

Entrepreneurial SCM competence and performance of manufacturing SMEs

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This study reviewed the literature and interviewed managers to discover the dimensions of a new construct called the *entrepreneurial supply chain management competence* of small and medium-sized enterprises. We measured entrepreneurial SCM competence in terms of five first-order constructs: innovation orientation, proactiveness orientation, risk-taking characteristics, relational capital, and coordination capability. We further proposed that this competence affects SMEs' performance directly and indirectly via the firm's SCM strategies. A set of survey data collected from automotive OEM suppliers in five ASEAN countries was used to test the research model. Results show that the five constructs are important dimensions of entrepreneurial SCM competence, and that they affect performance indirectly. Our findings provide valuable insights about the enablers of an SME's SCM practices and their effects on firm performance.

Keywords: entrepreneurship; supply chain management; competence; performance

1. Introduction

In this immensely competitive global environment, many firms resort to supply chain management (SCM) as a core strategic competence to gain competitive edge. The philosophy behind SCM stresses the seamless integration of value-creating activities across organisational boundaries to bring products and services to market. Although SCM exists in many different forms, depending on the levels of integration, individual performance, and industries, its key objective invariably is to create an inter-organisational, boundary-spanning strategy that enables both buyers and suppliers to integrate their activities to eliminate waste.

Despite the positive influences of SCM on firm performance though, research has shown that organisations that participate in the supply chain in the same market segment can experience dramatically different performance levels (Hsu *et al.* 2009). Unfortunately, there is a lack of research to explore the linkage between SCM competence and performance, especially among small and medium-sized enterprises (SMEs). Hence, the fundamental question pertains to the intangible resources that firms can employ to engage

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successfully in a supply chain. This question has motivated many influential theories on the genesis of SCM behaviour, including the resource-based view, transaction cost economics, and social exchange theory.

These theories focus primarily on large manufacturing firms; no theory pertains to the SCM behaviour of SMEs. This trend is understandable, because for much of the twentieth century, large manufacturing firms occupied the dominant share of the world economy. However, by the early 1990s, SMEs accounted for more than half of the domestic economic activity in most developed nations. For example, in the US manufacturing sector in 2000, SMEs accounted for 98% of all manufacturers and employed two-thirds of the workforce. The share of manufacturing SMEs continues to increase as they continue to create more jobs and generate faster growth rates than large manufacturers.

Despite the growing salience of SMEs, little research has looked into the intangible resources that these firms deploy to thrive, especially with respect to supply chains. SMEs are not simply smaller versions of large firms (Williams 2006). Since they lack the size and diverse resources that large firms possess, especially in the capital- and technology-intensive industries, SMEs lack the advantage of massive resources when they engage in a supply chain (Blackwell *et al.* 2006). Instead, they are constrained by their limited resources, lack of brand recognition, and imperfect management. These characteristics constitute significant barriers and influence the behaviour of SMEs because a minute mistake can cause a small firm to collapse (Ren *et al.* 2010). Hence, SMEs that intend to engage in SCM must rely on unique advantages, probably distinctly diverse from those discovered in research of large firms, to overcome their size- and resource-related disadvantages (Bayraktar *et al.* 2010).

This study attempts to contribute to the SCM and entrepreneurship literature by exploring this gap. First, we examine the role of a specific entrepreneurial SCM competence, which we define as the inimitable SCM capability for recognising and pursuing business opportunities that engender success and growth. Business competences have become central research themes for organisational strategy and performance literature, but little empirical research has aimed to uncover the bundles of SCM competences that may characterise the innovative processes underlying entrepreneurial success among the countless firms in a supply chain. Current knowledge in this area is fragmented and incomplete, and the benefits for firms that are competent in the supply chain, or what it takes to achieve this competence, is not yet clear.

Second, to extend the knowledge in this area, we first seek to establish whether a parallel exists between literature in entrepreneurship and SCM. Several key tenets from entrepreneurial literature are representative of more nascent attributes of supply managers. Table 1 illustrates the specific capabilities applicable to SCM and entrepreneurship from the different theoretical perspectives of transaction cost economics, resource-based view, and social capital theory. We therefore begin with an overview of entrepreneurship literature and interview practitioners to describe specific attributes of entrepreneurs that align with features of supply managers. We also conceptualise a new construct, entrepreneurial SCM competence, which incorporates key firm characteristics and factors that collectively should enhance firm performance. To study the impact of entrepreneurial SCM competence on firm performance, we conduct a series of interviews and identify specific factors that reflect entrepreneurial SCM competence in SMEs. Third, based on our findings from the literature review and interviews with practitioners, we develop a research model to analyse the direct and indirect intervening effects of entrepreneurial SCM competences on SCM strategies and firm performance. Thus, we

Table 1. Alignment between supply chain management and entrepreneurship roles.

