

# The Role of Market Orientation and Organizational Innovativeness in Enhancing the Supply Chain Agility of Korean Apparel Firms

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Received June 10, 2014; Accepted August 14, 2014

## Abstract

This study investigates the effects of two organizational variables (market orientation and organizational innovativeness) and the interaction between these two variables on supply chain agility as well as examines the moderating effect of 1) firm size and 2) the extent of global sourcing. Employing a web-based e-mail survey method, the study issued 1,320 questionnaires to South Korea apparel manufacturing companies; data from 147 completed surveys were analyzed. Market orientation, organizational innovativeness, and the interaction between the two variables positively affect supply chain agility. Firm size and global sourcing do not have any significant moderating effects on the relationship between organizational characteristics and supply chain agility. Companies with high market orientation and high organizational innovativeness have more agile supply chains than companies with only market orientation or organizational innovativeness. Firms need to effectively enhance market orientation and organizational innovativeness simultaneously to enhance supply chain agility. The lack of a moderating effect from firm size suggests that all companies should promote a greater degree of market orientation and organizational innovativeness to enhance supply chain agility regardless of firm size.

**Key words:** Market orientation, Organizational innovativeness, Supply chain agility, Global sourcing, Apparel supply chain

## I. Introduction

Supply chain agility (SCA) has become a critical source of competitive advantage in turbulent, uncertain, and changing market environments (Christopher, 2000; Swafford et al., 2006). Agility concentrates on quick responsiveness to dynamic and volatile markets and customer demand (Swafford et al., 2006; van Hoek et al., 2001). With a recent focus on responsiveness to customer needs, rather than cost reduction in supply chain management (SCM), agility is the most important aspect of SCM (Christopher & Towill, 2002).

Thus, understanding the factors related to SCA is important. Among the many factors, this study particularly focused on organizational characteristics and posits that market orientation (MO) and organizational innovativeness (OI) may be related to SCA (e.g., Braunscheidel & Suresh, 2009; Lin et al., 2010). These posits suggest that both factors will contribute to building a more agile supply chain because both market-oriented and innovative companies will respond to the changing needs of customers and to competitors' strategies more alertly. However, despite the possible MO and OI linkages to supply chain management, previous studies have dealt mainly with the impacts of MO and OI on a firm's financial performance or marketing performance such as profitability, market

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share, and sales growth. Recently, however, some studies on the relationship between organizational characteristics and SCM have appeared. Lin et al. (2010) explored the effects of MO and resource orientation on supply chain performance; they also demonstrated how MO and resource orientation affected the drivers of innovation in channel integration. Martin and Grbac (2003) researched how the strength of supplier relationships related to a firm's responsiveness to customer need and competitor action; they discovered a positive relationship. Min et al. (2007) found that supply chain orientation and SCM played a mediation role in the relationship between market orientation and firm performance. In addition, some previous studies focused on the antecedent role of flexibility (Swafford et al., 2006), and internal and external integration (Braunscheidel & Suresh, 2009) in SCA. However, the role of MO and OI in enhancing SCA remains unknown and research on this topic is very limited.

While global sourcing is common, and improvements in transport and communication technology may have reduced the barriers of distance, the fundamental challenges of global sourcing, such as longer lead times, still exist. Thus, this study holds that the impact of MO and OI on SCA may vary according to a firm's degree of global sourcing (i.e., global sourcing impedes the agility). In addition, firm size is an important variable explaining, in part, a firm's strategic behavior and performance. The general traits of small- and medium-sized enterprises (SME), such as less bureaucracy, less complicated organizational structures, and closer interactions among departments than are evident in large firms (Fiegenbaum & Karnani, 1991), may contribute to enhancing agility within a supply chain; similar enhancements are unlikely in large firms highlighting formalized work orders and procedures. Therefore, MO, OI, and SCA relationships will vary according to firm size, with large firms experiencing more difficulty in achieving agility.

The purpose of this study was to investigate the impact of two organizational factors, MO and OI, and the interaction effect of MO and OI on SCA. Additionally, this study explored the possible moderating effects of firm size and the degree of global sourcing

on relationships between MO and OI and SCA. This study focused on the apparel industry as agility in supply chain management is critical in the apparel market due to the characteristics of the industry. The industry is characterized by "demand uncertainty resulting from the high variation in styles and consumer tastes and the handling of numerous stock keeping units in a season, which makes it impossible to forecast demand accurately" (Jin et al., 2011, p. 193). Supply chains in the apparel industry are relatively long, there are a number of parties involved, and they consist of many small extremely fragmented chain members (Jin, 2006). For these reasons, the apparel industry is a business sector in which the importance of an agile supply chain is greater than in any other industry, such as automobiles or semiconductors. Fast-fashion retailers, such as ZARA and H&M, have experienced huge success by agilely providing small quantities of the latest fashion; their success supports the importance of SCA in the apparel industry. The study also focused on the Korean apparel industry because no country is more competitive, and none has a more dynamic market than Korea does. Korea's status is attributable to its high population density and its potential purchasing power, and its penetration into the world market with the highest level of broadband internet (World Economic Forum, 2012). In addition, Korean apparel consumers are extremely demanding. As the president of Dior Korea confessed "If we are able to settle in the Korean market, it will affect the Asian market as a whole" ("Interview - the president", 2011). The Korean market is often a test market to predict the success of products in the global market ("The positioning", 2005).

