proactive attitude has a substantial positive  
49 impact on the firm's perceived riskiness to investors and consequently its value in the marketplace,  
50 in addition to direct environmental benefits (Cruz, 2009). It is claimed, as Cruz (2009) further notes,  
51 that firms who practice proactive CR and that engage in environmental assessment and stakeholder  
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3 management (Bowman, 1980), are likely to anticipate and reduce potential sources of business risk,  
4 notably environmental damage, likely governmental regulation or adverse labour issues (Orlitzky and  
5 Benjamin, 2001). However, these studies implicitly draw on transactional theory and do not explicitly  
6 explain how  $x$  results in  $y$ . In this study we open the black box and offer a theoretically based  
7 reasoning as to why supply chain partnership and EEB result in better appreciation of risk.  
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11 According to Jia and Rutherford (2010), supply chain risk management aims to avoid or constrain  
12 supply chain vulnerability by identifying potential sources of risk and implementing appropriate  
13 prevention or mitigation actions. In the context of inter-firm relationships Das and Teng (2001) made  
14 a clear distinction between what they call relational risk, and what they call performance risk.  
15 According to Delerue (2004), relational risk is generally defined as 'the probability and consequence  
16 of not having satisfactory cooperation (Das and Teng, 1996) or as the probability and consequence of  
17 opportunistic behaviour by the partner (Nooteboom et al., 1997)'. This led Jia and Rutherford (2010)  
18 to propose a working definition of relational risk, located in the supply chain context, namely 'the  
19 risk to the supply chain of either party in a buyer-supplier relationship not fully committing to joint  
20 efforts due to either problems associated with cooperation or problems associated with  
21 opportunistic behaviour'. According to Das and Teng (2001), performance risk refers to those factors  
22 that may jeopardise the success of a relationship, even when the partners cooperate fully, in other  
23 words, where strategic objectives are not achieved for reasons other than collaboration and/or  
24 cooperation. Consequently, what Das and Teng (2001) term performance risk is present in all  
25 strategic manoeuvres.  
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29 Taking our lead from the institutional theory, our theoretical propositions suggest that suppliers  
30 participating in supply chain partnership with firms practising EEB in the context of their CR  
31 programme will experience the buyers' EEB practices resulting in greater legitimacy and growing  
32 trust for the buyer from the supplier. The literature supports this proposition. For example, firms  
33 that take a proactive approach to CR are, by virtue of their efforts to deal with their stakeholders and  
34 the natural environment (Waddock, 2004) through awareness building, monitoring and best practice  
35 sharing, more inclined to have a deeper appreciation of the risks associated with stakeholder  
36 relationships (Cruz, 2009, 2013), including supply partnerships. As alluded to previously, this is very  
37 important because controlling or mitigating such risks is critical in collaborative partnerships that  
38 have significant potential for benefits such as productivity and knowledge gains (Aron et al., 2005;  
39 Arnold et al., 2010).  
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43 Relational risk encompasses risks associated with the behaviour of partners. Relational risk therefore  
44 includes, for example, the over-estimating of the benefits of the partnership whilst ignoring the  
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3 potential shortcomings (Maloni and Benton, 1997, Leavy, 1994), or imbalances with resources within  
4 the partnership (Katner, 1989). Thus:

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7 **H2a:** The greater the internal awareness of EEB values and outcomes, the better is management  
8 appreciation of the relational risks (RR) associated with partnering.

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11 **H3a:** The greater the monitoring of EEB performance, the better is management's appreciation of  
12 the relational risks (RR) associated with partnering.

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15 **H4a:** The greater the sharing of EEB best practices, the better is management's appreciation of the  
16 relational risks (RR) associated with partnering.

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19 Partnership performance risk relates to performance outcome risks, and includes for example, loss of  
20 competitiveness through the partnership, over-reliance on a partner, which subsequently fails to  
21 meet expectations (MacBeth and Ferguson, 1994), or the risk of disruptions in supply (Wakolbinger  
22 and Cruz, 2011). Thus:

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26 **H2b:** The greater the internal awareness of EEB values and outcomes, the better is management's  
27 appreciation of the performance risks (PR) associated with partnering.

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30 **H3b:** The greater the monitoring of EEB performance, the better is management's appreciation of  
31 the performance risks (PR) associated with partnering.

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34 **H4b:** The greater the sharing of EEB best practices, the better is management's appreciation of the  
35 performance risks (PR) associated with partnering.

### 36 37 38 *2.1.3 Mediating effect of environmental and ethical behaviour on risk*

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40 As mentioned previously, we propose a model in which EEBs are mediator variables between  
41 partnership orientation and management's appreciation of the risk associated with partnering. In  
42 other words, we hypothesise that while an inclination for partnering orientation is not sufficient in  
43 itself for helping to ensure management's appreciation of the risks of partnering, it is a good  
44 predictor of the firm's propensity to embrace EEB, and when a firm does proactively engage with  
45 EEB, its management's appreciation of the risk of partnership improves. Put another way, investing  
46 in a partnering approach improves EEB that in turn leads to a better appreciation of the risks  
47 associated with partnering; however, there is no direct relationship between partnership orientation  
48 and management's appreciation of relation risk and performance risk. This leads to our final two  
49 hypotheses:  
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3 **H5a:** Environmental and ethical behaviours (EEBs) mediate the effect of partnership orientation on  
4 management appreciation of the relational risks (RR) associated with partnering.  
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7 **H5b:** Environmental and ethical behaviours (EEBs) mediate the effect of partnership orientation on  
8 management appreciation of the performance risks (PR) associated with partnering.  
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### 10 **3. Research methods**

