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The Relationship Between Sustainability, SCM Performance, and Financial Performance of Korean SMEs

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Abstract

Purpose – This study carried out an empirical study of the impact of sustainability – which has been gaining attention as challenges are arising in supply chains based on existing trade networks due to the impact of the COVID-19 pandemic – on SCM performance and financial performance of Korean SMEs. The study seeks to propose a measurement model to enhance the SCM performance and financial performance of Korean SMEs and to identify the relationship between sustainability, SCM performance and financial performance to suggest implications to SMEs, governments, and relevant organizations.

Design/methodology – Our Analysis established hypotheses that economic sustainability, environmental sustainability, and other factors related to sustainability have a positive impact on SCM performance and financial performance as well as SCM performance has a positive impact on financial performance, making empirical validations by utilizing Structural Equation Modeling based on data collected through survey from Korean SMEs.

Findings – According to an empirical study, although environmental sustainability and economic sustainability among factors of sustainability had a positive influence on SCM performance, social sustainability did not have a statistically significant influence. Furthermore, it was learned that only economic sustainability had a positive influence on financial performance while SCM performance has a positive influence on financial performance.

Originality/value – This empirical study explored the relationship between SCM performance and financial performance of Korean SMEs with a high tendency to depend on specific supply chains when the international trade network is in confusion and/or the global supply chain has collapsed. If Korean SMEs allocate management resources to the factors deducted from this study, they would be able to build more efficient supply chains and improve financial performance to improve sustainability.

Keywords: Finance Performance, Global Supply Chain, Korea's Small and Medium Enterprise, Supply Chain Management, Sustainability

JEL Classifications: D22, F14, O53

1. Introduction

Korean SMEs (Small and Medium-sized Enterprises) are a pivotal part of the foundation of national industries and economic activities. They have built their global supply chain through trade networks and have been importing and processing raw materials and intermediary goods to add the value of products before exporting them through SCM (Supply Chain Management). The supply chains in the East Asian region are being strengthened, and

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the movement of pursuing the overall optimization of corporate supply chains by transferring the manufacturing process to multiple countries was taken for granted. However, this movement led to the further distancing of the supply chain and pressured multiple nations and regions to be involved until raw materials and parts create a final product, increasing the risk of the process being disrupted (Han, Neung-Ho, 2021).

Especially, the uncertainty in production and logistics grew globally due to the breakout of the COVID-19 pandemic which continues to have a global impact from 2020. As trade activities were disrupted, companies were faced with the circumstance of having to restructure their global supply chains according to the situation they are facing to maintain their businesses. Especially in Korea, social awareness of how a single raw material in the supply chain can impact the economy is increasing due to the recent crisis of urea solution shortage.

How the disruption of the supply chain affects business activities depends on the size and relationship between supply and demand shock (Craighead et al., 2020). Although recovery was rapidly conducted through the agile distribution of various COVID-19 vaccines and countries' attempts to revitalize the economy through quantitative easing after temporarily increased demand shock caused by a rapid decrease of demand beyond the decrease of supply, the existing global supply chains of Korean SMEs have not overcome supply shock, causing crisis for the supply chain. Therefore, sustainability which ensures continuous improvement for the people and the environment for not only the present but uncertain future is gaining attention.

Therefore, this study aims to identify the critical factors of sustainability influencing the financial performance of Korean SMEs employing global supply chain networks, which enables better SCM and operations performance. Furthermore, this study statistically investigated the influence of SCM performance on financial performance. Therefore, this study will serve to practically explain the effective sustainability related factors valid for Korean SMEs. Also, this study aims to identify the relationship between sustainability, SCM performance, and financial performance, providing implications for strategic establishment of SMEs and relevant government ministries.

2. Theoretical Construct

2.1. Sustainability

As the supply chain experiences a social crisis, sustainability is gaining attention. Sustainability is the concept of interpreting the massive discourse of sustainable development from the perspective of corporate management, defined as management activities pursuing the development of our own needs and satisfaction without hindering our descendants' ability to achieve what they want (Lee, Won-Hee and Lee, Su-Yol, 2014; Jacobs and Chase, 2014; Park, Chan-Kwon et al., 2019). World Commission on Environment and Development (WCED, 1987) defines sustainability as meeting the needs of the present generation without compromising the ability of future generations to meet their needs, referring to economic, environmental, and social sustainability. Elkington (1998) and Carter and Rogers (2008) introduced the concept of "triple bottom line" including economic, social, and environmental factors.

