



An organizational entrepreneurship model of supply management integration and performance outcomes

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Abstract

Purpose – The role of supply managers in driving corporate performance is changing, with an increased emphasis on supply market intelligence, collaboration, inter-organizational partnerships, and operational integration with supply partners. These traits are also mirrored in the research on entrepreneurial settings and firms. The purpose of this paper is to explore the parallels between supply management roles, and the entrepreneurial skill sets and mechanisms that have been identified in prior research.

Design/methodology/approach – A structural equation model, using a sample of 151 manufacturing and service firms based in the UK, tests this hypothesised model.

Findings – The theoretical framework was supported, with results indicating that entrepreneurial behaviours (supply market intelligence and supply management influence) contribute to integration within the firm and with suppliers, in order to drive performance improvement.

Practical implications – The results provide support for purchasing managers seeking to improve performance by changing the recruitment and culture of the supply management function toward an entrepreneurial orientation.

Originality/value – Although the application of organizational entrepreneurship thinking to supply management theory is nascent, this paper's results suggest that further research along these lines may provide a resilient platform for utilisation of entrepreneurial constructs to explain supply management principles in buyer-supplier collaboration, relational capital, and organisational outcomes.

Keywords Entrepreneurialism, Supply chain management, Supplier relations

Paper type Research paper



Introduction

In the current globally competitive environment, many firms are turning to supply management as a core strategic competence that creates competitive advantage. Firms with proactive and world-class supply management programs are differentiated by

hybrid governance structures, where supply managers work closely with business stakeholders to scan the supply market, collect market intelligence, identify opportunities to integrate suppliers with internal requirements, deliver value-added initiatives to create value, and ensure on-going collaboration with key supplier partners (Cousins *et al.*, 2006b; Liker and Choi, 2004). In spite of these improvements, in many firms supply management (or purchasing as it has been called in the past) remains largely a support function, with little strategic value other than transactional efficiency and cost reduction through “hardnosed” negotiations (Handfield, 2006; Liker and Choi, 2004). More recently, the value of supply management as a key contributor to competitive advantage through critical market intelligence, strategic sourcing, and supplier relationship management has been empirically identified (Cousins *et al.*, 2006b; Krause *et al.*, 1998; Liker and Choi, 2004). Recent research also calls on supply managers to become more proactive in seeking out global sourcing opportunities, identifying new technologies, and introducing these insights into the organization for adoption (Giunipero *et al.*, 2008).

These qualities sound very familiar to researchers of corporate entrepreneurship, and indeed, many of these traits are common characteristics of entrepreneurs. We explore this linkage further, and seek clarity on whether entrepreneurial roles can be overlaid onto specific behaviours associated with strategic supply management in creating enterprise value. This leads us to an interesting question: do successful supply management functions behave in an entrepreneurial fashion in managing external suppliers and internal stakeholder groups? (In this context, we define supply management as the process of sourcing goods and services from 1st and 2nd tier suppliers). While significant work has been undertaken in exploring the implications of entrepreneurial behaviour on firm market performance (Sarkar *et al.*, 2001a), there is an increasing interest in the overlap between supply management and entrepreneurship (Arend and Wisner, 2005; Giunipero *et al.*, 2005; Morris and Calantone, 1991). Our prior research using the same dataset explored attributes of supply management functions through cluster analysis (Cousins *et al.*, 2006a).

This line of thinking is explored further through development of a framework that aligns key entrepreneurial characteristics with attributes of successful supply management functions. We empirically test a model which posits that the relative status of supply management and the skill levels of associates in the function lead to greater internal integration into core business unit strategies. We also explore the impact on external integration with critical suppliers who provide tacit and spillover effects from a value chain perspective (Dyer and Chu, 2000; Liker and Choi, 2004; Petersen *et al.*, 2005).

Aligning entrepreneurial and supply management roles

We first seek to establish whether there was a parallel between the bodies of literature in entrepreneurship and supply management. We identify a number of key tenets from the entrepreneurial literature that is representative of more nascent attributes of supply managers. We begin with an overview of the entrepreneurship literature, and next describe specific attributes of entrepreneurs that align with supply managers.

Entrepreneurship research and theory

The study of entrepreneurship and innovation has a rich and seminal history in shaping modern management thinking. Early work by Schumpeter (1934) led to

seminal theoretical frameworks for business strategy by Lawrence and Lorsch (1967), Thompson (1967), Child (1972), Mintzberg (1978), Miller (1983), Miller and Friesen (1982) and others (Kumar and Seth, 1998; Sarkar *et al.*, 2001a). The primary contribution of this literature is to establish the key structural and infrastructural variables associated with innovation in the firm, including structural elements (centralization of authority, organizational resources, differentiation, and integration) (Lawrence and Lorsch, 1967; Rogers and Schoemaker, 1971; Thompson, 1969), as well as decision-making elements (scanning and control systems, planning horizons, and consciousness of strategy and conceptualization) (Ansoff, 1965; Cyert and March, 1963; Miles and Snow, 1978; Miller and Friesen, 1978; Mintzberg, 1973).

One fundamental thread running through this literature is that entrepreneurship is not associated with a dominant organizational personality (e.g. an independent-minded owner-manager), but is determined more by the entrepreneurial activity of the firm (Miller and Friesen, 1983). As organizations become more complex and are confronted with increasingly difficult challenges associated with globalization, technology, risk management, and driving innovation, the entrepreneurial role emphasized by Schumpeter (1934) becomes more important than ever. The focus of this line of thinking is not so much the critical actor (Miller and Friesen, 1983), but the entrepreneurial management process associated with innovation and management dynamics is of interest. Recent research by Sorensen (2007) also identifies that larger firms with bureaucratic work structures may hinder development of the skills required for entrepreneurship. Further, this research suggests that people who work for larger, older firms are less likely to display entrepreneurial behaviour (Sorensen, 2007).

Are entrepreneurial skills applicable to supply managers?

Entrepreneurial behaviour is held to be vital for firms of all sizes to prosper in competitive environments (Covin and Slevin, 1988; Lumpkin and Dess, 1996; Zahra, 1993). However, the specific elements that are applicable to supply management functions are shown in Table I, and are discussed next in more detail.

The supply management literature is nascent in its development of key theoretical elements (Das and Handfield, 1997), especially in the application of corporate entrepreneurship theory. Notwithstanding, recent research has begun to explore the need for entrepreneurial behaviours in supply management and supply networks (Arend and Wisner, 2005; Giunipero *et al.*, 2005; Walter *et al.*, 2006). In a survey of purchasing professionals, Morris and Calantone (1991) asked respondents to identify traits of the entrepreneurial organization. Key traits of an entrepreneurial organization included: strong leadership at the top, willingness to pursue risks, hands-on management, closeness to the customer, and aggressiveness in the marketplace. Morris and Calantone's work was followed by the work of Giunipero (2005), Arend and Wisner (2005), Hult *et al.* (2003), Gonzalez-Padron *et al.* (2008) and Ireland and Webb (2007). The latter point out that an entrepreneurial orientation leads to more adaptation decisions, allowing supply chains to respond to market opportunities efficiently with flexibility and agility. These attributes align strongly with four common properties associated with mature supply management organizations, characterized by the following (Cousins *et al.*, 2008; Handfield, 2006; Liker and Choi, 2004; Monczka *et al.*, 2008):

- (1) supply market research and intelligence;
- (2) supplier integration;

Conditions to build	Supply management capability	Entrepreneurial capabilities
	<p>Supply market intelligence – the ability to develop deep insights into key supply market characteristics, including emerging technologies, price and cost trends, mergers and acquisitions, capacity requirements, quality and delivery performance, and other key supplier capabilities that form the basis for sound strategic sourcing (Arend and Wisner, 2005; Cair <i>et al.</i>, 2000; Chen <i>et al.</i>, 2004; Handfield, 2006). This element is also shown to link to higher entrepreneurial orientation, which has been shown to allow supply chains to respond to market opportunities efficiently with flexibility and agility (Hult <i>et al.</i>, 2002, 2003)</p> <p>Supply management influence – the ability to align with internal stakeholders and integrate strategic sourcing objectives with senior executive and enterprise-level strategies. (Cousins <i>et al.</i>, 2006a; Monczka <i>et al.</i>, 2000)</p>	<p>Environmental scanning – scanning provides managers with information about events and trends in their relevant environments, which facilitates opportunity recognition (Bluedorn <i>et al.</i>, 1994; Covin, 1991; Miller, 1983; Zahra, 1993)</p> <p>Opportunity identification – access to a network of buyers and suppliers, which enables an understanding of the entrepreneurial landscape and identification of resources and information (Lazear, 2005; Saxenian, 1994; Sorensen, 2007)</p> <p>Entrepreneurial orientation – a strategic orientation that describes a firm’s organizational autonomy, willingness to take risks, innovativeness and proactive assertiveness (Walter <i>et al.</i>, 2006)</p> <p>Locus of planning – use of integrative devices such as committees, task forces, and integrative personnel bring importance facts to bear upon decisions (Miller, 1983).</p> <p>Ensures active participation of mid-level managers in the process (Barringer and Bluedorn, 1999)</p> <p>Flexibility and tolerance of risk – ability to tolerate risk, ambiguity, uncertainty, and manage paradoxes and contradictions between strategic objectives (Giunipero <i>et al.</i>, 2005; Timmons, 1994)</p> <p>Network capabilities – abilities to initiate, maintain, and utilize relationships with various external partners (Walter <i>et al.</i>, 2006). Comprises coordination, relational skills, market knowledge, and internal communication (Walter <i>et al.</i>, 2006)</p> <p>Relational capability – capability to interact with other companies, based on absorption, combination, and coordination (Lorenzoni and Lipparini, 1999; Walter <i>et al.</i>, 2006)</p>
Integration and control	<p>Supplier integration – the ability to work with suppliers to integrate them into the product development and design, order management, and order fulfillment process, and to ensure timely communication of requirements and continuous improvement (Monczka <i>et al.</i>, 2001; Lawson <i>et al.</i>, 2006). Suppliers may become more involved in key processes such as inventory management, product design</p>	<i>(continued)</i>

Table I.
Aligning supply management and entrepreneurial capabilities

Table I.