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12 We followed Dillman's (2000) tailored design method for developing and administering a  
13 questionnaire survey instrument to test the study hypotheses. Dillman's (2000) guidance helped us  
14 to ensure a close fit between the constructs, research context and the target population and to  
15 maximise the response rate.  
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19 The cross-sectional nature of our study, in which data was obtained from a large sample of firms,  
20 was a deliberate and important feature in adding to the extant knowledge as it allowed the  
21 systematic testing of the proposed mediation effect. The target respondents for the study were  
22 senior managers and directors in supply management roles or with supply management  
23 responsibility within their firms, operating in the supply chains of various industry sectors including  
24 chemical, oil, pharmaceutical products, fast-moving consumer goods, food and grocery products,  
25 automotive, and computer and IT hardware. Consistent with other large sample studies (Taylor,  
26 2005) we adopted a single-informant approach (Phillips, 1981). The target sample was determined  
27 with help from the Chartered Institute of Logistics and Transport in the UK. Only those respondents  
28 considered capable of responding to the survey instrument were selected based on a careful analysis  
29 of their practitioner database. This process of scrutiny used the following criteria to ensure that only  
30 senior practitioners directly employed in designated supply management roles were selected: (1) the  
31 informant should hold a senior position with a job title specialised in supply chain management,  
32 logistics, purchasing, procurement, or other related area, or should hold a top-level senior position  
33 with integrating oversight across the key functions, such as job title CEO or managing director; and  
34 (2) complete specific individual contact details for the informant should be available. To maximise  
35 the likelihood that these carefully selected informants received and responded to the survey in  
36 person, we addressed the questionnaires together with a brief covering letter to the individual target  
37 informants, using their specific contact details that we had obtained (Vaus, 2004). These measures  
38 were taken to improve the quality of the responses and reduce the possibility of erroneous recall or  
39 respondent bias that can occur when a single informant data collection strategy is used (Fynes et al.,  
40 2005, Kumar et al., 1993). To improve the response rate we undertook a repeat mailing of the  
41 questionnaire (Dillman, 2000), and stimulated completion of the instrument by ensuring we  
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3 subsequently provided a timely summary of the study findings to each participant following the  
4 closing of the survey and data analysis.  
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### 6 7 **3.1 Measures**

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9 A two-stage process was used to develop the study measures for relational and performance risk and  
10 supply chain partnerships: an in-depth review of the associated and respective literatures, followed  
11 by pilot testing with industry practitioners.  
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15 We measured relational risk and performance risk with seven and three measures respectively,  
16 drawn from an extensive review of the literature. These two scales were closely informed by Delerue  
17 (2004) and Das and Teng (2001). Supply chain partnership was measured with five items after  
18 surveying the literature for a set of measures that could be used to indicate the presence of the  
19 partnership type relationship. A set of five were derived based closely on those presented by  
20 McDonald (1999) which were checked for construct validity by juxtaposing them against other  
21 salient contributions, for example Lambert et al. (1996b) and Mohr and Spekman (1994).  
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27 Having searched the literature for established measures of CR EEBs in the supply chain relationship  
28 context, we employed an alternative strategy for developing the items comprising this construct.  
29 While providing guidance, we found that the literature lacked the depth and consensus to provide an  
30 existing scale that was suitable. We were therefore guided by input from expert practitioners in  
31 developing our measures for EEB internal awareness, monitoring EEB performance and sharing EEB  
32 best practice. Starting with the supply chain EEB/CR framework proposed by Hughes et al. (1999) we  
33 consulted a panel of practitioners comprising senior managers with many years' experience working  
34 in senior supply management positions. Minor adjustments were made based on their feedback,  
35 enabling us to confirm the validity of the proposed measures as key practices and/or policies  
36 underpinning EEB in the domain of supply chain management. We therefore used four items to  
37 measure practices and policies promoting EEB internal awareness, two items to measure firms'  
38 monitoring of EEB performance, and four items to measure the sharing of EEB best practices.  
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48 The research instrument was also pilot tested to check its suitability and appropriateness for the  
49 target population, enabling us to have confidence in its content validity. The final instrument was  
50 administered as a postal questionnaire with a prepaid self-return envelope provided. After a follow-  
51 up mailing, 159 completed responses were received. Following screening of the returns for any  
52 respondents not meeting our aforementioned informant selection threshold, the administration of  
53 the research instrument had returned usable responses from 156 organisations, a response rate of  
54 16% commensurate with that which is typical for surveys of senior managers (Li et al., 2006).  
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3 Before data were entered into the subsequent analysis, multivariate normality of the data was  
4 examined (Kline, 2011). A test of skewness and kurtosis was performed using PRELIS software  
5 (Joreskog and Sorbom, 2004). We found that most variables have skewness or kurtosis within the  
6 range of -1 to +1. Moreover, the insignificant z-statistics of most skewness and kurtosis indicators  
7 suggested that a violation of normality assumption was not a major concern (Hair et al., 2010;  
8 Schumacker and Lomax, 2004). This confirms the appropriateness of the data for multivariate  
9 modelling and the use of maximum likelihood (ML) as the estimation method in the subsequent  
10 structural equation modelling (SEM) analysis. The covariance matrix of original items is reported in  
11 Appendix 2. We also compared the data of early and late respondents for each study variable  
12 (Armstrong and Overton, 1977) using a multivariate t-test to check for the absence/presence of non-  
13 respondent bias. The test confirmed that non-respondent bias was not an issue with the survey data.  
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### 21 **3.2 Validity and reliability**