	Transaction cost economics	Resource-based view	Social capital theory
Supply chain management literature	<p>Firms engaging in SC are driven by the objective of profit maximisation and cost efficiencies (Dyer 1996).</p> <p>Relationships between buyers and suppliers lower transaction costs and facilitate investments in relation-specific assets (Heide and John 1988).</p> <p>If a supplier can produce at lower cost than the buyer and the differential is greater than the sum of transaction related costs, engagement in SC is preferred (Hill 1990).</p> <p>Transaction costs depend on the ability of the supplier to meet buyer expectations (Walker and Poppo 1991).</p> <p>If there is a mutually beneficial interests between buyer and suppliers, opportunism will no longer be a concern for the buyer even when highly specific assets are involved (Zaheer <i>et al.</i> 1998).</p>	<p>SC member has developed its internal operations capabilities and infrastructure; it is in a position to leverage relationships within the SC (Hammer and Champy 1990).</p> <p>Collaborative, inter-firm development of SC capabilities affects performance (Morash and Clinton 1998).</p> <p>SCM capabilities, like just-in-time delivery and quality control, contribute to superior inventory performance in an SC (Balsmeier and Voisin 1996).</p> <p>A firm's SC resources enable it to conceive and implement SC strategies, thereby improving its effectiveness and performance (Romano 2002).</p> <p>Firms that want to offer goods and services at lower cost and higher quality must integrate and coordinate their operations capabilities with multiple supply chain members across a vast, complex set of tasks (Hayes <i>et al.</i> 1988).</p>	<p>Buyer-supplier relationships also play a crucial role in reducing uncertainties in the business exchange process (Patterson <i>et al.</i> 2004).</p> <p>Buyer-supplier relationship research provides extensive evidence of the positive effect of these relationships on SC practices (Duffy and Fearn 2004).</p> <p>In an SC, through formal and informal communication channels, social networks may facilitate information sharing, which helps match buyers and sellers or other business partners (Johnston <i>et al.</i> 2004).</p> <p>Sharing information about labour and material costs, suppliers, distributors, and other market conditions could reveal the profitability of an investment project, which is crucial for SC decisions (Carr and Pearson 1999).</p> <p>Social capital is important in developing a cooperative strategy and thus an inter-organisational competitive advantage (Dyer and Singh 1998).</p>
Entrepreneurship literature	<p>Entrepreneurial firm can be explained as a hybrid form of economic organisation combining selective advantages of market and</p>	<p>Entrepreneurial resources shape the environment by introducing new products, technologies, and administrative techniques into the firm.</p>	<p>Access to a social network enables an understanding of the entrepreneurial landscape and identification of resources and</p>

(continued)

Table 1. Continued.

Transaction cost economics	Resource-based view	Social capital theory
<p>hierarchy (Barney and Lee 2000). The entrepreneur has cognition and acts within target areas to reduce transaction costs while maximising profits, but staying in line with visions for success (Everaert <i>et al.</i> 2010).</p>	<p>Seizing new opportunities in the environment and taking pre-emptive action in response to perceived opportunity (Miller and Friesen 1978, Lumpkin and Dess 1996). Entrepreneur's ability to exploit opportunities for new ideas and processes is shown to have significant impacts on performance (Hult <i>et al.</i> 2002, 2003, Gonzalez-Padron <i>et al.</i> 2008).</p>	<p>information (Saxenian 1994, Lazear 2005, Sorensen 2007) Entrepreneurial abilities to initiate, maintain, and utilise relationships with various external social partners comprise coordination, relational skills, market knowledge, and internal communication (Walter <i>et al.</i> 2006). Entrepreneur's social ability to develop and use inter-firm relationships, measured by task execution and qualifications, determines firm's success (Ritter and Gemunden 2003).</p>

attempt to contribute to the SCM and entrepreneurship literature by linking an antecedent and mediator in a cohesive manner to SMEs' performance.

In the following section, we provide a rationale for the emergence of entrepreneurship in SCM. We then summarise relevant literature and conceptualise the concept of an entrepreneurial SCM competence based on our proposed theoretical model. Next, we develop a set of hypotheses to assess the validity of our study, explain our research method, and test the hypotheses by means of a survey-based study. Finally, we report our findings, and conclude the study with several managerial implications and suggestions for future study.

2. Theoretical background

What drives firms to engage in supply chain management initiatives? Marketing and operations management researchers disagree on the rationale for the dynamics of supply chain activities (Shin *et al.* 2000). Moreover, there is no single theoretical framework that can clarify the antecedents of SCM strategies (Hsu *et al.* 2009). We use the resource-based view (RBV) to identify a set of factors that might encourage firms to conduct business in a supply chain. In particular, the RBV assumes that gaining and preserving a sustainable competitive edge is a function of the firm's core resources and capabilities. These resources and capabilities are the key source of a firm's success, and heterogeneity in organisational

resources leads to varied competitive advantages and performance (Rumelt 1995). The RBV also explains how organisational competences, and thus capabilities, may develop and leverage within enterprising firms (Wernerfelt 1984).

Because of the differences between SMEs and large firms, especially in terms of their tangible resources, we argue that business competences internal to the manufacturing SME are distinctive and specific for achieving supply chain success. As trade barriers fell rapidly over the last decade, global supply chain and logistics capabilities advanced rapidly. At the same time, the complexity and uncertainty of the global market environment created greater supply chain risk, such as the risks associated with perceptions, cultural differences, organisational learning, e-business, information security, supplier opportunism, and dependence (Bunn and Liu 1996).

The uncertain returns on supply chain-related business activities imply an entrepreneurial firm in a supply chain is willing to bear some uncertainty (Giunipero *et al.* 2005, Cousins *et al.* 2006, Handfield *et al.* 2009). A thriving SME operating in a complex supply chain must possess some form of unique entrepreneurial SCM competence to compete against large, multinational organisations. Manufacturing SMEs may exhibit specific entrepreneurial resources, in the form of orientations and competences that are helpful for implementing effective supply chain management. Aligning entrepreneurial and SCM practices is crucial to achieving positive corporate outcomes. Corporate entrepreneurial activities might also complement SCM practices.

Entrepreneurship refers to a process of opportunity recognition and pursuit that leads to growth, including opportunistic activities that create value and bear risk, which means it is firmly associated with innovation (Sexton and Bowman-Upton 1991). However, entrepreneurship research is not restricted to small start-up firms but is also applicable to corporate ventures by established firms (Pinchott and Pellman 1999). An entrepreneurial firm thus engages in product-market innovations, undertakes somewhat risky ventures, and initiates proactive innovations to gain competitive edge (Kaynak *et al.* 2009). Similarly, the well-studied concept of *corporate entrepreneurship* refers to the development of new business ideas and opportunities within corporations (Miller 1983). This broad definition encompasses at least four schools of thought, each with its own assumptions and objectives: corporate venturing, intrapreneurship, entrepreneurial transformation, and 'bringing the market inside'.