Supply management capability	Entrepreneurial capabilities
<p>Cross-enterprise integration – the ability of the sourcing function to actively influence functional decision making, through close tracking of stakeholder requirements in product and process design and effective communication of this information to key suppliers to shape capabilities. CEI also includes the ability to bring new innovative ideas from suppliers and introduce them to key product platform design teams for consideration (Monczka <i>et al.</i>, 2000; Cousins <i>et al.</i>, 2006a, b)</p>	<p>Network competence – a firm's ability to develop and use inter-firm relationships, measured by task execution and qualifications (Ritter and Gemunden, 2003)</p> <p>Collectivism – the ability to perform well in groups (Reich, 1987), and subordinate individual interests to the goals of the group or team, with an emphasis on cooperation and harmony (Morris <i>et al.</i>, 1993)</p> <p>Operational integration – dense communications and administrative systems across the internal and external boundaries of the firm that drives decision making (Larson, 1992)</p> <p>Proactiveness – shaping the environment by introducing new products, technologies, and administrative techniques into the firm. Seizing new opportunities in the environment and taking preemptive action in response to perceived opportunity (Miller and Friesen, 1978; Lumpkin and Dess, 1996). As Lumpkin and Dess (1996) explain, a proactive firm seizes new opportunities through scanning the environment to seek opportunities (Venkatraman, 1989) and taking preemptive action in response to perceived opportunity (Sarkar <i>et al.</i>, 2001a)</p> <p>Entrepreneurial innovation – the degree of focus on exploiting opportunities for new ideas and processes. This is shown to have significant impacts on purchasing performance (Gonzalez-Padron <i>et al.</i>, 2008; Hult <i>et al.</i>, 2002, 2003)</p>

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- (3) cross-enterprise integration; and
 - (4) supply management influence.

Each of these elements is described below.

Supply market intelligence

The entrepreneurship research signals that entrepreneurs identify needs and opportunities, just as many supply managers are increasingly being asked to do. This attribute has been identified in a variety of works, and is referred to as either “environmental scanning”, “opportunity identification”, or “entrepreneurial orientation” (Table I). Similarly, supply managers must also be in a “scanning” mode to identify opportunities that may exist in supply markets and then bring them to the attention of internal decision-makers (Handfield, 2006). Prior research (Table I) establish that market intelligence is an important requirement for innovative supply chains that combine developments in information and related technologies to improve operational efficiency, enhance service effectiveness, reduce cost, and increase customer satisfaction (Gonzalez-Padron *et al.*, 2008; Hult and Swan, 2003). The supply management organization of the future must embrace these concepts to enhance performance with fewer resources and heightened expectations.

Supplier integration

This evolution of supply management relies on the fact that managers have the core skills, knowledge, capabilities, management authority, and systems required to not only identify opportunities, but also to act on them (Handfield, 2006). In this sense, these actions are similar to the entrepreneurial themes of network and relational capabilities, described in Table I. At the core of the supply management renaissance is the proposition that when firms invest in joint, relationship-specific assets, engage in knowledge exchange, and combine resources through governance mechanisms, a supernormal profit can be derived on the part of both exchange parties. A theoretical term for this benefit is “relational rent” (Dyer and Singh, 1998). Entrepreneurs are similarly able to manage networks and alliances, which comprise coordination, relational skills, market knowledge, and internal communication (Walter *et al.*, 2006). The relational view of the firm suggests that buying and supplying firms systematically share valuable know-how with each other and make relationship-specific investments in return for access to profit from rents generated through collaborative working arrangements. The vehicle for creating this form of value is through a process known as strategic sourcing (Handfield, 2006; Liker and Choi, 2004). Strategic sourcing involves the application of market intelligence to the creation of a supply market portfolio, and the execution of focused supply market strategies (e.g. leveraging, e-procurement, strategic alliances) based on opportunity and market characteristics.

Cross-enterprise integration

Once an opportunity is identified, supply managers need to nurture and manage the relationship between the firm and the supplier. This requires close coordination and integration at many levels. First, supply managers must establish stakeholder requirements in product and process design and effectively communicate this information to key suppliers in the form of specifications, statements of work, and customer requirements (Cousins *et al.*, 2006b). Second, the sourcing manager must be able

to bring new innovative ideas from suppliers and introduce them to key product platform design teams for consideration (Cousins *et al.*, 2006b; Hult *et al.*, 2002; Monczka *et al.*, 2000).

These capabilities have been identified in many forms in the entrepreneurial literature. The ability to bring external information into the firm was labelled proactiveness (shaping the environment by introducing new products, technologies, and administrative techniques into the firm). This approach involves seizing new opportunities in the environment and taking preemptive action in response to perceived opportunity (Lumpkin and Dess, 1996; Miller and Friesen, 1978). The second form of boundary spanning, involving taking stakeholder requirements to the supply market, is opportunity identification (dense communications and administrative systems across the boundaries of the firm that drives decision making (Larson, 1992). Gonzalez-Padron *et al.* (2008) also show that entrepreneurial innovation affects the quality of relationships among sourcing participants as well as cycle-time.

Supply management influence

The final characteristic of interest is the ability of the supply management function to be “taken seriously” within the firm. This is largely a function of their ability to build a solid business case around their approach, the ability to influence key decision makers, and the level of business acumen within the sourcing function (Giunipero *et al.*, 2004; Ward *et al.*, 2007). We find that this characteristic is of importance in the entrepreneurial literature as well. Moreover, entrepreneurial firms have a strong *locus* of planning, defined as the use of integrative devices such as committees, task forces, and integrative personnel to bring important facts to bear upon decisions (Miller and Friesen, 1983). This capability ensures the active participation of mid-level managers in the process (Barringer and Bluedorn, 1999). Second, the importance of influencing executive managers through greater flexibility and tolerance of risk is important. Supply managers must be able to manage paradoxes and contradictions between strategic objectives (Giunipero *et al.*, 2005; Timmons, 1994), yet effectively build a business case for change with senior executive leaders.

Using these key attributes of entrepreneurial behaviour, we next build a model which identifies the relationship among these parameters (Figure 1).

Application of the entrepreneurial model to supply management

Our application of entrepreneurial characteristics to the critical elements required for an effective strategic sourcing initiative is based on prior research in this area which reveals some very clear direct parallels in roles and responsibilities. We developed a survey to test an integrative model that combined these insights (Figure 1). These are represented in the following set of six hypotheses below, which are built on parallel relationships identified in both the entrepreneurship and supply management literature.

H1a, H1b – conditions to build

Prior researchers noted that a key attribute common to entrepreneurs is environmental scanning, which refers to the managerial activity of learning about events and trends in the organization’s environment (Hambrick, 1981). The philosophical roots of the scanning concept date back to the ancient Greeks, who believed that success in combat

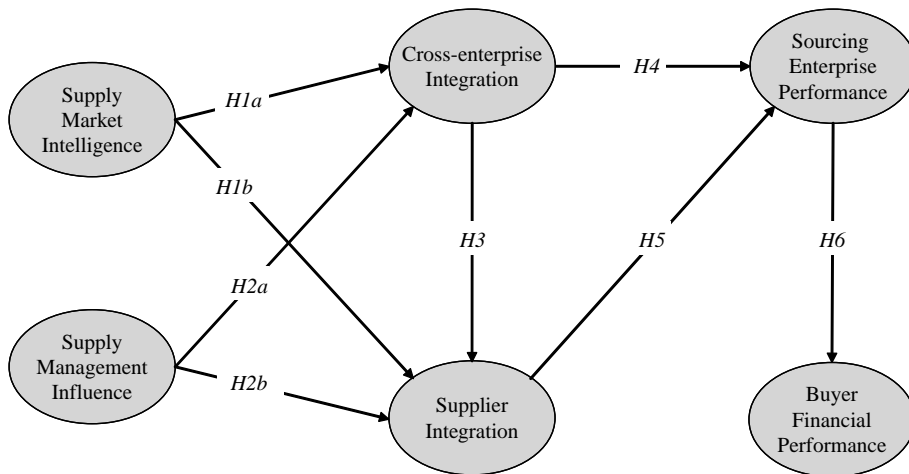


Figure 1.
Conceptual model and
hypotheses

was dependent upon adequate intelligence for the purpose of making good tactical and strategic decisions (Box, 1991). Scanning provides managers with information about events and trends in their relevant environments, which facilitates opportunity recognition (Bluedorn *et al.*, 1994). More recently, this has been identified as one of the elements required for network formation in entrepreneurial settings. Larson (1992) highlights the importance of reputation, trust, reciprocity, and mutual interdependence for network structures in entrepreneurial settings, and examines how control is exercised in these settings. Specifically, Larson identifies the pre-conditions for exchange, conditions to build, and integration and control mechanisms as a process for network formation. An entrepreneurial orientation also has been shown to allow supply chains to respond to market opportunities efficiently with flexibility and agility (Gonzalez-Padron *et al.*, 2008; Hult *et al.*, 2002, 2003).

