

The Impact of SCM and e-SCM on Change Acceptance Capability, Information Sharing Capability, Partnership Management Capability and Business Performance

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SCM과 e-SCM이 변화 수용, 정보 공유, 파트너십 관리 능력 그리고 비즈니스 성과에 미치는 영향

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Abstract This study analyzed the impact of supply chain management (SCM) and e-SCM on change acceptance capability, information sharing capability, partnership management capability, and business performance. This study and analysis were conducted targeting the employees of companies that introduced SCM and e-SCM in the metropolitan area and provinces. Change Acceptance Capability, Information Sharing Capability, Partnership Management Capability and Business Performance and the degree of relationship, between outcome variables, which are characteristic factors of SCM, were analyzed through a research model. Based on the survey results, nine research hypotheses were postulated, and the reliability, validity, and importance were examined. The research results supported by the research hypothesis can be summarized in two ways as follows. First, the company's capabilities were analyzed as major variables such as Acceptance Capability, Information Sharing Capability, Partnership Management Capability, and Business Performance. Second, the degree of relationship was analyzed in detail by classifying the necessary competencies in SCM into 4 categories, not the competencies of a specific company. This study is expected to provide appropriate information to SCM-related companies.

Key Words : SCM, e-SCM, Change Acceptance capability, Information Sharing capability, Partnership Management capability, Business Performance

요약 본 연구에서는 SCM(Supply Chain Management)과 e-SCM이 변화 수용 능력, 정보 공유 능력, 파트너십 관리 능력, 그리고 비즈니스 성과에 미치는 영향을 연구하였다. 수도권 및 지방에서 SCM과 e-SCM을 도입한 기업의 직원을 대상으로 조사 및 분석하였다. 연구모형을 통해 SCM의 특징적인 요소인 변화수용능력, 정보공유능력, 파트너십 관리역량, 사업성과 및 성과변수 간의 관계 정도를 분석하였다. 신뢰도, 타당도, 유의성 등을 검증하였다. 연구가설에 의해 지지된 연구 결과를 다음과 같이 2가지로 요약할 수 있다. 첫째로, 기업의 역량을 변화수용역량, 정보공유역량, 파트너십관리역량이 주요한 변수로 분석하였다. 둘째, 특정 기업의 역량이 아닌 SCM에서 필요한 역량을 4가지로 분류하여 관계 정도를 구체적으로 분석하였다. 본 연구는 SCM 관련 기업에 적절한 정보를 제공할 수 있을 것으로 기대된다.

키워드 : SCM, e-SCM, 변경수용능력, 정보공유능력, 파트너십 관리능력, 경영성과

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1. Introduction

In today's competitive environment, supply chain management (SCM) is important to overcome the uncertainty of the business environment, which is caused by technological development, customer diversity, and global competition. The supply chain (SC) refers to the process by which a reaches a consumer through various stages of material and component procurement, production, and distribution.

Supply chain management (SCM) is the procurement of materials and components, the production of products, and the management of all processes until the products are sold to consumers. e-SCM transfers existing SCM-related technologies for the online application to quickly and efficiently manage the flow of goods, information, and funds related to suppliers, distributors, retailers, and consumers[1-10].



Fig. 1. Supply Chain Management(SCM) Process

SCM aims to increase value, eliminate waste, and reduce the costs of production material purchases and product distribution by minimizing the SC costs while planning, organizing, and controlling several processes. In the SC, the competence of the various members can determine the capacity of the SC[11-20].

The aim of this study is to analyze the impact of SCM and e-SCM on change acceptance capability, information sharing capability, partnership management capability, and business performance. A total of 300 employees

from companies that had introduced SCM and e-SCM in metropolitan areas and provinces were surveyed for 30 days during October 2020.

The questionnaire survey examined the following variables on 5-point Likert scales: SCM, e-SCM, change acceptance capability, information sharing capability, partnership management capability, and business performance. Based on the survey results, nine research hypotheses were postulated, and the reliability, validity & importance were examined.