Economic sustainability is the most fundamental achievement for individual companies

and the supply chain management supports sustainability by increasing profit and decreasing cost. This is based on the idea that companies should be able to maximize corporate long-term profit including financial performance by guaranteeing investment profit from stakeholders and investors, while companies must be able to provide long-term profit to the local community (Jacobs and Chase, 2014).

Environmental sustainability can be achieved through environmental management, eco-friendly SCM of individual companies and the supply chain activities to reduce environmental risks and increase achievements related to the environmental performance as a set of corporate activities to prevent environmental pollution to take the environment into account, which includes, for example, integration of environmental standards (Bai and Sarkis, 2010), collection of environmental evaluation information from suppliers, evaluation of the environmental performance of supplied parts, encouragement to adhere to environmental standards, requests on environmental management system certification (Lee and Cheong, 2012).

Social sustainability is related to meeting the social requirements of individual companies and the local community and stakeholders of the supply chain. This refers to a set of activities to reduce social problems and risks that may occur in the supply chain to improve social achievements (Lee, Su-Yol and Lee, Joon-kyum, 2015). According to Jacobs and Chase (2014), 'social' refers to being related to the region and social community in which the company carries out business activities, promoting activities for not only its employees but for robustness and growth for the local community. Some key factors influencing social sustainability include compliance with the code of ethics, regular audits on ethical behavior (Carter, 2004), the safety and hygiene of employees, contribution to local society, and adherence to ISO 26000 (Chhabara, 2010).

Carter and Rogers (2008) defined sustainability to be the long-term achievements of a company's economic, ecological, and social goals from the systematic coordination of key organizations within the supply chain to achieve economic goals whereas Lee, Won-Hee and Lee, Su-Yol (2014) defined sustainability as removing risks in the supply chain and promoting social and environmental achievements to build a competitive supply chain.

2.2. SCM Performance

Examining how the performance of SCM is measured, the Supply Chain Operations Reference Model (SCOR) announced by Supply Chain Council (2005) is the basic model for the overall management of the supply chain, proposing systematic indexes for process-oriented performance management and analysis. The SCOR model proposes standards for the definitions, terminologies, and performance indexes for planning, sourcing, making, delivering, and returning processes. The high-level performance indicators of the SCOR model comprise reliability, flexibility and responsiveness, cost, and assets, and the detailed processes are measured for the low-level performance indexes. Kaplan and Norton (1992, 1996) also proposed performance measurement of the supply chain utilizing the Balanced Score Card (BSC). BSC includes perspectives of customers, internal processes, learning and growth in addition to traditional financial performance.

Steward (1995) categorized SCM performance into the four areas of delivery performance, flexibility and responsiveness, logistics cost, and asset management, reporting that companies achieving highly on these indexes led to high-profit growth rates and stock value. Beamon

(1999) proposed a performance measurement system for the manufacturing supply chain with a focus on processes, dividing the fields of performance measurement into three categories of resource, output, and flexibility. Gunasekaran et al. (2001) divided the process into a three-stage system of strategic, tactical, and operational level, proposing detailed measurement variables for each level. The indexes of strategic level are measurements of the responsiveness ability in the supply chain focusing on the customer, and indexes of tactical level are indexes measuring the responding abilities of the production sector to satisfy customer demand. Lastly, indexes of operation level refer to indexes measuring the efficiency of the production process.

Otto and Kotzab (2003) measured SCM performance through reduction of ordering cost and satisfaction with parts and product quality. Bhagwat and Sharma (2007) proposed financial performance, market share, and profitability of a company as a quantitative performance of the supply chain and proposed improvement of customer satisfaction, customer service quality, lead time, and flexibility as qualitative performance. Also, Chung, Yong-Kyun et al. (2007) defined SCM performance to be the performance gained through SCM utilization compared to competitors and industrial average, proposing improvements of efficient logistics costs and low inventory levels, high productivity and overall competitiveness as evaluation items.

