Research paper

Effects of supply chain management practices, integration and competition capability on performance

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Abstract
Purpose – The purpose of this research is to examine the causal linkages among supply chain management (SCM) practice, competition capability, the level of supply chain (SC) integration, and firm performance.
Design/methodology/approach – This is helpful in developing a framework for linking a firm's SC integration strategy to its competitive strategy, and in identifying how such a linkage can be connected to the improvement of organizational performance. Such effort also should enable us to derive a set of recommended strategies of SCM practices for SC integration.
Findings – From the results of LISREL analysis on small and large manufacturing firms, this paper finds that, in small firms, efficient SC integration may play a more critical role for sustainable performance improvement, while, in large firms, the close interrelationship between the level of SCM practices and competition capability may have more significant effect on performance improvement. It is concluded that, in early stage, the emphasis on systemic SC integration may be more crucial. Once SC integration has been implemented, it may be advisable to focus on SCM practice and competition capability.
Orginality/value – Attempts to show how the potential benefits of integrating supply chain can no longer be ignored.

Keywords Supply chain management, Competitive strategy, Organizational performance

Paper type Research paper

Introduction

Supply chain management (SCM) seeks to enhance competitive performance by closely integrating the internal functions within a company and effectively linking them with the external operations of suppliers, customers, and other channel members. The benefit of such supply chain integration can be attained through efficient linkage among various supply chain activities, and the linkage should be subject to the effective construction and utilization of various supply chain practices for an integrated supply chain. This means that a firm that is pursuing the effective construction of SCM practices needs to pay attention to SC integration. SCM practices implemented to achieve superior supply chain performance require internal cross-functional integration within a firm and external integration with suppliers or customers to be successful (Narasimhan, 1997).

The systematic construction and efficient utilization of SC integration and SCM practices above mentioned may be connected with competition capabilities of the firm. Carter and Narasimhan (1996) suggest that SCM and purchasing practices associated with competition capabilities of the firm may have more significant effects on firm performance, by showing that, depending on advertising, level of competition, product pricing and positioning, and degree of innovation in product lines, the influence of SCM factors on the overall performance and success of the firm can be different. Also, Stevens (1989, 1990) contends that the focus on the utilization of competition capability can be different according to the developmental stage of SC integration. That is, functional integration and early internal integration stages emphasize capabilities for cost reduction rather than balanced performance improvement, while later internal integration and external integration stages are characterized by capabilities enabling the supply of high quality products shipped direct to the line on time through full systems-visibility from distribution to purchasing, and complete information sharing and long-term commitment with key partners.

The purpose of this research is to disclose the interrelationships among the above-mentioned three constructs; SCM practice issue, the level of SC integration, competition capability, and also examines how the triangular relationships among the three constructs influence firm performance. This is helpful in developing a framework for linking a firm's SC integration strategy to its competitive strategy, and in identifying how such linkage can be connected to the improvement of organizational performance. Such effort also should enable us to derive a set of advisable utilization strategies of SCM practices for SC integration.

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Literature review

Supply chain practices cannot improve their own efficiencies individually, because the efficiency can be achieved through the interaction of various supply chain practices. Dawe (1994) asserted that, for effective SCM, comprehensive efforts for improvement in all of supply chain functions within a firm should be made, and, first of all, the focus of supply chain practices should shift from functional and independent to general and integrative. This implies that the performance of each supply chain practice should be evaluated depending on how the practice has a significant effect on the efficient integration of entire supply chain processes, and thus, the successful achievement of SC integration can be possible by the systematic utilization of various supply chain practices. Dawe's (1994) assertions have been supported by the observation by Ballou (1992) that the main activities of supply chains are generated in all of supply chain processes, and such main activities play very important roles in effective adjustment and linkage among supply chain functions.