## II. Literature Review

### 1. Market Orientation

MO has been defined as "the organization culture that most effectively and efficiently creates the necessary behaviors for the creation of superior value, performance for the business" (Narver & Slater, 1990, p. 21), and "the organization-wide generation of market intelligence pertaining to current and future customer

need, dissemination, and responsiveness to it” (Kohli & Jaworski, 1990, p. 6). Many scholars and enterprisers consider MO a core factor of modern marketing strategies and management. It is widely recognized that the more a company increases its MO, the better its market performance is (Turken, 2005). The notion that a market-oriented corporate culture is a key factor in a company's superior performance has started to receive academic attention (Han et al., 1998) as well.

Previous studies identified antecedents, mediators, and consequences related to MO. Confirmed antecedents of MO include positive supplier relationships (Martin & Grbac, 2003), learning orientation (Braunscheidel & Suresh, 2009), and resource orientation (Lin et al., 2010). Studied mediators in the relationship between MO and performance include integration, flexibility (Braunscheidel & Suresh, 2009), supply chain orientation (Min et al., 2007), SCM strategies (Green et al., 2006), value co-creation, value constellation, and resource integration (Lin et al., 2010). MO has proven consequences in several areas, which may be used to measure its effectiveness, including general performance (Martin & Grbac, 2003; Min et al., 2007), firm's SCA (Braunscheidel & Suresh, 2009), supply chain performance (Lin et al., 2010), and marketing as well as financial performance (Green et al., 2006). Braunscheidel and Suresh (2009) investigated the impact of two cultural antecedents and three organizational practices on the SCA of a firm. They found that two antecedents (MO and learning orientation) affected the three organizational practices - internal integration, external integration with key suppliers, and external flexibility - and that these organizational practices then had impacts on the firm's SCA.

## 2. Organizational Innovativeness

Organizational innovativeness refers to an organization's capability to innovate (Akman & Yilmaz, 2008). In other words, OI represents the active capability of an organization to introduce, develop, and implement new ideas, products, and technologies (Adler & Shenhart, 1990).

A firm with a high level of innovative capability can create new ideas and change them into new prod-

ucts, processes, or systems. This innovative capability can improve the ability of employees to solve difficult situations and unpredicted problems, thus increasing the possibilities for organizational maintenance and growth (Lin, 2006). Therefore, when organizational innovativeness is well developed and utilized, it becomes a crucial component a firm's competitive advantage.

Studies have consistently linked innovativeness to higher firm performance (Calantone et al., 2002; Deshpande & Farley, 2004; Hult et al., 2004). Calantone et al. (2002) investigated the relationships among learning orientation, firm innovation capability, and firm performance. Deshpande and Farley (2004) explored how organizational culture, market orientation, and innovativeness affected the performance of firms competing in business-to-business markets. Hult et al. (2004) argued that improving OI assisted organizations in gaining superior business performance. Lin (2006) stated that OI influenced organizational performance in three ways; enhanced efficiency, flexibility, and adaptability.

The purpose of this study was to investigate the impacts of two organizational characteristics (MO and OI) on supply chain agility. More specifically, the study tested MO, OI and MO-OI interaction as direct antecedents of SCA. It also investigated the moderating effects of firm size and global sourcing on the relationships among MO, OI, and SCA. <Fig. 1> shows the research framework.

## III. Research Framework and Hypotheses Development

### 1. Market Orientation and Supply Chain Agility

This study expected that an increase in a firm's degree of MO would help to increase agility in its supply chain. Prior literature defined MO from two perspectives: (1) organizational culture (i.e., Narver & Slater, 1990), and (2) organizational behavior (i.e., Kohli & Jaworski, 1990). Following Narver and Slater's (1990) organizational culture perspective, this study conceptualized MO in three dimensions: (1) customer orientation, (2) competitors orientation, and (3) inter-

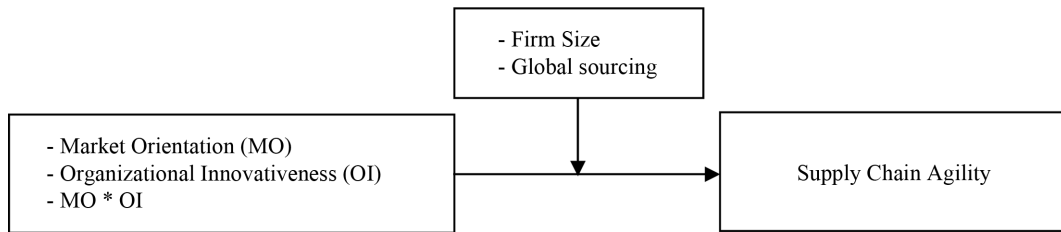


Fig. 1. Proposed research framework.

functional coordination. Thus, this study postulated that organizations with higher levels of each of the above market orientation dimensions would more likely to exhibit stronger SCA.