We emphasize the latter two elements in our model shown in Figure 1. Conditions to build refer to the need for mutual economic advantage, a trial period, and the role of one firm as an initiator for the engagement (Larson, 1992). The engagement is further dependent on the prior set of “pre-conditions for exchange”, namely the rules and procedures, clear expectations, reciprocity, and trust.

Our model similarly anticipates the need for an entrepreneurial orientation in scanning the market for opportunities as a predecessor for mutual exchange (Miller and Friesen, 1983; Zahra, 1991) which fosters innovation, risk-taking, and proactive behaviour (Covin, 1991). A critical input into the seven-step strategic sourcing process is the development of critical insights into current supply market conditions, including pricing, capacity, emerging supplier capabilities, offshore suppliers, low-cost country sourcing conditions, socioeconomic impacts on market requirements, and mergers and acquisitions impacting supply market conditions (Handfield, 2006). The impact of major disruptions in supply has been found to lead to losses of up to 20 per cent in firm shareholder value (Hendricks and Singhal, 2003). The recent rise in commodity prices led firms to recognize the need for a scanning capability which allows supply managers to impact internal resource allocations, planning decisions, and new product

and process development strategic planning processes. The impact of supply market knowledge on internal strategic planning is expressed in the first hypothesis:

H1a. Supply market intelligence is associated with increased levels of cross-enterprise integration.

A second condition for network formation identified by Larson (1992) is the ability to facilitate and develop strong relationships with suppliers, to pursue sources of product design knowledge, cost savings opportunities, and regular communication. Such dialogues build trust and mutual expectations that form the foundation for further development of the relationship. The entrepreneurial orientation perspective also suggests that entrepreneurial innovation enables firms to predict what the market may become, and that this is often associated with a strong learning orientation where the firm is not likely to miss opportunities created by the market (Calantone *et al.*, 2002; Gonzalez-Padron *et al.*, 2008). This knowledge exchange, and investment in relationship-specific assets is argued to take place under conditions where the expected value of the combined inflows of knowledge and investment exceeds the expected loss/erosion of advantages due to knowledge spill-overs to competitors (Dyer and Singh, 1998; Osborn and Hagedoorn, 1997). As such, the tacit nature of tacit information from external sources, facilitated through identification of external resources via external market intelligence, forms the basis for our second hypothesis:

H1b. Supply market intelligence is associated with increased levels of supplier integration.

Supply management influence

The second set of hypotheses associated with our research relates to the need for integration and control (Larson, 1992), the final element in “closing the loop” in entrepreneurial alliances. Integration and control refers to:

- operational integration to enhance communication and connect the administrative apparatus of each firm;
- strategic interdependence and the ability to control and shape behaviour; and
- integration and control through social relations or social control.

In each case, integration is created through heightening the ability to influence outcomes through operational and social interaction. Influence also relates to the concept of *locus* of planning, which refers to the depth of employee involvement in a firm’s strategic planning activities. A deep *locus* of planning denotes a high level of employee involvement in the planning process, which is akin to the Japanese-style of team oriented planning (Reid, 1989).

The importance of supply management influence on strategic decisions thus mirrors much of the entrepreneurial literature, whereby the application of integrative devices such as committees, task forces, and integrative personnel brings importance facts about the supply base to bear upon decisions (Miller and Friesen, 1983). Moreover, a deep *locus* of supply planning legitimizes the active participation of middle and lower-level supply managers in the planning process (Barringer and Bluedorn, 1999). As a function, entrepreneurship may drive an increased market orientation, which promotes organizational learning and drives increased performance

(Hult *et al.*, 2003). This maximizes the diversity of viewpoints and provides a deeper and more diverse mix of views in the strategic planning process (Dutton and Duncan, 1987; Judge and Zietnam, 1992). A positive relationship was found to exist between a deep *locus* of planning and corporate entrepreneurship intensity (Barringer and Bluedorn, 1999), leading us to posit that the same impact would apply to supply market *locus* of planning and internal strategic planning processes (Giunipero *et al.*, 2005; Morris and Calantone, 1991):

H2a. Supply management influence is associated with increased levels of cross-enterprise Integration.

The entrepreneurial literature emphasizes how complex relational and learning processes that depend on external social networks are critical in acquiring specialized skills (Powell *et al.*, 1996; Sarkar *et al.*, 2001b). In a parallel manner, we extrapolate this relationship to posit that as supply management builds credibility as a value-added resource into the strategic planning process, they may gain greater credibility with external suppliers (Handfield *et al.*, 1999; Monczka *et al.*, 2000, 1998). These network capabilities rely on supply management's ability for coordination, relational skills, market knowledge, and internal communication (Walter *et al.*, 2006):

H2b. Supply management influence is associated with increased levels of supplier integration.

Cross-enterprise relationships drive cross-boundary integration

As noted earlier, proactiveness is one facet of the multidimensional concept of entrepreneurship (Covin and Slevin, 1989) that we have embodied in our conceptualization of cross-enterprise integration. The proactive approach is associated with shaping the environment by introducing new products, technologies, and administrative techniques into the firm (Miller and Friesen, 1978). As Lumpkin and Dess (1996) explain, a proactive firm seizes new opportunities and seeks to take preemptive action to exploit them (Venkatraman, 1989). To some extent, this occurs when boundary spanners offer transparency to decision makers, thereby influencing the entrepreneurial and learning actions within the supply chain (Ireland and Webb, 2007).

The decision-making process that exists within entrepreneurial firms is an important element that can be extended here to cover supply management situations (Morris and Calantone, 1991). Moreover, as Miller and Friesen (1982, p. 5) point out:

Given that the organization gathers the appropriate information about the environment and about organizational performance through its scanning and control systems, and given that this information is communicated to appropriate decision makers, it is still necessary for this information to be *used* and evaluated by executives charged with making key decision.

These early pioneers of entrepreneurship thinking pointed to the length or planning horizon of decisions (futuraity), as well as the consciousness of strategy and degree of conceptualization (Miles and Snow, 1978; Miller and Friesen, 1978; Mintzberg, 1973). The extent to which firms seize external opportunities and act on them is also a function of the extent to which key individuals from these sources are integrated into enterprise strategic planning decisions (Lumpkin and Dess, 1996; Miller and Friesen, 1978).

This situation can be extended to the product design process. While supply managers may play an important perceived role in product design teams, the net impact of whether these decisions are acted upon can only be measured when suppliers are actually brought to the table and participate in the team (Petersen *et al.*, 2005). In the words of one manager we interviewed, “our engineering team is not willing to listen to suppliers’ input, although we give them plenty of opportunities to do so”. For instance, engineers have been known to strongly resist any supplier participation on product development team meetings (Monczka *et al.*, 2000). In a similar manner, supply managers with a stronger perceived relationship with top management will also have the necessary business acumen to make a business case and argue for increased supplier participation in other processes, such as process design, procurement, production, and increased system integration (Handfield, 2006). Our model posits that firms with a stronger cross-enterprise relationship function will be more emboldened to approach suppliers and involve them in organizational design and production processes. This is conceptualized in the following hypothesis:

H3. Cross-enterprise integration is associated with increased levels of supplier integration.

Supply management impact

A wealth of research supports the proposition that entrepreneurial behaviours lead to improved firm performance (Hitt *et al.*, 2001) and supply management performance (Gonzalez-Padron *et al.*, 2008; Hult *et al.*, 2002, 2003). Moreover, a number of arguments support the idea that alliance-related proactive behaviour creates value for firms. A fundamental argument was presented by Porter (1976), who found that proactive network formation could advantage firms and enhance their performance by increasing entry barriers into their strategic groups, and thus reducing the level of competitive intensity that they are subject to in the subsequent time period. Even in the face of multiple sources of dynamism (technological, market and competitive) there is an increased pay-off for firms that can form links with partners that possess new and complementary competencies in the supply chain (Duncan, 1972; Hagedoorn, 1993; Singh, 1997).

These elements are operationalised via a multi-echelon impact in our research model. That is, supply management does not have a direct impact on enterprise sourcing performance. However, the primary impact occurs through three value-added streams:

- (1) direct cost savings attributable to reduced cost of goods sold and improved bottom-line shareholder impact (Monczka *et al.*, 1998);
- (2) increased supplier integration into new product/process/service development and associated market share improvements (Handfield *et al.*, 1999; Petersen *et al.*, 2005); and
- (3) protection of shareholder value through supply risk management and avoidance of shareholder value destruction (Hendricks and Singhal, 2003).