2.3. Financial Performance

Financial performance refers to the economic results caused by the influence of tangible benefits and intangible benefits (Phillips and Phillips, 2016). Some of the indexes representing the financial performance of a company include investment profit rate, sales, and sales profit. Sales would be an index to calculate productivity while sales profit calculates profit from management activities, thus sales profit is an appropriate fit index for analyzing the relationship between supply chain performance and financial performance (Choi, Jee-Hyun and Kim, Jun-Hee, 2021). Traditionally, business performance is assumed to be in accounting terms (Conant, Mokwa and Varadarajan, 1990) and is measured in a form of analyzing various objective data, subjective performance and perceived performance are being used in measuring financial performance (Han, Hyun-Jeong and Yoon, Se-Mok, 2011). Styles (1998) said that the focus of performance measurement is closely dependent on data collection process and management related literature has come to an agreement that the measurement of corporate performance is better to be multidimensional.

Shoham (1998) carried out both subjective measurement and objective measurement for the three measurement items of sales, profitability and change in his study. For instance, objective measurement criteria such as total sales and number of sales markets as well as subjective measurement criteria such as the perceived level of success and sales in recognized related industries in measuring sales. Furthermore, it was insisted that measurement based on level of satisfaction could provide more abundant, detailed measurement items for independent variables since objective measurement and subjective measurement are equally important. Also, Song, Sin-Geun (2016) utilized indexes such as income increase, profit increase, and profit rate increase over the last three years have been utilized in measuring financial performance.

3. Research Hypothesis and Research Model

3.1. Research Hypothesis

3.1.1. Sustainability and SCM Performance

Sustainable SCM refers to the integral management of social and environmental topics and could be defined as strategic corporate activities to achieve environmental and social as well as economic performance through systematic coordination of purchase-supply relationship (Carter and Rogers, 2008). Hassini et al. (2012) defined SCM to be entire activities managing operation, support, knowledge, information, and resources of the supply chain to increase profit created from the overall supply chain by minimizing environmental problems and maximizing the common profit for the society. Chhabara (2010) insisted that monitoring systems should be reinforced to suppress the occurrence of social and environmental problems within the supply chain, utilizing sustainable performance criteria as an evaluation tool for suppliers to share information and reinforce technical support to achieve sustainable SCM. Maloni and Benton (1997) emphasized the importance of sustainability in the supply chain, mentioning that a supply chain actively responding to environmental regulations must be established and additional management such as environmental monitoring and social contribution evaluation is needed to continuously respond to environmental regulations.

With such a literature review, the proposition is that if tangible results could be achieved through Korean SMEs' superior attention to the factors for economic, social, and environmental sustainability, which lead to better SCM performance. This study aimed to validate the following hypotheses.

H1: Sustainability will have a positive (+) influence on SCM performance.
H1-1: Economic sustainability will have a positive (+) influence on SCM performance.
H1-2: Environmental sustainability will have a positive (+) influence on SCM performance.
H1-3: Social sustainability will have a positive (+) influence on SCM performance.

3.1.2. Sustainability and Finance Performance

Examining prior research on sustainability and financial performance, Oh, Geun-Hye and Kang, Sung-Mo (2014) validated corporate sustainability to be a factor affecting corporate value positively. Marshall et al. (2009) articulated that the level of voluntary notices related to the environment has a positive influence on corporate value for environmentally sensitive industries. Similary, Fusco et al. (2014) asserted that investment in sustainability led to improvements to corporate performance and operation indexes, improving competitiveness. Dommerholt (2016) stated that while the causal relationship between sustainability management and financial performance is not clear, high levels of financial performance could be achieved when sustainable management is strategically well-managed and integrated with the core competencies of a company. Margolis et al. (2008) also found a positive correlation between sustainable management and financial performance, while Kurucz et al. (2008) found sustainable management to play a mediating role among drivers of sustainability including risk management, competitive advantages, reputation, and human resources and financial performance. Sustainable management is impacted by one or more drivers of

sustainability to improve financial performance. Considering such mediating effects, the synergy effect between corporate sustainable management and financial performance increases (Eccles et al., 2014).