Bowersox (1989) also have the same perspective with the above argument. He asserts that the process of SC integration should progress from the integration of internal logistics processes to external integration with suppliers and customers. This internal integration can be accomplished by the automation and standardization of each internal logistics function, the introduction of new technology, and continuous performance control under formalized and centralized organizational structure (Bowersox, 1989). External integration can be achieved by information sharing and strategic linkage with suppliers and customers, and the standardization of logistics process between firms (Bowersox, 1989). All of these arguments lead to following first hypothesis.

H1. The level of SCM practices has a positive influence on the level of SC integration.

The three generic competitive strategies (cost minimization, value-added maximization, control/adaptability enhancement) for SCM which Bowersox and Daugherty (1995) suggest derives a significant inference on the relationship between competition capability and SC integration. Firms implementing cost minimization strategies emphasize on the centralization of internal structure with concentrated decision making. Such centralization facilitates common direction and helps coordinate efforts of cross-functions within a firm to achieve maximum cost control. Meanwhile, value-added maximizing firms focusing on assuring product quality and differentiation are interested in establishing ongoing relationships with selected trading partners, because they decrease uncertainty and risk while yielding overall productivity and quality improvements. Also, control/adaptability enhancing firms emphasizing flexibility, facilitate close coordination between trading partners and precise customization or tailoring of products and services. Because the objective is to maximize responsiveness, strategic or extended enterprise alliances are encouraged. Firms with this strategic perspective seek to establish long-term cooperative relationships with channel partners.

The above discussion of Bowersox and Daugherty (1995) implies that the strength of strategic alliance and SC integration may be different depending on the characteristics and level of competition capabilities. Simchi-Levi *et al.* (2003) support the above argument. They assert that strategic alliance can lead to adding value to products, improving market access, strengthening operations, adding technological strength, enhancing strategic growth, enhancing organizational skill, and building financial strength. When considering that the benefits of strategic alliances above can be defined as key competition capabilities (Bowersox and Daugherty, 1995; Simchi-Levi *et al.*, 2003) and SC integration can be regarded as the most intensive level of strategic alliance (Stevens, 1989, 1990; Simchi-Levi *et al.*, 2003), such assertion emphasizes that SC integration may have a significant relationship with the intensification of competition capabilities. The following hypothesis represents such view.

H2. The level of SC integration has a positive effect on competition capability.

In general, firms pursue different competition capabilities within the generic strategies of competing on cost, quality, time, flexibility, or product differentiation. Also, supply chain practices vary depending on the nature of the business and the competitive environment (Narasimhan and Carter, 1998). A question that arises in this context is which supply chain practices should be used to support which competition capabilities of the firm. On this question, Goh *et al.* (1999, pp. 15, 20) and Watts *et al.* (1992, p. 5) suggest a meaningful clue:

> With an overall cost leadership strategy requiring tight cost control, one can also expect the supply chain function to emphasize cost minimization. Meanwhile, if the corporate competitive strategy is centered around providing customers with high quality products, the supply chain strategy and practices must also focus on quality.

The comparison of the two types of strategy which Miles and Snow (1978) provide, lead to more specific implications. The prospector, represented by differentiation, diversification, flexibility and innovation, identifies the possibility of a corporation's success in daring investments on new technology and facilities, the development of new products, and pioneering new market opportunities rather than focusing on stability. Therefore, an extensive marketing plan and a decentralized management system is preferred, as focus is placed on the promotion rather than restriction of organizational activities. On the other hand, the defender scheme represented by cost leadership, efficiency, integration and progressiveness, focuses on the stability of organization, takes a cautious stand on changes in the environment, and defends itself from market infiltration by competitors with a narrow range of products. Hence, a small-scale plan and a centralized control system are preferred, where only a limited amount of environment analysis is carried out. Miles and Snow's (1978) theory implies that cost leadership priority can be connected with highly centralized and formalized organizational/administrative activities of the supply chain, while differentiation priority can be linked to highly specialized infrastructural and technological activities. Accordingly, from all of the above arguments, we can expect the following hypothesis.