In this manner, we posit that supply management’s influence on internal planning processes, as well as integration of suppliers into team-based processes, can have a measurable impact on buyer performance improvements through reduced cycle time,

improved product design, and improved product quality. As suppliers are better identified through supply market intelligence, and over a two to three year period become more closely aligned with focal firm team processes through supplier relationship management liaisons (Handfield, 2006), we posit an associated improvement in outcomes. These concepts are reflected in the following hypotheses:

- H4.* Cross-enterprise integration is associated with increased levels of sourcing enterprise performance.
- H5.* Supplier integration is associated with increased levels of sourcing enterprise performance.

The final element in the model posits the net impact of improved supplier relationships. Moreover, above-normal returns are obtainable when firms can create or exploit imperfections in strategic factor markets (Barney, 1986). Early movers can preempt resource spaces of various types, including scarce supply capabilities and tacit knowledge on new product and service technologies (Lieberman and Montgomery, 1988). In this respect, innovative supply agreements such as those found in alliances can be effective in providing governance mechanisms that facilitate the transmittal and coordinate of tacit knowledge flows, which can be converted into a source of strategic advantage and relational rents, resulting in improved financial performance (Dyer and Singh, 1998; Madhok and Tallman, 1998). Key relationship performance indicators are thus posited to result in improved firm financial outcomes, in terms of creating shareholder wealth through improved market share, relational rents, profitability, and growth. This body of theory forms the basis for our final hypothesis:

- H6.* Sourcing enterprise performance is associated with increased levels of buyer financial performance.

Research design

Sample characteristics

The hypotheses were tested through a survey that collected information about a firm's strategic supply practices. A sample of 800 UK manufacturing firms was surveyed, which included firms from a database provided by The Chartered Institute of Purchasing & Supply. Each respondent in the sample was selected based on job function (purchasing manager or equivalent), plant size (at least 100 employees) and industry sector by SIC code. We received 172 responses, of which 21 were deemed not usable due to missing data. The effective response rate was thus 18.8 per cent (151/800). This response rate compares favourably with other similar studies in the area (Carr and Pearson, 2002; Ragatz *et al.*, 2002; Rosenzweig *et al.*, 2003).

The characteristics of the sample organizations are shown in Table II, including number of employees, business unit sales and industry sector. The response by position was managing director (3 per cent), vice president/director (13 per cent), purchasing manager (52 per cent), senior buyer (8 per cent), and junior manager (24 per cent). No significant mean differences were detected between either of these groups. The average length of tenure with the company was 10.16 years providing

Table II.
Profile of respondents

	N	Percentage
<i>Number of employees</i>		
Under 100	26	17.2
Over 100-500	42	27.8
Over 500-1,000	10	6.6
Over 1,000	61	40.4
No response	12	8.0
Total	151	100.0
<i>Business unit sales volume</i>		
Under £50 million	38	25.2
Over £50-100 million	22	14.6
Over £100-250 million	16	10.6
Over £250-500 million	15	9.9
Over £500 million-£1 billion	18	11.9
Over £1 billion	35	23.2
No response	7	4.6
Total	151	100.0
<i>Industry sector</i>		
Aerospace and defense	10	6.6
Automotive	10	6.6
Chemicals	6	4.0
Communications/high tech	15	9.9
Consumer goods	12	7.9
General manufacturing	33	21.9
Pharmaceutical	7	4.6
Other services	57	37.7
No response	1	0.7
Total	151	100.0

support that our informants were also knowledgeable about the issues under investigation.

Questionnaire administration

The survey and a letter explaining the purpose of the research was mailed to senior purchasing managers. Efforts were made to enhance the response rate by sending an e-mail containing the survey to managers two weeks after the initial mailing, and by offering respondents a composite summary of results (Forza, 2002). The survey was also pilot tested in two phases. The draft questionnaire was first sent to four academics, expert in the area, and four practitioners who were asked to comment on the content, clarity and scaling of the instruments. A small number of minor changes were made as a result of this feedback.

Executive interviews

In completing our research, we also conducted eight 30 minute phone interviews with supply management executives from a variety of different industries (oil and gas, electronics, medical devices, transportation and logistics, supply chain consulting, and others). These interviews explored many of the relationships posited in the survey, and elicited several important insights that were woven into the analysis and discussion later in the paper.

Non-response bias

Tests for non-response bias were carried out by comparing early respondents (responses received within the first two weeks) and later respondents (responses received within the third week or later) (Armstrong and Overton, 1977). A *t*-test of difference was conducted on firm size (employees and sales), and mean responses to each variable. No statistically significant differences were identified at $p < 0.05$.

Operationalisation of variables

The items used to measure the theoretical constructs were derived from an extensive review of the extant literature. Each item was measured using a seven-point Likert scale, with the use of practices anchored at “not at all” (= 1) and “a very great extent” (= 7). All items used in the questionnaire are reported in the Appendix.

Supply market intelligence used the scales developed by Carr and Smeltzer (2000) and Carr *et al.* (2000) to assess the ability of the function to: monitor changes in the supplier market; the depth of technical capabilities; and the ability to reduce total costs of business. Supply management influence was assessed using the scale of Carr and Smeltzer (2000) who assessed the extent of top management support, importance to strategy and importance in the eyes of top managers’.

Cross-enterprise integration was assessed using a three-item scale developed by Narasimhan and Das (2001), examining the extent to which the purchasing function integrated with other areas in the firm, including new product design, process improvement and strategy-making. Supplier integration was measured using a three-item scale modified from Narasimhan and Kim (2002). The items included the level of information exchange through IT, the level of supplier participation in product design, as well as procurement and production.

Performance outcomes were assessed as relationship improvement and financial performance. Sourcing enterprise performance was measured using a three-item scale, adapted from Kotabe *et al.* (2003), assessing the degree to which the relationship had, over the past two to three years, resulted in improved product design, product quality and reduced lead times for the buyer firm. Financial performance was assessed on the basis of return on investment, return on sales, and profit growth, as compared to major competitors (Carr and Pearson, 2002; Carr and Smeltzer, 2000).

Statistical analysis

Confirmatory factor analysis (CFA) and structural equation modeling were adopted to test our proposed theoretical framework. AMOS 6.0 was employed for this purpose (Arbuckle, 2005). We assessed model fit using four indices: the χ^2 test; the comparative fit index (CFI); the Tucker-Lewis index (TLI); and the root-mean-square error of approximation index (RMSEA). Discussion of these indices may be found in Gerbing and Anderson (1992), Hu and Bentler (1999), and Marsh *et al.* (1996). Satisfactory model fits are indicated by non-significant χ^2 tests, RMSEA values less than or equal to 0.08, and TLI and CFI values greater than or equal to 0.90.

The statistical analysis of the data was conducted along a number of stages in order to satisfy requirements for reliability, validity and unidimensionality. First, Harman’s one-factor test was used to test for potential common method bias (Podsakoff and Organ, 1986). A principal component factor analysis, with varimax rotation, yielded six factors with eigenvalues greater than 1.0, and accounted for 68 per cent of the variance.

The first factor explained 21 per cent of the variance, and there was no general factor in the unrotated factor structure, indicating that common methods bias may not be a serious problem in the data (Podsakoff and Organ, 1986).

The items were then validated via CFA. CFA provides a more stringent test of construct validity and unidimensionality using latent and manifest variables. Each construct was made scale-variant by fixing one of the loadings in each construct to a value of 1.0 (Jöreskog and Sörbom, 1993). Each indicator within the measurement model was then checked for low factor loadings (< 0.40), high residuals (i.e. normalized residuals > 2.58), and modification indices (> 3.84). Table III provides the loadings and error terms of the manifest variables onto each latent variable.

A number of procedures were followed to assess convergent validity (Bagozzi and Yi, 1988) and discriminant validity (Anderson and Gerbing, 1988; Fornell and Larcker, 1981). The convergent validity of the scales (extent to which the measurement items reflect a common underlying construct) was supported, with estimated coefficients of all indicators being significant ($t > 2.0$). The average variance extracted (AVE), which measures the variance captured by the indicators relative to measurement error, was also greater than the 0.50 minimum necessary to justify the use of a construct (Hair *et al.*, 1998). Composite reliability (CR) values were also calculated to provide a further assessment of internal consistency. A minimum value of 0.70 is recommended, as it indicates that around 0.50 of the item's variance (the squared loading) can be attributed to the construct of interest (Fornell and Larcker, 1981). The lowest CR was 0.77 for cross-enterprise integration, ranging to 0.90 for buyer financial performance.

