

THE ROLE OF THE SUPPLY CHAIN EXECUTIVE IN SUPPLY CHAIN
INTEGRATION: A BEHAVIORAL APPROACH

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ABSTRACT

Applying a behavioural approach of agency theory, this paper aimed to identify the most appropriate employment and compensation system (ECS) for supply chain executives in order to foster supply chain integration. We attempted to develop a novel approach of how encourages supply chain integration from the perspective of managerial incentives, an enabler that has not been analyzed in the literature. The paper presents the analysis of three sources of risk bearing - compensation risk, employment risk and environmental risk - which can adversely influence supply chain executives' risk-taking behaviour, rendering them less willing to promote supply chain integration. We argue that an ECS that lessens executive risk bearing results in higher risk-taking behaviour and thus promotes supply chain integration. An ECS should thus (1) assure reliable remuneration that is viewed as essential for the SC executive's standard of living and (2) reward on the basis of how decision of fostering supply chain integration is strategically desirable for the firm's interest and also its performance outcomes.

Key words: Supply chain management, behavioural agency model, executive risk taking, firm performance

... The area (SCM) that was once considered to be only of minor concern to managers is now at the forefront of business planning. The discipline that had a difficult time getting the attention of senior managers in firms now has representatives in the top echelons of most organizations (Lancioni, 2000).

1. Introduction

Past research has examined strategic supply chain management; viewing supply chains not just as production and distribution mechanisms, but also as important competitive weapons to gain advantages over peers (Hult, Ketchen & Nichols, 2002; Hult, Ketchen & Slater, 2004; Hult, Ketchen & Arrfelt, 2007). Firms such as Toyota, Inditex and Dell have used the collective capabilities of their supply chains rather than merely their individual capabilities to gain the opportunity of winning in an increasing competitive market. While competition between single firms is still the rule, increasingly in the new era of competition, it is actually between their supply chains (Christopher, 2005; Rice & Hoppe, 2001). Firms recognize that they do not possess the full range of capabilities to design, produce and deliver the products and services that demanding markets require or to compete globally (Gomes-Casseres, 1994). They thus need to develop partnerships with other members of their supply chains in order to facilitate supply chain integration and, consequently strengthen their capabilities (Mentzer, Min & Zacharia, 2000; Dyer & Nobeoka, 2000; Christopher, 2005; Kotabe, Martin & Domoto, 2003).

Supply chain partners therefore seek to synchronize their processes and share knowledge in order to enhance supply chain integration. Such integration has become a requirement for the success of supply chain management (Austin, Lee & Kopczack, 1997). Integrated supply chains allow committed partners to reduce overall cost of supply (Lee, Padmanabhan & Wang, 1997; Modi & Mabert, 2007; Frohlich & Westbrook, 2001), increase the flexibility of processes (Malhotra, Gosain & El Sawy, 2005; Chopra & Meindl, 2007) and improve innovative capabilities. These improved results, owing to supply chain integration, hence permit supply chain partners to respond more efficiently and more quickly to current market needs.

Although important for enhancing firm performance, supply chain partnerships might be inherently risky. The threat of knowledge spill over to potential competitors (Dyer & Singh, 1998; Gulati & Gargiulo, 1999; Bleeke and Ernst, 1995) and the potential loss of partnership-specific investment (Williamson, 1985; Osborn & Hadedoorn, 1997) are present in managerial decision making. The perceived risk of opportunistic behaviour of a partner in both situations influence the SC executive's behaviour. The SC executive aware of the potentially high, but uncertain returns derived from supply chain partnerships could be less willing to encourage them. That is, given that firm performance is usually related to executive compensation, the uncertain outcomes of supply chain partnerships might restrict the risk-taking behaviour of the SC executive due to potential loss of a part of executive wealth. Hence, the SC executive might be not willing to engage in collaborative initiatives with supply chain partners and, ultimately, fail to optimize the firm's performance.

It has been shown that a firm's employment and compensation system (ECS) plays an important role in influencing executives' risk preferences and, ultimately firm performance (Balkin & Gomez-Mejia, 1987; Dyer, Falman & Milkovich, 1985). Thus when developing a firm's strategies (e.g., to create supply chain partnerships), the employment risk and compensation risk are important considerations that deserve primary attention. Likewise, environmental risk has been analyzed as other important

driver in executive compensation design (Miller, Wiseman & Gomez-Mejia, 2002; Bloom & Milkovich, 1998; Gray & Cannella, 1997). A high level of environmental risk exposure decreases risk-taking behaviour among executives due to the small degree of control that they exercise over performance outcomes. Hence employment and compensation risk (i.e., internal risk) coupled with environmental risk (i.e., external risk) are two kinds of sources of executive risk bearing that could jeopardize executive wealth. These risks might result in SC executives making conservative decisions or evading actions related to supply chain partnerships in order to reduce their risk exposure. However, these decisions/actions can negatively affect firm performance. The design of an appropriate ECS thus becomes a fundamental theme that this research attempts to pursue in order to assure that the SC executive is working in favour of the firm's strategic objectives.