This study posited that customer orientation, the first dimension of MO, positively related to SCA. That is, if a firm wants to meet customer requirements more efficiently, it has to promote agility in the supply chain while responding to the changing needs of customers. In particular, with the continuous shortening of a product's life span due to the high seasonality of fashion goods, it is crucial for customer-oriented apparel firms to launch new products that respond promptly to customer demands. To develop new products rapidly, agility within the supply chain becomes essential. Thus, firms with high levels of customer orientation tend to exhibit high levels of agility within the supply chain.

The next dimension of MO competitor orientation, improves a firm's SCA by focusing its efforts on responding and adapting to market needs more effectively than its competitors do. Competitor-oriented firms analyze their competitors' strategies and strengths, products and services, more than firms that are not competitor-oriented do (Han et al., 1998). Competitor-oriented firms should establish strong relationships with their suppliers for quick responses because individual firms no longer control all the resources necessary to compete without close cooperation with suppliers in the value chain. Therefore, another expectation of the study was that firms with high levels of competitor orientation would exhibit high levels of SCA.

The third dimension of MO, inter-functional coordination, requires the involvement of each organizational function (marketing, sales, manufacturing, R&D,

and financing) to meet customers' needs (Narver & Slater, 1990). Moreover, in the context of today's competitive environment, inter-functional coordination supports agile collaboration among firms in the supply chain beyond an organization's boundaries; it also promotes collaboration among many functional areas or departments within the firm (Lukas & Ferrell, 2000). Especially, inter-functional coordination based on information sharing is one of the important components of SCA enhancement (Cooper et al., 1997). Thus, one can expect, as this study did, that high levels of inter-functional coordination would positively affect SCA. Drawing on the above discussion, the study hypothesized:

H1 Firms that exhibit high levels of market orientation will exhibit high levels of supply chain agility.

## 2. Organizational Innovativeness and Supply Chain Agility

The adoption of innovation is generally intended to contribute to the performance or effectiveness of a firm. In the context of SCM, innovativeness, integration, is imperative particularly in terms of enhancing the supply chain (Rutner et al., 2003). More specifically, openness to new ideas, products, processes or business systems that promote administrative efficiencies and the adoption of new process technologies will result in improvement of supply chain performance, in terms of such measure as time-to-market, cost reduction, responsiveness, process improvement, and more (Panayides & Lun, 2009).

Three specific reasons explain the importance of OI

in the supply chain context. First, OI enhances efficiency. Since innovative organizations are more open to considering and accepting new knowledge, processes, and technologies, this capability helps the organization's members to discover new methods of production for the purpose of quality and quantity improvement (Lin, 2006). Second, innovativeness enhances flexibility. When an organization encounters an unanticipated change in the external environment, prompt reactions and quick searches for solutions are critical for the organization to manage the change (Lin, 2006). Third, innovativeness enhances adaptability. An innovative firm has a higher level of adaptability because of its willingness to engage in and adopt innovations (Lin, 2006). According to prior literature about agility, the three dimensions - efficiency, flexibility, and adaptability - along with response, speed, quality, and change, are core characteristics of SCA (see. Rimie-ne, 2011, p. 895). Therefore, this study postulated that organizations with higher levels of OI implementation were more likely to exhibit stronger SCA.

H2 Firms that exhibit high levels of organizational innovativeness will exhibit high levels of SCA.

### 3. Interactions of Market Orientation and Organizational Innovativeness

MO is necessary for the creation of an appropriate environment for innovation (Baker & Sinkula, 1999). When organizations intend to develop a strong MO, they should also try to enhance their innovativeness (Hurley & Hult, 1998). Even if the MO of a firm is high and already has a positive impact on the firm's SCA, the effects of the firm's MO may vary according to its degree of innovativeness. Even if a firm responds sensitively to its customers' needs and to competitor activities, it should be open to new ideas and processes and should carry out such processes aggressively to earn greater results from its MO. OI enables firms to create competitive power constantly in a fierce and uncertain business environment. A firm with high levels of MO will actively pursue more innovative activities compared to a firm with low levels of market-orientation. Consequently, if both the MO and

the OI of a firm were high, the study expected that the impact of the interaction of these two on the firm's SCA would be greater than that of MO alone or innovativeness alone. In sum, firms can achieve successful results when MO and OI work together. Thus, the authors hypothesized:

H3 The interaction of market orientation and organizational innovativeness positively affects SCA.

### 4. Moderating Effect of Firm Size

Traditional research has emphasized various mechanisms used by large firms to gain a competitive advantage and to compete more effectively against small and medium-sized enterprises (SME). While large firms enjoy several advantages, such as economies of scale, bargaining power with suppliers and distributors, reputation, and monopoly power to set prices (Das et al., 1993), SME are likely to possess inter-organizational trust, better communication, and cooperative competency. The owners of SME can respond with agility and flexibly to market intelligence because decision making is non-bureaucratic and the decision-maker is able to oversee the whole production and marketing process (Nooteboom, 1994). Less bureaucracy and a family-like atmosphere contribute to enhance flexibility and agility within a supply chain. Therefore, the authors hypothesized:

H4-a The positive relationship between market orientation and supply chain agility will be moderated by firm size such that the relationship will be stronger among small companies than among large companies.