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23 To evaluate the validity and reliability of the survey instrument confirmatory factor analysis (CFA)  
24 was conducted (Hair et al., 2010) using LISREL 8.70 (Joreskog and Sorbom, 2004). All original survey  
25 items were entered into the measurement model according to their corresponding latent construct.  
26 The initial CFA results suggested that not all the standardised factor loadings were above the  
27 satisfactory threshold of 0.60 (Wallace et al., 2004). Therefore items with low factor loadings were  
28 evaluated based on the understanding of the meanings of the constructs and the underlying theory.  
29 Items with loadings of <0.6 were suppressed from further analysis, which led to the exclusion of four  
30 items. The CFA was conducted again with the remaining items and showed satisfactory factor  
31 loadings and model fit ( $\chi^2 = 225.49$ ,  $df = 174$ ,  $P < 0.05$ ,  $\chi^2/df = 1.30$ , IFI = 0.99, CFI = 0.99, RMSEA =  
32 0.04).  
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41 To evaluate the convergent validity of the refined instrument, the standardised factor loadings were  
42 examined first. All the factor loadings are significant and above the acceptable level of 0.6 and the  
43 majority are above the ideal level of 0.7 (Hair et al., 2010). Moreover, all the construct reliabilities for  
44 the corresponding constructs are above 0.7 (Fornell and Larcker, 1981). All the Cronbach's alpha  
45 values are above or close to the acceptable level of 0.7 (Nunnally, 1978). Furthermore, all the AVEs  
46 (average variance extracted) for the corresponding constructs are above 0.5, indicating that the AVE  
47 by each construct exceeds the variance due to measurement error for that construct (Fornell and  
48 Larcker, 1981). Overall, the convergent validity of the instrument is found to be acceptable (Table 1).  
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55 To examine the discriminant validity of the instrument, the AVE for each construct was compared  
56 against the squared factor correlations between that construct and other constructs. As shown in  
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3 Table 1, most of the squared factor correlations between each construct are below the  
4 corresponding AVEs, suggesting satisfactory discriminant validity (Fornell and Larcker, 1981).  
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6 Interestingly, the squared factor correlations between the three EEB constructs are above their  
7 corresponding AVEs. As noted by Moore and Benbasat (1991) conceptual dimensionality should be  
8 distinguished from empirical dimensionality, in that constructs are conceptually different although  
9 they tend to be viewed identically by the respondents. Given that the three constructs measure the  
10 environmental and ethical CR behaviours and were developed according to the substantive theories,  
11 it is not surprising to see high correlations between these constructs. As Bollen and Hoyle (1990)  
12 point out, high or perfect correlation is not a sufficient condition to claim that a concept is uni-  
13 dimensional rather than bi-dimensional. We re-examined the three EEB constructs against the  
14 theory, and noting their distinct conceptual differences, and their different positions in the  
15 implementation stages framework proposed by Carlisle and Faulkner (2004), in this research they are  
16 retained as separate constructs in the following analysis. The final measurement items are reported  
17 in the Appendix 1.  
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26 [Take in Table 1 about here]  
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## 28 **4. Results**

### 29 **4.1 Direct effects**

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31 Our hypotheses were tested using SEM with a maximum likelihood estimation option and our  
32 conceptual model (Figure 1) as the base model (M1). We first examined the base model. The model  
33 fits the data satisfactorily ( $\chi^2 = 470.90$ ,  $df = 180$ ,  $P < 0.005$ ,  $\chi^2/df = 2.62$ ,  $IFI = 0.91$ ,  $CFI = 0.91$ ,  $RMSEA =$   
34  $0.10$ ). Table 2 summarises the results.  
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41 With regard to hypotheses H1a, H1b and H1c, Table 2 shows that partnership orientation relates  
42 positively to the internal awareness of EEB values and outcomes (path coefficient = 0.23,  $t = 2.33$ ), to  
43 the monitoring of EEB performance (path coefficient = 0.30,  $t = 3.02$ ), and to the sharing of EEB best  
44 practices (path coefficient = 0.17,  $t = 1.86$ ) respectively. All three hypotheses are therefore  
45 supported.  
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50 Hypothesis H2a and H2b pertain to the effects of the internal awareness of EEB values and  
51 outcomes. The results (Table 2) show that the internal awareness of EEB values and outcomes is  
52 positively related to management appreciation of the relational risks (RR) associated with partnering  
53 (path coefficient = 0.29,  $t = 2.90$ ), but not to the performance risks (PR) associated with partnering.  
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3 For hypotheses H3a and H3b, which concern the effect of monitoring EEB performance, we find that  
4 such monitoring is positively related to management appreciation of the relational risks (path  
5 coefficient = 0.32,  $t = 3.18$ ), thus supporting H3a, but not to management appreciation of the  
6 performance risks.  
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10 The sharing of CR best practices is positively associated with management appreciation of both the  
11 relational risks (path coefficient = 0.18,  $t = 2.02$ ) and the performance risks associated with  
12 partnering (path coefficient = 0.25,  $t = 2.57$ ).  
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16 Thus, our results show that all three facets of environmental and ethical behaviour contribute to  
17 better management appreciation of relational risk (H2a, H3a and H4a supported); however, only the  
18 sharing of EEB best practices is shown to lead to better management appreciation of the  
19 performance risks (H4b supported).  
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#### 22 **4.2 Mediating effect of corporate responsibility**

