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**The influence of levels of supply chain integration on the relationship between corporate competitive capabilities and business performance: Evidence from Malaysian SMEs**

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## Abstract

This study aims to empirically investigate the influence of levels of supply chain integration (SCI) as a moderating variable on the relationship between corporate competitive capabilities (CCC) and business performance. Data was collected from a postal questionnaire from 135 Malaysian manufacturing SMEs. The data was tested using confirmatory factor analysis, cluster analysis and multi-group SEM analysis. The findings confirm that the levels of SCI in a given firm moderate the relationship between CCC and business performance for that firm. The study also contributes to the body of knowledge by expanding the understanding of levels of SCI as a moderator.

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# THE INFLUENCE OF LEVELS OF SUPPLY CHAIN INTEGRATION ON THE RELATIONSHIP BETWEEN CORPORATE COMPETITIVE CAPABILITIES AND BUSINESS PERFORMANCE: EVIDENCE FROM MALAYSIAN SMES

Siti Nur `Atikah Zulkifli<sup>a</sup> and Nelson Perera<sup>b</sup>

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## Abstract

This study aims to empirically investigate the influence of levels of supply chain integration (SCI) as a moderating variable on the relationship between corporate competitive capabilities (CCC) and business performance. Data was collected from a postal questionnaire from 135 Malaysian manufacturing SMEs. The data was tested using confirmatory factor analysis, cluster analysis and multi-group SEM analysis. The findings confirm that the levels of SCI in a given firm moderate the relationship between CCC and business performance for that firm. The study also contributes to the body of knowledge by expanding the understanding of levels of SCI as a moderator.

*Key words:* corporate competitive capabilities, levels of supply chain integration, moderator, Malaysian SMEs.

## **I. Introduction**

The Malaysian Government appreciates the importance of small and medium-sized enterprises (SMEs) to the development of the Malaysian economy. A number of agencies – for example, the Small and Medium Enterprise Corporation (SME Corp), SME Bank and the Ministry of International Trade and Industry (MITI) – have been created as part of the Government's various initiatives, programmes and strategies to promote and foster Malaysian SMEs. However, the development of SMEs in Malaysia needs to focus not only on the contributions and initiatives from Government, but on the role of the SMEs themselves.

To accomplish this, Malaysian SMEs must be equipped with the necessary skills, capability, technical expertise and best practices to remain relevant (NSDC, 2009; NSDC, 2010), and to subscribe and adhere to globally accepted standards, adopt new technologies and discover new markets (NSDC, 2009). Moreover, it is important that SMEs recognise and know how to exploit the capabilities that exist in their organisation. Much consideration must also be given not only to adapting existing methods and practices, but developing new ones that suit SMEs in Malaysia.

Many studies of business capabilities have been carried out over the past few years to identify their significance to an organisation (Ogulin, 2003; Ting, 2004). However, there is no definite evidence that focuses on the importance of capability to SMEs' success. An understanding of this issue could provide crucial insights to help less-developed countries' SMEs – which are especially vulnerable to global financial conditions – to successfully

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compete in times of crisis, and to continue to grow. Because SMEs serve as the primary growth engine to many countries (Baines, 2004; Hayashi, 2005; Hooi, 2006; Tambunan, 2007), the lack of studies examining capabilities, SCI and SMEs is of some concern.

Therefore, this study attempts to empirically investigate the influence of a moderating variable, levels of SCI, that might be critical to the relationship between the corporate competitive capabilities (CCC) and business performance of Malaysian SMEs. In the study, firms' levels of SCI was selected as a moderator from extant studies, and was considered as it applied to three domains: internal integration, external integration with suppliers and external integration with customers. In this study, CCC was considered as the second-order factor of cost leadership, differentiation, innovative marketing and customer service, and business performance was considered as the second-order factor of market, supplier, process, people and customer-relationship performance.

In this paper, the authors review the literature on CCC and levels of SCI; attempt to explore both CCC and levels of SCI practice in SMEs; and analyse and discuss the findings. Section 2 of this paper focuses on the theoretical issues of CCC and levels of SCI, Section 3 describes the research hypothesis of interest and Section 4 describes the methodology. Section 5 contains the data analysis, and Section 6 contains the discussion and conclusions.

## **II. Literature Review**

This paper reviews relevant literature covering corporate competitive capabilities (CCC) and levels of supply chain integration (SCI).