Research on OI by firm size has shown inconsistent results. Some researchers have suggested that SME might be better suited to realize innovations and to gain the results of innovations compared to large firms (Hausman, 2005; Sivadas & Dwyer, 2000). For example, less bureaucracy, less complicated organizational structures, and faster decision-making enable an innovative organization to create a more favorable environment to develop a new product (Das et

al., 1993). Compared to large firms, most SME have limited financial capacity. Thus, SMS firms are likely to be more dependent on the innovative capabilities of the organization based on human resources and organizational atmosphere (organizational climate) than on any other support strategies or factors. Therefore, the authors hypothesized:

- H4-b The positive relationship between organizational innovativeness and supply chain agility will be moderated by firm size such that the relationship will be stronger among small companies than among large companies.

### 5. Moderating Effect of Global Sourcing

During the last 20 years, firms have substantially expanded their supply chains to international locations (Ruggero & Matteo, 2011). However, although improvements in transport and communication technology may have reduced the barriers of distance, the effect of global sourcing on general business performance is still a controversial topic. Numerous benefits and risks associated with global sourcing have been identified, such as the benefits gained by accessing lower prices and technical expertise versus the risk of increased instability in the supply chain (Narasimhan et al., 2006). Indeed, several studies have failed to detect any significant impact of global sourcing on business activity performance. However, Markides and Berg (1988) asserted that global sourcing not only raised the cost of inventories, transportation, and administration, but also led to lower quality, and longer lead times. Many companies engaged in global sourcing often fail to account for the added costs of global sourcing, particularly intangible costs such as less flexibility and agility. Long lead times comprise the most important problem in SCA. Handfield (1994) showed empirically that global sourcing systematically caused fewer on-time deliveries and longer lead-times. Das and Handfield (1997) came to the conclusion that "... sourcing and logistics in global supply chain bases are not yet comparable to domestic statuses in all areas" (p. 258), highlighting that relation-

ships with foreign suppliers were still restricted to less frequent deliveries compared to local suppliers. The geographic distance problem remains a significant barrier to SCA enhancement; it makes the supply chain much less responsive and it generates additional costs (Levy, 1995). Global sourcing also can hinder close inter-functional coordination due to communication time lags and differences in language and culture among the participants in global supply chains. Therefore, in this study, if firms with high levels of MO engaged in global sourcing, the positive effect of MO on SCA was expected to decrease due to the challenges associated with global sourcing.

- H5-a The positive relationship between market orientation and supply chain agility will be moderated by a firm's level of global sourcing such that the relationship will be stronger among firms with lower levels of global sourcing than among those with higher levels of global sourcing.

This study postulated that OI would increase SCA by improving a company's efficiency, flexibility, and adaptability. If apparel companies adopted global sourcing, however, these improvements might be limited by geographical distance, communication problems, cultural differences, and the varying business environments in terms of taxation and differing systems of commercial law. In other words, the cultural and emotional differences caused by difficult communication among participants and diverse business environments in the process of innovation would decrease the effect of innovativeness. Thus, if a firm's degree of global sourcing increased, the effect of OI on SCA might decrease.

- H5-b The positive relationship between organizational innovativeness and supply chain agility will be moderated by a firm's level of global sourcing such that the relationship will be stronger among firms with lower levels of global sourcing than among those with higher levels of global sourcing.

## IV. Methods

### 1. Sample and Data Collection

This study conducted a web-based survey and data collection using an expert research company. Before the major survey, preliminary interviews with six managers from apparel companies were conducted from January 30, 2012 to February 6, 2012. The interviews asked the managers to assess the convenience of responses, the clarity of the questions, and the suitability of the terms for each survey question. The final questionnaire contained amended and supplemented questions based on the results of the preliminary interviews. The final questionnaire took four weeks, from February 13, to March 13, 2012.

Based on a poll of 1,510 companies in The Korean Fashion Brand Annual 2010/2011, the study sent a web-linked email to the target respondents (mainly product planning departments or purchasing departments) in 1,320 companies, which confirmed their e-mail addresses. The cover message of the email briefly explained the general purpose of the research, appealed for cooperation and assured anonymity. During the survey period to increase the response rate, the study also sent two to four email requests for participation to companies that had been unable to participate in the weekly survey. Incentives (small leather goods) also encouraged respondents to complete the survey. The online web-link for the survey was open for four weeks. One hundred and fifty-four respondents returned completed questionnaires. The overall response rate was approximately 11.7%. Data analyses used 147 questionnaires, excluding insincere responses.

### 2. Measurement

#### 1) Market Orientation

The study borrowed the MO scale utilized by Narver and Slater (1990), Braunscheidel and Suresh (2009), and Turkan (2005). The 16-item scale consists of the following three sub-constructs: customer orientation, competitor orientation, and inter-functional coordination. This study used a 5-point Likert scale (1=*stro-*

*ngly disagree*, 5=*strongly agree*). Six items measured customer orientation: having a level of commitment and orientation to customer needs, creating value for the customers, understanding customers' needs, creating customer satisfaction, measuring customer satisfaction systematically and frequently, and giving attention with services after sales. Five items measured competitor orientation: sharing information concerning competitor strategies, responding to competitive actions that threaten, regularly discussing competitors' strengths and strategies, anticipating how competitors will respond to company activities, and systematically analyzing the competitor's products. Five items also measured inter-functional coordination: regularly visiting current and prospective customers, communicating information about customer experiences across all business functions, integrating service for the needs of target markets, including everyone in contributing to the creation of customer value, and responding to each function's and each department's needs and requests.