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24 We followed the procedure recommended by Hair et al. (2010) to examine the mediating role of  
25 EEB. Table 3 shows the results of adding a direct path to the base model (M1), between supply chain  
26 partnership (SCP) and management appreciation of relational risk (RR). The revised model (M1.1) fits  
27 the data satisfactorily ( $\chi^2 = 470.82$ ,  $df = 179$ ,  $P < 0.005$ ,  $\chi^2/df = 2.63$ ,  $IFI = 0.91$ ,  $CFI = 0.91$ ,  $RMSEA =$   
28  $0.10$ ). The direct effects observed in the base model were repeated with the exception that this time  
29 the sharing of EEB best practices was shown to be positively related to the management  
30 appreciation of the performance risks associated with partnering (H4b) only, and hence not to the  
31 relational risks (i.e. H4a rejected). Table 3 shows that hypothesis 5a was therefore supported, but in  
32 a slightly more limited way than expected. In other words, the results confirm that a partnership  
33 orientation does not directly lead to better management appreciation of the relational risks (direct  
34 path is non-significant). Adding the direct path between partnership orientation and management  
35 appreciation of relational risks did not improve the model fit significantly (chi-square change is non-  
36 significant,  $\Delta\chi^2 = -0.08$ ,  $\Delta df = -1$ ). Thus, model M1.1 confirms that:  
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47 The internal awareness of EEB values and outcomes and the monitoring of EEB performance do  
48 mediate between partnership orientation and management appreciation of relational risk (RR).  
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51 Table 4 shows the mediation effect in relation to performance risk (PR). It presents the results of  
52 adding a direct path to the base model (M1), between supply chain partnership (SCP) and  
53 management appreciation of performance risk (PR). The revised model (M1.2) fits the data  
54 satisfactorily ( $\chi^2 = 471.17$ ,  $df = 179$ ,  $P < 0.005$ ,  $\chi^2/df = 2.63$ ,  $IFI = 0.91$ ,  $CFI = 0.91$ ,  $RMSEA = 0.10$ ). The  
55 direct effects observed in the base model were replicated exactly in model M1.2. That is to say, H1a,  
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3 H1b, H1c, H2a, H3a, H4a and H4b were all supported. Table 4 also shows that a partnership  
4 orientation does not directly lead to better management appreciation of the performance risks  
5 (direct path and chi-square change are non-significant,  $\Delta\chi^2 = 0.27$ ,  $\Delta df = -1$ ), and therefore that  
6 hypothesis 5b was supported. In other words, model M1.2 confirms that:  
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10 The sharing of EEB best practices does mediate between partnership orientation and  
11 management appreciation of performance risk (PR).  
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14 [Take in Table 2, Table 3 and Table 4 about here]  
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## 17 5. Discussion

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19 In general terms, this paper contributes to two salient fields of research. Firstly, to the increasingly  
20 significant area concerned with green supply chain design and operations (Kumar et al., 2012).  
21 Secondly, it contributes to the development of the relatively young, but growing and increasingly  
22 relevant area, of supply chain risk management research (Christopher and Peck, 2004; Jia and  
23 Rutherford, 2010; Colicchia and Strozzi, 2012). The supply chain partnership literature stresses the  
24 importance of 'trust' and points out that 'trust' is a key determinant of supply chain partnership  
25 success (He et al., 2011; Wu et al., 2012). The extant literature also points out that firms practising  
26 corporately responsible EEBs are better at anticipating risk. However, these studies implicitly draw  
27 on transactional theory and do not explicitly explain how  $x$  results in  $y$ . Likewise, the supply chain  
28 literature does not explain how in practice a firm can go about developing trust, and the green  
29 supply chain literature does not explicitly address partnership. In this study we open the black box  
30 and offer a theoretically based reasoning as to why supply chain partnership and EEB result in better  
31 appreciation of risk. In doing so, we offer a decision support mechanism to practising managers.  
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35 Our findings contribute to the literature examining executives' and managers' considerations and  
36 choices regarding allocating scarce resources to developing supply chain partnership and green  
37 practice implementation (Shavit and Adam, 2011). Our findings indicate that, at the functional level  
38 and in the context of buyer–supplier partnerships, investment of resources in green practices  
39 alongside supply chain partnership does pay off. The findings lend weight to the argument that  
40 investing in CR/EEB can be viewed as a shrewd method for reducing a firm's risk exposure by  
41 generating trust among supply chain partners, and hence as a supply chain risk management  
42 approach (Cruz, 2013). More broadly, our findings suggest that investing in CR/EEB is a route to  
43 building more robust relationships with important supply chain stakeholders. Our findings also  
44 provide direct support for the view that CR should reflect the idea that responsibilities are integral to  
45 corporate behaviours, actions, decisions and impacts, in contrast to its close relation social  
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3 responsibility, which instead connotes the discretionary responsibilities of business (Carroll, 1979;  
4 Surroca et al., 2010).

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7 Our findings confirm our proposition that simply entering into partnerships, or increasing the  
8 prevalence of a partnering orientation with main suppliers, does not in itself facilitate the  
9 appreciation of the potential risks of partnering that, with the increasing need for firms to be agile  
10 and responsive, is nowadays crucial. This is an important finding because it indicates that any  
11 managerial assumption that simply getting closer to suppliers will help the firm to reduce risk  
12 exposure within the supply chain is likely to be flawed. Instead, our findings confirm the influential  
13 role of green, CR behaviours/practices at the functional level within the firm.

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16 We have established that an EEB ethos within a firm, evidenced through internal awareness,  
17 monitoring and sharing best practice activities, enhances management's appreciation of the risks  
18 associated with partnering. Thus our results indicate that the full range of EEB practices (i.e.  
19 awareness, monitoring and sharing best practice), and not just specific ones, leads to enhanced  
20 management appreciation of the *relational risk* associated with partnership, and that EEB best  
21 practice sharing leads to enhanced management appreciation of the *performance risk* associated  
22 with partnering. Secondly, we have established that although a partnering orientation itself is not  
23 sufficient to ensure management's appreciation of the risks of entering partnership relationships, it  
24 is a good predictor of a firm's propensity to embrace EEB. Thirdly, we have established that EEB  
25 mediates the relationship between partnership orientation and management appreciation of the  
26 risks of partnering.