In Chapter 2, we review the literature related to SCM and enterprise capabilities. Section 3 describes the research model and hypothesis setting and data collection method based on the literature study. In Chapter 4, the validity of the research model is examined and the hypothesis testing results are presented through empirical analysis. Chapter 5 presents the implications, limitations, and future research directions based on the empirical analysis results. This study conducted differentiated research from three perspectives in the field of SCM e-SCM, and will be able to provide guidelines for related research in the future. The purpose of this study was to check the degree of relationship between variables through the three perspectives of SCM and e-SCM, and it will be helpful in establishing practical strategies of related companies through a differentiated approach from previous studies.

2. Precedent Research

2.1 SCM

SCM is the management of material and information flows both in and between facilities, such as vendors, manufacturers, assembly plants, and distribution centers[21]. Park & Chae (2016) measured SCM introduction performance by product quality, delivery speed,

process flexibility, and price leadership. Their results showed that information sharing, interdependence, and product quality have a significant impact on adopting SCM[22]. Kim et al. (2013) found that asset utilization, cash flow, corporate growth, profitability, and firm value were improved by introducing SCM[23].

2.2 e-SCM

When practiced in manufacturing industries, E-SCM involves using the internet to carry out value-added activities so that the products produced by the manufacturer meet customers' needs and desires and give a good return on investment. Yoon et al. (2011)[24] selected the e-SCM adoption factors of Korean companies as the network effect, expected profit, relational asset, and adoption cost. Their results showed that the network effect and the expected profit were positively related to the introduction of e-SCM. Yoon et al. (2011)[25] analyzed the relationship between adoption, integration, and performance in e-SCM. Their analysis results showed that network effects, business process-specific assets, and efficiency improvements influenced e-SCM adoption.

2.3 Change Acceptance Capability

Among the capabilities of a company, change acceptance capability is a composite element that forms and connects the behavior and organizational system of organizational members generated by cultural factors such as values and norms in the process of organizational change[26]. Among companies in uncertain environments, those with the ability to rapidly accept changes are more likely to be able to cope with the situation and achieve higher performance.

Yang(2010)[27] stated that customer needs can be accommodated through smooth communication with consumers among change

acceptance capabilities. The Internet shopping mall has argued that the ability to respond should be maximized to form a relationship with consumers. Bae, Lee & Kim (2014) investigated the relationship between the change acceptance capability of the school principal and that of the teachers[28]. Their analysis results showed that teachers' behavioral change was influenced by the principal's change acceptance capability.

2.4 Information Sharing Capability

Because SCM systems require more analysis, coordination, and effort than previous production methods, information sharing among partner companies is essential for successful SCM implementation[29]. Park(2012) defined the information-sharing capability as follows: Sharing information about changes, various sharing information about partner companies, and providing information that can affect partner companies[30]. Choi, Kim & Ha (2012) defined the following two items for information sharing capability: the company has enough SCM-related hardware (POS system, computer, RFID system), and the company has a SOC-related specialist or dedicated department[31].

2.5 Partnership Management Capability

Partnerships involve repetitive and long-term transactions that utilize the resources needed by partners to achieve common goals and share benefits and risks across the company. A partnership is a long-term relationship and is based on mutual recognition and understanding between the transaction parties so that each company's success in the transaction is intrinsically dependent on the other[32].

Jung(2012) found that customer capability and supplier capability affect both offline and online relationships[33]. Offline relationships

affect customer and supplier learning, but online relationships do not. Yang & Yoo(2014) found that supplier and buyer cooperation activities increase when SCM flexibility is high, and that business performance improves with increasing sales cooperation activities[34].

2.6 Business Performance

Lee & Hong (2010) found that the factors forming the SCM partnership have a statistically significant effect on the reinforcement factors of SCM[35]. Their analysis results suggested that the efficiency of SCM should be maximized to improve SCM performance and enterprise performance. Lee (2009) suggested that in the past, cost and asset turnover were used to measure SCM management performance. Recently, however, a Balanced Scorecard has been used to measure SCM management performance[36].