This research attempts to make four main contributions to supply chain management and executive compensation literature. Firstly, little is known about which ECS is most likely to encourage the SC executive to promote supply chain integration. Previous research has mainly focused on the determinants of CEO compensation (e.g., Tosi & Gomez-Mejia, 1989; Tosi, Werner, Katz & Gomez-Mejia, 2000; Balkin, Markan & Gomez-Mejia, 2000). However the SC executive, the subject of this study, also plays a pivotal role in ensuring continued firm competitiveness and success (Mangan & Christopher, 2005). Resource allocation decisions made by the SC executive to promote supply chain integration are important since increasingly integrated supply chains are considered important competitive weapons for firms (Hult et al., 2002; Hult et al., 2004; Hult et al., 2007). Secondly, we examined two dimensions of executive risk bearing-compensation risk and employment risk - that influence the SC executive's risk taking behaviour (i.e., foster supply chain integration). We also analyzed how environmental risk moderates the risk bearing-risk taking relationship that has not been analyzed in previous research (Wiseman & Gomez-Mejia, 1998; Larraza-Kintana, Wiseman, Gomez-Mejia & Welbourne, 2007). This research attempts to give a more realistic answer to how compensation risk, employment risk and environmental risk influence the SC executive's decision making processes.

Thirdly, previous research in SCM has mainly stressed the importance of information technologies, information sharing, trust, commitment, interdependence and strategy congruence as enablers of supply chain integration (Lee et al, 1997, Golicic & Mentzer, 2005; Malhotra et al., 2005; Monczka, Peterson, Handfield & Ragatz, 1998; Sanders, 2005; Sanders 2007; Vickery et al, 2003). We extended the present literature by introducing and developing managerial incentives as a key enabler of supply chain integration. Fourthly, previous research has been mainly focused on aligning compensation with innovation outputs (e.g., patents created by a single firm, see Balkin et al., 2000 and Makri et al., 2006). Supply chain integration can bring improvements in operational and logistics processes (Lee et al., 1997; Frohlich & Westbrook, 2001; Modi & Mabert, 2007) and the launching of new innovative products (Malhotra et al., 2005; Petersen, Handfield & Ragatz, 2005). This study expands on the scope of measurement of former studies to include results (1) that are generated by supplier-buyer partnerships rather than just one single firm and (2) that are not necessarily protect by patents.

In summary, using a behavioural approach of agency theory this study attempts to develop a set of guidelines of how SC executive compensation should be designed in order to encourage supply chain integration. This involves an analysis of the influence

of three types of risk bearing- compensation risk, employment risk and environmental risk- that can influence the SC executive's willingness to promote supply chain integration. This is due to the fact that risks of supply chain integration (i.e., knowledge spillover to potential customers and loss of partnership-specific investment) might influence the SC executive's risk preference. Hence in order to promote risk taking behaviour, we noted that a firm's ECS should assure reliable remuneration that is viewed as essential for the SC executive's standard of living (e.g., reliable annual cash bonus and base pay). It should also reward on the basis of how the SC executive's decision of fostering supply chain integration is strategically desirable for the firm's interests rather than merely on financial results of such decision. Finally, we also argued that an appropriate ECS is especially valuable for those firms (1) operating in volatile environments where employment stability and reliable remuneration are less likely to be guaranteed and (2) facing supply chain competition where firms increasingly rely upon collaboration with supply chain partners. This is due to the fact the skills and knowledge needed to survive in competitive markets are not always found within a single firm (Inkpen & Beamish, 1997; Leonard-Barton, 1995, Gomes-Casseres, 1994).

This paper is organized into four sections. In the next section the conceptual framework is discussed and the hypotheses are formulated. Firstly we analyze the importance of supply chain integration and the risks that it involves. Next we explain the three sources of executive risk bearing that influence the risky decision of fostering supply chain integration under the perspective of the behavioural agency model (BAM). We then analyze how supply chain integration enhances committed partners' overall performance. In the third section, we provide a discussion of our hypotheses and provide guidelines for future research. In the final section, we give our primary conclusions of this paper.

2. Theoretical framework and hypotheses

To support our arguments, we developed a framework that utilizes the behavioural agency model (BAM) of managerial risk taking (Wiseman & Gomez-Mejia, 1998) to explain how a firm's ECS should be designed to encourage key, albeit risky, strategies with another supply chain partner. The theory of executive compensation developed by Wiseman & Gomez-Mejia (1998) suggests that SC executives are loss averse when uncertain outcomes resulted from supply chain partnerships threaten their personal wealth (e.g., executive compensation). Such uncertainty might be due to the expected losses of knowledge spill over to potential competitors and partnership-specific investments that negatively affect firm performance if one of partners behaves opportunistically. However, such uncertainties could be justified when the expected value of all advantages offered from supply chain partnerships exceeds that of the threats (Dyer & Singh, 1998; Osborn & Hagedoorn, 1997; Saxton, 1997).

In this sense, supply chain partnerships offer a set of advantages and potential risks to committed firms. They combine resources in a unique way and may realize an advantage over competing firms who are unable or unwilling to do so. They jointly generate and own relational profits that otherwise can not be created by either firm independently. According to the relational view, an effective strategy may be for firms

to systematically share valuable know-how with other supply chain partners in return for access to the stock of valuable knowledge residing within partnerships (Dyer & Singh, 1998). However, sharing knowledge could erode or eliminate the firm's competitive advantage due to valuable knowledge can be disclosed to potential competitors. The relational view also suggests that greater partnership-specific asset investments will lead to higher collective profits (Dyer, 1996; Clark & Fujimoto, 1991; Asanuma, 1989; Dyer & Singh, 1998), although these investments may create a high degree of interdependence between partners.