H3. The level of SCM practices has a positive influence on competition capability.

Most of SC integration studies hold the same view in that SC integration level has a positive influence on performance outcomes. Armistead and Mapes (1993) indicate that the level of SC integration improves quality and operating

performance through a field study of 38 firms' managers in the UK. Narasimhan and Jayaram (1998) propose that SC integration impacts customer responsiveness and manufacturing performance via the key linkage between sourcing and degree of manufacturing goal achievement through empirical validation of key causal linkages in a supply chain. Johnson (1999) shows, through a survey of industrial equipment distributors, that strategic integration results in enhanced economic reward for the firm. Stevens (1990) also contends that depending on the developmental stage of SC integration, integration can remove the barriers between functions or organizations, thus leading to efficient linkages in a supply chain and the strengthening of supply chain competitiveness. Best and Seger (1989) hold a similar view with Stevens (1990) by emphasizing the efforts for cost reduction in the reactive stage and for balanced performance improvement in the integrative stage in their study on four logistical developmental stages. These arguments lead to the following hypothesis.

H4. The level of SC integration has a positive effect on firm performance.

Narasimhan and Carter (1998) suggest that efficient SCM and purchasing practices may also have a significant effect on firm performance. Their study showed that sales, market share, and market position are influenced by not only advertising, competition level, product pricing and positioning, and degree of innovation in product lines, but also purchasing factors, thus emphasizing purchasing's strategic impact on the firm. This means that the purpose and performance of a firm to fulfill various customer demands or to improve the efficiency of a firm itself can be different depending on the characteristics and utilization focus of supply chain practice. Lambert and Stocks (1993) also stresses that supply chain practices are needed for satisfying customer demands. Also, some successful examples of supply chain practices in the real world such as Amazon.com, Tesco, Dell Computer, and Toyota confirm the existence possibility of significant causal relationship between the utilization characteristics of supply chain practice and firm performance. Such possibility is connected to the following hypothesis.

H5. The level of SCM practices has a positive effect on firm performance.

A company's underlying cost structure must be low enough to offer a price that is comparable to the competition, or the products offered must be higher in value than the competition so a premium price can be commanded. Product quality and product line variety must meet or exceed customer expectations. The company should have high order fill rates, short order cycle times, accurate order and shipping information, and frequent deliveries. These competitive capabilities should enable firms to achieve high customer satisfaction and further market performance (Tracey *et al.*, 1999). Innis and LaLonde (1994) and Koufteros (1995) assert that competition capabilities including price offered, product quality, product line breadth, order fill rate, order cycle time, order and shipment information, and frequency of delivery are linked to customer satisfaction. Also, Miles and Snow (1978) note that competitive status of a corporation acquired from superior competition capability carries significant meaning on corporation's performance. These arguments enable us to suggest the following hypothesis.

H6. Competition capability has a positive effect on firm performance.

The literature review above described leads to the development of the proposed four construct variables; SC integration, SCM practices, competition capability, firm performance. Structural equation modeling technique was used to investigate the interrelationships among the four construct variables.

Research methodology

Sampling

Consistent with the purpose of this study, manufacturing corporations carrying out all the value chain activities in a supply chain were sampled. The data were collected through questionnaires sent to supply chain managers or top-level executives in 590 large manufacturing corporations among Korea's listed and registered corporations and 900 Japan's major national logistics professional association members. The questionnaires were transmitted by individual visit, fax, and mail to Korean firms, and by fax and mail using the countrywide mailing list of the association for Japanese firms. The respondents were mainly supply chain managers, but in cases where a separate organizational entity for SCM did not exist, response was requested from a top-level executive of sales, production, or planning department who was responsible for or well acquainted with supply chain policies and corporate strategies of the firm. In order to raise the reliability of measurement, respondents were requested to consult with others in the SCM department or functional executives as appropriate when answering questions. A total of 668 completed responses (Korea – 265, Japan – 403) were returned (response rate = 44.8 per cent), and of these 668 responses, 45 incomplete responses (Korea – 21, Japan – 24) were discarded. Accordingly, the analysis that follows and all reported statistics were based on a sample of 623 manufacturing organizations (Korea – 244, Japan – 379). Table I summarizes the sample characteristics for each country according to industry type and size. The diversity of the sample should strengthen the external validity of this study results.