Factors and items	Standardized loading	<i>t</i> -value
<i>Supply market intelligence</i>		
SMI1	0.78	–
SMI2	0.83	10.39
SMI3	0.87	10.67
<i>Supply management influence</i>		
SMG1	0.76	–
SMG2	0.87	10.98
SMG3	0.90	10.79
<i>Cross-enterprise integration</i>		
SPI1	0.81	–
SPI2	0.80	6.47
SPI3	0.56	6.43
<i>Supplier integration</i>		
SKI1	0.87	–
SKI2	0.72	8.45
SKI3	0.60	7.11
<i>Sourcing enterprise performance</i>		
BPI1	0.76	–
BPI2	0.89	8.34
BPI3	0.74	–
<i>Financial performance</i>		
FP1	0.93	–
FP2	0.88	14.22
FP3	0.77	11.66

Table III.
Assessment of reliability
and construct validity

All tests of discriminant validity were similarly supportive. That is, no confidence intervals of the correlations for the constructs (ϕ values) included 1.0 ($p < 0.05$) (Anderson and Gerbing, 1988), and the square of the intercorrelations between two constructs, ϕ^2 , was less than the AVE estimates of the two constructs. This was true for all pairs of constructs (Fornell and Larcker, 1981). The inter-item correlations, Cronbach's α , CR, and the values of AVE for the constructs operationalised in this study are shown in Table IV.

The overall fit of the CFA measurement model to the data were satisfactory: ($\chi^2(120) = 203.21, p = 0.00$; TLI = 0.93; CFI = 0.94; and RMSEA = 0.068). These criteria confirm that the constructs tested in our model satisfy the requirements of unidimensionality. Reliability was also assessed using Cronbach's α (Cronbach, 1951). All six constructs retained acceptable coefficient α s, with values ranging from 0.76 for cross-enterprise integration and supplier integration, through to 0.89 for buyer financial performance. Thus, the reliability of the research constructs can be established, and we now proceed to test the structural model.

Empirical testing of hypothesized structural model

The structural model tests the causal paths among the variables of interest. The structural model was tested with full information maximum likelihood estimation. The model (Figure 2) is recursive and hence identified (Bollen, 1989). The fit indices for the structural model indicate an acceptable fit to the data: ($\chi^2(126) = 206.63, p = 0.00$; TLI = 0.93; CFI = 0.94; RMSEA = 0.065).

Figure 2 shows the results of the eight hypothesised relationships, and shows that the constructs are related in the theoretically predicted manner. *H1* was supported with supply market intelligence significantly associated with both cross-enterprise integration ($\beta = 0.31, p < 0.001$) and supplier integration ($\beta = 0.32, p < 0.001$). Partial support was found for *H2* with supply management influence positively related to *H2* with supply management influence significantly related to cross-enterprise integration ($\beta = 0.43, p < 0.001$), but non-significant to was found to be positively related to supplier knowledge integration ($\beta = 0.06, n/s$). Cross-enterprise integration was significantly related to supplier integration ($\beta = 0.49, p < 0.001$), supporting *H3* providing support for *H3*. Cross-enterprise integration cross-enterprise integration

Variable ^{a,b}	1	2	3	4	5	6
1. Supply market intelligence	0.87					
2. Supply management influence	0.12	0.88				
3. Cross-enterprise integration	0.30	0.38	0.76			
4. Supplier integration	0.41	0.14	0.48	0.76		
5. Sourcing enterprise performance	0.30	0.13	0.42	0.51	0.84	
6. Buyer financial performance	0.16	0.08	0.19	0.13	0.20	0.89
Mean	4.86	5.00	3.89	4.36	4.52	4.53
SD	1.20	1.26	1.38	1.21	1.23	1.19
Composite reliability	0.87	0.88	0.77	0.78	0.84	0.90
Average variance extracted	0.69	0.71	0.54	0.55	0.64	0.74

Notes: ^aFor $N = 151, r$ has to be 0.162 or higher to be significant ($p < 0.05$); ^bCronbach's α shown on the diagonal

Table IV.
Correlation matrix and
descriptive statistics

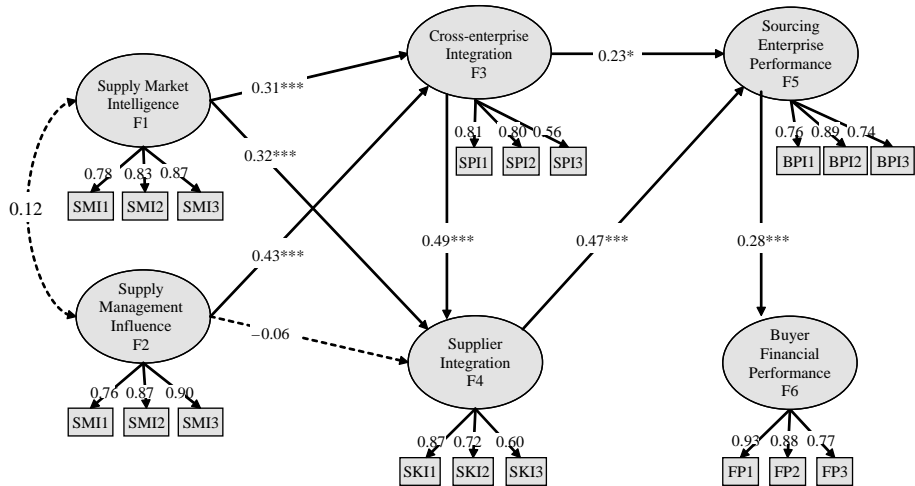


Figure 2.
Parameter estimates
for the structural model

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, all one-tailed tests. Error terms are omitted for clarity. Non-significant relationships shown as dotted line

($\beta = 0.23$, $p < 0.05$) and supplier integration ($\beta = 0.47$, $p < 0.001$) were both found to be positively associated with sourcing enterprise performance, providing support for *H4* and *H5*, respectively. Finally, sourcing enterprise performance was shown to be positively related to buyer financial performance ($\beta = 0.28$, $p < 0.001$), supporting *H6*.

We also carried out a test of convergent validity by correlating the sourcing enterprise performance construct with a self-reported objective scale of firm profit margins. The financial performance construct was correlated positively and significant with profit margin ($r = 0.44$, $p \leq 0.01$).

Discussion

The results of the hypotheses are next discussed and summarized in terms of key outcomes and impact on theory development. In particular, we emphasize the validity of applying entrepreneurial characteristics to the field of supply management, and identify opportunities for further research.

H1a, H1b – supply market intelligence

The results provide solid empirical support for the relationship between supply market intelligence (a key attribute of entrepreneurial orientation) and increased cross-enterprise relationship integration. In addition, *H1b* was also supported, identifying the role of supply market intelligence on the likelihood of supplier integration into team-based production and new product development processes. These results emphasize that the role of supply management is one that introduces and fosters innovative, risk-taking, and proactive behaviour (Covin, 1991; Kanter, 1988), which introduces new thinking into internal team-based processes. Entrepreneurial firms that can identify and exploit synergistic value-creating opportunities with supply partners may be advantaged over those who are either unable, or unwilling to do so (Dyer and Singh, 1998; McEvily and Zaheer, 1999; Sarkar *et al.*, 2001a).

Moreover, the integration of suppliers into teams to provide technical insights, supply market trends, and insights into pricing and capacity problems, can be translated into improved product and process development decisions (Handfield, 2006). The fact that both purchasing integration into teams, as well as supplier integration on teams, is facilitated based on the ability of purchasing to provide relevant supply market intelligence has also been noted in our interviews with executives. One executive we spoke with at a major catalyst manufacturer noted that:

Supply market intelligence will become the only form of strategic advantage in the future. We bring insights into the market place on supply market conditions that has won us [purchasing] the respect and trust of internal business functions such as operations, marketing, and finance.

H2a, H2b – supply management influence

Our second set of hypotheses examined the impact of the entrepreneurial behaviour of supply management influence, which was closely aligned to the entrepreneurial attributes of *locus* of planning and tolerance of risk. This construct was operationalised as the relative status of supply management in the organization. Our results found that supply management's influence was a good predictor of the extent to which they had "a seat at the table" with other business function planning activities. However, this element was not an effective predictor of the ability of suppliers to be fully integrated into firm decision-making processes.

The first result suggests that the entrepreneurial facet of entrepreneurship (Covin and Slevin, 1989) is an important foundation for building an effective supply management capability. According to Miller and Friesen (1983), firm proactiveness depends on the response to the question, "does it shape the environment by introducing new products, technologies, administrative techniques, or does it merely react?" This approach considers the possibility that supply management must shape their environment through their own entrepreneurial actions, and must achieve this through a process of fostering a culture of relationship building with senior management. Supply management has historically been in a position of acting as a service function, and was viewed primarily as a tactical function (Chen *et al.*, 2004). Changing this perception requires a strong supply management leader who is able to overcome resistance to change and to introduce a bold innovation into the firm's strategic planning processes (Rogers and Schoemaker, 1971). It will also require someone who is patient and willing to develop a strong relationship with key business unit and functional leaders. As one senior executive we interviewed noted:

I always approach a business unit president or the head of a function such as HR by first introducing myself, and asking them how I can help them. I then spend a lot of time visiting with them, and learning about what it is they buy, how they buy it, and from whom. Then I provide some suggestions as to how I can help them save money or improve their supplier's performance through development of a category strategy. But I never try to strong-arm them into doing anything – instead, I ask if they will let me work on a small pilot project to demonstrate the capabilities of our supply management team. Once they see what we can do for them, then we are asked back in again and again.