Therefore, if Korean SMEs take interest in sustainable management activities and improve economic, environmental, and social sustainability, financial performance is expected to improve, establishing the following hypotheses.

H2: Sustainability will have a positive (+) influence on financial performance.
H2-1: Economic sustainability will have a positive (+) influence on financial performance.
H2-2: Environmental sustainability will have a positive (+) influence on financial performance.
H2-3: Social sustainability will have a positive (+) influence on financial performance.

3.1.3. SCM Performance and Finance Performance

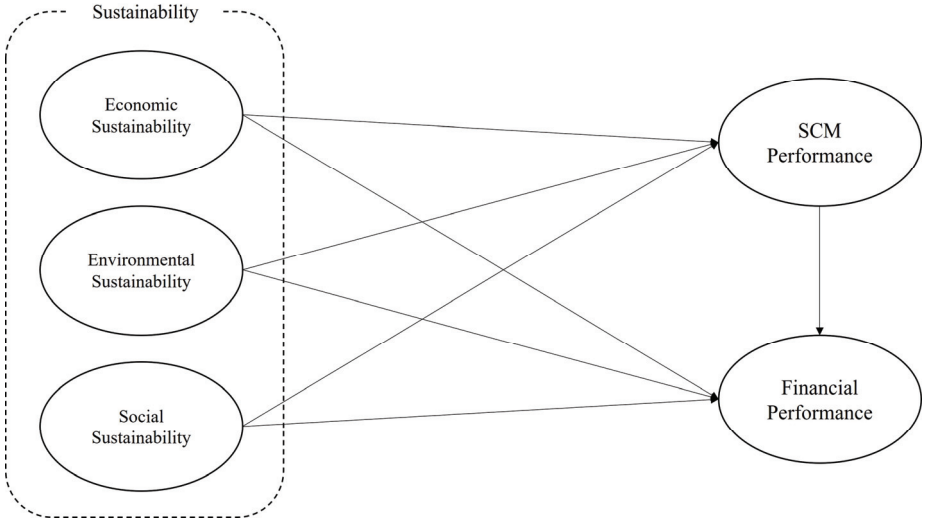
Companies' management performance gained in the market through SCM could serve as a competitive edge, and companies can enjoy the effects of reducing costs through the efficient ordering process, improving income stream, receiving continuous orders, and increasing price flexibility as sources of profit generation (Lee, Young-Min, 2011). Also, the flow of products could become transparent in the process of manufacturing and distributing, supporting clear identification of the products and services through SCM. This enables low-cost replacement of high-cost inventory management tasks of companies (KOSBI, 2005). Performance in finance and accounting has been considered to be a significant factor in SCM measurement, and measurement indexes related to finance and accounting have been considered to be vital indexes for judging the improvement of financial solvency (Kim, So-Chun and Lim, Wang-Kyu, 2014). According to Bagchi et al. (2005), cooperative SCM activities remove waste from the overall supply chain, and the eager information-sharing of participating companies innovates the decision-making process of the organization to lead to the positive influence of lowering organizational costs. Also, the effect of reduced cost affects customers and companies participating in each supply chain, improving the level of customer service to create the virtuous cycle of enhanced financial performance of participating companies (Romano, 2002). Therefore, it was predicted that high SCM performance achieved by Korean SMEs will lead to increased financial performance, and the following hypothesis was validated.

H3: SCM performance will have a positive (+) influence on financial performance.

3.2. Research Model

This study identifies the factors of Korean SMEs' sustainability, carrying out empirical research on the relationship between factors of sustainability, SCM performance and financial performance, to provide implications to companies, governments, and relevant organizations. To that end, research hypotheses to be validated in this study were proposed through reviewing prior key research, leading to the research model in Fig. 1.

Fig. 1. Research Model



4. Empirical Analysis

4.1. Research Hypothesis

4.1.1. Research Design and Methodology

This study model is designed based on the theoretical evidence by reviewing prior research, and the detailed measurement items for each research item were comprised as in Table 1.