#### 2) Organizational Innovativeness

This study borrowed the OI scales utilized by Calantone et al. (2002), and employed a 5-point Likert scale with anchors (1=*strongly disagree*, 5=*strongly agree*). OI was measured by seven items: trying out new ideas, seeking out new ways to do things, being creative in methods of operation, being the first to market new products and services, perceiving innovation as too risky and resisting (reversely coded), having no emphasis on innovation as a part of corporate culture (reversely coded), and increasing the introduction of new products.

#### 3) Supply Chain Agility

The study borrowed SCA scales utilized by Swafford et al. (2006) and Khan and Pillania (2008), and used a 5-point Likert scale (1=*strongly disagree*, 5=*strongly agree*). Twelve items measured SCA according to a firm's ability to accomplish the following rapidly: exchanging information, forecasting changes, adjusting to suppliers delivery schedules, reducing inventory, reducing order-to-delivery cycle time, reducing setup time, reducing product development cycle

time, reducing manufacturing lead time, improving manufacturing process capability, adjusting to the customization, adjusting workforce capability, and introducing new product.

#### **4) Firm Size**

Firm size was measured by the previous year's sales volume, not by the number of employees because the proliferation of commission systems of sales people and the outsourcing to subcontractors in Korean fashion industries make firm size measurement difficult based on the number of employees. For comparative analysis, data were divided into high-sales-volume companies versus low-sales-volume companies based on a mean value of sales volume (i.e., 30 billion won).

#### **5) The Degree of Global Sourcing**

The previous year's proportion of overseas sourcing to total production measured the degree of global sourcing. Data were divided between companies with high levels of global sourcing (66 companies) versus companies with low levels (including none) of global sourcing (81 companies) based on a mean value (10 percent) for the degree of global sourcing in the previous year's production.

## **V. Data Analysis and Results**

The SPSS 15.0 statistics package program tested the hypotheses. Data were analyzed through frequency analysis, descriptive statistics, reliability and factor analysis, correlation analysis and moderated multiple regression analysis. <Table 1> summarizes the characteristics of the respondents. Data were divided into high-sales volume companies versus low-sales volume companies based on a median value (30 billion won) of sales volume for comparative analysis. Seventy-six companies had sales volume above 30 billion won and 71 had below 30 billion won. A second criterion divided data into companies with high levels of global sourcing (66 companies) versus companies with low levels of (or no) global sourcing (81 companies) based on a median value (10 percent) of global sourcing for comparative analysis.

### **1. Reliability and Validity Assessments**

Before proceeding with hypothesis testing, the study investigated reliability and validity assessments. The Cronbach alphas of this study proved the reliability of the measurement items (Table 2)–(Table 4). The study also conducted exploratory factor analysis to verify convergent validity and discriminative validity. The principle component analysis used varimax rotation and an Eigenvalue of 1 as selection criteria. The exploratory factor analysis of MO extracted the three factors associated with the literature (customer orientation, competitor orientation, inter-functional coordination) explaining a total variance of 55.85% (Table 2). The results of the exploratory factor analysis of OI showed a single factor with seven items and explained 48.50% of the total variance (Table 3). Finally, result from the same analysis of SCA also proved uni-dimension after deleting three items explaining 60.25% of the total variance (Table 4).

### **2. Testing Hypothesis**

Before testing the hypotheses, the study tested basic assumptions, such as normality and homoscedasticity, using the regression model. Durbin Watson test results from residual analyses were 1.449–1.786, close to 2. Thus, the regression model supported assuming a normal distribution of residuals. The study also could not find any serious violations of homoscedasticity. A linear regression analysis tested hypotheses 1, 2, and 3. As reported in <Table 5>, the results indicated that MO, OI, and the interaction of the two variables had a positive impact on SCA at the significant level of  $p < .001$  (MO:  $\beta = .566$ ,  $t = 8.267$ . OI:  $\beta = .403$ ,  $t = 5.302$ . MO-OI interaction:  $\beta = .591$ ,  $t = 8.833$ ). Therefore, the results supported H1, H2, and H3.