The following sub-sections contain a detailed discussion of (1) the advantages and threats of supply chain integration, (2) the behavioural agency model and (3) improved firm performance owing to supply chain integration.

2.1 Advantages and threats of integrated chains

Increasingly SC executives are discovering the advantages that can be gained by seeking mutually beneficial, long-term relationships within their supply chains. It has been shown that competitive advantage for some firms is derived from resources and capabilities embedded in collaborative relationships with other partners (Dyer & Singh, 1998; Dyer & Nobeoka, 2000; Gulati, Nohria & Zaheer, 2000; Malhotra et al., 2005). Firms can access and use the new knowledge and capacities of their supply chain partners in order to better exploit resources and capabilities available. Furthermore, they can combine and create new knowledge that increases their capacity for developing effective, innovative solutions.

The importance of supply chain integration has been stressed by a large number of empirical studies that have validated the advantages of supplier-buyer partnerships (Corsten & Kumar, 2005; Dyer & Nobeoka, 2000; Frohlich & Westbrook, 2001; Malhotra et al., 2005; Petersen, Handfield & Ragatz, 2005). This integration is more salient in the case of firms that face supply chain competition because the partners recognize that their partners' collective capabilities are needed to survive in competitive markets. In this regard, the synchronization of inter-firm processes and knowledge sharing routines therefore become the key of integrated chains whose members sharing compatible goals and similar culture and working together aim to achieve a sustained inter-organizational competitive advantage. The following paragraphs give some details from advantages and threats of supply chain integration.

Fully integrated supply chains can enhance overall performance of committed partners in several ways. Firstly, integrated chains reduce overall supply chain operational cost due to the synchronization of processes and the high level of coordination between firms. For instance, the firm experiences lower delivered costs to customers, lower levels of inventories, and better utilization of facilities and production capacity (Lee et al., 1997; Frohlich & Westbrook, 2001; Malhotra et al., 2005; Modi & Mabert, 2007). Secondly, integrated supply chains can increase their flexibility due to the fact that partners are more willing to help each other to cope with uncertainty from supply, manufacturing, and demand. Amongst other benefits it helps the firm to better handle supply uncertainty, meet shorter lead times, meet higher service levels and handle a greater variety of products (Chopra & Meindl, 2007; Malhotra et al., 2005). Thirdly,

supply chain partners can combine diverse sources of knowledge (Von Hippel, 1988) and enhance inter-organizational learning through the entire supply chain in order to create new knowledge. This enables a firm to improve and update its innovative capabilities and ultimately, to respond efficiently and rapidly to market needs. The supply chain can thus become a vehicle of learning that can assist committed partners in implementing continuous innovation methodologies (Chapman & Corso, 2005).

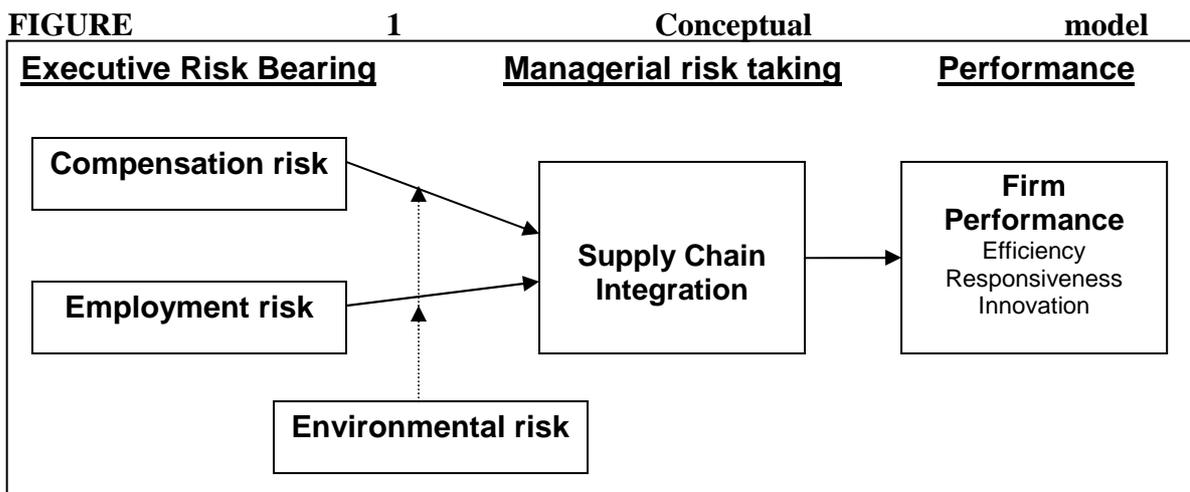
Although supplier-buyer partnerships seem to offer a number of positive advantages for committed firms, SC executives have to deal with the threats associated with the intense level of supply chain integration required, which makes them less willing to allocate resource in this risky decision.