Corporate venturing pertains to the organisational arrangements that new ventures need and the processes associated with aligning them with the firm's existing activities (Chesbrough 2003). *Intrapreneurship* examines the often subversive tactics these corporate entrepreneurs adopt, as well as the actions executives take to make their lives easier or harder. It also considers the personalities and styles of individuals who make good corporate entrepreneurs (Birkinshaw 1997). *Entrepreneurial transformation* assumes that firms can and should adapt to an ever-changing environment and suggests that such adaptation would best be achieved by manipulating the firm's culture and organisation systems in a more entrepreneurial manner (Ghoshal and Bartlett 1997). Finally, *bringing the market inside* focuses on structural changes to encourage entrepreneurial behaviour, using the metaphor of the marketplace to suggest how firms should manage their resource allocations. It proposes the greater use of these market techniques as spin-offs and corporate venture capital operations.

Entrepreneurial SCM competences provide substantial advantages that facilitate SCM activities. As resources, they lead to superior performance, particularly in highly competitive or challenging environments. The most useful competences are those that

are rare, valuable and inimitable because they are key determinant of superior organisational performance (Teece *et al.* 1997). The RBV identifies inimitability and immobility as the other characteristics that support sustainable competitive edge, and intangible resources are important for gaining competitive edge in international settings (Barney 1991). As a bundle of business culture and processes, entrepreneurial SCM competence should provide a source of competitive edge because it is difficult for competitors to replicate. It is embedded in organisational processes and thus difficult for outsiders to observe (Barney 1995). Furthermore, entrepreneurial SCM competence is less likely to be perfectly mobile across organisations. It develops over time within the firm and is not easily transferred. Consistent with the RBV, we expect entrepreneurial SCM competence to offer the firm a key source of sustainable competitive edge. For resource-constrained manufacturing SMEs, entrepreneurial SCM competence is particularly important because it allows them to compete successfully against large corporations.

3. Hypotheses development

3.1 *Recognising entrepreneurial SCM competence*

We used a two-phase research design to conduct this study. In the first phase, we utilised an exploratory research approach in which we reviewed the relevant literature and interviewed several SME executives to learn their SCM strategies and to uncover key SCM constructs. In the second phase, we surveyed a large sample of automotive original equipment manufacturer (OEM) suppliers from five Association of Southeast Asia Nations (ASEAN) countries.

Manufacturing SMEs rarely fit the traditional profile of big, well-established firms with substantial financial and tangible resources. Rather, SMEs possess far fewer tangible assets, such as plants, property, and equipment, and lack financial and human resources. The control of vast resources favours large manufacturing firms to compete effectively in the supply chain. However, this implies that the complexities of supply chain operations are especially challenging for SMEs (Hafeez *et al.* 2010). For SMEs, competing in the supply chain is an innovative act that requires them to possess processes that are unique and inimitable by the better resourced large firms.

The interviews with SME executives revealed several types of competences that appear critical to the performance of firms in a supply chain. Most of the interviewees mentioned the value of an *entrepreneurial orientation*, particularly during the expansion phase of their business. They also highlighted the importance of developing good relationships with both customers and suppliers in the supply chain. They further stressed that success required substantial coordination capability to pursue information alignment with supply chain members. Finally, these managers emphasised the significance of awareness to customers and markets, as facilitated by efforts to understand the customers and respond to their particular needs.

An inclusive review of the interviews indicates that the most important organisational attributes can be grouped into five categories: *innovation orientation*, *risk-taking characteristics*, *proactiveness orientation*, *relational capital skill*, and *coordination capability*. Our literature review supports that these attributes are vital to the performance of entrepreneurial firms. Hence, we define *entrepreneurial SCM competence* as the inimitable SCM capability for recognising and pursuing business opportunities that engender success

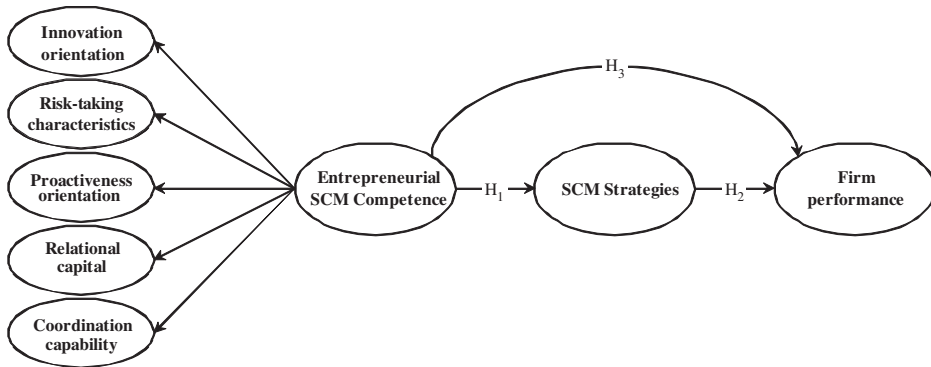


Figure 1. Conceptual framework.

and growth. In theory, it is a second-order construct that is measured by five first-order factors, as we have summarised in Figure 1.

The five factors do not ‘cause’ competitive advantage; rather, they collectively reveal the latent, intangible construct of entrepreneurial SCM competence. Other indicators are plausible, but we focus on the five factors that emerged from our interviews, and to some extent supported by our literature review. In developing our hypotheses, we further examined the extant literature to uncover potential antecedents of performance for SMEs participating in supply chain activities (Handfield *et al.* 2009). While the factors are relevant to any supply chain member, our exploratory investigation suggests that they are particularly important to the operations of manufacturing SMEs because they are generally rare, valuable, inimitable, and are capable of creating superior performance.

3.2 Conceptualising entrepreneurial SCM competence

We conceptualise entrepreneurial SCM competence as a multidimensional concept that reflects the extent to which firms adopt a bundle of SCM competences to compete in a supply chain. The concept also implies that the SME possesses intangible capabilities and processes that account for its SCM success, which eventually leads to superior performance. The competences span multiple dimensions, including learning about supply chain environments and adapting the organisation to new supply chain channels through interactions with customers and suppliers.