In this manner, supply management builds credibility with the organization, which leads to eventual acceptance of supply managers on teams and business unit planning processes.

H3 – cross-enterprise integration and supplier integration

Cross-enterprise integration was assessed in terms of purchasing representation on product and process design team meetings, as well as accountability for strategic results. These factors had a significant impact on the extent to which firms' integrated external suppliers via team processes and information systems linkages. This result also aligns with the prior result – that is, supply management status helps to get the team a “seat at the table”, but further work has to be done before supplier inputs can be truly integrated into functional decision making. Supply management influence legitimizes the active participation of supply managers in the planning process, and helps to prevent the potential for good ideas to be left undiscovered simply because they were not involved in the planning process. This level of participation develops a base upon which supply management can also bring suppliers to the table. In so doing, the entrepreneurial process is further escalated by maximizing the diversity of viewpoints (including external viewpoints provided by suppliers), and minimizes homogeneity of management teams (Lant *et al.*, 1992). This latter issue can constrain entrepreneurial activity, as found by studies that identified a negative relationship between top management team homogeneity and an openness to innovation and change (Bantel and Jackson, 1989; Judge and Zietnam, 1992). Instead, a deeper and more diverse mix of team players that includes external suppliers can increase the possibility of new product development and process innovations that lead to success (Handfield *et al.*, 1999; Petersen *et al.*, 2005).

As one manager from a financial services firm noted:

I welcome supply management's input. In fact, I would like to have a supply physically located in my facility, so that I could talk to him every day if I wanted to. This person must have to have enough connections with the supply community to broker the other people from the right sources. I don't necessarily need someone to manage the relationships – but I need this person to help me run my business!

H4, H5, H6 – impact on sourcing enterprise performance and financial performance

Both elements of entrepreneurial behaviour mentioned previously (cross-enterprise integration and supplier integration) had an impact on both enterprise sourcing performance and financial performance. In capability-based competition, where key strategic assets are trans-organizational, enterprising firms that are able to design alliance networks with key factors of supply are likely to be advantaged, as such alliances tend to be difficult to duplicate and can lead to sustainable, above-average market performance (Dyer and Singh, 1998). Effective integration of supplier concepts can also facilitate the development of skills and knowledge, increased partnering options, and cumulative learning that creates additional value (Anand and Khanna, 2000; Sarkar *et al.*, 2001b). Value is created through the learning of new skills and leveraging the complementary resources of supplier partners (Hitt *et al.*, 2000; Kogut, 1988). Tangible buyer performance metrics including reduced lead time, improved product designs, and improved product quality create competitive factors which in turn translate into above-normal market returns and shareholder value. This result supports prior research linking entrepreneurial orientation and learning to improved supply management performance in terms of relationships, cycle time, and quality (Gonzalez-Padron *et al.*, 2008; Hult *et al.*, 2002, 2003). Companies that understand this relationship have developed truly world-class supply management capabilities, and

have adopted high levels of supplier integration. Not surprisingly, these firms (including Toyota, Cisco, Samsung, and others) have shown dramatic financial performance improvements over their competitors.

Managerial implications

Several managerial implications also stem from our results. First, firms who are seeking to build improved collaboration with suppliers must recruit and train managers who have a strong orientation towards building strong internal relationships with stakeholders, who bring credibility in the form of hiring individuals with strong supply market knowledge and networks, who can “sell” business units on these capabilities, and provide consultative support to business unit and functional teams in the form of supply market intelligence, contracting and negotiation skills, and category management strategy (Giunipero *et al.*, 2005; Handfield, 2006; Hult *et al.*, 2003). The importance of team-building skills, leadership skills, and relationship management skills has been echoed in other research (Giunipero *et al.*, 2006), and provides a strong basis for future research in this nascent field of inquiry.

Second, the implications of this research suggest that supply management organizations must begin to act in a more entrepreneurial fashion. Some of the managers also agreed, noting that in some cases they are allowing their category managers to have free-rein in making independent sourcing strategies, pursuing innovative and new supplier relationships, and being more accountable for results than for process. Changing an organizational culture to allow category teams to act in a more entrepreneurial fashion is certainly a new idea that will require additional support and research before it becomes established as a best practice for the future.

Limitations and future research

There are several limitations to our findings. First, we recognize that the causal chain from entrepreneurial behaviour to firm performance needs further investigation. Further research should address indirect effects through mediating variables such as supplier performance, technological complexity, team-based processes, and industry impacts. These parameters may vary and influence the results, since the research on supplier integration and supply management planning integration is nascent. Other global variables that have been found to be relevant in the entrepreneurial literature may also influence the research, such as firm size, firm structure, and management orientation.

Conclusion

The application of entrepreneurial concepts as a lens to study supply management is in a nascent stage, yet our results complement many other recent studies, and lend credibility to this theoretical orientation. Moreover, the results provide a strong basis for the contention that entrepreneurial behaviour is an important attribute for firms to seek in building a supply management leadership team.

References

- Anand, B.N. and Khanna, T. (2000), “Do firms learn to create value? The case of alliances”, *Strategic Management Journal*, Vol. 21, pp. 295-315.
- Anderson, J.C. and Gerbing, D.W. (1988), “Structural equation modeling in practice: a review and recommended two-step approach”, *Psychological Bulletin*, Vol. 103, pp. 411-23.

- Ansoff, I. (1965), "The firm of the future", *Harvard Business Review*, September/October, pp. 162-78.
- Arbuckle, J.L. (2005), *Amos™ 6.0 User's Guide*, Amos Development Corporation, Mount Pleasant, SC.
- Arend, R.J. and Wisner, J.D. (2005), "Small business and supply chain management: is there a fit?", *Journal of Business Venturing*, Vol. 20 No. 3, pp. 403-36.
- Armstrong, S.J. and Overton, T.S. (1977), "Estimating non-response bias in mail surveys", *Journal of Marketing Research*, Vol. 14, pp. 396-402.
- Bagozzi, R. and Yi, Y. (1988), "On the evaluation of structural equation models", *Journal of the Academy of Marketing Science*, Vol. 16, pp. 74-94.
- Bantel, K. and Jackson, S. (1989), "Top management and innovations in banking: does the composition of the team make a difference?", *Strategic Management Journal*, Vol. 10, pp. 107-24.
- Barney, J.B. (1986), "Strategic factor markets: expectations, luck, and business strategy", *Management Science*, Vol. 32 No. 10, pp. 1231-41.
- Barringer, B.R. and Bluedorn, A.C. (1999), "The relationship between corporate entrepreneurship and strategic management", *Strategic Management Journal*, Vol. 20 No. 5, p. 421.
- Bluedorn, A.C., Johnson, R.A., Cartwright, D.C. and Barringer, B.R. (1994), "The interface and convergence of the strategic management and organizational environment domains", *Journal of Management*, Vol. 20, pp. 201-62.
- Bollen, K. (1989), *Structural Equations with Latent Variables*, Wiley, New York, NY.
- Box, T. (1991), "Performance predictors for entrepreneurial manufacturing", unpublished doctoral dissertation, Oklahoma State University, Okmulgee, OK.
- Calantone, R.J., Cavusgil, S.T. and Yushman, Z. (2002), "Learning orientation, firm innovation capability, and firm performance", *Industrial Marketing Management*, Vol. 31 No. 6, pp. 515-24.
- Carr, A.S. and Pearson, J.N. (2002), "The impact of purchasing and supplier involvement on strategic purchasing and its impact on firm's performance", *International Journal of Operations & Production Management*, Vol. 22 No. 9, pp. 1032-53.
- Carr, A.S. and Smeltzer, L.R. (2000), "An empirical study of the relationships among purchasing skills and strategic purchasing, financial performance, and supplier responsiveness", *Journal of Supply Chain Management*, Vol. 36 No. 3, pp. 40-54.
- Carr, A.S., Leong, G.K. and Sheu, C. (2000), "A study of purchasing practices in Taiwan", *International Journal of Production and Operations Management*, Vol. 20 No. 12, pp. 1427-46.
- Chen, I.J., Paulraj, A. and Lado, A.A. (2004), "Strategic purchasing, supply management, and firm performance", *Journal of Operations Management*, Vol. 22 No. 5, pp. 505-23.
- Child, J. (1972), "Organizational structure, environment and performance: the role of strategic choice", *Sociology*, Vol. 6 No. 1, pp. 1-22.
- Cousins, P., Lawson, B. and Squire, B. (2006a), "An empirical taxonomy of purchasing functions", *International Journal of Operations & Production Management*, Vol. 26 No. 7, pp. 775-94.
- Cousins, P.D., Lawson, B., Petersen, K.J. and Handfield, R.B. (2006b), "Creating supply chain relational capital: the impact of formal and informal socialization processes", *Journal of Operations Management*, Vol. 24 No. 6, pp. 851-63.

