

ASEAN AUTOMOTIVE SUPPLY CHAIN MANAGEMENT (SCM): ENTREPRENEURIAL SCM COMPETENCE AND PERFORMANCE

Tritos Laosirihongthong, Thammasat University, Thailand, ltritos@engr.tu.ac.th
Chin-Chun Hsu, University of Nevada Las Vegas, USA, vincent.hsu@unlv.edu
Keah Choon Tan, University of Nevada, USA, kctan@unlv.edu
G. Keong Leong, University of Nevada Las Vegas, USA, keong.leong@unlv.edu

ABSTRACT

The purpose of this study is to discover the dimensions of a new construct called the *entrepreneurial supply chain management competence*. 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 it affects 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.

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 organizational 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-organizational, 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 organizations that participate in the supply chain in the same market segment can experience dramatically different performance levels [1]. 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 successfully in a supply chain. This question has motivated many influential theories on the genesis of SCM behavior, including the resource-based view, transaction cost economies, and social exchange theory.

These theories focus primarily on large manufacturing firms; no theory pertains to the SCM behavior of SMEs. This trend is understandable, because for much of the 20th 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 U.S. manufacturing sector in 2000, SMEs accounted for 98 percent of all manufacturers and employed two-thirds of the workforce [2]. 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 looks 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 [3]. 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 [4]. Instead, they are constrained by their limited resources, lack of brand recognition, and imperfect management. These characteristics constitute significant barriers and influence the behavior of SMEs because a minute mistake can cause a small firm to collapse [5]. 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 [6].

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 recognizing and pursuing business opportunities that engender success and growth. Business competences have become central research themes for organizational strategy and

performance literature, but little empirical research aims to uncover the bundles of SCM competences that may characterize 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 are 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 conceptualize 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 interview with practitioners, we develop a research model to analyze the direct and indirect intervening effects of entrepreneurial SCM competences on SCM strategies and firm performance. Thus, we 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 summarize relevant literature and conceptualize 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.

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 [7]. Moreover, there is no single theoretical framework that can clarify the antecedents of SCM strategies [1]. 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 organizational resources leads to varied competitive advantages and performance [8]. The RBV also explains how organizational competences, and thus capabilities, may develop and leverage within enterprising firms [9].

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, organizational learning, e-business, information security, supplier opportunism, and dependence [10].

The uncertain returns on supply chain-related business activities imply an entrepreneurial firm in a supply chain is willing to bear some uncertainty [11] [12] [13]. A thriving SME operating in a complex supply chain must possess some form of unique entrepreneurial SCM competence to compete against large, multinational organizations. 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 [14]. However, entrepreneurship research is not restricted to

Table 1
Alignment between Supply Chain Management and Entrepreneurship Roles

	Transaction Cost Economics	Resource-Based View	Social Capital Theory
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Supply Chain Management Literature	<p>Firms engaging in SC are driven by the objective of profit maximization and cost efficiencies [15]. Relationships between buyers and suppliers lower transaction costs and facilitate investments in relation-specific assets [16].</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 [17].</p> <p>Transaction costs depend on the ability of the supplier to meet buyer expectations [18].</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 [19].</p>	<p>SC member has developed its internal operations capabilities and infrastructure, it is in a position to leverage relationships within the SC [22].</p> <p>Collaborative, inter-firm development of SC capabilities affects performance [23].</p> <p>SCM capabilities, like just-in-time delivery and quality control, contribute to superior inventory performance in SC [24].</p> <p>A firm's SC resources enable it to conceive and implement SC strategies, thereby improving its effectiveness and performance [25].</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 [26].</p>	<p>Buyer-supplier relationships also play a crucial role in reducing uncertainties in the business exchange process [32].</p> <p>Buyer-supplier relationship research provides extensive evidence of the positive effect of these relationships on SC practices [33].</p> <p>In a SC, through formal and informal communication channels, social networks may facilitate information sharing, which helps match buyers and sellers or other business partners [34].</p> <p>Sharing information about labor and material costs, suppliers, distributors, and other market conditions could reveal the profitability of an investment project, which is crucial for SC decisions [35].</p> <p>Social capital is important in developing a cooperative strategy and thus an inter-organizational competitive advantage [36].</p>
Entrepreneurship Literature	<p>Entrepreneurial firm can be explained as a hybrid form of economic organization combining selective advantages of market and hierarchy [20].</p> <p>The entrepreneur has cognition and acts within target areas to reduce transaction costs while maximizing profits, but staying in line with visions for success [21].</p>	<p>Entrepreneurial resources shape 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 [27] [28].</p> <p>Entrepreneur's ability to exploit opportunities for new ideas and processes is shown to have significant impacts on performance [29] [30] [31].</p>	<p>Access to a social network enables an understanding of the entrepreneurial landscape and identification of resources and information [37] [38].</p> <p>Entrepreneurial abilities to initiate, maintain, and utilize relationships with various external social partners comprise coordination, relational skills, market knowledge, and internal communication [39].</p> <p>Entrepreneur's social ability to develop and use inter-firm relationships, measured by task execution and qualifications, determines firm's success [40].</p>