### **a. Corporate Competitive Capabilities**

Competitiveness refers to the ability of a firm to grow and prosper among other firms in the marketplace (Han et al., 2007), and involves a decision pattern and a range of business activities that a company intends to pursue, and the firm's economic and human organisation. Competitiveness also contributes to economic and non-economic factors affecting shareholders, employees, customers and the community (Andrews, 1980). It could also be referred to as the ability to sustain a market position and requires the achievement of several simultaneous targets (Altenburg et al., 1998).

Corporate competitive capabilities (CCC) are necessary to develop a core competence, and in turn to generate a good business strategy. The current study shapes a new concept of competitive advantage; consequently, there is only a limited number of studies that clarify the CCC domain. Some pioneer scholars refer to CCC as a competitive strategy or corporate strategy (Andrews, 1980; Watts et al., 1992) and a manufacturing task (Miller & Roth, 1994). These concepts can be a middle point of direction for a company developing its goals (Andrews, 1980).

The study of Tracey et al. (1999) uses structural equation modelling (SEM) analysis to demonstrate that competitive capability is positively related to advanced manufacturing technologies, to the manager's participation in strategy formulation and to performance as measured by market performance and customer satisfaction. Firms with a high level of competitive capability achieve high performance. These findings are also supported by Rosenzweig et al. (2003) through hierarchical regression analysis.

Competitive factors also depend on the firm's situation. For example, Voss et al. 1995's study of Finland, Germany, Netherlands and the UK finds that those countries share three important values: site size, origin of parent companies and agenda for individual country. The study then shows that Germany is the best model of good practice as measured by performance index, and recommends that firms – particularly SMEs – in other countries should take Germany as an excellent example to establish a world-class competitive standard.

Jusoh and Parnell's 2008 study of Malaysian firms shows that competitive advantage can be attained through lower production costs than those possible for developed countries, and also through stability in the economic and political environment. Therefore, Malaysia can provide many platforms for firms to grow and succeed. Over the past decade, Malaysia has transformed itself into a competitive manufacturing and export base, and focused on the development of a knowledge-based economy that emphasises information technology, and on developing an educated and trainable workforce. Similarly, McGinnis and Kohn (1993) contend that it is necessary for firms to be leaders in a competitive and unpredictable market environment by striving to compete strongly in the marketplace.

However, to the best of these researchers' knowledge, many scholars fail to identify the specific or standard criteria to measure CCC (for examples, Watts et al., 1992; Innis & La Londe, 1994; Miller & Roth, 1994; Tracey et al., 1999; Kim, 2006a). An accepted business model that includes cost-leadership and differentiation strategy is required for further analysis, as discussed by Porter (1980). These two strategies can be developed by focusing on organisational efforts to identify and dominate a market segment. However, if a firm fails to develop the strategies, it can become "stuck in the middle" without competitive advantage (Porter, 1980, p. 41). Some scholars have thus concentrated on two additional strategies: innovative marketing and customer service.

#### **b. Levels of Supply Chain Integration**

Supply chain integration (SCI) is the process of bringing business strategies and performance together. In the early 1990s, the development of supply chain management (SCM) became the most crucial factor in the improvement of competitive capability within a firm (Du, 2007). It is important to exchange real-time information between suppliers and customers to improve business opportunities. Lee et al. (2007) recommend that firms should consider this linkage for reducing lead time while improving performance. In general, it should be considered as a source of competitive advantage (Gimenez & Ventura, 2005; Lee et al., 2007). O'Leary-Kelly and Flores (2002, p. 226) confirm this assertion:

...the level of integration refers to the extent to which separate parties work together in a cooperative manner to arrive at mutually acceptable outcomes. Accordingly, this definition encompasses constructs pertaining to the degree of cooperation, coordination, interaction and collaboration.

Many scholars have described different ways to apply SCI. The most established are Lummus et al. (2008) and Pagell (2004), who define SCI as the integration and coordination of different process (for example, manufacturing, purchasing and logistics) by letting them work together within and across the firm to improve performance. However, firms should realise that it is difficult to achieve good integration if knowledge is lacking (Pagell, 2004). Moreover, it is difficult to explain the idea of this integration when it involves several firms and the simultaneous movement of materials such as cash, products and information (Çalipinar, 2007).

Previous studies (for example, Narasimhan, 1997; Frohlich & Westbrook, 2001; Narasimhan & Kim, 2002; Rosenzweig et al., 2003; Cagliano et al., 2006; Kim, 2006b) have asserted that the implementation of SCI is significant to the development of a firm, as it will have a positive effect on performance. A comprehensive study, looking particularly at internal and external integration, is necessary to define optimum levels of integration (Rosenzweig et al., 2003).