-
- Cousins, P.D., Lamming, R.C., Lawson, B. and Squire, B. (2008), *Strategic Supply Management: Principles, Theories and Practice*, Pearson Education, London.
- Covin, J.G. (1991), "Entrepreneurial versus conservative firms: a comparison of strategies and performance", *Journal of Management Studies*, Vol. 28 No. 5, pp. 439-63.
- Covin, J.G. and Slevin, D.P. (1988), "The influence of organization structure on the utility of an entrepreneurial top management style", *Journal of Management Studies*, Vol. 25 No. 3, pp. 217-34.
- Covin, J.F. and Slevin, D.P. (1989), "Strategic management of small firms in hostile and benign environments", *Strategic Management Journal*, Vol. 10 No. 1, pp. 75-87.
- Cronbach, L. (1951), "Coefficient alpha and the internal structure of tests", *Psychometrika*, Vol. 16, pp. 297-334.
- Cyert, R. and March, J. (1963), *A Behavioral Theory of the Firm*, Prentice-Hall, Englewood Cliffs, NJ.
- Das, A. and Handfield, R.B. (1997), "A meta-analysis of doctoral dissertations in purchasing", *Journal of Operations Management*, Vol. 15 No. 2, p. 101.
- Duncan, R. (1972), "Characteristics of organizational environments and perceived environmental uncertainty", *Administrative Science Quarterly*, Vol. 29, pp. 52-73.
- Dutton, J.E. and Duncan, R.B. (1987), "The influence of the strategic planning process on strategic change", *Strategic Management Journal*, Vol. 8 No. 2, pp. 103-16.
- Dyer, J.H. and Chu, W. (2000), "The determinants of trust in supplier-automaker relationships in the U.S., Japan, and Korea", *Journal of International Business Studies*, Vol. 31 No. 2, pp. 259-85.
- Dyer, J. and Singh, H. (1998), "The relational view: cooperative strategy and sources of interorganizational competitive advantage", *Academy of Management. The Academy of Management Review*, Vol. 23 No. 4, p. 660.
- Fornell, C. and Larcker, D.F. (1981), "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research*, Vol. 18 No. 1, pp. 39-50.
- Forza, C. (2002), "Survey research in operations management: a process-based perspective", *International Journal of Operations & Production Management*, Vol. 22 No. 2, pp. 152-94.
- Gerbing, D.W. and Anderson, J.C. (1992), "Monte Carlo evaluations of goodness of fit indices for structural equation models", *Sociological Methods & Research*, Vol. 21, pp. 132-60.
- Giunipero, L.C., Denslow, D. and Eltantawy, R. (2005), "Purchasing/supply chain management flexibility: moving to an entrepreneurial skill set", *Industrial Marketing Management*, Vol. 34 No. 6, pp. 602-13.
- Giunipero, L.C., Handfield, R. and Cousins, P. (2004), *Purchasing Education & Training Part II*, CAPS Research, Tempe, AZ.
- Giunipero, L.C., Handfield, R.B. and Eltantawy, R. (2006), "Supply management's evolution: key skill sets for the supply manager of the future", *International Journal of Operations & Production Management*, Vol. 26 No. 7, pp. 822-44.
- Giunipero, L.C., Handfield, R. and Johansen, D. (2008), "Beyond buying: supply-chain managers used to have one main job: purchasing stuff cheaply. They need a whole new skill set now", *Wall Street Journal*, 10 March, p. R8.
- Gonzalez-Padron, T., Hult, G. and Calantone, R. (2008), "Exploiting innovative opportunities in global purchasing: an assessment of ethical climate and relationship performance", *Industrial Marketing Management*, Vol. 37 No. 1, pp. 69-82.

- Hagedoorn, J. (1993), "Understanding the rationale of strategic technology partnering: interorganizational modes of cooperation and sectoral differences", *Strategic Management Journal*, Vol. 14, pp. 371-85.
- Hair, J.F., Anderson, R.E., Tatham, R.L. and Black, W.C. (1998), *Multivariate Data Analysis*, 5th ed., Prentice-Hall, Englewood Cliffs, NJ.
- Hambrick, D. (1981), "Specialization of environmental scanning activities among upper level executives", *Journal of Management Studies*, Vol. 18 No. 3, pp. 293-320.
- Handfield, R. (2006), *Supply Market Intelligence: A Handbook for Managers*, Auerbach Publications, New York, NY.
- Handfield, R., Ragatz, G., Petersen, K. and Monczka, R. (1999), "Involving suppliers in new product development", *California Management Review*, Vol. 42 No. 1, pp. 59-82.
- Hendricks, K.B. and Singhal, V.R. (2003), "The effect of supply chain glitches on shareholder wealth", *Journal of Operations Management*, Vol. 21, pp. 501-22.
- Hitt, M.A., Ireland, R.D., Camp, S.M. and Sexton, D.L. (2001), "Guest editors' introduction to the special issue – strategic entrepreneurship: entrepreneurial strategies for wealth creation", *Strategic Management Journal*, Vol. 22 Nos 6/7, pp. 479-91.
- Hitt, M.A., Dacin, M.T., Levitas, E., Arregle, J-L. and Borza, A. (2000), "Partner selection in emerging and developed market contexts: resource-based and organizational learning perspectives", *Academy of Management Journal*, Vol. 43 No. 3, pp. 449-67.
- Hu, L. and Bentler, P. (1999), "Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives", *Structural Equation Modeling Journal*, Vol. 66 No. 1, pp. 1-55.
- Hult, G. and Swan, K. (2003), "A research agenda for the nexus of product development and supply chain management processes", *Journal of Product Innovation Management*, Vol. 20, pp. 333-6.
- Hult, G.T.M., Ketchen, D.J. Jr and Nichols, E.L. Jr (2002), "An examination of cultural competitiveness and order fulfillment cycle time within supply chains", *Academy of Management Journal*, Vol. 45 No. 3, pp. 577-86.
- Hult, G.T.M., Snow, C.C. and Kandemir, D. (2003), "The role of entrepreneurship in building cultural competitiveness in different organizational types", *Journal Of Management*, Vol. 29 No. 3, pp. 401-26.
- Ireland, R.D. and Webb, J.W. (2007), "A multi-theoretic perspective on trust and power in strategic supply chains", *Journal of Operations Management*, Vol. 25 No. 2, pp. 482-97.
- Jöreskog, K.G. and Sörbom, D. (1993), *LISREL 8: Analysis of Linear Structural Relationships by Maximum Likelihood, Instrument Variables and Least Squares Methods*, 8th ed., Scientific Software, Morrisville, IN.
- Judge, W.Q. and Ziethaml, C.P. (1992), "Institutional and strategic choice perspective on board involvement in the strategic decision process", *Academy of Management Journal*, Vol. 35, pp. 766-94.
- Kanter, R. (1988), *The New Alliances: How Strategic Partnerships are Reshaping American Business*, Press of America, New York, NY.
- Kogut, B. (1988), "Joint ventures: theoretical and empirical perspectives", *Strategic Management Journal*, Vol. 9, pp. 319-32.
- Kotabe, M., Martin, X. and Domoto, H. (2003), "Gaining from vertical partnerships: knowledge transfer, relationship duration, and supplier performance improvement in the US and Japanese automotive industries", *Strategic Management Journal*, Vol. 24 No. 4, pp. 293-316.

-
- Krause, D., Handfield, R. and Scannell, T. (1998), "An empirical investigation of supplier development: reactive and strategic processes", *Journal of Operations Management*, Vol. 17, pp. 39-58.
- Kumar, S. and Seth, A. (1998), "The design of coordination and control mechanisms for managing joint venture-parent relationships", *Strategic Management Journal*, Vol. 19 No. 6, pp. 579-99.
- Lant, T.K., Milliken, F.J. and Batra, B. (1992), "The role of managerial learning and interpretation in strategic persistence and reorientation: an empirical exploration", *Strategic Management Journal*, Vol. 13, pp. 585-608.
- Larson, A. (1992), "Network dyads in entrepreneurial settings: a study of the governance of exchange relationships", *Administrative Science Quarterly*, Vol. 37 No. 1, pp. 76-104.
- Lawrence, P.R. and Lorsch, J. (1967), *Organization and Environment*, Harvard University Press, Boston, MA.
- Lazar, E. (2005), "Entrepreneurship", *Journal of Labor Economics*, Vol. 23 No. 4.
- Lieberman, M.B. and Montgomery, D.B. (1988), "First-mover advantages", *Strategic Management Journal*, Vol. 9, pp. 41-58, Special Issue: Strategy Content Research.
- Liker, J. and Choi, T. (2004), "Building deep supplier relationships", *Harvard Business Review*, 1 December, pp. 104-13.
- Lorenzoni, G. and Lipparini, A. (1999), "The leveraging of interfirm relationships as a distinctive organizational capability: a longitudinal study", *Strategic Management Journal*, Vol. 20 No. 4, pp. 317-38.
- Lumpkin, G.T. and Dess, G.G. (1996), "Clarifying the entrepreneurial orientation construct and linking it to performance", *Academy of Management Review*, Vol. 21 No. 1, pp. 135-72.
- McEvily, B. and Zaheer, A. (1999), "Bridging ties: a source of firm heterogeneity in competitive capabilities", *Strategic Management Journal*, Vol. 20, pp. 1133-56.
- Madhok, A. and Tallman, S. (1998), "Resources, transactions and rents: managing value through interfirm collaborative relationships", *Organization Science*, Vol. 9 No. 3, pp. 326-39.
- Marsh, H., Balla, J. and Hau, K.T. (1996), "An evaluation of incremental fit indices: a clarification of mathematical and empirical properties", in Marcoulides, G. and Schumacker, R. (Eds), *Advanced Structural Equation Modelling: Issues and Techniques*, Lawrence Erlbaum Associates, Mahwah, NJ, pp. 315-45.
- Miles, R. and Snow, C. (1978), *Organizational Strategy, Structure, and Process*, McGraw-Hill, New York, NY.
- Miller, D. (1983), "The correlates of entrepreneurship in three types of firms", *Management Science*, Vol. 29 No. 7, pp. 770-92.
- Miller, D. and Friesen, P.H. (1978), "Archetypes of strategy formulation", *Management Science*, Vol. 24 No. 9, pp. 921-33.
- Miller, D. and Friesen, P.H. (1982), "Innovation in conservative and entrepreneurial firms: two models of strategic momentum", *Strategic Management Journal*, Vol. 3 No. 1, pp. 1-25.
- Miller, D. and Friesen, P.H. (1983), "Strategy-making and environment: the third link", *Strategic Management Journal*, Vol. 4 No. 3, pp. 221-35.
- Mintzberg, H. (1973), "Strategy-making in three modes", *California Management Review*, Vol. 16 No. 2, pp. 44-53.
- Mintzberg, H. (1978), "Patterns in strategy formation", *Management Science*, Vol. 24, pp. 934-48.
- Monczka, R., Trent, R., Handfield, R. (2001), *Purchasing and Supply Management*, 2nd ed., South-Western.