The first inherent threat that they face is knowledge spill over to potential competitors. In supply chain partnerships there is a high likelihood that a firm participates in several supply chain partnerships simultaneously (Rice & Hope, 2001). The existence of common or overlapping suppliers complicates the task of aligning business strategies and sharing valuable knowledge. This is due to the fact that know-how shared with a customer or know-how jointly created between a buyer and its supplier can be inadvertently disclosed to potential competitors, and thus put in danger a firm's competitive advantage. This situation is intensified when there is a lack of formal or specified contractual agreement as is the case in many supply chain partnerships (Lambert, Emmelhainz & Gardner 1996). Unlike other types of inter-firm partnerships, a supply chain relationship is built upon repeated transactions and reliance of other party's capabilities to complete the value chain process, rather than shared equity or contracted objectives (He, Ghobadian, Gallea, Race & Spinks, 2007). In such a situation, the firm faces considerable moral hazard concerns because of the unpredictability of the behaviour of its supply chain partners who may 'free-ride' by limiting their contributions to the partnership or simply behave opportunistically (Gulati, 1998). These situations make the firm vulnerable due to a potential loss incurred if know-how is available to other potential competitors. This consequently restricts the willingness to promote supply chain partnerships of the SC executive who is aware of the potential danger of knowledge spill over to firm performance.

In addition to the threat of knowledge spill over, supply chain partnerships also create potential inter-dependence among partners (Gulati & Singh, 1998; Gulati & Gargiulo, 1999). The investment in tangible assets (i.e., customized new technology and machinery) and the investment in training or development programs (i.e., work teams and consulting groups) are indispensable for the development of supply chain partnerships. These investments are required to achieve high levels of synchronization of inter-firm processes and promote knowledge sharing routines. However assets specificity invested in partnerships is costly and increases the vulnerability of opportunism by the exchange partner (Williamson, 1985). Hence the lack of trust and commitment among supply chain partners might cause them to behave opportunistically at the expense of overall supply chain performance and, consequently, trigger the loss of value of partnership-idiosyncratic assets. The SC executive, who is concerned about the uncertainty of this situation, could make conservative decisions with regard to supply chain partnerships due to the potential loss of partnership-specific assets that can threaten firm performance.

As noted earlier, supply chain integration offers advantages and potential risks that can influence committed firms' performance. To the extent that executive compensation is impacted by firm performance, the uncertain outcomes of supply chain partnerships can influence the SC executive's risk preference. In turn, it could also restrict risk-taking behaviour of the executive who might be less willing to engage in collaborative initiatives with supply chain partners. Thus a firm's ECS design should alleviate the diverse risk bearing the SC executive has to face in decision making of supply chain integration in order to align the SC executive's interests in favour of the firm.

Figure 1 presents the study's model. Building on previous research, this study focuses on three key risk bearing areas –compensation risk, employment risk and environmental risk- that affect the SC executive's decision making. These three kinds of risk augment the vulnerability of the SC executive and thus reduce his or her risk-taking behaviour. In order to foster supply chain integration, we propose that the firm should design a reward system that guarantees essential compensation pay and evaluates the desirability of the SC executive's decisions to its overall strategy. This reduces compensation risk and employment risk perceived by the SC executive and, ultimately promote supply chain integration. Such integration is indispensable for those firms that compete under the new rules of competition in which collaboration with other partners is need to survive.



2.2 Behavioural Agency Model

The Behavioural Agency Model (BAM) developed by Wiseman and Gomez-Mejia (1998) integrates elements of agency theory and behavioural views of decision making under uncertainty in a corporate governance context in order to develop a model of managerial risk taking. This includes behavioural models of decisions (Sitkin & Pablo, 1992) that explain how risk preference changes with the framing of problems. Problems are framed by comparing anticipated outcomes from available options against a reference point. Positively framed problems occur when available options of varying risk and return generally promise acceptable expected value. Negatively framed problems occur when available options promise unacceptable expected values. BAM predicts that decision makers exhibit risk-averse preference when selecting among positively framed problems and exhibit risk-seeking preference when selecting among identical but negatively framed prospects (Kahneman & Tversky, 1979).

Underlying this shift in risk preference between positively and negatively framed problems is the key concept of loss aversion -not risk aversion found in most agency formulations. Loss aversion concerns the avoidance of loss, even if this means accepting higher risk (Tversky & Kahneman, 1986). Loss-averse decision makers are more sensitive to losing wealth than to increasing wealth. Loss aversion therefore explains a preference for riskier actions to avoid an anticipated loss altogether over less risky options to merely minimize the loss (Thaler & Johnson, 1990). This suggests that risk preferences of loss-averse decision makers will vary with the framing of problems in order to prevent or reverse losses and thus preserve their utility (Coffee, 1988).

In addition to the concept of loss-aversion, risk bearing and risk taking are also two central concepts in the BAM. Risk bearing is either the perceived risk to agent wealth that can result from a governance mechanism design (i.e. how to transfer risk from the principal to the agent) or it is inherently in the role of the agent owing to the employment risk that cannot be avoided (Wiseman & Gomez-Mejia, 1998). The latter is due to the fact that SC executives' wealth and status is closely tied to the survival and performance of their firms (Coffee, 1988; Treynor & Black, 1976; Bettis, 1983). Risk taking, however, represents the agent's choice of investment risk from among the firm's investment opportunities. Hence, loss-averse decision makers that face conditions of gain are likely to perceive more risk to personal wealth (i.e. compensation risk) and in turn exhibit a negative influence on risk taking. Conversely, decision makers under conditions of loss (i.e. high levels of employment risk) perceive less risk to personal wealth and consequently exhibit a positive influence on risk taking.