small start-up firms but is also applicable to corporate ventures by established firms [41]. An entrepreneurial firm thus engages in product-market innovations, undertakes somewhat risky ventures, and initiates proactive innovations to gain competitive edge [42]. Similarly, the well-studied concept of *corporate entrepreneurship* refers to the development of new business ideas and opportunities within corporations [27]. 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 organizational arrangements that new ventures need and the processes associated with aligning them with the firm's existing activities [43]. *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 [44].

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 organization systems in a more entrepreneurial manner [45]. Finally, *bringing the market inside* focuses on structural changes to encourage entrepreneurial behavior, 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 organizational performance [46]. 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 [47]. 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 organizational processes and thus difficult for outsiders to observe [48]. Furthermore, entrepreneurial SCM competence is less likely to be perfectly mobile across organizations. 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.

HYPOTHESES DEVELOPMENT

Recognizing Entrepreneurial SCM Competence

We used a two-phase research design to conduct this study. In the first phase, we utilized 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 favors 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 [49]. 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 emphasized 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 organizational 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 recognizing and pursuing business opportunities that engender success and growth. In theory, it is a second-order construct that is measured by five first-order factors, as we summarized 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 [11]. 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

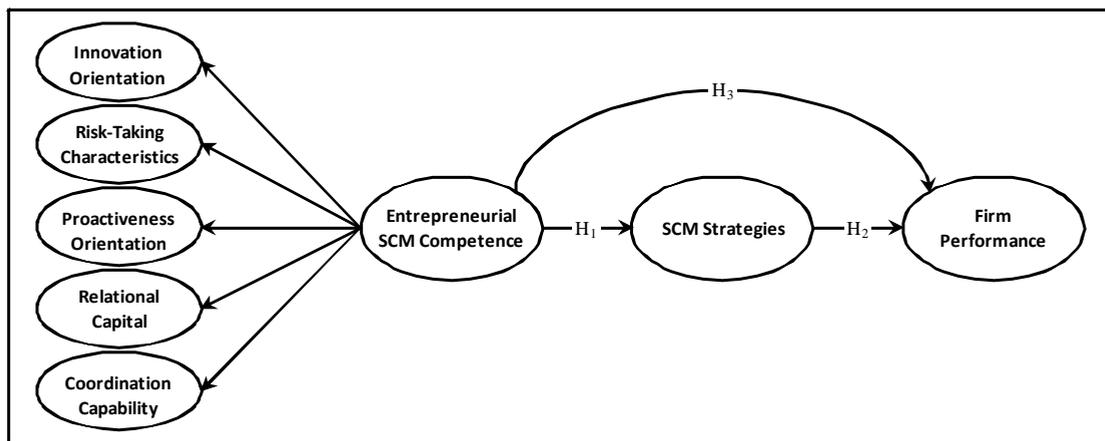


Figure 1: Conceptual Framework

rare, valuable, inimitable, and are capable of creating superior performance.

Conceptualizing Entrepreneurial SCM Competence

We conceptualize 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 organization 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 [50], and are characterized by a managerial vision and



innovative organizational culture that aims at achieving the firm's goals through a supply chain [29]. 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 [7].

Risk-Taking Characteristics: The critical role of risk-taking characteristics appears in virtually all SME literature. Risk-taking activities engender superior organizational 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 [51]. Manuj and Mentzer [52] 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-maximizing strategies in which they leverage SCM. Risk-taking or venturing behavior also may result when firms engage in new supply chains or provide new products and services to supply chain members.