- Monczka, R.M., Petersen, K., Handfield, R. and Ragatz, G. (1998), "Success factors in strategic supplier alliances: the buying company perspective", *Decision Sciences Journal*, Vol. 29 No. 3, pp. 553-77.
- Monczka, R.M., Handfield, R., Frayer, D., Ragatz, G. and Scannell, T. (2000), *New Product Development: Supplier Integration Strategies for Success*, ASQ Press, Milwaukee, WI.
- Monczka, R.M., Trent, R.J. and Petersen, K.J. (2008), "Getting on track to better: global sourcing", *Supply Chain Management Review*, Vol. 12 No. 2, pp. 46-53.
- Morris, M.H. and Calantone, R.J. (1991), "Redefining the purchasing function: an entrepreneurial perspective", *International Journal of Purchasing & Materials Management*, Vol. 27 No. 4, pp. 2-9.
- Morris, M.H., Avila, R. and Allen, J. (1993), "Individualism and the modern corporation: implications for innovation and entrepreneurship", *Journal of Management*, Vol. 19 No. 3, pp. 595-612.
- Narasimhan, R. and Das, A. (2001), "The impact of purchasing integration and practices on manufacturing performance", *Journal of Operations Management*, Vol. 19 No. 5, pp. 593-609.
- Narasimhan, R. and Kim, S.W. (2002), "Effect of supply chain integration on the relationship between diversification and performance: evidence from Japanese and Korean firms", *Journal of Operations Management*, Vol. 20 No. 3, pp. 303-23.
- Osborn, R.N. and Hagedoorn, J. (1997), "The institutionalization and evolutionary dynamics of interorganizational alliances and networks", *Academy of Management Journal*, Vol. 40 No. 2, p. 261.
- Petersen, K., Handfield, R. and Ragatz, G. (2005), "Supplier integration into new product development: coordinating product, process, and supply chain design", *Journal of Operations Management*, Vol. 23 No. 4, pp. 371-88.
- Podsakoff, P.M. and Organ, D.W. (1986), "Self-reports in organizational research: problems and prospects", *Journal of Management*, Vol. 12 No. 4, pp. 531-44.
- Porter, M.E. (1976), *Interbrand Choice, Strategy, and Bilateral Market Power*, Harvard University Press, Cambridge, MA.
- Powell, W., Koput, K. and Smith-Doerr, L. (1996), "Interorganizational collaboration and the locus of innovation: networks of learning in biotechnology", *Administrative Science Quarterly*, Vol. 41, pp. 116-45.
- Ragatz, G.L., Handfield, R.B. and Petersen, K.J. (2002), "Benefits associated with supplier integration into new product development under conditions of technology uncertainty", *Journal of Business Research*, Vol. 55 No. 5, pp. 389-400.
- Reich, R.B. (1987), *Harvard Business Review*, May/June, Vol. 65 No. 3, pp. 77-83, 7p.
- Reid, D. (1989), "Operationalizing strategic planning", *Strategic Management Journal*, Vol. 10 No. 6, pp. 553-67.
- Ritter, T. and Gemunden, H. (2003), "Interorganizational relationships and networks: an overview", *Journal of Business Research*, Vol. 56 No. 9, pp. 691-7.
- Rogers, E.M. and Schoemaker, F.F. (1971), *Communication of Innovations: A Cultural Approach*, The Free Press, New York, NY.
- Rosenzweig, E.D., Roth, A.V. and Dean, J.W. Jr (2003), "The influence of an integration strategy on competitive capabilities and business performance: an exploratory study of consumer products manufacturers", *Journal of Operations Management*, Vol. 21 No. 4, pp. 437-56.
- Sarkar, M.B., Echambadi, R. and Harrison, J.S. (2001a), "Alliance entrepreneurship and firm market performance", *Strategic Management Journal*, Vol. 22, pp. 701-11.

-
- Sarkar, M.B., Echambadi, R., Cavusgil, T.S. and Aulakh, P.S. (2001b), "The influence of complementarity, compatibility, and relationship capital on alliance performance", *Academy of Marketing Science*, Vol. 29 No. 4, pp. 358-73.
- Saxenian, A. (1994), *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*, Harvard University Press, Cambridge, MA.
- Schumpeter, J. (1934), *The Theory of Economic Development*, Harvard University Press, Cambridge, MA.
- Singh, K. (1997), "The impact of technological complexity and interfirm cooperation on business survival", *Academy of Management Journal*, Vol. 40 No. 2, pp. 339-67.
- Sorensen, J.B. (2007), "Bureaucracy and entrepreneurship: workplace effects on entrepreneurial entry", *Administrative Science Quarterly*, Vol. 52 No. 3, pp. 387-412.
- Thompson, J.D. (1967), *Organizations in Action*, McGraw-Hill, New York, NY.
- Thompson, V. (1969), *Bureaucracy and Innovation*, University of Alabama Press, Tuscaloosa, AL.
- Timmons, J.A. (1994), *New Venture Creation: Entrepreneurship for the 21st Century*, 4th ed., Irwin Press, Homewood, IL.
- Venkatraman, N. (1989), "The concept of fit in strategy research: toward verbal and statistical correspondence", *Academy of Management Review*, Vol. 14 No. 3, pp. 423-44.
- Walter, A., Auer, M. and Ritter, T. (2006), "The impact of network capabilities and entrepreneurial orientation on university spin-off performance", *Journal of Business Venturing*, Vol. 21 No. 4, pp. 541-67.
- Ward, N., Handfield, R. and Cousins, P. (2007), "Stepping up on SRM", *CPO Agenda*, Summer, pp. 42-7.
- Zahra, S.A. (1991), "Predictors and financial outcomes of corporate entrepreneurship", *Journal of Business Venturing*, Vol. 8, pp. 319-40.
- Zahra, S. (1993), "Environment, corporate entrepreneurship, and financial performance: a taxonomic approach", *Journal of Business Venturing*, Vol. 8, pp. 319-40.

Appendix. Items and constructs

Supply market intelligence ($\alpha = 0.87$)

- SMI1 – Purchasing professionals have the necessary skills to monitor and interpret changes in the supplier market/product base.
- SMI2 – Purchasing professionals have the technical capabilities to help our suppliers improve their processes and products.
- SMI3 – Purchasing professionals have the necessary skills to improve the firm's total cost of doing business with the firm's suppliers.

Supply management influence ($\alpha = 0.88$)

- SMG1 – Top management is supportive of our efforts to improve the purchasing department.
- SMG2 – In this company, purchasing is considered a vital part of our company strategy.
- SMG3 – Purchasing's views are considered important in most top managers' eyes.

Cross-enterprise integration ($\alpha = 0.76$)

- SPI1 – Purchasing is measured on strategic contributions to the company (e.g. new products/technologies), versus cost and efficiency contributions.
- SPI2 – Purchasing participates in new product design.
- SPI3 – Purchasing participates in process design and improvement.

Supplier integration ($\alpha = 0.76$)

- SKI1 – The participation level of suppliers in the process of procurement and production.
- SKI2 – The participation level of suppliers in the design stage.
- SKI3 – Information exchange with suppliers occurs through information technology.

Sourcing enterprise performance ($\alpha = 0.84$)

- BPI1 – In the last 2-3 years, we have continued to be able to reduce lead time through our supplier relationship.
- BPI2 – In the last 2-3 years, we have continued to be able to improve product design through our supplier relationship.
- BPI3 – In the last 2-3 years, we have continued to be able to improve product quality through our supplier relationships.

Financial performance ($\alpha = 0.89$)

- FP1 – Return on investment.
- FP2 – Return on sales.
- FP3 – Profit growth.

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