3. Data Collection and Research Hypothesis

3.1 Data Collection

In this study, we analyzed the impact of SCM and e-SCM on change acceptance capability, information sharing capability, partnership management capability, and business performance. The procedure for analyzing the survey data has already been described above.

3.2 Research Hypothesis

3.2.1 Research Model and Change Acceptance Capability

Kim et al.(2012) examined the effect of SCM introduction on SCM performance, innovation intention, and core performance[37]. They found that the change acceptance capability directly affects the SCM performance. Cho & Koo(2008) investigated the relationship between knowledge acquisition, transportation, and acceptance of change in firms adopting

SCM[38]. From their analysis results, they suggested that SCM operates independently against the acceptance of change. Based on these literature findings, we postulated the following hypothesis.

Hypothesis 1: The introduction of SCM will have a positive (+) impact on change acceptance capability.

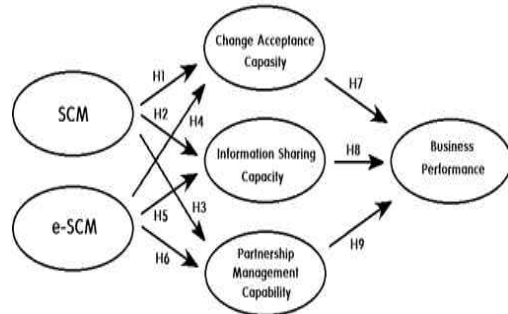


Fig. 2. The research model

3.2.2 SCM and Information Sharing Capability

Kim, C. B. (2009) found that SCM performance has a significant impact on internal information capability, external information capability, and IT capability[39]. She/He concluded that SCM integration can affect the information capability of internal integration, external integration, and IT competence. Lee et al.(2010) suggested that information sharing and reliability are important among SCM trading companies[40]. Moreover, they suggested that management performance can be expected through collaboration and information standardization among SCM companies. Based on these literature findings, we postulated the following hypothesis.

Hypothesis 2: The introduction of SCM will have a positive (+) impact on information sharing capability.

3.2.3 SCM and Partnership Management Capabilities

Lee, Lee & Lee (2007) examined the impact of trust and satisfaction of companies

participating in SCM on partner companies[41]. The analysis revealed that in companies participating in SCM, collaboration, information sharing, and conflict reinforced partnerships. To successfully run SCM, Park & Chang (2009) suggested that it is important to establish long-term partnerships among SCM companies[42]. Based on these literature findings, we postulated the following hypothesis.

Hypothesis 3 : The introduction of SCM will have a positive (+) impact on partnership management capability.

3.2.4 e-SCM and Change Acceptance Capability

Kim (2009) found that e-SCM integration affects the performance of e-SCM. In addition, e-SCM integration suggested change acceptance capability and information technology capability[43]. Lee (2009) confirmed that usefulness and complexity among the characteristics of e-SCM have a positive (+) and negative (-) effect on the satisfaction of usage, respectively[44]. She/He also found that the change acceptance capability of executives influences the use of e-SCM regardless of whether it is used or not. Based on these literature findings, we postulated the following hypothesis.

Hypothesis 4: The introduction of e-SCM will have a positive (+) impact on change acceptance capability.

3.2.5 e-SCM and Information Sharing Capability

Kim (2010) presented human, business, and information technology as e-SCM resources and found that the information of technology influences e-SCM adoption among e-SCM resources[45]. Kim & Kim (2008) found that e-SCM organizational structure, executive mind, ability to share information among members,

demand and supply planning, information technology utilization, organizational size, and inter-company collaboration all affected e-SCM performance[46]. Based on these literature findings, we postulated the following hypothesis.

Hypothesis 5 : The introduction of e-SCM will have a positive (+) impact on information sharing capability.