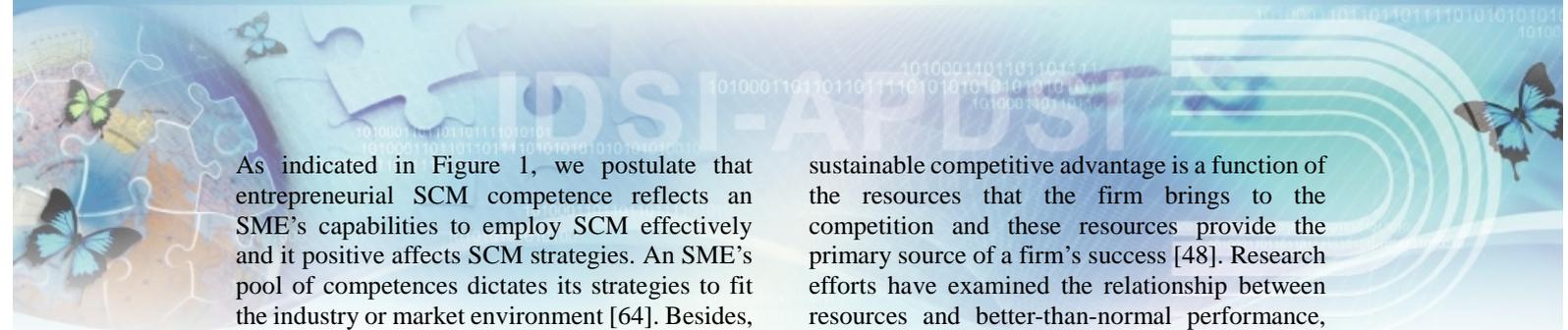
Proactiveness Orientation: Most SMEs in our interviews are highly proactive with respect to their industry, product category, and how they compete in the supply chain. We define a proactiveness orientation as the firms' tendency to originate proactive innovations that beat competitors to the punch [27]. Proactiveness entails a firm's ability to integrate supply chain information and shape its environment by introducing new products, technologies, and administrative techniques [53]. This approach also involves seizing new opportunities in the environment and taking preemptive action in response to opportunities. A proactive firm seizes and exploits new opportunities [28]. Proactive behavior occurs when boundary spanners offer transparency to decision makers, which influences entrepreneurial and learning actions within the supply chain [54]. 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 customer and suppliers, which the literature refers to as relational capital skill [55]. In this context, social networking activity is a strategy for augmenting their self-interests through mutual relationships. The benefit of information flows in such

activities has been widely emphasized [56]. In SCM terms, a relational capital skill symbolizes an ability to connect with supply chain members who control necessary inputs, especially those whom the entrepreneurs know well enough to predict their behavior [57]. Through formal and informal communication channels, relational capital skill aids information sharing among supply chain members [58]. 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 [59]. 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 [60]. Sharing information about labor and material costs, suppliers, distributors, and other market conditions is vital for manufacturing SMEs because it reveals the profitability of other supply chain members [61]. This competence refers to the capability to integrate key business processes among supply chain members to provide the correct products, services, and information [62]. 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 [63]. 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.

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 [64]. Besides, the relationship between entrepreneurship and strategic management has been verified [65]; 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 [6]. However, the competitive global market suggests that buyers are now better organized 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 hypothesize,

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

SCM Strategies and Firm Performance

The ability of firms to succeed in competitive markets is largely a function of their internal capabilities and competences [47] [48]. Evolutionary economics theory elaborates on the superior ability of firms to develop particular organizational *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 behaviors. Although operational practices typically emerge from the integration of unique knowledge of the firm [66], SCM strategies also reflect the quality- and efficiency-focused business activities in which a firm has become skilled [67]. Therefore, entrepreneurial SMEs are able to perform productive tasks repeatedly to create value in their SCM strategies [46], and in turn, the SCM strategies become the main source of the firm's performance advantage [7]. Hence, we hypothesize,

H₂: SCM strategies positively affect SMEs' performance.

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 [48]. 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 [68]. 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 [69]. Firms with an entrepreneurial advantage enjoy monopolistic edge to create resource position barriers [9]. The positive influence of entrepreneurship on firm market performance also has been empirically studied [57]. 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 hypothesize,

H₃: Entrepreneurial SCM competence positively affects SMEs' performance.

METHODOLOGY

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 organizational 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. Majority of the respondents' firms had some form of quality management system certification and implemented formal total quality management or similar continuous improvement programs.