### **3. The Moderating Effects of Firm Size**

A moderator is a variable that affects the direction and/or strength of the relation between an independent variable and a dependent variable (Baron & Kenny, 1986; Jin, 2006). This study considered two multiple regression equations to test the interaction effect



Table 1. Characteristics of respondents

		Frequency (n)	Percentage (%)
Categories	Men's wear	16	10.9
	Women's wear	28	19.0
	Casual wear	28	19.0
	Sports wear	22	15.0
	Kids & Baby's wear	14	9.5
	Inner wear	11	7.5
	Fashion accessories	28	19.0
Sales Volume	Under 10 billion won	24	16.3
	10-30 billion won	47	32.0
	30-50 billion won	32	21.8
	50-80 billion won	28	19.0
	80-150 billion won	11	7.5
	Over 150 billion won	5	3.4
Global Sourcing	No	52	35.4
	Yes	95	64.6
Sourcing Period	Under 3 years (including NO sourcing)	71 (52)	48.2
	4-6 years	20	13.6
	7-9 years	25	17.0
	Over 10 years	31	21.2
Extent of Global Sourcing	Under 10 percent (including NO sourcing)	81 (52)	55.1
	10-20 percent	24	16.3
	20-30 percent	10	6.8
	30-40 percent	10	6.8
	Over 50 percent	22	15.0
Form of Global Sourcing	Through owned factories	9	9.5
	Through agent	20	21.1
	Through subcontractors	41	43.2
	Others	25	26.3
Sourcing Country	China	43	45.3
	East-Asia	19	20.0
	North Korea	17	17.9
	Others	16	16.8
Period of Respondent's Service	Under 2 years	11	7.5
	3-5 years	36	24.5
	6-9 years	36	24.5
	Over 10 years	64	43.5

between independent variables and moderating variables:

$$\text{Model 1 : } y = b_0 + b_1X + b_2Z$$

$$\text{Model 2 : } y = b_0 + b_1X + b_2Z + b_3XZ$$

where

$y$  = dependent variables (i.e., supply chain agility)

$x$  = independent (predictor) variables (i.e., market orientation, organizational innovativeness)

$z$  = independent (moderator) variables (i.e., firm

**Table 2. Factor analysis of market orientation**

Factor	Measurement Item	Factor loading	Eigen value	Variance explained % (Cumulative %)	Cronbach's $\alpha$
Factor 1 Customer Orientation	Our strategy for competitive advantage is based on our understanding of customer needs	0.862	3.369	22.93 (22.93)	0.865
	We measure customer satisfaction systematically and frequently	0.845			
	Our business objectives are driven by customer satisfaction	0.834			
	We give close attention to after-sales service	0.826			
	Our business strategies are driven by beliefs about how we can create greater customer value	0.802			
Factor 2 Competitor Orientation	We respond to competitive actions that threaten us	0.756	3.010	18.81 (41.74)	0.794
	We regularly analyze products offered by competitors	0.746			
	The top management team regularly discusses competitors' strengths and strategies	0.739			
	We can usually anticipate how competitors will respond to our competitive moves	0.665			
	Our salespeople share information within our business concerning competitors; strategies	0.664			
Factor 3 Interfunctional Coordination	All of our managers understand how everyone in our company can contribute to creating customer value	0.813	2.257	14.10 (55.84)	0.070
	All of our business functions are integrated in serving the needs of target customers	0.703			
	Our top managers from every department visit our current and prospective customers	0.635			
	We communicate information about our successful and unsuccessful customer experiences across all business functions	0.507			

**Table 3. Factor analysis of organizational innovativeness**

Factor	Measurement Item	Factor loading	Eigen value	Variance explained %	Cronbach's $\alpha$
Organizational Innovativeness	Our company is creative in its operation methods	0.825	3.395	48.50	0.820
	Our company frequently tries out new ideas	0.772			
	Our company is often the first to market with new products and services	0.762			
	Innovation in our company is perceived as too risky and is resisted (R)	0.683			
	Our company seeks out new ways to do things	0.632			
	Our new product introduction has increased over the last 5 years	0.591			
	Emphasis and the pursuit of continuous innovation is not part of our corporate culture (R)	0.569			

(R): Reverse scored.

size, the degree of global sourcing)

$b_0$  = intercept

$b$  = regression coefficient

Before testing the moderating effect of firm size via moderated multiple regression analysis, the study examined the multicollinearity problem. The results sho-

wed that the variance inflation factor (VIF) values of all variables were between 1.076 and 3.661, much lower than the recommended threshold of 10 (Hair et al., 1998). Therefore, multicollinearity was not an issue in the following regression analysis.

The results of moderated multiple regression showed that there was no significant difference between the

**Table 4. Factor analysis of supply chain agility**

Factor	Measurement Item	Factor loading	Eigen value	Variance explained %	Cronbach's $\alpha$
Supply Chain Agility	Ability to rapidly reduce manufacturing lead time	0.799	2.422	60.25	0.830
	Ability to rapidly reduce order-to-delivery cycle time	0.793			
	Ability to rapidly forecast changes	0.766			
	Ability getting adjusted to suppliers delivery schedules	0.727			
	Ability to rapidly reduce setup costs	0.721			
	Ability to rapidly reduce product development cycle time	0.719			
	Ability to rapidly improve manufacturing capability	0.706			
	Ability to rapidly reduce inventory	0.685			
	Ability to rapidly exchange information	0.640			

**Table 5. Summary statistics for regression analyses**

Dependent variable	Independent variables	Unstandardized Coefficient		Standardized Coefficient	$t$	$F$	Adjusted $R^2$
		b	Std. Error	$\beta$			
Supply Chain Agility	MO	.727	.088	.566	8.267***	68.33***	.316
	OI	.432	.081	.403	5.302***	28.11***	.157
	MO * OI	.116	.013	.591	8.833***	78.02***	.345