In summary, the BAM suggests that the SC executive is loss-averse and that risk bearing only occurs when there is a threat to his or her compensation and employment security. This model would suggest a different interpretation of how compensation risk, employment risk and environmental risk can affect the SC executive's risk preference and thus his or her managerial behaviour. Risk-averse behaviour could be expected when the SC executive anticipates the threat of a part of his or her essential pay while risk-taking behaviour could be expected when the SC executive seek to reduce/reverse the most severe loss of all his or her incomes looking for other high-return, albeit risky, alternatives.

Vulnerability of the SC executive: Sources of executive risk bearing

This research analyzed three sources of the SC executive's risk bearing: compensation risk, employment risk and environmental risk. The first two kinds of risk bearing are intimately related to internal risk that executives face regarding how the firm has designed its compensation and monitoring system. While the third one is associated with external risk over which the firm does not have any control. Although this comparison is extremely important in order to gain a better understanding of how these sources of risk bearing influence the SC executive's behaviour in various ways, this study also attempts to develop an appropriate ECS that reduce managerial risk bearing. Reducing the vulnerability of executive wealth increases the probability that the SC executive will channel firm resources not only to better exploit its capabilities but also to promote supply chain integration. This latter decision has been usually accepted in the SCM literature because firms that opt to promote supply chain integration can

consistently improve their overall performance, although they have to face to potential threats of opportunistic behaviour of any supply chain partner.

A) Compensation risk

The first kind of risk bearing analyzed is compensation risk. Developers of traditional agency models view compensation risk as the proportion of compensation that is variable, and they see this measure as a proxy for risk bearing (Beatty & Zajac, 1994; Gray & Cannella, 1997). This view assumes that the SC executive is risk averse and thus prefers higher proportions of certain compensation over uncertain (variable) compensation. However under the BAM, we assume that the SC executive is loss averse - not risk averse. Hence, the amount of variable pay in the compensation package design has little effect on agent risk bearing when it is simply added to a compensation scheme as a "layer" (i.e. from 10 to 20% of variable pay). This is due to the fact that the loss of variable pay does not threaten to base pay engendered from pursuit of contingency pay and thus does not create a loss condition for the SC executive. Instead, the threat to present and future essential pay (e.g. base pay and reliable annual cash bonus) represents a potential loss to perceived wealth for the SC executive.

Furthermore, threats to anticipated essential pay would seem more salient than threats to variable pay, since losses associated with anticipated essential pay pose a significant threat to the SC executive's perceived wealth and, ultimately, to his or her standard of living. Loss of variable compensation however possess a less severe loss because it is normally used for discretionary consumption expenses and savings that can be deferred more easily into the future or, perhaps, foregone altogether (Arkes, Joyner & Stone, 1994; Strahilevitz, 1992). The SC executive is therefore less willing to encourage supply chain integration in order to limit the potential threat to a reliable pay (i.e. annual cash bonuses) that has been anticipated and viewed as essential to his or her standard of living.

In this research, we adopted the concept of downside risk of essential compensation developed by Larraza-Kintana et al (2007). Under the BAM's perspective, they defined this concept as the potential of losing a portion of pay critical to maintaining the executive's standard of living. In this regard, threats to *reliable* bonus payment could be likely salient for loss-averse SC executives since its loss represents the loss of something of value in their standard of living. If they perceive increased threat to this type of essential compensation, they would be more willing to avoid actions that would aggravate this risk. For instance, if annual cash bonuses are paid consistently due to high service level and efficiency of operations management owing to the firm's own resources, the SC executive is less willing to allocate resources in supply chain partnerships that help to improve overall firm performance. This is due to the fact that the SC executive may anticipate the loss of this reliable pay if he or she makes any risky decision as is the case of fostering supply chain partnerships. The SC executive therefore is more likely to protect anticipated, reliable pay (e.g., reliable cash bonus) that is viewed and perceived as essential for his or her standard of living rather than attract additional wealth through improved firm performance owing to supply chain integration.

Since the SC executive faces a gain context (e.g. gain of a reliable cash bonus), he or she is likely to perceive more risk to personal wealth, and in turn exhibit risk-averse preferences. Such preferences adversely influence risk-taking behaviour which might damage/limit the firm's performance. These arguments lead to the following hypothesis:

Hypothesis 1: The higher the level of perceived downside risk of essential compensation, the less likely the SC executive promotes supply chain integration.

B) Employment risk

A related but different source of SC executive's risk bearing is employment risk. The SC executive can face a greater probability of termination and a higher likelihood of negative reputation in the market if the investment to create supply chain partnerships does not produce the desired ex-post results. This is because it is difficult for outsiders to distinguish unfortunate circumstances from poor decisions (Wiseman & Gomez-Mejia, 1998). Since the termination and negative reputation results in the worst loss situation of all current income and puts in serious jeopardy all future income, employment risk represents the most severe threat to the SC executive's wealth than either form of compensation risk (Larraza-Kintana et al., 2007).

As noted above, SC executives are loss-averse under the BAM's perspective and thus very sensitive to losing wealth. SC executives would be more willing to take higher levels of risk in order to protect their actual wealth. Since employment risk corresponds to the complete loss of all incomes, SC executives therefore will have a tendency to take riskier actions and be more willing to promote supply chain integration in order to reverse the potential loss. As the probability of employment risk increases, SC executives tend to augment preference for risky decision as it is suggested by the research on choice behaviour related to risk (Tversky & Wakker, 1995).