3.2.6 e-SCM and Partnership Management Capability

Kwon, Chung & Choi (2006) analyzed how e-SCM participating companies formed a successful partnership. They proposed a new e-SCM partnership causality model based on existing partnership formation factors by analyzing the factors of partnership formation[47]. Lee, Kwon & Kang (2006) analyzed the relationship between e-SCM, competitive strategy capability, and competitive advantage[48]. Their analysis results showed that e-SCM has a significant effect on competitive strategy capability (price, new product flexibility, quantity flexibility, quality, delivery time). Based on these literature findings, we postulated the following hypothesis.

Hypothesis 6 The introduction of e-SCM will have a positive (+) impact on partnership management capability.

3.2.7 Change Acceptance Capability and Business Performance

In the impact of firm characteristics on logistics performance, Son & Lee (2010) found that logistics performance has a positive effect on logistics performance, but information system level has no effect[49]. Therefore, they argued that logistics performance is higher for firms that shift fast to organizational change.

Chung(2011) confirmed that logistics performance has improved since the introduction of SCM and that the higher the change acceptance capability, the better the logistics performance[50]. Therefore, to improve SCM performance, the change acceptance capability should be increased.

Based on these literature findings, we postulated the following hypothesis.

Hypothesis 7: Change acceptance capability will have a positive (+) effect on business performance.

3.2.8 Information Sharing Capability and Business Performance

Kim & Bae (2010)[45] classified SCM decision factors into information sharing, conformity, and standardization. Their results showed that information sharing has a significant effect on business performance. Yoon (2013) analyzed the effect of logistics information systems on customer attitude and firm performance and found that the information system affects customer attitude, working conditions, and customer support[51]. Based on these literature findings, we postulated the following hypothesis.

Hypothesis 8: Information sharing capability will have a positive (+) impact on business performance.

3.2.9 Partnership Management Capability and Business Performance

Koo (2012) found that communication has a significant effect on business performance, and education/training and brand have positive effects, but supervisor leadership has no effect[52]. Jang, Lee & Kim (2008) classified SCM activities into integrated activities, activation support activities, collaboration policy activities, performance measurement activities, and information system activities[53].

Business performance was divided into learning and growth, customer performance, financial performance, and internal process performance. From their analysis results, SCM activities have a significant effect on business performance. Based on these literature findings, we postulated the following hypothesis.

Hypothesis 9: Partnership management capability will have a positive (+) impact on business performance.

3.3 Operational Definition of Variables

The operational definitions of the independent variables, parameters & dependent variables are shown in Table 1 and Table 2.

Table 1. Operational Definition of Independent Variables

Var.	Measurement Factors	References
SCM	People and reputation are important.	G. O. Park & H. C. Chae, (2016)[22] Y. J. Kim et al. (2013)[23] G. S. Cho & C. M. Goo (2008)[38]
	It can take advantage of high recognition.	
	Various communication is possible.	
e-SCM	Various information networks can be operated.	G. W. Yoon et al. (2011)[24] S. H. Kim (2009)43][G. W. Yoon et al. (2011)[24]
	I want to save people and facilities costs.	
	I expect to increase profits by reducing transaction costs.	
	Order processing speed is fast.	

Table 2. Operational Definition of Parameters & Dependent Variables

Var.	Measurement Factors	References
Change Acceptance capability	Engaging trading companies in production and distribution.	J. H. Yang (2010) S. H. Bae et al. (2014) T. W. Kim et al. (2012)
	I want to share revenue and risk with trading companies.	
	I want to share facilities and equipment with trading companies.	
Information Sharing capability	Share cost and market information with trading companies.	G. O. Park (2012) S. G. Choi et al. (2012) T. H. Yoon (2013)
	It has enough hardware related to SCM.	
	There are SCM experts and dedicated departments.	
Partnership Management Capability	Providing useful information to customers.	J. S. Jung (2012) D. M. Yang & W. J. Yoo (2014) S. M. Lee et al. (2007)
	I understand the process of handling business with customers.	
	Adheres to customer's requirement and delivery date.	