Research variables and measurements

Table II organizes research variables and measurement items with measurement scale. One thing to be noted is about the selection procedure of measurement items for supply chain practices. In order to select the measures for the utilization focus of supply chain practice, we identified 54 variables from previous research (Handfield and Withers, 1993; McGinnis and Kohn, 1993; Rao *et al.*, 1994; Dawe, 1994). Through preliminary interviews with 30 supply chain executives and experts, variables with low explanatory value were removed and those items having similar characteristics among items with high explanatory value were grouped together. This process yielded seven broad areas of supply chain initiatives (see Table II). These seven SC initiatives can be grouped theoretically into three dimensions; technological initiative, structural initiative, logistical initiative.

Table I Sample characteristics

	Type of Industry						
	Consumer products industry[a]		Basic industrial material industry[b]		Electronic and machinery industry[c]		Total
Korea							
Number of firms	99	(40.7%)	81	(33.1%)	64	(26.2%)	244
Mean sales (million US $)	342		560		744		520
Mean asset (million US $)	428		775		963		684
Japan							
Number of firms	137	(36.1%)	73	(19.3%)	169	(44.6%)	379
Mean sales (million US $)	958		1,290		1,522		1,273
Mean asset (million US $)	1,198		1,609		2,137		1,696

Notes: [a] Consumer product industry: food processing, sweetmeats, pharmaceuticals, footwear, clothes, wood, furniture; [b] Basic industrial material industry: textile, organic chemical, inorganic chemical, petrochemical, cement, paper, tire, fertilizer, fabric, pulp, metal; [c] Electronics and machinery industry: computer, home appliances, communication equipment, electronic parts, automobile, automobile parts, machinery

Data analysis

Confirmatory factor analysis

In order to examine precisely unidimensionality, and convergent and discriminant validity of measurement items, confirmatory factor analyses (CFA) using LISREL were conducted. The overall fits of all confirmatory factor analyses were judged to be satisfactory (χ^2 probability > 0.10; GFI, AGFI, NFI, NNFI > 0.9, RMSR < 0.05) (Byrne, 1994; Hair *et al.*, 1998). Also, all the standardized estimates of the observed variables exceeded 0.500 and all the corresponding *t*-values were statistically significant at the 5 per cent significance level. Together these indicate convergent validity of measurement variables designed in this paper. For identifying convergent validity more precisely, composite reliability index and average variance extracted were computed by using completely standardized solutions derived from CFA (Fornell and Larcker, 1981). All composite reliability indices and average variance extracted were over 0.7 and 0.5 respectively, thus verifying convergent validity (Bagozzi and Yi, 1988). All modification indices (Bentler, 1995) also provided from LISREL revealed no parameters that could be released to significantly improve model fit. This reflects high discriminant validity.

The interpretation of results

In order to investigate more precisely the effect of company size, this paper divided 623 samples into large firms and small firms regardless of the countries. For the classification into large and small firms, this paper cluster-analyzed the sample of firms, grouping them on annual sales and assets. As a result, 370 and 253 firms are grouped into large and small firms respectively. LISREL and maximum likelihood method was used for the estimation of unknown parameters, and the matrix of covariance between measurement variables as input data for LISREL analysis was employed.