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 [70]. Five items measure *Risk-taking characteristics* by asking respondents to indicate the extent to which their company's attitudes toward uncertainty and risk [71]. 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 [72]. The seven items that measure *relational capital* show the extent to which the firm maintains relationships with its customers and suppliers [58] [73] [74]. 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 [75] [76]. *SCM strategies* use nine items adapted from Hsu *et al.* [1], and the *performance* construct consists of four items commonly used in operations management literature (Table 2).

Statistical Analysis

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 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 $\alpha = .05$ 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 statistics for the constructs range from .855 for coordination capability to .894 for proactiveness orientation, which suggests that the scales are sufficiently reliable. Critics of Cronbach's 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 modeling, composite reliability (CR) and average variance extracted (AVE) are viable alternatives, because they are more parsimonious than Cronbach's [77]. Thus, in Table 2, we also provide the CR values, which range from .8995 to .9472, in excess of the recommended threshold value of .60. The AVE values range from .5377 to .8117, which exceed the recommended threshold level of .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 [77]. In Table 2, the seven constructs exhibit excellent convergent validity because their AVE is greater than .50. The test for discriminant validity examines the correlation between each pair of latent variables [78]. If the two latent variables are distinct, their correlation should be one-dimensional. 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 (standardized loading $[\gamma] = .55, t = 7.68$), risk-taking characteristics ($\gamma = .71, t = 10.63$), proactiveness orientation ($\gamma = .67, t = 9.73$), relational capital skill ($\gamma = .82, t = 11.09$), and coordination capability ($\gamma = .52, t = 7.25$) are all significant factors ($p < .01$) of the second-order construct; thus, suggesting a good level of convergent validity for entrepreneurial SCM competence. Furthermore, the CR of .8872 and AVE of .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 to the data. Again, the first-order factors, innovation orientation ($\gamma = .60, t = 8.54$), risk-taking characteristics ($\gamma = .71, t = 10.70$), proactiveness orientation ($\gamma = .67, t = 9.73$), social capital ($\gamma = .81, t = 11.07$), and coordination capability ($\gamma = .53, t = 7.33$) all loaded significantly on entrepreneurial SCM competence ($p < .01$). With regard to the model parameter estimates, the results reveal that entrepreneurial SCM competence affects SCM strategies positively, with a coefficient of $\beta = .46 (t = 7.98)$. These findings support H₁. Also, SCM strategies positively and significantly affect performance, with $\beta = .71 (t = 5.25)$, in support of H₂. However, the impact of entrepreneurial SCM competence on performance is not statically significant at $\alpha = 5\%$; hence, H₃ is not supported.

Table 2
Measurement Scale

Construct and Items	Standardized Loadings (λ)
(A) Innovativeness Orientation (Cronbach's $\alpha = .878, CR = .8995, AVE = .6041$)	
The level of innovative and leading edge research & development pursues in your firm.	0.56
The level of novelty of the new products.	0.72
The use of the latest technological innovations in new product development.	0.66
The speed of new product development.	0.77
The number of new products the firm has introduced.	0.93
The number of new products that are first to market (early market entrants).	0.79
$\chi^2/df = 1.481, RMSEA = .054, NNFI = .99, AGFI = .94$	
(B) Risk-Taking Characteristics (Cronbach's $\alpha = .881, CR = .9219, AVE = .7034$)	
Senior executives share similar beliefs about the future direction of this organization.	0.68
Senior managers actively encourage change and implement a culture of improvement, learning, and innovation in moving toward excellence.	0.81
Employees have the opportunity to share in and are encouraged to help the organization implement change.	0.79
There is a high degree of unity of purpose throughout the company, without barriers between individuals and/or departments.	0.80
There is a comprehensive and structured planning process which regularly sets and reviews short and long-term goals.	0.74
$\chi^2/df = 1.818, RMSEA = .071, NNFI = .99, AGFI = .93$	
(C) Proactiveness Orientation (Cronbach's $\alpha = .894, CR = .9079, AVE = .6646$)	
Our company always stays on the leading edge of new technology in our industry.	0.73
We anticipate the full potential of new practices and technologies.	0.81
We proactively pursue long-range programs to acquire technological capabilities.	0.90
We constantly explore and attempt to acquire next generation technology.	0.80
Our research and development pursues truly innovative and leading edge research.	0.69
$\chi^2/df = 0.773, RMSEA = .000, NNFI = 1.00, AGFI = .97$	
(D) Relational Capital (Cronbach's $\alpha = .874, CR = .9032, AVE = .5748$)	
We actively and regularly seek customer inputs to identify their needs and expectations.	0.66
Customer needs and expectations are effectively disseminated and understood throughout the workforce.	0.72
We always maintain a close relationship with our customers and provide them an easy channel for communicating with us.	0.75
We have an effective process for resolving customers' complaints.	0.71
We strive to establish long-term relationships with suppliers.	0.81
We use a supplier rating system to select our suppliers and monitor their performance.	0.70
Suppliers are actively involved in our new product, component, module, and system development process.	0.60
$\chi^2/df = 1.438, RMSEA = .052, NNFI = .99, AGFI = .93$	
(E) Coordination Capability (Cronbach's $\alpha = .855, CR = .9111, AVE = .5377$)	
Establishing more frequent contact with supply chain members.	0.61
Creating compatible information sharing systems with suppliers.	0.64
Locating closer to your customers.	0.47
Requiring suppliers to locate closer to your firm.	0.49
Outsource non-core activities to third-party logistics providers.	0.59
Improving the integration of activities across the supply chain.	0.72
Communicating your firm's future plan to suppliers and customers.	0.78
Creating cross-organizational supply chain management teams.	0.72
Creating compatible information sharing systems with customers.	0.63
$\chi^2/df = 1.148, RMSEA = .030, NNFI = 1.00, AGFI = .93$	
(F) SCM Strategies (Cronbach's $\alpha = .904, CR = .9472, AVE = .6736$)	
Performance of your products.	0.54
Conformance of your products to specifications.	0.54