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29 Our findings have two main theoretical implications. Firstly, our findings indicate that CR/EEB directly  
30 affect firms' appreciation of the risks of partnering. The findings thereby add to the extant literature  
31 rooted in institutional theory, which views CR/EEB as a set of implementable deliberate and  
32 demonstrable actions that enable firms to enhance their legitimacy among their suppliers, and in  
33 turn develop greater information flow from suppliers to inform decision-making.

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36 Secondly, our findings indicate that a partnership approach, although characterised by loose  
37 contractual agreements and the absence of legal structures, has significant merit in contemporary  
38 supply chain design, when accompanied by the promulgation of risk revealing EEB. Our findings  
39 thereby add to the extant literature that focuses primarily on, endorses and aligns towards the  
40 relational view of the firm (Dyer and Sigh, 1998) as opposed to the new institutional economics  
41 theoretical perspective (Williamson, 2000) for example, which instead places partnership as a risk-  
42 laden proposition.

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3 Our findings also confirm that the relationship between supply chain partnership and supply chain  
4 risk management is not straightforward. In doing so, they provide new insight, helping to fill the gap  
5 in the literature about the processes that can be used to minimise risk for supply chain members  
6 (Arnold et al., 2010). This has extended the supply chain risk management literature (Cruz, 2013), by  
7 both confirming the limitation of partnership *per se* as a risk mitigating mechanism and identifying  
8 the need for intervening mechanisms to help properly realise risk management in the supply chain  
9 context.  
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15 As has been noted by a variety of authors (Beekman and Robinson, 2004; Handley and Benton, 2009)  
16 there are many examples of firms that have entered into partnerships as a means of improving  
17 business performance only to be disappointed at the outcomes. Indeed, it is the risks associated with  
18 collaborative supply chain relationships, according to Arnold et al. (2010), that have often been  
19 identified as one of the primary limiting factors on the growth of such relationships (Aron et al.,  
20 2005; Goh et al., 2007). The findings of this study, by identifying how managers can gain a deeper  
21 appreciation of the risks of a partnering approach, helps to offset this limiting factor and therefore  
22 should help to facilitate the growth of such relationships. Typically, cooperative relationships bring  
23 risk and leave an organisation vulnerable if they are not controlled during the stages of relationship  
24 formulation and commitment building (Kumar and van Dissel, 1996; Arnold et al., 2010). The findings  
25 of this study indicate that managers can reduce such vulnerability by providing the necessary control  
26 of risk through investing in CR/EEB.  
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35 A further important contribution of this study is that it explicitly considers relational risk in its own  
36 right as a component of supply chain related risk. This is an important departure from much of the  
37 existing literature on supply chain risk, which as Jia and Rutherford (2010) note is heavily focused on  
38 performance risk sources and mitigation (Tang 2006; Zsidisin, 2003). In contrast, relational risk  
39 sources and mitigation (Christopher and Lee, 2004; Das and Teng, 2001; Delerue, 2004) have  
40 received little attention (Jia and Rutherford, 2010).  
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### 45 46 **5.1 Managerial implications**

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48 Our results indicate that an important strategy firms can adopt for developing a good understanding  
49 of the risks of partnering is an undertaking and commitment to CR, which itself is more likely to take  
50 root and improve when the firm embraces a close relationship ethos as part of its supply strategy.  
51 Our findings therefore have several managerial implications in relation to green supply chain design.  
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55 Each of the EEB practices comprising our three EEB construct variables are in themselves practices  
56 that directly and practically can green the supply chain, for example regular independent audits of  
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3 commercial and environmental integrity if undertaken by increasing numbers of firms in the supply  
4 chain, and likewise incorporating the findings from independent environmental audits within internal  
5 or external training programmes. However, there is an equally important new insight and implication  
6 from our findings for greening the supply chain. It is widely agreed that it is vital that firms not only  
7 increasingly green their supply chain, but green it in a sustainable way, that is, with a long-term  
8 rather than short-term green perspective. They can do this individually, or through some form of  
9 collective means. Partnership is an attempt to build relationships for long term viability rather than  
10 short-term (and short-lived) gain. A better understanding of the relational and performance risks  
11 associated with partnering, driven through the implementation of EEB, is likely to lead to more  
12 durable partnerships. Partnerships that have longevity are, in turn, arguably better able, firstly, to  
13 facilitate the permeation and spread of green practices within the supply chain but, secondly, and  
14 arguably more importantly, to permit these environmental and ethical practices to be properly and  
15 more permanently embedded. Thus the reduction in the likelihood of exposure to partnership risks is  
16 likely to convert transient green supply chain policies, into long-lasting green supply chain practices  
17 and systems.

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28 Given the potentially tremendous costs to the firm of not understanding, and hence not mitigating  
29 against or comprehensively managing the risks associated with partnering, we can conclude that  
30 buying into CR/EEB and investing in those practices that realise a CR/EEB ethos is an opportunity that  
31 firms should not miss or take lightly. Our findings indicate that CR/EEB is not a fad or a luxury, but in  
32 the context of firms' management of their suppliers and in particular strategic supplier relationships,  
33 it is essential. By implication, the sooner that firms embrace CR/EEB, the sooner they are likely to  
34 reduce their risk exposure when partnering, and the less likelihood there is that unintended and  
35 undesirable consequences will flow from their otherwise well intentioned efforts to establish closer  
36 supplier relationships. Our study indicates that tactically this can be achieved with a variety of  
37 measures. Of particular practical value to managers, the study has identified the specific EEB  
38 practices that are relevant to enhancing managers' appreciation of the risk of partnerships. This is a  
39 further benefit of this study's approach of operationalising (i.e. measuring) EEB through tangible  
40 practices, rather than through more abstract principles/statements of intent, as has been the case  
41 with many prior studies on greening supply chains. The practical measures that managers can  
42 immediately implement include developing a values statement and ethical framework on what  
43 constitutes acceptable business practices, conducting regular independent audits of environmental  
44 integrity, incorporating findings of independent environmental audits or monitoring practices within  
45 training programmes with partners, and incorporating environmental and ethical standards within  
46 partnering strategies.