In the same vein, employment risk perceived by the SC executive is intimately related to evaluation and reward system of a firm. If an ECS evaluates and rewards primarily on the basis of the success of decision making in meeting performance criteria, it is more likely that SC executives perceive higher level of risk exposure. Conversely, SC executives could be more confident to make risky decisions knowing that they are evaluated and rewarded in function of strategic desirability of their decisions to their firm's goals. Under the BAM, a firm should therefore evaluate and reward the quality of the SC executive's decisions based on how these are strategically aligned to the firm's interests (strategic control system) rather than merely the measurable outcomes (financial control system) resulting from these decisions (Baysinger & Hoskisson, 1990). The evaluations of managerial performance of the SC executive should thus be based on inferences concerning the quality of the decision-making process; a strategic control system that lessens risk bearing and thus promotes supply chain integration. Accordingly, we propose:

Hypothesis 2: The higher the level of perceived employment risk, the more likely the SC executive promotes supply chain integration.

C) The moderator role of environmental risk

Finally, the third kind of risk bearing analyzed in this research is related to firm-specific risk (e.g. environmental risk or environmental uncertainty) rather than internal risks described in two previous hypotheses. We have explained how the SC executive's risk preference changes depending on if he or she faces a context gain (e.g. risk averse behaviour when face the loss of a part of essential compensation) or a loss context (e.g. risk seeking behaviour when perceived high levels of employment risk). Now, we will explain how environmental risk moderates the effects of compensation risk and employment risk on the risk-taking decision of the SC executive. The incorporation of this new type of risk to BAM can help provide a more realistic understanding of ECS since SC executives take into account the uncertainty of the industries in which their companies operate.

Environmental risk is typically defined as greater variability in organizational returns and increased chances for corporate ruin (Baird & Thomas, 1990; Miller & Bromiley, 1990). Industry-wide forces and other external factors expose the firm to performance uncertainty over which it may exert very little control (Bloom & Milkovich, 1998; Gray & Cannella, 1997). This risk also has implication for agents. For instance, greater external risk itself may impose risk on SC executives by threatening their income and reducing employment stability. This is due to uncertain cash flows or greater chances of organizational failure may make it more difficult for a firm to meet its present and future compensation obligations on all forms of pay and to secure the entire employment relationship (Bloom & Milkovich, 1998).

Therefore under a set level of external risk, uncertain outcomes of firm performance and supply chain partnerships are inherently high because decisions might fail (e.g. by high degree of global competition) despite the best efforts of the SC executive. Knowing that SC executives cannot control external risk, they could perceive all types of compensation risk increased due to difficulty that the firm faces. This could result in they are much more willing to react by withholding effort or by taking evasive actions designed to reduce their risk exposure. That is, SC executives are much less willing to promote supply chain partnerships because uncertain outcomes of firm performance are now driven by non-controllable factors. Such uncertainty specially increases the threat of a part of their essential pay (e.g. reliable annual cash bonus) independently if SC executives have an efficient control of operations management without the need of supply chain partnerships. In short, a high degree of environmental risk (1) augments uncertainty over how firm and supply chain partnerships will perform, (2) increases executive risk bearing due to forms of essential pay are less likely to be guaranteed, and (3) thus reduces riskier decision-making by the SC executive. We expect that:

Hypothesis 3a: The negative effect of essential compensation risk on promoting supply chain integration will be greater for a higher degree of environmental risk.

Similarly, higher levels of environmental risk can also threaten the entire employment relationship. That is, firm-specific external risk threatens not only all forms of

compensation but also employment stability of the SC executive. Under the BAM's perspective, we would expect that the SC executive would exhibit a higher level of risk-preferences (and thus promote supply chain integration) as long as environmental risk increases. This is due to the fact that high levels of external risk increase the probability of employment risk, independently of strategic control system and, ultimately, augment the level of perceived risk by SC executives. Since SC executives are loss averse, they are much more prone to take higher levels of risks in order to avoid an anticipated loss. SC executives would thus exhibit a higher level of risk-taking behaviour (i.e. promoting supply chain integration) in order to reverse the perceived loss of employment in highly volatile environments.

This type of risk-taking behaviour would not be expected since risks of supply chain integration also are increased in volatile environments (e.g. the partnerships-specific investments). This could however be valuable when SC executives recognize that the benefits of supply chain integration, such as a better level of control over demand, manufacturing and supply uncertainty (Chopra & Meindl, 2007; Liker & Choi, 2004) and a reduction of innovation risks (Germünden et al., 1992), are higher than its threats. The SC executive could therefore encourage supply chain integration because it can help (1) to gain some control over uncertainty and (2) to share determined risk with other partners that ultimately benefit the firm's interests. SC executives can thus exhibit a higher level of risk-taking behaviour in volatile environments when they stress advantages of supply chain integration. Formally stated:

Hypothesis 3b: The positive effect of employment risk on promoting supply chain integration will be greater under higher levels of environmental risk.