Durability of your products.	0.56
Flexibility and responsiveness of your delivery lead time.	0.66
Flexibility and responsiveness of your production lead time.	0.75
Turnovers of your raw materials and component parts.	0.81
Overall inventory turnovers.	0.77
Accuracy of inventory levels.	0.70
Delivery lead time of purchased materials and component parts.	0.80
$\chi^2/df = 1.336$, RMSEA = .045, NNFI = .99, AGFI = .92	

(G) Performance (Cronbach's $\alpha = .923$, CR = .9449, AVE = .8117)	
Sales Growth	0.83
Market Growth.	0.93
Market Share.	0.96
Profitability.	0.80
$\chi^2/df = 2.22$, RMSEA = .086, NNFI = .99, AGFI = .93	

Note: CR = composite reliability, AVE = average variance extracted

Table 3
Correlation of the Constructs

	1	2	3	4	5	6	7
Innovativeness orientation	1.000						
Risk-Taking characteristics	.382*	1.000					
Proactiveness orientation	.489*	.441*	1.000				
Relational capital	.385*	.581*	.514*	1.000			
Coordination capability	.287*	.309*	.324*	.414*	1.000		
SCM strategies	.483*	.391*	.355*	.429*	.322*	1.000	
Performance	.522*	.335*	.304*	.265*	.203*	.458*	1.000
Mean	3.446	3.941	3.502	3.889	3.352	3.972	3.703
Standard Deviation	.780	.786	.852	.736	.705	.591	.824