The study comprises the three components of sustainability proposed by Carter and Rogers (2008) and Elkington (1998), and 14 variables including economic sustainability (5 items), environmental sustainability (5 items) and social sustainability (4 items) proposed by Jacobs and Chase (2014) and Park, Chan-Kwon et al. (2019) are employed. The measurement items for SCM performance comprised the five variables proposed by Bhagwat and Sharma (2007) and Chung, Yong-Kyun et al. (2007) while four variables were extracted for financial performance based on the study from Shoham (1998) and Song, Sin-Geun (2016), in which financial performance for the last three years was researched by considering the COVID-19 pandemic. A 5-point Likert Scale (1 = lowest and 5 = highest) was used for analysis.

This study conducted a survey on the executives and employees of Korean SMEs currently using supply chains, in which SMEs are defined as companies with average annual sales or annual sales of 40 billion ~ 150 billion won and total assets of less than 500 billion won according to Basic Act on Small and Medium Enterprises. The survey period was 40 days from November 25th 2021 to January 5th 2022, and 120 copies of answers among the 142 collected copies excluding 22 survey answers with missing variables or insincere answers were utilized for analysis. Table 2 shows the general status of SMEs responding to the survey through online survey, e-mail, or in-person visits.

Table 1. Detailed measurement items and prior research of research variables

Constructs	No	Detailed Measurement Items	Reference
Economic Sustainability	EC1	Continuous improvement in return on investment	Carter and Rogers (2008), Elkington (1998), Jacobs and Chase (2014), Lee, Won-Hee and Lee, Su-Yol (2014), Park, Chan-Kwon et al. (2019)
	EC2	Overall productivity inventory	
	EC3	Improve product and service sales	
	EC4	Increasing the number of companies wishing to do re-transactions and new transactions	
	EC5	Improving Business performance	
Environmental Sustainability	EN1	Increasing resource recycling rate	
	EN2	Increased use of renewable resources	
	EN3	Improve Echo efficiency	
	EN4	Application of environmental pollution control systems	
	EN5	Construction of environmental management systems	
Social Sustainability	SS1	Compliance with required legal liability	
	SS2	Efforts to keep ethical responsibility	
	SS3	Efforts to uphold charitable responsibility	
	SS4	Efforts to cooperate with stakeholders	
SCM Performance	SP1	More productive than any other company	Bhagwat and Sharma (2007), Chung, Yong-Kyun et al. (2007), Otto and Kotzab (2003), Stewart (1995)
	SP2	Lower Logistics costs than other companies	
	SP3	Lower inventory level than other companies	
	SP4	High competitiveness using supply chains	
	SP5	Fast lead time from order to supply	
Financial Performance	FP1	Sales have increased over the past three years	Styles (1998), Shoham (1998), Song, Sin-Geun (2016),
	FP2	Profitability has increased over the past three years	
	FP3	Cash has been flowing smoothly over the past three years	
	FP4	Asset turnover has increased over the past three years	

Multiple statistical methods were used to analyze the hypotheses proposed in this study, and all the analyses needed for the study were carried out by SPSS 27 and AMOS 27. Although the measurement items of the questionnaire have been validated in prior research, some of the items were revised for the study, utilizing structural equations modeling. To confirm the reliability and validity of the detailed measurement items of the research, exploratory factor analysis (EFA) was performed in advance and confirmatory factor analysis (CFA) was additionally performed by using the measurement items. Furthermore, the final path analysis was carried out by using the research items satisfying confirmatory factor analysis

Table 2. Survey Respondents

Division	Subdivision	Frequency(n=120)	%	Cumulative %
Sectors	Machinery / Metal	12	10.0	10.0
	Electric / Electronic	14	11.7	21.7
	Information / Communications	7	5.8	27.5
	Software	13	10.8	38.3
	Biotechnology	4	3.3	41.7
	Chemistry	7	5.8	47.5
	Environment	9	7.5	55.0
	Textiles / Clothing	8	6.7	61.7
	Food	17	14.2	75.8
	Others	29	24.2	100.0
Annual sales	below 5 billion	47	39.2	39.2
(KRW)	below 10 billion	36	30.0	69.2
	below 30 billion	19	15.8	85.0
	below 50 billion	9	7.5	92.5
	more than 50 billion	9	7.5	100.0
Staff	below 10	46	38.3	38.3
Numbers	below 30	23	19.2	57.5
	below 50	9	7.5	65.0
	below 100	17	14.2	79.2
	below 300	25	20.8	100.0