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3 Furthermore, while a number of these EEB practices will require managerial effort and monetary  
4 investment to implement, others such as creating a values statement and ethical framework on  
5 acceptable environmental practices will require very little investment, or are relatively simple  
6 extensions to existing business practices.  
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10 It is important that managers appreciate the risks that can accompany a partnership relationship  
11 approach (Hallikas et al., 2004). It is important that they have a good understanding of the potential  
12 risks. The findings of this study indicate that investing in CR/EEB is essential to help managers to  
13 avoid making potentially costly investments in their relationships with suppliers that then fail to  
14 deliver the expected outcomes (Dekker et al., 2013). Furthermore, and consequently, that investing  
15 in CR/EEB is likely to help managers to make better informed decisions about who to partner with  
16 and when (Carl, 2008), and can help them to more judiciously appraise the relationships, and in turn  
17 to better define the boundaries, scope and/or main activities involved in partnering relationships.  
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21 The results of the study also have valuable practical utility for those policy makers such as national  
22 and local government, tasked with persuading firms of the need to invest in greening the supply  
23 chain. It provides them with empirical support for convincing firms of the value, to their wider efforts  
24 to improve collaboration and performance within the supply chain, of deliberately investing in a  
25 green policy perspective by developing an EEB and CR ethos.  
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### 28 29 30 31 32 33 **5.2 Limitations and further research**

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35 This study has a number of limitations. Our research has confirmed a positive relationship between  
36 EEB in terms of internal awareness, monitoring and sharing best practice, and better managerial  
37 understanding of the risk associated with supplier partnerships. However, despite our confirmatory  
38 testing, our measures of the CR and risk constructs require further validation in different contexts.  
39 Furthermore, new measurement items, particularly for EEB/CR, are likely to emerge in the literature  
40 quickly, and these need to be incorporated into similar analyses of the mediating role. Future studies  
41 may also wish to extend our analysis by considering how other aspects of risk may or may not be  
42 affected by the presence or absence of EEB.  
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46 We have noted above a number of managerial actions that our study has confirmed should advance  
47 managerial appreciation of relational and performance risk. More in-depth research is now needed  
48 to examine how these actions can be most effectively implemented. Moreover, an examination of  
49 the causal linkages at a more fine-grained dimensional level would also be beneficial. For example,  
50 further research is needed to establish how each of the contributing awareness, monitoring or best  
51 practice sharing activities can be leveraged, not only to maximise their impact on helping managers  
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to reduce relational or performance risk, but also to help managers to better construct the justifications they are likely to continue to need to make for the prioritisation of scarce resources towards CR practices.

Our study has established the relevance of CR to one of the core functional strategies within the firm – supply chain management. Investigation of CR’s relevance to other functional strategy areas is strongly encouraged.

For Peer Review Only

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**Appendix 1. Measurement items***EEB internal awareness\**

INTAWN2: a values statement and ethical framework on acceptable business practices

INTAWN3: publicising environmental and ethical statements to stakeholders

INTAWN4: task group(s) to examine potentially sensitive areas

*Monitoring of EEB performance\**

MONIT1: regular independent audits of commercial and environmental integrity

MONIT2: development of appropriate monitoring practices to ensure compliance with ethical policies

*Sharing EEB best practices\**

SHARBP1: incorporating findings of independent audits of commercial and environmental integrity or monitoring practices to ensure compliance with ethical policies within training programmes with partners

SHARBP2: using accreditation to ISO14000 Series (Environmental Management Systems Standard) to distinguish preferred supplier status

SHARBP3: incorporating environmental and ethical standards within partnering strategies

SHARBP4: incorporating findings of independent audits of commercial and environmental integrity or monitoring practices to ensure compliance with ethical policies within internal training programmes

*Relational risk*

RELISK2: imbalance in resources

RELISK3: imbalance in information sharing

RELISK4: imbalance in accruing benefits

RELISK5: premature trust

RELISK6: conflict over the scope of the partnership

*Performance risk*

PERRISK1: partners failing to meet expectations

PERRISK2: loss of competitiveness

PERRISK3: risk of supply disruptions

*Supply chain partnership*

SCP1: view our key suppliers as suppliers of capabilities, not merely products and services

SCP2: engage extensively in two way exchange of important/technical information with key suppliers

SCP3: regularly involve suppliers in new product/service development

SCP4: make long-term commitment to suppliers to achieve mutually acceptable outcomes

SCP5: the benefits from problem solving with main suppliers are always shared jointly