2.3 Supply chain integration and firm overall performance

The design of an appropriate ECS can influence the SC executive's risk preference and, consequently, foster supply chain integration. This is an important topic to research in the supply chain field because (1) supply chain integration plays a critical role in the new era of competition in which supply chains compete against supply chains (Christopher, 2005; Rice & Hoppe, 2001) and (2) the supply chain integration enablers mainly studied until now are related to the technology, trust, commitment and information sharing (Kaufmann and Carter, 2006; Lee et al., 1997; Moberg, Whipple, Cutler and Speh, 2004; Malhotra et al., 2005; Monczka, Peterson, Handfield and Ragatz, 1998; Sanders, 2005; Tan, Lyman and Wisner, 2002; Vickery et al., 2003).

Recent SCM literature suggests firms increasingly use the collective capacities of their suppliers and buyers rather than merely their individual capabilities to compete and survive in global, demanding markets. Partners recognize that synchronizing their operations and sharing knowledge within their supply chains allow them to gain and sustain competitive advantage in highly competitive global markets. They seek to establish a collaborative relationship that can create value that could otherwise not be created by either partner independently (Zajac & Olsen, 1993). That is, supply chain partners create each other's synergies and develop win-win relationships. Conversely, the lack of supply chain integration could lead to increased inventories, poorer product availability, higher manufacturing cost, increased replenishment lead times, and a drop in profits (Lee et al., 1997; Chopra & Meindl, 2007). Firms can therefore benefit

considerably not only by accessing and exploiting valuable knowledge from the supply chain (Christopher, 2005; Dyer & Singh, 1998; Dyer & Nobeoka, 2000; Kotabe et al., 2003; Hult et al., 2004), but also by creating new knowledge that increases their capacity for developing effective and innovative solutions.

Supply chain integration provides different perspectives of benefits. Firstly, some researchers (Lee et al., 1997; Modi & Mabert, 2007; Frohlich & Westbrook, 2001) have shown that high levels of supply chain integration reduce overall supply chain operational cost. This is due to the synchronization of inter-firm processes and the high level of coordination and timely information exchanged between supply chain partners. Secondly, high levels of supply chain integration also allow partners gain great flexibility or responsiveness in their operations (Chopra & Meindl, 2007; Liker & Choi, 2004; Malhotra et al., 2005). Partners become more responsive to markets, having for instance shorter lead time, greater product variety and faster new product introductions. This is because (1) they are more willing to help each other to cope with uncertainty from supply, manufacturing, and demand; (2) they experiment together and learn of their own experiences and of their partners' best practices; (3) and they understand how the supply chain of which they are members works and what role they play to strengthen supply chain capabilities.

Thirdly, supply chain integration can go further through improved operational performance encouraging the innovation capabilities of supply chain partners. Supply chain partners can combine diverse sources of knowledge (Von Hippel, 1988) and enhance inter-organizational learning through the whole supply chain in order to create new knowledge. This new knowledge may be turned into innovative products and processes with economic value in markets. The creation of market knowledge within a supply chain therefore allows partners to launch new innovative products; develop new ways to make, assemble, or deliver products and services; and in extreme cases, to create new industries (Malhotra et al., 2005). Knowledge creation resulting from supply chain integration is an important source of new ideas that can encourage the firm's innovative capabilities, enabling it to differentiate itself from its competitors.

In short, the supply chain can become a vehicle of learning and assisting committed partners in implementing continuous innovation methodologies that lead to improved operational performance and better innovation capabilities. This discussion may lead to the following hypothesis:

Hypothesis 4a, b, c: High level of supply chain integration should be positively related to improved performance in terms of (a) efficiency, (b) responsiveness, and (c) innovation of the firm.

Increasingly supply chain executives should manage not only their own organizations' operations but also those of their supply chains. They should allocate resources to synchronize processes and share knowledge within the supply chain in order to improve overall performance of their firms. Simultaneously, they have to deal with the dilemma associated with the intense level of collaborative knowledge sharing and the investments made into close relationships. This uncertain situation limits risk-taking behaviour of SC executives who could see their wealth threatened if the expected result of supply chain integration does not occur. In order to promote supply chain integration

and ensure continued firm competitiveness and success, we stressed the importance in developing an appropriate ECS that reduces executive risk bearing and thus promotes risk-taking behaviour.

3. Discussion and directions for future research

Previous research has suggested that integrated supply chains have a positive influence on the overall performance of committed partners (Frohlich and Westbrook, 2001; Rosenzweig et al., 2003; Vickery et al., 2003). Explanations of which factors foster supply chain integration are thus central issues to researchers and practitioners in the supply chain field. This paper attempts to contribute to this field by giving a theoretical explanation of how to promote supply chain integration from the perspective of managerial incentives. This perspective can help to explain how the SC executive's risk-preferences can be influenced by an appropriate ECS. That is, the SC executive is more willing to exhibit risk-taking behaviour, fostering supply chain integration, when a firm's ECS (1) assures reliable remuneration to the SC executive's standard of living and (2) evaluates the strategic desirability of his or her decisions to the firm's interests. In both cases the idea is to reduce executive risk exposure with the purpose to change risk preference. We also noted that the development of these managerial incentives is especially valuable in the case of organizations that face supply chain competition.