One thing to be noted was that the Goodness of Fit for the hypothesized structural equation model (base model) for small firms indicated that the model did not fit the data satisfactorily; $\chi^2 = 85.47$ ($P = 0.015$), df $= 59$, GFI $= 0.907$, AGFI $= 0.857$, NNFI $= 0.85$, NFI $= 0.80$, RMSR $= 0.114$. Also, the results of modification index and normalized residual suggested modifications to the model that would improve the Goodness of Fit. That is, the modification index of path for competition capability → SC integration which was fixed at a value of zero in the base model was highest and significant (18.88). This was a very interesting result when considering that the path for SC integration → competition capability which sets to be free in the base model was insignificant at 95 per cent significance level. Accordingly, this paper modified the base model by setting the path of competition capability → SC integration to be a free parameter instead of the path of SC integration → competition capability. All of the overall goodness of fit measures for the revised model satisfied the normally asserted standards for Goodness of Fit, indicating a high degree of fit of the data to the proposed model. Also, model revisions were not suggested by the modification indices.

The procedure deriving the result for large firms was the same as that for small firms. The Goodness of Fit for the hypothesized structural equation model (base model) for large firms indicated that the model did not fit the data satisfactorily; $\chi^2 = 81.28$ ($P = 0.030$), df $= 59$, GFI $= 0.925$, AGFI $= 0.884$, NNFI $= 0.88$, NFI $= 0.84$, RMSR $= 0.095$. Also, the results of modification index and normalized residual suggested modifications to the model that would improve the Goodness of Fit. That is, the modification index of path for SC integration → SCM practice which was fixed at a value of zero in the base model was highest and significant (15.45). By considering that the path for SCM practice → SC integration which sets to be free in the base model was insignificant at 95 per cent significance level, this paper modified the base model by setting the path of SC integration → SCM practice to be a free parameter instead of the path of SCM practice → SC integration. The goodness of fit indices for the revised model satisfied the generally accepted standards for Goodness of Fit, indicating a high degree of fit of the data to the proposed model. Also, the modification indices did not suggest model revisions.

In both cases, the results of the structural model indicated that SCM practice level has a significant influence on competition capability. This result holds the same view with previous research emphasizing the necessity of efficient linkage between SCM practice and competition capability, thus supporting *H3*. However, the influences of SCM practice and competition capability on firm performance was different between small and large firms. That is, in the case of small

Table II Measurement items and method

Research variable	Measurement items
Level of supply chain integration **(Seven-point Likert scales: Extremely low-extremely high)**	
Company's integration with suppliers	Information exchange with suppliers through IT
	The level of strategic partnership with suppliers
	The participation level of suppliers in the design stage
	The participation level of suppliers in the process of procurement and production
	The establishment of quick ordering system
	Stable procurement through network
Cross functional integration within a company	Data integration among internal functions through network
	Systematic IS integration among internal functions
	Real-time searching of the level of inventory
	Real-time searching of logistics-related operating data
	Data integration in production process
	Integrative inventory management
	Systematic interaction system between production and sales
	Periodic interdepartmental meetings among internal function
Company's integration with customers	Follow-up with customers for feedback
	The level of computerization for customer ordering
	The level of organic linkage with customers by network
	The level of sharing on market information
	The agility of ordering process
	The frequency of periodical contacts with customers
	The level of communication with customers
Level of SCM practice **(Seven-point Likert scales: Extremely low-extremely high)**	
Technical initiative	Advanced management and manufacturing technology
	Nationwide information network
Structural initiative	Formalization of supply chain organization
	Executive program for supply chain management
	Human resource management
Logistical initiative	Logistics infrastructure
	Close location to suppliers and customers
Competition capability **(Seven-point Likert scales: Extremely low emphasis-extremely high emphasis)**	
Cost leadership	The capability to procure raw-material consistently
	Quality control capability in production activity
	The capability to forecast market growth and demand
	The capability to reduce production cost
	Innovation of manufacturing process
	The capability to offer consistent quality product
Customer service	On-time delivery capability
	The capability to supply high-quality product
	The capability to deliver products quickly
	Volume flexibility capability
	The capability to compete on price
	After-sale service capability
Innovative marketing technology	The capability to distribute the product broadly
	The capability to advertise and promote the product
	The capability to develop distinctive brand
	The capability to utilize innovative marketing technique
	The capability to control sales/distribution network
Differentiation	The capability to develop new product
	The capability to deliver a broad product line
	Design flexibility depending on customer demand