4.2. Evaluation of Research Model

4.2.1. Exploratory Factor Analysis

This study used principal component analysis to carry out exploratory factor analysis, applying varimax of the orthogonal rotation method. As for the number of factors extracted, only factors with an eigenvalue of 1 or more were extracted. The valid criteria for selecting factors were 0.4 or higher for factor loading, and 0.5 or higher for the explained total accumulated variance (Bagozzi and Yi, 1988). According to exploratory factor analysis, the KMO measure value is 0.878 and the significance probability of Bartlett's test of sphericity was 0.000, verified to be suitable for factor analysis. However, the fifth item of economic sustainability (improving final performance) was cross-loaded, thus this item was removed from the analysis.

Table 3. Reliability and Exploratory Factor Analysis Results

Variable	No	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Economic Sustainability	EC1	**0.865**	0.074	0.052	0.153	-0.003
	EC2	**0.837**	0.079	0.183	0.075	0.134
	EC3	**0.786**	-0.085	0.297	0.268	0.192
	EC4	**0.677**	0.181	0.215	0.073	0.375
	EC5	**0.606**	0.109	**0.536**	0.068	0.215
Environmental Sustainability	EN1	0.054	**0.700**	0.296	0.117	0.360
	EN2	-0.021	**0.800**	0.179	0.270	0.082
	EN3	0.205	**0.778**	0.275	0.278	0.075
	EN4	0.114	**0.812**	0.263	0.219	0.089
	EN5	0.015	**0.786**	0.199	0.226	0.180
Social Sustainability	SS1	0.166	0.196	**0.789**	0.165	-0.077
	SS2	0.218	0.277	**0.786**	0.126	0.057
	SS3	0.207	0.353	**0.733**	-0.014	0.142
	SS4	0.166	0.266	**0.714**	0.240	0.131
SCM Performance	SP1	0.176	0.313	0.180	**0.672**	0.318
	SP2	0.038	0.321	0.061	**0.739**	0.039
	SP3	0.087	0.154	0.126	**0.802**	0.246
	SP4	0.156	0.161	0.134	**0.802**	0.249
	SP5	0.232	0.205	0.117	**0.781**	0.275
Financial Performance	FP1	0.164	0.118	0.135	0.161	**0.860**
	FP2	0.128	0.113	0.087	0.176	**0.885**
	FP3	0.139	0.176	0.021	0.262	**0.847**
	FP4	0.158	0.152	-0.012	0.300	**0.829**
Eigen value		3.759	3.697	3.585	3.302	3.161
Variance (%)		16.344	16.075	15.585	14.357	13.742
Total variance (%)		16.344	32.419	48.004	62.361	76.103

KMO = 0.878, χ^2 = 2164.03, df = 253, p = 0.000

4.2.2. Confirmatory Factor Analysis

This study carried out confirmatory factor analysis for all factors to evaluate the reliability and validity of the multi-item scale for constructs according to the research methodology of Anderson and Gerbing (1988). Factor loading and significance levels of all items were assessed for analysis of measurement items, and values of CR (Critical Ratio), AVE (Average Variance Extracted), and Cronbach's α were validated to measure internal consistency. According to analysis results, the standard factor loadings of the measurement items were 0.7 or higher except for item SP2, with t-values all significant at p<0.001 level as shown in Table 4. Also, the CR value to assess convergent validity was 0.7 or higher; Cronbach's α value was 0.8 or higher, and the AVE value was 0.5 or higher as the standard value, satisfying the standard values (Fornell and Lacker, 1981). Here, the SP2 item with standard factor loadings of 0.7 or less was deleted (Woo, Jong-Pil, 2012) and Modification Index (M.I.) value was reflected to assume a correlation between error terms for the same factors (EN1 and EN2, EN1 and EN4, EN4 and EN5, FP1 and FP2, FP1 and FP3, FP1 and FP4, FP2 and FP3, FP3 and FP4), improving fit indexes (Rohr et al., 2017; Strough et al., 2016).