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

Table 4
Second-Order Entrepreneurial SCM Competence Construct

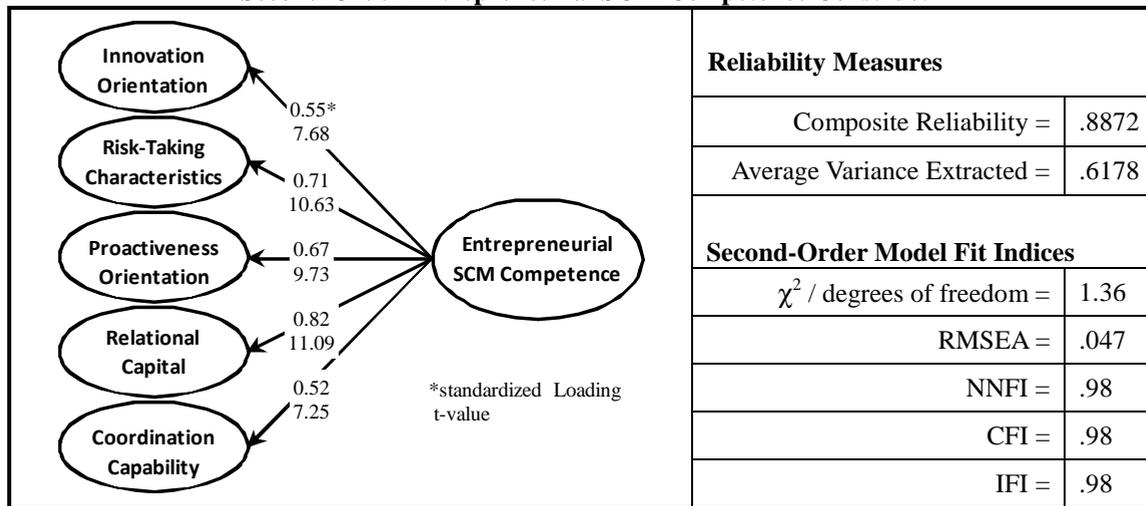
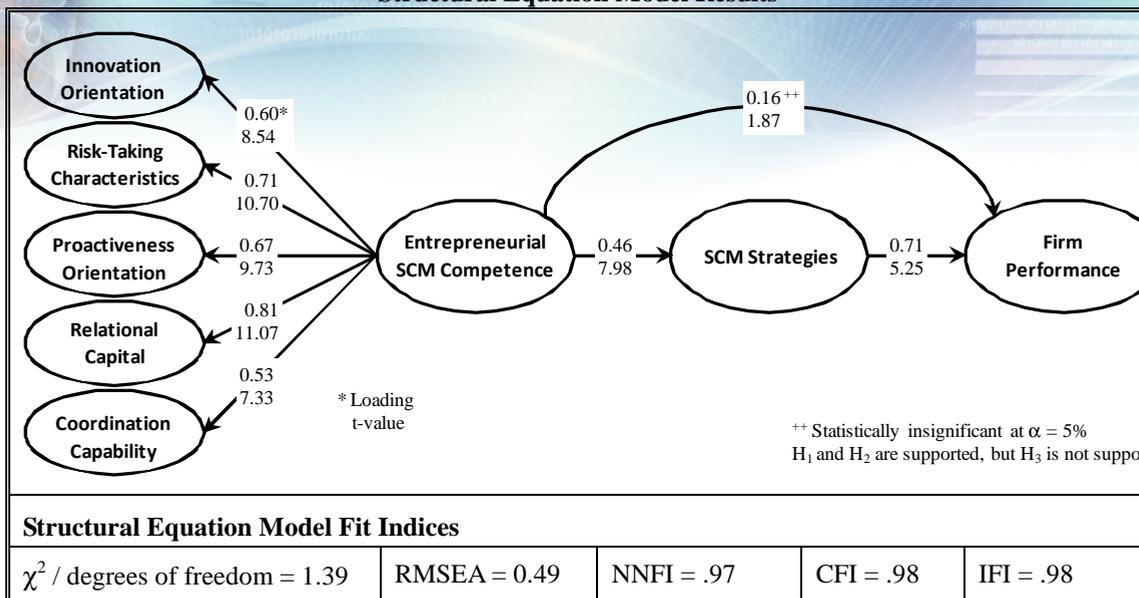


Table 5
Structural Equation Model Results



DISCUSSION

Our findings suggest that organizational 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 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 skillfully managing their entrepreneurial SCM competence. These results in turn offer worthy theoretical and managerial implications.

MANAGERIAL IMPLICATIONS

Theoretically, our findings suggest that to flourish in this competitive global market, manufacturing SMEs should develop unique competence that are inimitable to maximize their utility in the supply chain. The possession of entrepreneurial SCM competence leads to the development of crucial organizational 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 organizational culture and produce a unique configuration of resources.

Our results suggest that a firm's entrepreneurial SCM competence is a multidimensional 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 characterize 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 also likely has 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 specialized approaches owned by individual managers or is embedded within the manufacturing SME. That is, entrepreneurial SCM competence comprises of 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.

This study provides number of limitation. First, though we identify five distinctive dimensions of entrepreneurial SCM competence, we acknowledge there are likely other relevant dimensions. Ongoing research should investigate these potential dimensions, such as the organizational learning or knowledge management in which SMEs engage after participating in supply chain activities. Second, our model does not consider performance from multiple perspectives. 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.

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The background of the page features a light blue and green color scheme. On the left, there are several colorful butterflies (blue, green, yellow) flying over a faint map of the world. The right side of the page is dominated by a large, stylized graphic of a human head profile in profile, facing right. The head is composed of various geometric shapes and patterns, including binary code (0s and 1s) and curved lines, suggesting a focus on technology, psychology, or cognitive science. The overall aesthetic is clean and modern.

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