Notes: \*Adapted from Hughes et al., 1999



Appendix 2. Covariance matrix of original items

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
1: SCP1	1.01																									
2: SCP2	0.53	1.25																								
3: SCP3	0.56	0.94	1.74																							
4: SCP4	0.45	0.66	0.91	1.35																						
5: SCP5	0.59	0.79	0.98	0.91	1.41																					
6: RELRISK1	0.10	-0.03	-0.06	-0.04	0.15	1.02																				
7: RELRISK2	-0.04	-0.18	-0.17	-0.13	-0.05	0.57	1.09																			
8: RELRISK3	0.00	0.00	0.03	0.11	0.14	0.40	0.51	0.95																		
9: RELRISK4	0.10	-0.06	0.02	0.06	0.19	0.32	0.52	0.61	0.95																	
10: RELRISK5	0.04	-0.03	-0.10	-0.01	0.06	0.46	0.50	0.43	0.37	0.91																
11: RELRISK6	-0.06	-0.09	0.02	0.01	0.01	0.46	0.49	0.52	0.45	0.50	1.12															
12: RELRISK7	0.08	0.01	0.03	-0.06	0.10	0.39	0.39	0.32	0.38	0.42	0.45	1.09														
13: PERRISK1	0.04	0.15	0.08	-0.01	0.03	0.18	0.23	0.31	0.22	0.22	0.23	0.19	0.93													
14: PERRISK2	0.11	0.11	0.23	0.10	0.13	0.32	0.40	0.37	0.29	0.30	0.42	0.22	0.56	1.09												
15: PERRISK3	0.06	0.06	0.12	0.08	0.02	0.14	0.41	0.29	0.26	0.28	0.36	0.40	0.49	0.52	1.18											
16: INTAWN1	0.06	0.13	0.04	0.18	0.16	0.24	0.22	0.38	0.27	0.29	0.16	0.20	0.24	0.23	0.13	1.11										
17: INTAWN2	0.11	0.12	0.19	0.15	0.31	0.34	0.33	0.36	0.28	0.31	0.31	0.36	0.24	0.27	0.20	0.45	1.21									
18: INTAWN3	0.04	0.02	0.05	0.13	0.23	0.41	0.45	0.34	0.35	0.48	0.33	0.42	0.10	0.17	0.30	0.38	0.78	1.34								
19: INTAWN4	0.06	0.04	-0.02	0.09	0.08	0.30	0.35	0.29	0.20	0.33	0.25	0.28	0.17	0.31	0.19	0.52	0.57	0.97								
20: MONIT1	0.14	0.14	0.13	0.13	0.27	0.37	0.34	0.39	0.32	0.39	0.32	0.37	0.18	0.26	0.32	0.41	0.56	0.71	0.44	0.97						
21: MONIT2	0.17	0.24	0.20	0.22	0.27	0.34	0.40	0.38	0.29	0.40	0.28	0.33	0.13	0.19	0.27	0.47	0.57	0.67	0.44	0.72	1.04					
22: SHARBP1	0.01	0.12	0.10	0.10	0.12	0.28	0.32	0.38	0.27	0.35	0.38	0.34	0.18	0.27	0.29	0.43	0.62	0.66	0.45	0.64	0.70	1.03				
23: SHARBP2	-0.13	-0.06	-0.04	-0.11	-0.03	0.21	0.36	0.16	0.30	0.31	0.30	0.37	0.08	0.24	0.34	0.26	0.59	0.62	0.40	0.49	0.50	0.67	1.42			
24: SHARBP3	-0.03	0.00	0.04	0.01	0.04	0.23	0.31	0.33	0.28	0.33	0.27	0.27	0.14	0.19	0.25	0.48	0.53	0.63	0.41	0.58	0.64	0.72	0.71	1.06		
25: SHARBP4	0.00	0.14	0.08	0.11	0.14	0.27	0.34	0.38	0.28	0.36	0.38	0.41	0.29	0.29	0.36	0.51	0.70	0.67	0.48	0.67	0.68	0.86	0.66	0.68	1.02	

Table 1. CFA analysis of the refined survey instrument

Construct	Number of items	Cronbach's alpha	Construct reliability	AVE	Squared factor correlations						
					SCP	RR	PR	IA	MT	SBP	
SCP	4	0.86	0.86	0.61	1.00						
RR	5	0.83	0.83	0.50	0.00	1.00					
PR	3	0.74	0.75	0.50	0.02	0.35	1.00				
IA	3	0.79	0.79	0.56	0.03	0.34	0.12	1.00			
MT	2	0.83	0.83	0.71	0.07	0.35	0.12	0.69*	1.00		
SBP	4	0.87	0.88	0.65	0.01	0.28	0.16	0.67*	0.74*	1.00	

Goodness of fit:  $\chi^2 = 225.49$ ,  $df = 174$ ,  $P < 0.05$ ,  $\chi^2/df = 1.30$ ,  $IFI = 0.99$ ,  $CFI = 0.99$ ,  $RMSEA = 0.04$

Notes: Sample size = 156. RR = Relational risk, PR = Performance risk, IA = Internal awareness, MT = Monitoring, SBP = Sharing best practice.

Construct reliability:  $\rho_c = (\sum\lambda)^2 / [(\sum\lambda)^2 + \text{Var}(\delta)]$ ,  $AVE = \sum\lambda^2 / [\sum\lambda^2 + \text{Var}(\delta)]$ .

\* Squared factor loadings greater than corresponding AVEs.

AVE = average variance extracted.

**Table 2. Model M1 – results of SEM: standardised path coefficients (t-value)**

	Exogenous (controlled) variables				Endogenous variables		
	Internal awareness	Monitoring	Sharing best practice	Relational risk	Performance risk		
H1(a, b, c): Supply chain partnership (SCP)	0.23** (2.33)	0.30** (3.02)	0.17* (1.86)	–	–	–	–
H2a and H2b: Internal awareness (IA)	–	–	–	0.29** (2.90)	0.17 (1.68)		
H3a and H3b: Monitoring (MT)	–	–	–	0.32** (3.18)	0.07 (0.72)		
H4a and H4b: Sharing best practice (SBP)	–	–	–	0.18** (2.02)	0.25*** (2.57)		

Goodness of fit:  $\chi^2 = 470.90$ ,  $df = 180$ ,  $P < 0.005$ ,  $\chi^2/df = 2.62$ ,  $IFI = 0.91$ ,  $CFI = 0.91$ ,  $RMSEA = 0.10$

Notes: Sample size = 156. \*Borderline significant path estimate. \*\*Significant path estimate.