This paper extends the behavioural agency model developed by Wiseman and Gomez-Mejia (1998) incorporating an important variable of risk bearing as is environmental risk. Such risk influences ECS because firms operating in volatile environments have more difficulty in assuring employment stability and reliable compensation to their executives. Environmental risk also is an important factor that SC executives take into account in their decision making. We noted that loss-averse SC executives respond differently to compensation risk and employment risk in highly competitive markets. Essential compensation risk and employment risk are intensified in uncertain environments; however, the former diminishes risk-taking behaviour while the latter increases risk-taking behaviour. This explains the reasons why firms should attempt to reduce essential compensation risk and evaluate the quality of executives' decision making process when they seek to promote risky decisions. This paper contributes to executive compensation literature by giving another step toward the development of more realistic models of executive compensation based on behavioural approach of agency theory.

This paper also utilized a new context to examine the advantages of managerial incentives. Past research has been almost exclusively concerned with compensation design issues for CEOs and top management teams. A major novelty of this study is its focus on the SC executive who plays an increasingly pivotal role in ensuring continued firm competitiveness and success (Mangan & Christopher, 2005). Therefore to develop an appropriate ECS for SC executives is becoming crucial for firms whose supply chain is an important weapon of competitive advantage. Finally, this paper provides insights of how the supply chain allows partners (1) to access and exploit the resource and capabilities available and (2) to create new market knowledge that is highly valuable in demanding global markets.

3.1 Limitations and Future Research

The limitations of this research provide fertile areas for further research. Firstly, this research proposed some guidelines of how employment and compensation system (ECS) for the SC executive should be designed in order to foster supply chain integration. Future research could empirically analyze the hypotheses formulated in this research in order to find support to the notion that an appropriate ECS that diminishes executive risk bearing, increases the risk-taking behaviour and thus promotes supply chain integration. Secondly, this research suggests guidelines about how to promote supply chain integration from the perspective of managerial incentives. However, other factors such as strategic fit, information technology, trust and commitment between partners are also fundamental in supply chain integration (Harrigan, 1985; Sarkar et al., 2001; Malhotra et al., 2005; Dyer, 1997; Eng, 2006; Zineldin & Jonsson, 2000). Future work might need to explore jointly these factors in order to develop a comprehensive framework of supply chain integration enablers.

Thirdly, this paper places an emphasis on the new tendency toward greater collaboration between supply chain partners. However, there are some circumstances where this type of collaboration does not function. Competing supply chains with the presence of common suppliers or supply chains whose suppliers compete with customers (for a discussion see Rice and Hoppe, 2001) make such collaborations difficult. Our conclusions should therefore be interpreted with caution in those situations. Fourthly, this research proposes a set of guidelines of how SC executive compensation should be designed in order to encourage supply chain integration. However, the advantages of supply chain integration go beyond operations management area including for example areas such as innovation and marketing. Executives of these areas could be interested in developing joint strategies with other members of the supply chain to achieve their firms' goals. The design of a compensation plan with incentives for teams of executives, in addition to individual incentives studied here, therefore could be a salient topic to research.

Finally, this study associates managerial risk taking with firms' overall performance, specifically how the SC executive's decisions in fostering supply chain integration lead improved performance in terms of efficiency, responsiveness and innovation. However, it does not analyze the influence of SC executives' decisions in the bottom line as is the case of their firms' stock price. Future research could analyze to the extent that SC managers' decisions can influence their firms' stock prices, unlike other senior executives.

4. Conclusions

The present paper states that (1) the propensity of a firm to promote supply chain integration is related to the attitudes of the SC executive towards risk, (2) these attitudes will change systematically according to the three kinds of risk bearing analyzed, and (3) an ECS plays an important role as enabler of supply chain integration through the promotion of SC executive's risk taking behaviour. Supply chain integration should be

supported and practiced by an appropriate ECS that encourages SC executives to allocate resources not only to better exploit their firms' capabilities and skills but also to promote supply chain partnerships. This is due to the fact that supply chain partnerships enhance the creation of new knowledge and inter-organizational learning through the whole supply chain, which can result in a positive impact on firms' overall performance and improved capabilities for the chain to operate and survive in the new rules of competition.

Using the behavioural agency model (BAM), we argue that in order to promote and take advantage of supply chain integration, a firm's ECS should offer reliable pay that are perceived as essential to the SC executive's standard of living (e.g. reliable bonus payment) rather than variable pay (e.g. stock options) that is normally used for discretionary consumption expenses. This challenges what has been suggested traditionally, recognizing that loss of essential pay is more salient than loss of variable pay for executives wealth. We also noted that a firm should evaluate managerial performance based on behavioural control regarding to SC executive's decision-making process rather than on the primarily financial performance outcomes of his or her decisions. When a firm's monitoring system evaluates and rewards the strategic match between SC executive's decision making and firm's interests, he or she will be more willing to promote supply chain integration.

Finally we stated the SC executive's compensation and employment is intimately influenced by the unique conditions that the firm faces. High levels of firm-specific risk augments compensation risk and employment risk due to the fact that it makes more difficult for firms to meet compensation obligations and secure employment stability. This suggests that firms operating within the context of high levels of environmental uncertainty should guarantee more essential pay to their SC executives in order to promote supply chain integration than those firms with lower levels of environmental uncertainty. Firms should also put more emphasis on the evaluation of executives' decision making rather than results of their decisions since executives can exercise low control over firm performance in highly environmental uncertainty. This suggests that SC executives should be rewarded on the basis of how decision making of supply chain integration was strategically desirable to firm's interest rather than supply chain integration results.

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