Narasimhan (1997) recommends the implementation of internal integration and external integration (with both suppliers and customers) to support the firm's success. Levels of SCI could be a moderator on the relationship of CCC and business performance (Kim, 2006a). Malaysian SMEs face a significant challenge of adapting strategies that have been implemented by large organisations through a better understanding of SCI (Sayuti, 2007).

### III. Hypothesis

This hypothesis focuses on the significance of levels of supply chain integration (SCI) in this study. As a moderating variable, SCI has an important role in developing a relationship between corporate competitive capabilities (CCC) and the performance of small and medium-sized firms, as CCC may not directly relate to firm performance (Kim, 2006b). The study of Narasimhan and Kim (2002) also shows that levels of SCI can be analysed as a moderator to firm performance. However, there is no such study analysing the relationship of CCC and business performance with the presence of SCI as a moderator. Thus, this study will investigate the role of SCI through the following hypothesis:

***Hypothesis: Levels of supply chain integration moderate the relationship between corporate competitive capabilities and business performance.***

### IV. Methodology

A pilot study and pre-testing of the questionnaire were conducted prior the data-collection process. Then, the questionnaire set was distributed to 950 SMEs in Malaysia; 139 were returned to the researchers. However, only 135 questionnaires (an overall response rate of 14.21 percent) were usable for further analysis. The response rate can be considered relatively high compared to similar mail surveys in the Malaysian context (for examples, Sohail & Sohal, 2003; Hooi, 2006; Hashim & Ahmad, 2008; Jusoh & Parnell, 2008).

Using the questionnaire results, the hypothesis of interest was tested through the multi-group SEM analysis, as discussed in the next section.

### V. Data Analysis

CCC, levels of SCI and business performance were measured by items rated on a seven-point Likert scale. This study conducted three types of analysis: confirmatory factor analysis (CFA), cluster analysis and multi-group SEM analysis. First, the CFA was assessed to measure the dimensionality of CCC, levels of SCI and business performance, including the assessment of first-order and second-order factors. These constructs were subjected to convergent, discriminant and nomological validity tests, and were determined to be valid.

Second, cluster analysis was conducted to develop groups for levels of SCI; the groups were determined to be high- and low levels of SCI. These two groups were used to analyse the hypothesis through multi-group SEM analysis, the results of which indicated significantly different chi-square statistics, with  $\Delta\chi^2(1) = .867, p < .05$ . As a result, levels of SCI was determined to moderate the relationship between CCC and business performance, and the hypothesis was supported.

### VI. Discussions and Conclusions

The study attempted to discover the strength of the relationship between CCC and business performance with levels of SCI as a moderator, in the context of Malaysian SMEs. The findings showed that levels of SCI significantly moderated the relationship between CCC and business performance; this study thus can be incorporated into the body of a literature that examines the improvement of firms' efficiency and achievement throughout value-chain activities.

The findings of the current study appeared to be consistent with the results of Chang et al.'s 2008 study of 145 PC manufacturers in Taiwan confirmed that levels of SCI (as measured by IT integration and process integration) significantly moderated the relationship between IT investment and firm performance. Given the lack of theoretical and empirical evidence justifying the levels of SCI moderating relationship examined in the current study, the study of Chang et al. (2008) could serve as a point of reference.

The current study constitutes a major contribution to new knowledge in its finding that levels of SCI can be the most important factor in improving Malaysian SMEs' business performance, as it transforms the communication that integrates all SC activities, from preliminary planning to products handover to end customers. Indeed, since SCI activities are grouped into high- and low levels in the analysis, policy-makers can apply this study in determining the best way to implement the appropriate level of SCI to integrate their firm's capabilities. Malaysian SMEs should be particularly concerned with establishing an efficient SC for mobilising firms' abilities in the competitive market.

For SMEs in early the stage of operations, the emphasis on systematic SCI may be more imperative due to the fact that close strategic alignment and coordination with SC partners are indispensable for linking CCC to business performance improvement. Policy-makers and practitioners need to pay an attention to such strategic alignment, as small firms usually do not have the power to control the entire SC process (Kim, 2009). For this reason, Malaysian SMEs need to seriously consider the use of levels of SCI within their organisation to strengthen the effect of improvements in CCC on business performance.

The most conspicuous limitation of this study relates to the narrow focus on the hypothesis relationship, even though other forms of relationship among the variables of interest are possible. The findings that the moderator variable, levels of SCI, positively moderates the relationship between CCC and business performance, suggests that there may be other mediating effects on the relationship. This deserves further research. In practice, this study may provide SME managers with a useful tool for examining the efficiency of their competitiveness capability in the market.

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