- **Innovation orientation**

In the interviews, most of the SME managers mentioned the importance of an aggressive innovative approach. Firms with a strong innovative orientation tend to possess distinctive competences and outlooks (Quintana-Garcia and Benavides-Velasco 2005), and are characterised by a managerial vision and innovative organisational culture that aims at achieving the firm’s goals through a supply chain (Gonzalez-Padron *et al.* 2008). These SME managers revealed that an innovation orientation implies active exploration of new businesses through the supply chain. Firms with limited tangible resources that want to pursue SCM strategies may need a strong innovative posture to take the initiative to pursue

new opportunities in complex and risky markets. An innovation orientation also should give rise to processes, practices, and decision-making activities associated with supply chain activities and thus may contribute to firm performance (Shin *et al.* 2000).

- **Risk-taking characteristics**

The critical role of risk-taking characteristics appears in virtually all SME literature. Risk-taking activities engender superior organisational performance for entrepreneurial firms. Firms in complex supply chains require seamless coordinated flows of goods, services, information, and cash; or else, they face significant supply risk (Harland *et al.* 2004). Manuj and Mentzer (2008) identify eight types of SCM risk: supply, operational, demand, security, macro, policy, competitive, and resource. Manufacturing SMEs with risk-taking entrepreneurial characteristics are likely to seek profit-maximising strategies in which they leverage SCM. Risk-taking or venturing behaviour also may result when firms engage in new supply chains or provide new products and services to supply chain members.

- **Proactiveness orientation**

Most SMEs in our interviews are highly proactive with respect to their industry, product category, and how they compete in the supply chain. We define a proactiveness orientation as the firms' tendency to originate proactive innovations that beat competitors to the punch (Miller 1983). Proactiveness entails a firm's ability to integrate supply chain information and shape its environment by introducing new products, technologies, and administrative techniques (Miller and Friesen 1978). This approach also involves seizing new opportunities in the environment and taking pre-emptive action in response to opportunities. A proactive firm seizes and exploits new opportunities (Lumpkin and Dess 1996). Proactive behaviour occurs when boundary spanners offer transparency to decision makers, which influences entrepreneurial and learning actions within the supply chain (Ireland and Webb 2007). Thus, a proactiveness orientation drives entrepreneurial SCM competence.

- **Relational capital skill**

In our interviews, SME executives frequently highlighted the importance of being socially connected to customers and suppliers, which the literature refers to as relational capital skill (Dwyer *et al.* 1987). In this context, social networking activity is a strategy for augmenting their self-interests through mutual relationships (Galaskiewicz 1979). The benefit of information flows in such activities has been widely emphasised (Burt 1992). In SCM terms, a relational capital skill symbolises an ability to connect with supply chain members who control necessary inputs, especially those whom the entrepreneurs know well enough to predict their behaviour (Sarkar *et al.* 2001). Through formal and informal communication channels, relational capital skill aids information sharing among supply chain members (Lee *et al.* 2010). Moreover, relational activities in a supply chain, such as interactions with buyers and suppliers, facilitate the provision of firm-specific products and services, which may include creating awareness of the product, demonstrating its attributes, or modifying it to meet unique requirements. To accomplish this provision, manufacturing SMEs could engage in relationships with supply chain partners that leverage the core competencies of the individual partners and thereby better manage uncertainty in exchange processes (Handfield and Bechtel 2002). In a supply chain, relational capital skill represents

not only how a firm interfaces with a particular partner but also how it connects with firms throughout the supply chain; hence, it should enhance manufacturing SMEs' SCM competence.

- **Coordination capability**

Prior literature examined information sharing as an enabler of coordination capability within the supply chain (Carr and Smeltzer 2002). Sharing information about labour and material costs, suppliers, distributors, and other market conditions is vital for manufacturing SMEs because it reveals the profitability of other supply chain members (Sanders and Premus 2005). This competence refers to the capability to integrate key business processes among supply chain members to provide the correct products, services, and information (Kim *et al.* 2006). A relationship also may arise between the use of coordination capability and the richness of shared information. Coordination capability among supply chain members has a positive and direct effect on both internal and external collaboration, and information sharing is a key dimension of collaboration. Coordination capability relates positively to systems integration, or the ability to use information sharing for collaborative purposes. Furthermore, information sharing between supply chain partners should be collaborative and enable partners to achieve the benefits of coordination capability (Walton and Gupta 1999). Coordination capability simplifies manufacturing processes to increase cost efficiency, increases employees' productivity, reduces variation, and eliminates waste. The possession of coordination capability signals to partner firms that information sharing can drive relationship development; hence, coordination capability is a factor that supports entrepreneurial SCM competence.

3.3 Entrepreneurial SCM competence and SCM strategies

As indicated in Figure 1, we postulate that entrepreneurial SCM competence reflects an SME's capabilities to employ SCM effectively and it positively affects SCM strategies. An SME's pool of competences dictates its strategies to fit the industry or market environment (McGahan and Porter 2002). Besides, the relationship between entrepreneurship and strategic management has been verified (Barringer and Bluedorn 1999); thus, for resource-constrained manufacturing SMEs, entrepreneurial SCM competence is acutely important to the extent that they allow the firm to leverage its competency in the supply chain to develop quality- and efficiency-oriented strategies. Manufacturing SMEs attempt to achieve superior products that meet the preferences of industrial buyers well and reach buyers effectively and efficiently through SCM (Bayraktar *et al.* 2010). However, the competitive global market suggests that buyers are now better organised and more demanding. The extent of entrepreneurial SCM competence implementation differs by firm, though firms that are more advanced in their competence should use their resources more efficiently and effectively to achieve greater benefits. Hence, we hypothesise:

H₁: Entrepreneurial SCM competence positively affects the SMEs' SCM strategies.