Table 2. Continued

Var.	Measurement Factors	References
Business Performance	Sales and market share are increasing.	S. W. Lee & S. W. Lee (2010) J. S. Lee (2009) B. M. Goo (2012)
	Employees are increasing and competitiveness is improving.	
	New product development and quality improvement are being done.	

4. Empirical Analysis

In this study, we examined the impact of the introduction of SCM and e-SCM on partnership management capability and business performance. The operational definitions and measurement variables were derived from precedent research before the main hypothesis was verified. The reliability and validity of the variables were analyzed. The internal consistency was checked by using Cronbach’s Alpha coefficient, which is a reliability test method. Nunnally (1978) reported that confidence is high when the coefficient is greater than 0.6 in preliminary studies and is guaranteed if it exceeds 0.7 in actual research. In Table 3, Cronbach’s Alpha was 0.6 or more. Therefore, the measurement factors used in this study can be regarded as having internal consistency. In order to verify the validity of the measurement factors, exploratory factor analysis was performed using Varimax Rotation for principal component analysis. The exploratory factor analysis was performed by dividing the independent variables in Table 3 and the parameter variables in Table 4. In Table 3, 4, the factors loadings of the research were all above the reference value of 0.5. Therefore, the factors of the variables were judged to be well connected to each other.

Table 3. Reliability Analysis and Exploratory Factor Analysis Result (Independent Variables)

Variable	SCM	e-SCM	Cronbach’s α
SCM	.846	.098	0.614
	.831	-.034	
	.511	.278	
e-SCM	-.016	.838	0.733
	-.013	.734	
	.239	.683	
	.265	.673	

Table 4. Reliability Analysis and Exploratory Factor Analysis Result (Mediated Variables)

Var.	CA	IS	PM	Cronbach’s α
CA	.787	.216	.181	0.716
	.782	.267	-.101	
	.723	.058	.270	
IS	.062	.808	.193	0.705
	.212	.794	.128	
	.225	.679	.083	
PM	.092	.148	.825	0.718
	-.009	.166	.754	
	.274	.075	.746	

Change Acceptance: CA,
Information Sharing: IS, Partnership Management: PM

Table 5 shows that the AVE values of the measurement factors did not exceed the reference value of 0.5. However, it is considered acceptable if they exceed 0.4. Therefore, the central validity of the variables was considered to be generally secured. The correlation between variables was analyzed by using discriminant validity analysis. The AVE square root values and correlation coefficients of each variable were compared. As shown in (Table 5), the AVE square root of the variables was larger than the other correlation coefficients. Therefore, the validity of discrimination between each variable was confirmed.

Table 5. Discriminant Validity Analysis

Var.	AVE	SCM	e-SCM	CA	IS	PM	BP
SCM	0.411	0.641					
e-SCM	0.417	0.323	0.646				
CA	0.464	0.490	0.473	0.681			

Table 5. Continued.

Var.	AVE	SCM	e-SCM	CA	IS	PM	BP
IS	0.463	0.121	0.291	0.583	0.680		
PM	0.484	0.297	0.494	0.411	0.442	0.696	
BP	0.468	0.215	0.598	0.576	0.514	0.635	0.684

Note: The bold red numbers in the diagonal are the AVE square root values of the variables. All other values are the correlation coefficients between the variables

Table 6. Hypothesis Testing through Structural Equation

Hypo.	Route	S.D Coef.	P	Veri.
H1	SCM-> CA	.517	.08*	Selection
H2	SCM-> IS	.028	.871	Dismissal
H3	SCM->PM	.148	.368	Dismissal
H4	e-SCM-> CA	.506	.02**	Selection
H5	e-SCM-> IS	.396	.03**	Selection
H6	e-SCM-PM	.536	.000***	Selection
H7	CA->BP	.286	.07*	Selection
H8	IS->BP	.282	.08*	Selection
H9	PM->BP	.711	.000***	Selection

Hypo.: Hypotheses, Route: Route, S.D Coef.: Standard Deviation Coefficient, P: P-value, Veri.: Verification
*p<.01, **p<.05, ***p<.001

The empirical analysis results confirmed the impact of SCM and e-SCM adoption on firm capability and business performance. The structural equation model using AMOS 18.0 was used to verify the proposed research model. Prior to the hypothesis testing, the fitness of the research model was verified through Maximum Likelihood Estimation.