\*\*\* $p < .001$

MO (Market Orientation), OI (Organizational Innovativeness).

adjusted  $R^2$  in model 1 and model 2 (Table 6). Thus, the interaction effect between MO and firm size on SCA was not at the statistically significant level of  $p < .05$  ( $\beta = .123$ ,  $t = 1.018$ ) (Table 6). Another moderated multiple regression analysis examining the effect of OI on SCA by firm size revealed no significant difference of the adjusted  $R^2$  in model 1 and model 2 (Table 5). The interaction effect between OI and firm size on SCA was not at the statistically significant level of  $p < .05$  ( $\beta = .143$ ,  $t = 1.068$ ) (Table 7). These results rejected hypotheses 4a and 4b.

#### 4. The Moderating Effects of Global Sourcing

The review of multicollinearity showed that the variance inflation factor (VIF) values of the variables exhibited some problems. Thus, in order to solve the problem of multicollinearity, the study used the mean centering method, which decreases the standard error by deducting the average value from the observed value of each variable (Aiken & West, 1991; Han, 2003).

The results then showed that the variance inflation factor (VIF) values of all variables were between 1.005 and 1.243, much lower than the recommended threshold of 10. Therefore, multicollinearity was no longer an issue in the following regression analyses.

The results of moderated multiple regression analysis showed no significant difference between the adjusted  $R^2$  in model 1 and model 2, meaning that the interaction effect between MO and the degree of global sourcing on SCA was not at the statistically significant level of  $p < .05$  ( $\beta = -.049$ ,  $t = -.757$ ) (Table 8). Therefore, the results rejected hypothesis 5a. The analysis of the effect of OI on SCA by the degree of global sourcing also revealed no significant difference between the adjusted  $R^2$  in model 1 and model 2 (Table 9). Thus, the interaction effect between OI and the degree of global sourcing on SCA was not at the statistically significant level of  $p < .05$  ( $\beta = -.646$ ,  $t = -.637$ ) (Table 9). Therefore, the results also rejected hypothesis 5b, thereby rejecting both hypotheses testing the moderating effect of global sourcing (H5a, H5b).

**Table 6. Impact of the interaction between MO and firm size on supply chain agility**

Model	Model 1		Model 2	
	$\beta$	$t$	$\beta$	$t$
Constant		3.052		3.216
Market Orientation (Mo)	.553	8.075***	.536	7.588***
Firm Size	-.115	-1.682	-.217	-1.792
MO * Firm Size			.123	1.018
	$F=36.01$ *** Adjusted $R^2=.324$		$F=24.36$ *** Adjusted $R^2=.324$	

\*\*\* $p<.001$

VIF: 1.076-3.162

**Table 7. Impact of the interaction between OI and firm size on supply chain agility**

Model	Model 1		Model 2	
	$\beta$	$t$	$\beta$	$t$
Constant		5.945		5.882
Organizational Innovativeness (OI)	.392	5.196***	.368	4.667***
Firm Size	-.149	-1.976*	-.267	-1.997*
OI * Firm Size			.143	1.068
	$F=16.28$ *** Adjusted $R^2=.173$		$F=11.25$ *** Adjusted $R^2=.174$	

\* $p<.05$ , \*\*\* $p<.001$

VIF: 1.097-3.185

**Table 8. Impact of the interaction between MO and global sourcing on supply chain agility**

Model	Model 1		Model 2	
	$\beta$	$t$	$\beta$	$t$
Constant		108.730		107.850
Market Orientation (Mo)	.533	8.291***	.534	8.292***
Global Sourcing (GS)	-.303	-4.717***	-.300	-4.650***
MO * GS			-.049	-.757
	$F=50.30$ *** Adjusted $R^2=.403$		$F=33.62$ *** Adjusted $R^2=.401$	

\*\*\* $p<.001$

VIF: 1.005-1.016

**Table 9. Impact of the interaction between OI and global sourcing on supply chain agility**

Model	Model 1		Model 2	
	$\beta$	$t$	$\beta$	$t$
Constant		97.530		96.820
Organizational Innovativeness (OI)	.372	5.185***	.366	5.065***
Global Sourcing (GS)	-.325	-4.536**	-.324	-4.513***
OI * GS			-.646	-.637
	$F=26.24$ *** Adjusted $R^2=.257$		$F=17.55$ *** Adjusted $R^2=.254$	

\*\* $p<.01$ , \*\*\* $p<.001$

VIF: 1.010-1.023

## VI. Discussion and Implications

Within the context of the South Korean apparel supply chain, this study explored the relationships between organizational characteristics (MO and OI) and SCA (H1, H2), and the interaction effect of MO-OI on SCA (H3). The study also investigated the moderating effects of firm size (H4a and H4b) and the degree of global sourcing in the links between MO and OI on SCA, (H5a and H5b, respectively). The results of this study supported hypotheses 1, 2, and 3. However, no moderating effects were found; thus, hypotheses 4a and 4b, testing the moderating effect of firm size and hypotheses 5a and 5b, testing the moderating effect of global sourcing were rejected. The following is a summary of the study's findings.