3.4 SCM strategies and firm performance

The ability of firms to succeed in competitive markets is largely a function of their internal capabilities and competences (Barney 1991, 1995). Evolutionary economics theory

elaborates on the superior ability of firms to develop particular organisational *capabilities*, which consist of critical *competencies*. Within a supply chain, SMEs attempt to offer products with value that buyers perceive as exceeding the value of alternative offerings. The urge to provide superior buyer value drives manufacturing SMEs to create and maintain a business culture that fosters the requisite business behaviour. Although operational practices typically emerge from the integration of unique knowledge of the firm (Teece and Pisano 1994), SCM strategies also reflect the quality- and efficiency-focused business activities in which a firm has become skilled (Wu *et al.* 2007). Therefore, entrepreneurial SMEs are able to perform productive tasks repeatedly to create value in their SCM strategies (Teece *et al.* 1997), and in turn, the SCM strategies become the main source of the firm's performance advantage (Shin *et al.* 2000). Hence, we hypothesise:

H₂: SCM strategies positively affect SMEs' performance.

3.5 Entrepreneurial SCM competence and firm performance

The RBV assumes that gaining and preserving a sustainable competitive advantage is a function of the resources that the firm brings to the competition and these resources provide the primary source of a firm's success (Barney 1995). Research efforts have examined the relationship between resources and better-than-normal performance, stemming from the assertion that the heterogeneity of resources leads to variable competence and performance level (Prahalad and Hamel 1990). Firms with valuable, inimitable, and non-substitutable resources generally excel in the market-place. Thus, competence and durable performance difference can be accounted for by asymmetric resource endowments across firms with differential competence (Amit and Schoemaker 1993). Firms with an entrepreneurial advantage enjoy monopolistic edge to create resource position barriers (Wernerfelt 1984). The positive influence of entrepreneurship on firm market performance has also been empirically studied (Sarkar *et al.* 2001). As product life cycles shrink rapidly in the modern supply chain environment, firms must rely on proprietary technology to bring high quality products to market quickly and efficiently ahead of the competition. To recap these ideas, we assert that entrepreneurial SCM competence, as evinced by innovation orientation, risk-taking characteristics, proactiveness orientation, relational capital skill, and coordination capability, positively affects manufacturing SMEs' performance. Our literature review also suggests that the competency is especially salient for the performance of the manufacturing SMEs. Thus, we hypothesise:

H₃: Entrepreneurial SCM competence positively affects SMEs' performance.

4. Methodology

4.1 Questionnaire and data collection

To test the proposed model, we designated manufacturing SMEs as our sampling frame. Prior to conducting the survey, we first interviewed managers who had experience with SCM. We interviewed six experts (four practitioners, two academics) to explore emergent phenomena and derive appropriate constructs and explanations, even as we uncovered key constructs and associated relationships. Conducting these interviews as a prelude to our survey-based research provides grounded and qualitative evidence about the validity of the

key variables. We then undertook an exploratory study, beginning with an extensive literature review in which we located measurement scales and information for each construct. Insights and input from the interviews guided the survey instrument development. The resulting questionnaire used five-point Likert scales, and was administered according to well-established procedures. A group of business scholars reviewed the resulting questionnaire for face validity.

We collected data from automotive OEM suppliers in five ASEAN countries: Indonesia, Malaysia, the Philippines, Vietnam, and Thailand. We focused on this region in an attempt to expand existing literature, which largely has been confined to firms in the Western hemisphere. We conducted a series of one-day workshops in each ASEAN country, to which we invited representatives (i.e., production, purchasing, and quality assurance managers) from the tier suppliers of automobile SME manufacturers. The invitation, which came from the ASEAN Secretariat, informed participants about the 'Proposed ASEAN Policy Blueprint for SME Development 2004–2014' and suggested methods ASEAN automotive manufacturers might use to enhance organisational capabilities. Participants also received self-assessment worksheets, which 165 of them completed and returned after the workshop. Response rates are 67.06%, 37.50%, 74.00%, 42.86%, and 32.00% in Vietnam, Thailand, the Philippines, Malaysia, and Indonesia, respectively. Most respondents (62.27%) worked for tier-1 suppliers, and almost half were employed by joint ventures or foreign direct invested firms. The majority of the respondents' firms had some form of quality management system certification and implemented formal Total Quality Management or similar continuous improvement programmes.

4.2 Measures

To increase scale validity, we used multiple indicators to represent the unobservable constructs and employed existing scales whenever possible. The *innovativeness orientation* construct consists of *six* items that reflect the quality of the new product, in comparison with products developed in the focal company in the previous three years, competitors' products, and other products developed by the firm (O'Cass and Weerawardena 2009). *Five* items measure *Risk-taking characteristics* by asking respondents to indicate the extent to which their company's attitudes toward uncertainty and risk (Covin and Miles 2007). To measure *proactiveness orientation*, we use *five* items that refer to the extent to which the company practices certain strategies to position itself in the market (Voola and O'Cass 2010). The *seven* items that measure *relational capital* show the extent to which the firm maintains relationships with its customers and suppliers (Lawson *et al.* 2009, Yang 2009, Lee *et al.* 2010). For *coordination capability*, we use *nine* items that ask respondents to rate their firm's practices on communication and information exchange with customers and suppliers (Leek *et al.* 2003, Holden and O'Toole 2004). *SCM strategies* use *nine* items adapted from Hsu *et al.* (2009), and the *performance* construct consists of *four* items commonly used in operations management literature (Table 2).

4.3 Statistical analysis and results

To achieve a high degree of validity, we used multiple indicators to measure each latent construct. To assess the quality of the measures, we evaluated the psychometric properties

Table 2. Measurement scale.