Table 4. Confirmatory Factor Analysis: items and loadings

Construct and scale items	Standardized Loading	p	Cronbach`s α	CR	AVE
Sustainability					
Economic Sustainability					
Continuous improvement in return on investment	0.750	***	0.889	0.873	0.634
Overall productivity inventory	0.809	***			
Improve product and service sales	0.891	***			
Increasing the number of companies wishing to do re-transactions and new transactions	0.724	***			
Environmental Sustainability					
Increasing the resource recycling rate	0.758	***	0.912	0.914	0.682
Increased use of renewable resources	0.788	***			
Improve Echo efficiency	0.877	***			
Application of environmental pollution control systems	0.882	***			
Construction of environmental management systems	0.817	***			
Social Sustainability					
Compliance with required legal liability	0.765	***	0.866	0.867	0.620
Efforts to keep ethical responsibility	0.835	***			
Efforts to uphold charitable responsibility	0.785	***			
Efforts to cooperate with stakeholders	0.763	***			
SCM Performance					
More productive than any other company	0.818	***	0.901	0.903	0.653
Lower Logistics costs than other companies	-	-			
Lower inventory level than other companies	0.807	***			
High competitiveness using supply chains	0.848	***			
Fast lead time from order to supply	0.868	***			
Financial Performance					
Sales have increased over the past three years	0.832	***	0.933	0.933	0.778
Profitability has increased over the past three years	0.859	***			
Cash has been flowing smoothly over the past three years	0.920	***			
Asset turnover has increased over the past three years	0.914	***			

Note: ***$p < 0.001$

The criterion for the fitness index for adopting the measurement model is that χ^2/df (i.e., dividing the χ^2 value by the degrees of freedom) is between 1 and 2 or 1 and 3 (Byrne, 1989), with CFI, IFI, and TLI of 0.90 or higher (Bentler and Bonett, 1980; Hetzel, 1996), SRMR of 0.80 or lower (Hu and Bentler, 1995) and RMSEA of 0.07 or less (Steiger, 2007).

This study assessed the fitness index for the modified model. χ^2/df was 1.458, which is less than 3, indicating good fit and RMESEA was 0.062, indicating appropriate fit. Also, CFI, IFI, and TLI were respectively 0.958, 0.959, and 0.948, and SRMR was 0.063, all exceeding the minimum conditions required.

Discriminant validity refers to whether there is a clear difference between each construct is clear, and to verify this, the square root value of AVE for each construct is compared with the correlation coefficient between the construct and other constructs (Fornell and Lacker, 1981). The criterion of whether discriminant validity is appropriate is that the square root value of AVE is 0.7 or more, and the value must be greater than the values of other correlation coefficients in the corresponding row and column. As the result of testing the discriminant validity of the modified model as shown in Table 5, the square root value of AVE was at least 0.867 (social sustainability), higher than 0.7, the standard value. Since the value is greater than the value of the entire correlation matrix of rows and columns, it can be said that there is a minor risk in discriminant validity.

Table 5. Descriptive statistics and associated measures

	items	Mean (SD)	AVE	(1)	(2)	(3)	(4)	(5)
(1) Economic Sustainability	4	3.87(0.74)	0.634	**0.873**	0.332	0.546	0.499	0.429
(2) Environmental Sustainability	5	3.28(0.87)	0.682	0.110	**0.914**	0.695	0.609	0.405
(3) Social Sustainability	4	3.92(0.73)	0.620	0.298	0.483	**0.867**	0.449	0.266
(4) SCM Performance	4	3.57(0.69)	0.698	0.249	0.371	0.202	**0.903**	0.613
(5) Financial Performance	4	3.51(0.89)	0.778	0.184	0.164	0.071	0.376	**0.933**