First, this study proves that organizational characteristic variables, such as MO and OI, directly affect

supply chain agility (SCA), supporting the idea that MO as well as OI are significant antecedents of SCA. The findings of this study also confirm that the interaction of MO and OI positively affects SCA. These results imply that companies with both high MO and high OI have more agile supply chains than do companies with only high MO or high OI. Thus, firms need to enhance both MO and OI simultaneously to enhance SCA effectively.

Second, the results of this study suggest that firm size has no significant moderating effect on the relationship between organizational characteristics (MO and OI) and SCA. This finding supports recent studies suggesting that the effect of firm size becomes less significant over time (e.g., Abdul-Talib et al., 2011; Ismail et al., 2010; Suh et al., 2011). With the entry of global fast fashion brands, such as ZARA

and H&M, into Korean markets, Korea's large apparel companies that had been relatively complacent were motivated to survive the competition with global market leaders. The superior competencies of global companies in supply chain management urged Korean companies to invest in achieving agile supply chains. Since the effects of MO and OI are the same, regardless of firm size, these components are as important in increasing SCA in Korean companies as they are in small and large companies around the world.

Finally, the findings of this study did not support the moderating effect of global sourcing in linking MO-SCA and OI-SCA. One possible reason may relate to the proximity of Korean apparel firms' sources from China (45.3%) and other East Asian countries (20.0%), which are geographically close to Korea compared to their distances from the US and the EU. In addition, even faster sourcing is available to Korean apparel companies through the production of Kaesong (18.0%) industrial complex in North Korea. This implies that if the same study, conducted in the US or the EU where sourcing locations are geographically and culturally far away, might produce different results. Another possible reason may be that most of the Korean apparel firms use global sources for basic products that are relatively insensitive to trends and quantity. Despite the possible explanations, the findings of this study suggest that the effect of MO on SCA is the same regardless of the degree of global sourcing, meaning that MO and OI are important in increasing SCA whether firms source globally or not.

This study makes several contributions to the supply chain literature. First, to the best of the authors' knowledge, this study is the first attempt to discover an interaction effect between MO and OI on SCA. In fact, to date, there has been insufficient investigation of the notion that MO may be closely associated with OI. Secondly, the study also contributes to extending the research to the impact of organizational cultural antecedents of SCA by considering organizational characteristic, such as MO and OI, and their effects. Finally, the study contributes to the literature by providing empirical evidence that global sourcing does not necessarily reduce agility. This suggests that geographical and physical distance between sourcing coun-

tries may not be critical in assessing the benefits and challenges of global sourcing, as was once suggested. In this context, this study adds a new perspective to previous studies that mainly explored the effects of global sourcing in companies located in the U.S. or Europe. However, because this study's subject, South Korea, sources from geographically close countries, further investigation should validate this finding.

The study's findings suggest a number of relevant practical managerial implications. First, apparel companies should enhance both MO and OI simultaneously to enhance SCA effectively. Second, the effect of firm size has continuously decreased under circumstances that have shifted the core competition paradigm from economies of scale to economies of speed. Thus, every company should promote a greater degree of MO and OI regardless of firm size. Third, according to the survey results of this study, the mean value for customer orientation is the lowest (3.13) among the variables, while the mean value for competitor orientation is the highest (3.86). This result indicates that most Korean apparel companies are less customer-oriented than expected; they are concerned about their competitive ranking among competitors. This may be because of their heavy reliance on department stores as retail outlets. Thus, Korean apparel companies need to make a special effort to enhance customer-orientation in the three dimensions of MO. In addition, inter-functional coordination, which is another MO dimension, needs to be improved, emphasizing mutual cooperative (horizontal) partnerships. As discussed earlier, in today's rapidly changing business environment, one's own capabilities have limitations in meeting customer need. Therefore, it is necessary to establish close cooperative relations with key suppliers, thereby improving firms' MO. Organizational innovative capability is not formed within a short-time process. Once formed, however, an organization's ability to innovate cannot be easily replicated by competitors, and it becomes the core of the firm's competitiveness. Accordingly, in mid- and long-term perspectives, constant interest and investment in activities to increase OI are necessary.

This study has several limitations. First, the findings of this study may not be applicable to all supply

chains, as this study was conducted within the context of Korean apparel firms and their supply chains. Second, this study adopted sales volume as the measurement criterion for firm size; however, when different proxies (e.g., the number of employee etc.) are used, the results may be different.

Based on the previous discussion, the authors suggest the following for future research. First, this study examined MO and OI as organizational antecedents of SCA. Further studies could consider other organizational characteristics, such as organizational learning orientation and top manager commitment to SCA.

Second, this study explored the moderating effects of firm size and global sourcing in the relationships among MO, OI, and SCA. However, other factors that may moderate the relationships should be explored: the form of the supply chain (vertical integration versus horizontal coordination), the number of participants within the supply chain, the SKUs, and the product characteristics (basic products versus trend products).

Finally, future studies should extend this study to other countries and other sectors/industries to generalize the findings.

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