(continued)

Table II

Research variable	Measurement items
Firm performance (Seven-point Likert scales: Worst in industry-best in industry)	
Market performance	Sales growth
	Market share growth
Financial performance	Total cost reduction
	Return on investment
	Return on assets
	Financial liquidity
	Net profit
Customer satisfaction	The reduction of response time for product design changes
	The reduction of response time for product volume changes
	The accuracy of order processing for customers
	The reduction degree of product return ratio
	The speed of order handling
	The reduction of response time for product returns or after-service

firms, SCM practice and competition capability do not have significant direct impacts on firm performance at the 95 per cent significance level. But the indirect effects of SCM practice and competition capability on firm performance are very high as can be seen in Table III (SCM Practice → Firm Performance: 0.540, Competition Capability → Firm Performance: 0.381). This result means that, in small firms, SCM practice and competition capability may not be related to firm performance directly, and thus intermediate mechanisms for efficient linkages of SCM practice and competition capability with firm performance may be required. This explains the logical validity of the revised model which substitutes the path of SC integration → competition capability for the path of competition capability → SC integration. That is, in the revised model, both SCM practice and competition capability have statistically significant influences on SC integration, and SC integration has a significant effect on firm performance. The LISREL results for small firms show that SC integration may be a significant intermediate mechanism for efficient linkages of SCM practice and competition capability with firm performance. The comparison with the results on large firms more clearly brings out the importance of SC integration in small firms.

In case of large firms, SCM practice and competition capability have significant direct effects on firm performance. Meanwhile, even though SC integration had a significant effect on performance, the level of significance of the path ($p < 0.05$) was less than that in case of small firms ($p < 0.01$). On the contrary, the indirect effect of SC integration on performance was statistically significant as can be seen in Table III (0.742). This means that in small firms, the direct effect of SC integration on performance is stronger, while in large firms, the indirect effect of SC integration on performance is dominant.

However, the above argument does not mean that, in large firms, the importance of SC integration can be diminished. From the results for large firms, the following principal

Table III Hypothesis test result

Path	ML coefficient	Indirect effect	*T*-value	Hypothesis test
Small firm group				
SCM practice → SC integration	0.646	0.203	4.499*	*H1* Support
SC integration → Competition capability	0.134		1.202	*H2* Reject
Competition capability → SC integration[a]	0.543		(3.712)*	
SCM practice → Competition capability	0.374		2.992*	*H3* Support
SC integration → Firm performance	0.701		5.003*	*H4* Support
SCM practice → Firm performance	0.232	0.540*	1.787	*H5* Reject
Competition capability → Firm performance	0.208	0.381*	1.699	*H6* Reject
Large firm group				
SCM practice → SC integration	0.156		1.397	*H1* Reject
SC integration → SCM practice[a]	0.577		4.101*	
SC integration → Competition capability	0.398	0.375*	2.979*	*H2* Support
SCM practice → Competition capability	0.650		4.886*	*H3* Support
SC integration → Firm performance	0.262	0.742*	2.309*	*H4* Support
SCM practice → Firm performance	0.539	0.362*	3.660*	*H5* Support
Competition capability → Firm performance	0.557		3.902*	*H6* Support

Notes: [a] Result for path set to be free in the revised model according to modification index; *statistically significant at $p \leq 0.05$

question arises: "What makes it possible for SCM practice and competition capability to influence on firm performance directly, in case of large firms?" This question is related to the logical validity of the revised model which substitutes the path of SCM practice → SC integration for the path of SC integration → SCM practice. That is, SC integration has statistically significant influence on both SCM practice and competition capability. This means that, in large firms, SC integration may play an infrastructual role for direct effects of SCM practice and competition capability on firm performance.