**Table 3. Model M1.1 with direct path between SCP and relational risk (RR) – results of SEM: standardised path coefficients (t-value)**

	Exogenous (controlled) variables				Endogenous variables		
	Internal awareness	Monitoring	Sharing best practice	Relational risk	Performance risk		
H1(a, b, c): Supply chain partnership (SCP)	0.24** (2.44)	0.31** (3.14)	0.17* (1.91)	–	–	–	–
H2a and H2b: Internal awareness (IA)	–	–	–	0.32** (3.08)	0.18 (1.73)		
H3a and H3b: Monitoring (MT)	–	–	–	0.40** (3.68)	0.09 (0.92)		
H4a and H4b: Sharing best practice (SBP)	–	–	–	0.13 (1.53)	0.23** (2.39)		
Mediating effect H5a: SCP				–0.17 (–1.67)			

Goodness of fit:  $\chi^2 = 470.82$ ,  $df = 179$ ,  $P < 0.005$ ,  $\chi^2/df = 2.63$ ,  $IFI = 0.91$ ,  $CFI = 0.91$ ,  $RMSEA = 0.10$

Notes: Sample size = 156. \*Borderline significant path estimate. \*\*Significant path estimate.

Table 4. Model M1.2 with direct path between SCP and performance risk (PR) – results of SEM: standardised path coefficients (t-value)

Exogenous (controlled) variables	Endogenous variables			
	Internal awareness	Monitoring	Sharing best practice	Performance risk
H1(a, b, c): Supply chain partnership (SCP)	0.22** (2.30)	0.30** (2.99)	0.17* (1.84)	–
H2a and H2b: Internal awareness (IA)	–	–	–	0.17 (1.62)
H3a and H3b: Monitoring (MT)	–	–	–	0.01 (0.12)
H4a and H4b: Sharing best practice (SBP)	–	–	–	0.28** (2.82)
<i>Mediating effect</i>				
H5a: SCP				0.08 (0.71)

Goodness of fit:  $\chi^2 = 471.17$ ,  $df = 179$ ,  $P < 0.05$ ,  $\chi^2/df = 2.63$ ,  $IFI = 0.91$ ,  $CFI = 0.91$ ,  $RMSEA = 0.10$

Notes: Sample size = 156. \*Borderline significant path estimate; \*\*Significant path estimate.

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FIGURES

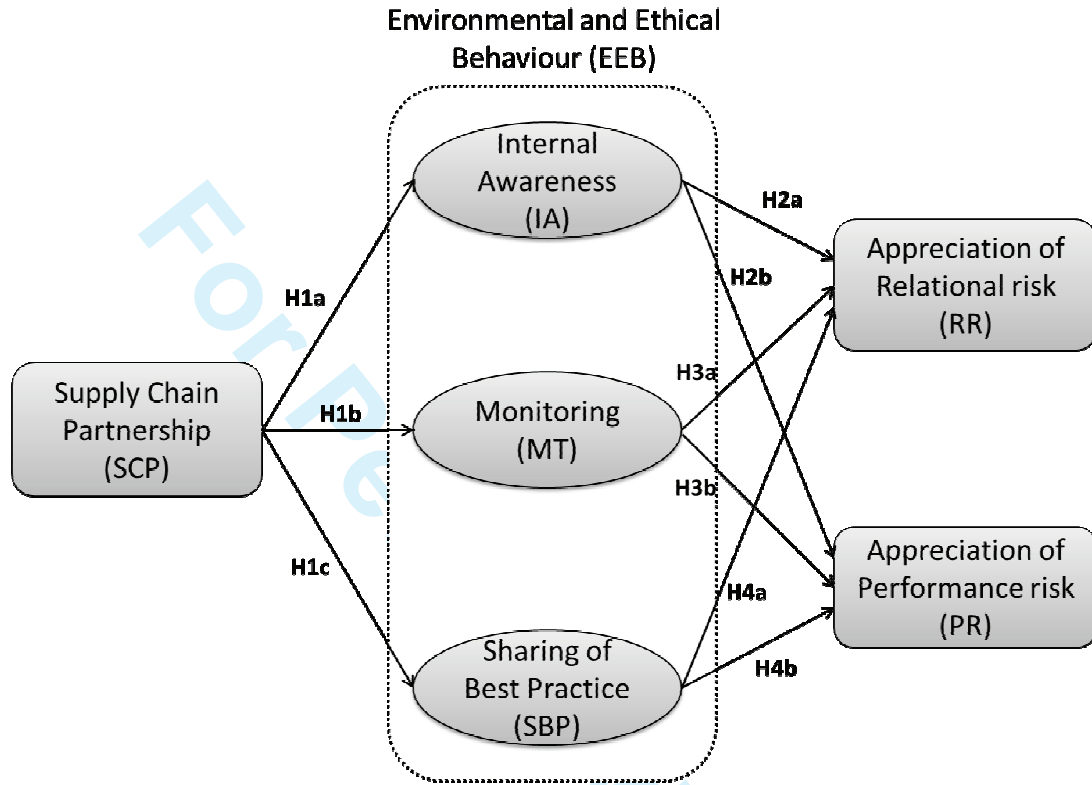


Figure 1. Research model.