Notes: 1. Goodness-of-fit-statistics: $\chi^2(171) = 249.332$; $p<.001$; $\chi^2/df = 1.458$; IFI = 0.959; CFI = 0.958; TLI = 0.948; SRMR= 0.063; RMSEA = 0.062

2. SD = Standard Deviation, AVE = Average Variance Extracted, IFI = Incremental Fit Index, CFI = Comparative Fit Index, TLI = Trucker-Lewis Index, SRMR = Standardized Root Mean Square Residual; RMSEA = Root Mean Square Error of Approximation

3: [a]. composite reliabilities are along the diagonal; [b]. correlations are above the diagonal; [c]. squared correlations are below the diagonal

4.3. Research Hypothesis Verification

The path analysis of the revised model for the proposed research hypothesis was performed since the reliability and validity of the research items presented in this study were secured. The results of path analysis are shown in Table 6.

According to the results of the test of hypothesis H1, it was found that the factors of environmental sustainability (β=0.611) and economic sustainability (β=0.403) had a positive (+) effect on SCM performance at the significance level of 0.1%. However, it was found that social sustainability had no significant effect on SCM performance. Also, according to validation of Hypothesis H2, economic sustainability (β=0.244) had a positive (+) effect on financial performance at the significance level of 5%, but environmental sustainability and social sustainability did not affect financial performance significantly. As a result of testing hypothesis H3, it was found that SCM performance (β=0.476) had a positive (+) effect at a significance level of 0.1%.

Table 6. Standardized parameter estimates for structural model

				Coefficient	t-value	Hypothesis
H1-1	Economic Sustainability	→	SCM Performance	0.403	3.661***	Accepted
H1-2	Environmental Sustainability	→	SCM Performance	0.611	4.387***	Accepted
H1-3	Social Sustainability	→	SCM Performance	-0.195	-1.322	Rejected
H2-1	Economic Sustainability	→	Financial Performance	0.244	2.054**	Accepted
H2-2	Environmental Sustainability	→	Financial Performance	-0.201	-1.346	Rejected
H2-3	Social Sustainability	→	Financial Performance	0.174	-1.406	Rejected
H3	SCM Performance	→	Financial Performance	0.476	3.641***	Accepted

Note: **p <0.05, ***p <0.001

5. Conclusion

Due to the global COVID-19 pandemic, the existing global supply chain and trade networks were heavily affected. Especially, since Korean SMEs tended to depend on specific customers, the existing supply chain suffered a major crisis, leading to attention to sustainability.

This study carried out an empirical study on Korean SMEs, verifying Hypothesis 1 to identify the elements of sustainability affecting SCM performance and verifying Hypothesis 2 to identify the elements of sustainability affecting financial performance. Also, Hypothesis 3 was investigated the relationship between SCM performance and financial performance. According to analysis, SCM performance was positively (+) affected by environmental sustainability elements in the order of rate of resource recycling, the utilization rate of renewable resources, increased eco-efficiency, utilization of environmental pollution prevention systems and building of environmental management systems and economic sustainability elements in the order of improved investment profit rate, improved productivity, improved product and service sales, and companies wanting to trade again or start a new trade, social sustainability elements of compliance with required legal responsibilities, philanthropic responsibilities towards the local community, maintaining good relations with the local community, and enhancing the level of cooperation with stakeholders had no statistically significant effect. It was empirically proved that SCM performance had a positive (+) effect on financial performance, as well as only economic sustainability affecting financial performance positively (+).

The key implication of this study is that sustainability elements affecting SCM performance and financial performance of Korean SMEs were identified, showing that management to improve environmental sustainability and economic sustainability must be carried out and

economic sustainability must be improved to directly improve financial performance. Also, the study findings are significant that SCM performance has a positive effect on fundamental financial performance, with such research results serving as the theoretical basis that Korean SMEs' sustainable management improves both SCM and financial performance.

While the survey was conducted for Korean SMEs, there are several limitations to generalization since the number of samples may not be enough although it fulfills the qualification suggested by Hair et al. (1998). There is the need to attempt follow-up studies specialized for different supply chain structure, and it is expected that more in-depth research findings would be achieved through future research through case studies.

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