Construct and items	Standardised loadings (λ)
(A) Innovativeness orientation (Cronbach's $\alpha = 0.878$, CR = 0.8995, AVE = 0.6041)	
1. The level of innovative and leading edge research & development pursued in your firm.	0.56
2. The level of novelty of the new products.	0.72
3. The use of the latest technological innovations in new product development.	0.66
4. The speed of new product development.	0.77
5. The number of new products the firm has introduced.	0.93
6. The number of new products that are first to market (early market entrants). $\chi^2/df = 1.481$, RMSEA = 0.054, NNFI = 0.99, AGFI = 0.94	0.79
(B) Risk-taking characteristics (Cronbach's $\alpha = 0.881$, CR = 0.9219, AVE = 0.7034)	
1. Senior executives share similar beliefs about the future direction of this organisation.	0.68
2. Senior managers actively encourage change and implement a culture of improvement, learning, and innovation in moving towards excellence.	0.81
3. Employees have the opportunity to share in and are encouraged to help the organisation implement change.	0.79
4. There is a high degree of unity of purpose throughout the company, without barriers between individuals and/or departments.	0.80
5. There is a comprehensive and structured planning process which regularly sets and reviews short and long-term goals. $\chi^2/df = 1.818$, RMSEA = 0.071, NNFI = 0.99, AGFI = 0.93	0.74
(C) Proactiveness orientation (Cronbach's $\alpha = 0.894$, CR = 0.9079, AVE = 0.6646)	
1. Our company always stays on the leading edge of new technology in our industry.	0.73
2. We anticipate the full potential of new practices and technologies.	0.81
3. We proactively pursue long-range programmes to acquire technological capabilities.	0.90
4. We constantly explore and attempt to acquire next generation technology.	0.80
5. Our research and development pursues truly innovative and leading edge research. $\chi^2/df = 0.773$, RMSEA = 0.000, NNFI = 1.00, AGFI = 0.97	0.69
(D) Relational capital (Cronbach's $\alpha = 0.874$, CR = 0.9032, AVE = 0.5748)	
1. We actively and regularly seek customer inputs to identify their needs and expectations.	0.66
2. Customer needs and expectations are effectively disseminated and understood throughout the workforce.	0.72
3. We always maintain a close relationship with our customers and provide them an easy channel for communicating with us.	0.75
4. We have an effective process for resolving customers' complaints.	0.71
5. We strive to establish long-term relationships with suppliers.	0.81
6. We use a supplier rating system to select our suppliers and monitor their performance.	0.70
7. Suppliers are actively involved in our new product, component, module, and system development process. $\chi^2/df = 1.438$, RMSEA = 0.052, NNFI = 0.99, AGFI = 0.93	0.60

(continued)

Table 2. Continued.

Construct and items	Standardised loadings (λ)
(E) Coordination capability (Cronbach's $\alpha = 0.855$, CR = 0.9111, AVE = 0.5377)	
1. Establishing more frequent contact with supply chain members.	0.61
2. Creating compatible information sharing systems with suppliers.	0.64
3. Locating closer to your customers.	0.47
4. Requiring suppliers to locate closer to your firm.	0.49
5. Outsource non-core activities to third-party logistics providers.	0.59
6. Improving the integration of activities across the supply chain.	0.72
7. Communicating your firm's future plan to suppliers and customers.	0.78
8. Creating cross-organisational supply chain management teams.	0.72
9. Creating compatible information sharing systems with customers.	0.63
$\chi^2/df = 1.148$, RMSEA = 0.030, NNFI = 1.00, AGFI = 0.93	
(F) SCM strategies (Cronbach's $\alpha = 0.904$, CR = 0.9472, AVE = 0.6736)	
1. Performance of your products.	0.54
2. Conformance of your products to specifications.	0.54
3. Durability of your products.	0.56
4. Flexibility and responsiveness of your delivery lead time.	0.66
5. Flexibility and responsiveness of your production lead time.	0.75
6. Turnovers of your raw materials and component parts.	0.81
7. Overall inventory turnovers.	0.77
8. Accuracy of inventory levels.	0.70
9. Delivery lead time of purchased materials and component parts.	0.80
$\chi^2/df = 1.336$, RMSEA = 0.045, NNFI = 0.99, AGFI = 0.92	
(G) Performance (Cronbach's $\alpha = 0.923$, CR = 0.9449, AVE = 0.8117)	
1. Sales growth	0.83
2. Market growth.	0.93
3. Market share.	0.96
4. Profitability.	0.80
$\chi^2/df = 2.22$, RMSEA = 0.086, NNFI = 0.99, AGFI = 0.93	

Note: CR = composite reliability; AVE = average variance extracted.

of the survey instrument with confirmatory factor analysis (CFA) using LISREL 8.72; we provide the measurement scales in Table 2. In Table 3, we show the zero-order correlation matrix for the seven latent variables and provide a brief overview of their interrelationships. The correlation matrix shows that all correlations are statistically significant at $\alpha = 0.05$ and exhibit the expected positive relationships, in preliminary support for the relationships in Figure 1.

We verify the seven measurement models in Table 2 by examining all variables for normality using third- and fourth-order moments and reduced the skewness of the data. The LISREL 8.72 program also provides maximum likelihood estimates, with the covariance matrix as input. As Table 2 shows, the Cronbach's α statistics for the constructs range from 0.855 for coordination capability to 0.894 for proactiveness orientation, which suggests that the scales are sufficiently reliable. Critics of Cronbach's α argue that it is a simple measure of reliability based on internal consistency, but it fails to adequately estimate errors caused by the factors external to an instrument, such as differences in testing situations or respondents over time. For structural equation modelling, composite

Table 3. Correlation of the constructs.