The analysis results were as follows: $\chi^2=225.420$ (df=125, $p=0.001$), CFI=0.939 (>0.9), NFI=0.910 (>0.9), RMR=0.052 (<0.07), GFI=0.934 (>0.9). Since this result exceeds the recommended standard of fitness, the research model was deemed appropriate and hypothesis testing was conducted. The impact of SCM and e-SCM adoption on partnership management capability and business performance was analyzed. The causality results analyzed by the structural equation are shown in Table 6 and Fig. 2.

The effects of SCM and e-SCM on change acceptance capacity, information sharing capacity, partnership management capacity, and management performance were examined through the structural equation model. The introduction of SCM had a significant effect on change acceptance capabilities among the firms capabilities, but information sharing capabilities and partnership management capacity were not significant. The introduction of E-SCM had a significant effect on the capabilities, which in turn had a significant effect on the business performance.

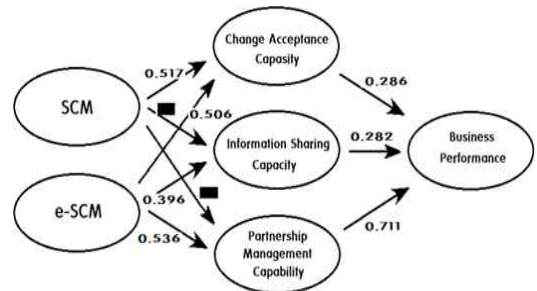


Fig. 3. Research Model Analysis Results

5. Conclusion

As globalization has progressed, companies have faced many environments, and uncertainty has increased accordingly. It is important for companies to cooperate with other companies due to the difficulty in surviving alone. With such cooperation, companies must systematically manage their SCs and strengthen their capabilities in order to survive in the SC. Therefore, this study aims to clarify the importance of SCM and competency by examining the relationship between the enhancement of firm capacity through the introduction of SCM and finally the enhancement of company performance. The empirical analysis results are summarized as follows.

First, the introduction of SCM has a significant relationship with change acceptance capabilities. Jung (2011) stated that the companies that introduced SCM increased change acceptance capabilities and logistics performance. This significant relationship found between SCM and change acceptance capabilities is consistent with previous research results. However, the introduction of SCM did not have a significant effect on information sharing capabilities and partnership management capabilities. The importance of information sharing and partnership through the introduction of SCM can be confirmed through previous studies, but the present study results can be interpreted as suggesting that the introduction of E-SCM has a relatively greater impact.

Second, E-SCM, which strengthens competency, has a significant relationship with the firm's capabilities. This finding is consistent with the results of previous studies (Kim 2009, Kwon et al. 2006, Lee 2009). Companies that introduced E-SCM based on the network have a similar infrastructure and can easily share information with each other. Third, change acceptance capabilities, information sharing capabilities, and partnership management capabilities have a significant effect on firm performance. There are many opportunities to learn how to do well through SCM with other companies and to strengthen the company's capabilities through feedback on deficient aspects. These relationships play a major role in enhancing company performance. Two implications are proposed from this study. First, we analyzed the capabilities of companies by subdividing them into change acceptance capability, information sharing capability, and partnership management capability.

It is the academic implication that can make detailed measurement in SCM-related research

by classifying the necessary capabilities in SCM instead of one company's competence

The effects of the introduction of SCM and E-SCM were different, which suggests that companies should focus on which capabilities they should focus on according to the type of SCM. This study conducted differentiated research from three perspectives in the field of SCM e-SCM, and will be able to provide guidelines for related research in the future.

Finally, the study has one limitation because all the surveyed companies were located in a metropolitan area. These surveyed companies included many with relatively similar industries and capacities and hence many with relatively high capabilities. Future research is needed to expand the survey area nationwide.

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