Implications and conclusion

The potential benefits of integrating supply chain can no longer be ignored. This potential, however, will be realized only if the connections and inter-relationships among different parts of the supply chain are recognized, and proper alignment is ensured between the design and execution of the company's competitive strategy (Stevens, 1989). This paper is an attempt to show how this potential can be realized through linking SCM practices to competition capability.

LISREL analysis results on small firm and large firm groups indicate that in small firms, the role of SC integration as a critical intervening variable between SCM practice or competition capability and firm performance is highly emphasized, while in large firms, the infrastructural role of SC integration which drives the strong interrelationship between SCM practice and competition capability is stressed. This means that large firms had already achieved considerable levels of SC integration, and, based on such high level of SC integration, more close interrelationship between SCM practice and competition capability and more significant direct effect of these two constructs on performance might be possible.

However, regardless of whether the role of SC integration is intermediate or infrastructural, the results of this paper discloses empirically that, depending on the intensity of triangular relationship among SCM practice, competition capability, and SC integration, the level of effect on performance can be different. This is a major contribution of this paper. This contribution also brings out the necessity of subsequent research on the specific type of linkage between SCM practice and competition capability, the causal relationship between such specific linkage type and each level of SC integration, and the effect of such causal relationship on each of performance measures, in order to actualize the proposed model this paper suggests. In this perspective, the research on causal relationships among measurement variables consisting of latent variables in this paper deserves further research.

The results of this study also provide meaningful managerial implications. As mentioned above, it can be interpreted from the results that in small firms, efficient SC integration may play a relatively more critical role for performance improvement, while in large firms, the close interrelationship between SCM practice and competition capability may have more significant effect on performance improvement. This implies that, in early stages of SC integration process, the emphasis on systematic SC integration may be more crucial, and once SC integration has progressed somewhat, it may be advisable to focus on SCM practice and competition capability.

Such implication also drives a deduction on the characteristics and features of SC integration. That is, the role of SC integration as an intervening variable means that even if a firm has excellent SCM practices and competition capabilities, close strategic alignment and coordination with its supply chain partners are indispensable for linking such SCM practices and competition capability to firm performance improvement. Such strategic alignment or integration may be more serious in cases where a firm does not have size and power enabling the control of entire supply chain. When considering that small firms are generally difficult to cover, in other words, control consistently and monitor completely entire supply chain, the above argument is persuasive. However, the reckless pursuit of strategic alignment or integration without the capability of managing the entire supply chain has considerably high risks for the loss of bargaining power to SC partners, because small firms might fully accept even their SC partner's unreasonable demands due to the concern that the investments on site, physical, human specific assets for transaction with specific SC partners become sunk cost, thus probably being dominated by partners.

Accordingly, the strategic integration approach which properly utilizes partners' existing facilities and technologies by the way of short-term lease or contract may be advisable rather than the new investments on transaction-specific assets with partners. In other words, not technical and operational integration approach based on direct investments for facility and technology, but arms-length integration or market exchange integration approach which flexibly controls the level of close relationship based on organizational and administrative behavior may be more effective. However, such partnerships in terms of arms-length integration may not guarantee long-term benefits because of continuous cost burdens of maintaining the relationship. Accordingly, if size and know-how enable active control of the entire supply chain are prepared from arms-length integration, the change into technical integration on the basis of new investments on transaction-specific assets may be advisable in the long run. Such technical integration can accelerate the intensification of SCM practice and competition capability itself or the level of correlation between two variables by embodying internally necessary expertise, facility, and resource.

Conclusively, the argument on the change of SC integration role and characteristics according to size abovementioned deserves further consideration in managerial perspectives in that it provides a meaningful suggestion on the development stage of SC integration and the feature of SC integration in each stage, and this can be a strategic framework for accelerating an attempt to improve or further reengineer the structure of the entire SCM.

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