	1	2	3	4	5	6	7
1. Innovativeness orientation	1.000						
2. Risk-taking characteristics	0.382*	1.000					
3. Proactiveness orientation	0.489*	0.441*	1.000				
4. Relational capital	0.385*	0.581*	0.514*	1.000			
5. Coordination capability	0.287*	0.309*	0.324*	0.414*	1.000		
6. SCM strategies	0.483*	0.391*	0.355*	0.429*	0.322*	1.000	
7. Performance	0.522*	0.335*	0.304*	0.265*	0.203*	0.458*	1.000
Mean	3.446	3.941	3.502	3.889	3.352	3.972	3.703
Standard deviation	0.780	0.786	0.852	0.736	0.705	0.591	0.824

Note:

*all correlations are significant at $\alpha = 5\%$ (two-tailed, $n = 165$).

reliability (CR) and average variance extracted (AVE) are viable alternatives, because they are more parsimonious than Cronbach's α (Bagozzi and Yi 1988). Thus, in Table 2, we also provide the CR values, which range from 0.8995 to 0.9472, in excess of the recommended threshold value of 0.60. The AVE values range from 0.5377 to 0.8117, which exceed the recommended threshold level of 0.50. These three statistics in combination suggest that all the constructs are sufficiently reliable.

Next, we assessed the unidimensionality of each construct. We tested the measurement models for convergent validity (i.e., degree of association between measures of a construct), discriminant validity (i.e., degree to which measures of constructs are distinct), and nomological validity (i.e., validity of the entire model). In the CFA, each measure loads significantly on the expected constructs, which demonstrates convergent validity (Bagozzi and Yi 1988). In Table 2, the seven constructs exhibit excellent convergent validity because their AVE is greater than 0.50. The test for discriminant validity examines the correlation between each pair of latent variables (Anderson and Gerbing 1988). If the two latent variables are distinct, their correlation should be unidimensional. In Table 3, all coefficients are significant and most are less than 0.5; thus, discriminant validity can be assumed. Nomological validity is assessed by the model fit indices. The analysis reveals that the measurement models are more than acceptable for reproducing the population covariance matrices. These results suggest an adequate level of construct validity.

Subsequently, we assessed the validity of entrepreneurial SCM competence as a second-order construct. In Table 4, innovativeness orientation (standardised loading $[\gamma] = 0.55$, $t = 7.68$), risk-taking characteristics ($\gamma = 0.71$, $t = 10.63$), proactiveness orientation ($\gamma = 0.67$, $t = 9.73$), relational capital skill ($\gamma = .82$, $t = 11.09$), and coordination capability ($\gamma = 0.52$, $t = 7.25$) are all significant factors ($p < 0.01$) of the second-order construct; thus, suggesting a good level of convergent validity for entrepreneurial SCM competence. Furthermore, the CR of 0.8872 and AVE of 0.6178 indicate that entrepreneurial SCM competence as a second-order construct attains good construct validity. We proceed to estimate our theoretical structural equation model, with entrepreneurial SCM competence as a second-order construct and SCM strategies as a mediator.

In the theoretical model, we also tested the direct and indirect impacts of entrepreneurial SCM competence and the direct impact of SCM strategies on performance. In Table 5, we report the LISREL results, which show an excellent fit of the model

Table 4. Second-order entrepreneurial SCM competence construct.

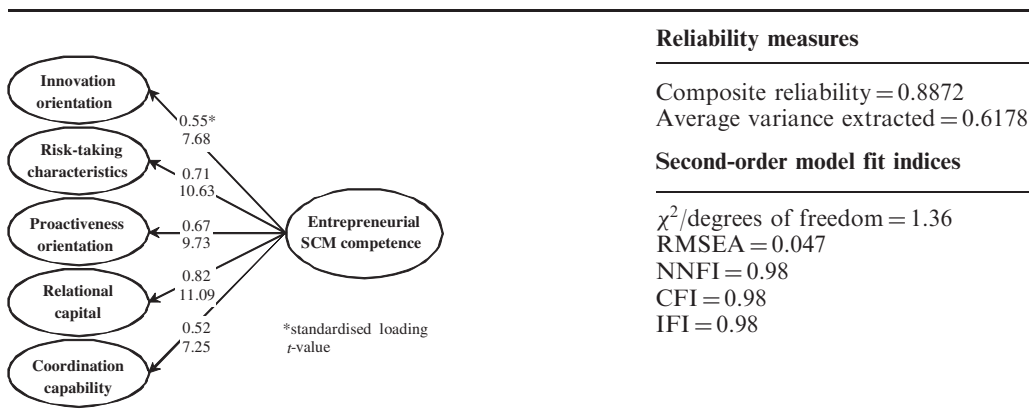
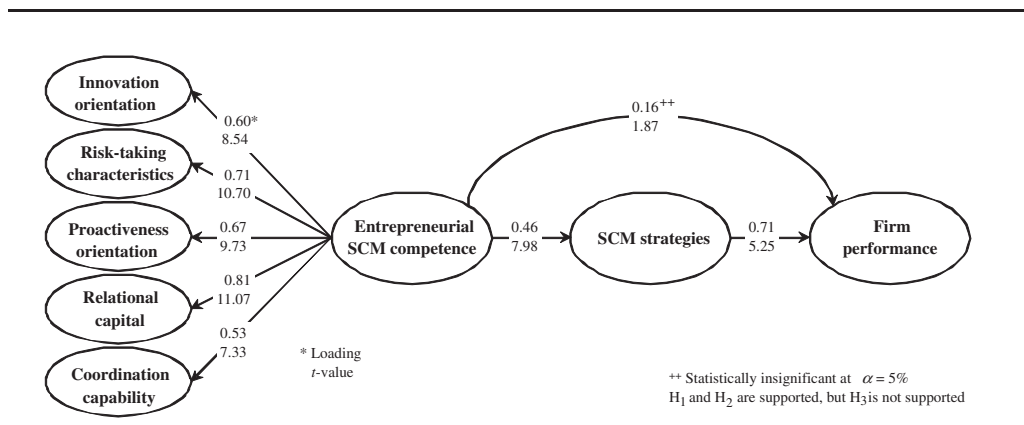


Table 5. Structural equation model results.



to the data. Again, the first-order factors, innovation orientation ($\gamma = 0.60$, $t = 8.54$), risk-taking characteristics ($\gamma = 0.71$, $t = 10.70$), proactiveness orientation ($\gamma = 0.67$, $t = 9.73$), social capital ($\gamma = 0.81$, $t = 11.07$), and coordination capability ($\gamma = 0.53$, $t = 7.33$) all loaded significantly on entrepreneurial SCM competence ($p < 0.01$). With regard to the model parameter estimates, the results reveal that entrepreneurial SCM competence affects SCM strategies positively, with a coefficient of $\beta = 0.46$ ($t = 7.98$). These findings support H_1 . Also, SCM strategies positively and significantly affect performance, with $\beta = 0.71$ ($t = 5.25$), in support of H_2 . However, the impact of entrepreneurial SCM competence on performance is not statistically significant at $\alpha = 5\%$; hence, H_3 is not supported.

5. Discussions and managerial implications

Theoretically, our findings suggest that to flourish in this competitive global market, manufacturing SMEs should develop unique competence that is inimitable to maximise their utility in the supply chain. The possession of entrepreneurial SCM competence leads to the development of crucial organisational capability. Entrepreneurial SCM competence thus reflects superior firm resources, leading to superior SCM strategies undertaken by skilled personnel. As the RBV highlights, a firm's foundational resources, including its key competency, are important in diverse business environments, because they provide a stable basis for developing specific competency, which is particularly useful to the extent that it is embedded in organisational culture and produce a unique configuration of resources.

Our results suggest that a firm's entrepreneurial SCM competence is a multi-dimensional construct that taps specific internal competency. Although manufacturing SMEs tend to lack substantial financial and tangible resources, those that succeed in the competitive global market appear to leverage more fundamental, intangible resources, which constitute their entrepreneurial SCM competence. Their key intangible resources include innovation orientation, risk-taking characteristics, proactiveness orientation, relational capital skill, and coordination capability. Although undoubtedly other competencies are instrumental to manufacturing SMEs, our findings, based on interviews with practitioners and an intensive literature review, indicate that these five factors are particularly salient. As distinctive first-order constructs, they reveal the level of firms' entrepreneurial SCM competence.

This study reveals that manufacturing SMEs' performance hinges on the development and well-conceived manipulation of a particular SCM competency, which can be broken down to five unique capabilities as measured by the five first-order factors. Manufacturing SMEs may be relatively recent entrants into the supply chain. They also tend to lack the large base of financial and tangible resources that characterise large manufacturing firms. Their entrepreneurial SCM competence, as identified herein, helps them to overcome the scarcity of traditional resources and succeed through the supply chain. The quality of the management team in manufacturing SMEs is also likely to have particular relevance for firm survival. Various competencies possessed by management result from the specific circumstances, causal relationships, and unique social structure within each SME. Furthermore, entrepreneurial SCM competence may be relatively distinctive because it reflects the specialised approaches owned by individual managers or is embedded within the manufacturing SME. That is, entrepreneurial SCM competence comprises a collection of firm-specific capabilities that are inimitable by would-be rival firms.

By exploring entrepreneurial SCM competence as a second-order construct, we provide managers with a means to assess their own abilities in their supply chain. Managers can examine how multiple constructs simultaneously form their firms' entrepreneurial SCM competence. Also, the complex structure of entrepreneurial SCM competence makes it difficult for competitors to replicate this comprehensive strength. We highlight its components and empirically confirm their explanatory value. Managers of manufacturing SMEs should devise an appropriate collection of capabilities to support their entrepreneurial SCM competence.

6. Conclusion

Our findings suggest that organisational capabilities of manufacturing SMEs support superior performance. Specifically, our results provide empirical evidence that

manufacturing SMEs that possess a high level of entrepreneurial SCM competence perform better in their supply chains. Entrepreneurial SCM competence leads to superior SME performance through SCM strategies; that is, entrepreneurial SCM competence precedes SCM strategies, and SCM strategies affect manufacturing SMEs' performance.

The results stress the importance of entrepreneurial SCM competence, which precedes SCM strategies in explaining performance, and indicate that SCM strategies should be viewed as a means to achieve superior performance. Our findings support the notion that SCM strategies bridge the gap between entrepreneurial SCM competence and superior firm performance. The significant relationships from entrepreneurial SCM competence to SCM strategies, and then from SCM strategies to performance show that entrepreneurial SCM competence has indirect effects on firm performance. However, entrepreneurial SCM competence does not affect performance directly. This finding is significant in that it may provide an answer to the missing link between SMEs' capabilities and performance. SMEs must implement appropriate SCM strategies to fully benefit from exceptional entrepreneurial SCM competence because such competence does not affect performance directly. The results also suggest that manufacturing SMEs can enhance their performance by establishing and skilfully managing their entrepreneurial SCM competence. These results in turn offer worthy theoretical and managerial implications.

7. Limitations and future research

This study provides important insights into the relationships among entrepreneurial SCM competence, SCM strategies, and firm performance, but it is not without limitations. First, though we identify five distinctive dimensions of entrepreneurial SCM competence, we acknowledge there are likely to be other relevant dimensions. Ongoing research should investigate these potential dimensions, such as the organisational learning or knowledge management in which SMEs engage after participating in supply chain activities. Second, our model does not consider performance from multiple perspectives. For example, it ignores variables such as market structure, from industrial organisation literature; ownership structure, from finance literature; or corporate governance, from organisational behaviour literature. Other important variables might include the length of operations or SCM experience. Third, the antecedents of entrepreneurial SCM competence have yet to be explored. Further research should investigate both internal and external factors of SMEs that influence entrepreneurial SCM competence. We posit that a firm's management characteristics or previous SCM experience may represent important internal factors that influence entrepreneurial SCM competence; industry-specific characteristics could provide important external factors. Fourth, the use of longitudinal data would be useful to determine whether the effects of the model variables are short-term or endure over time. In addition, such data could reveal how changes in some variables affect performance. A model that uses such changes in entrepreneurial SCM competence and firm performance might yield further interesting results; a lagged investigation of the variables over time would also help pinpoint causation in the model. Finally, our study may have been influenced by the sampling frame. Additional validation using a broader sample therefore is needed.

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