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Environmental Consciousness and Environmental Management Performance: The Mediating Effect of Environmental Information Sharing

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Abstract

The purpose of the study is to empirically investigate the effect of suppliers' environmental consciousness on environmental information sharing and management performance and to conduct the mediating effect of environmental information sharing between the environmental consciousness of suppliers and environmental management performance. The scope of environmental consciousness was extended from the consumer perspective to the organizational perspective and proposed a variable called environmental information sharing to explain how environmental consciousness affects environmental management performance. The research model and hypotheses were established based on previous studies. After collecting 295 samples of effective responses from suppliers, an empirical analysis was conducted using structural equation modeling. The findings show that suppliers' environmental consciousness affects environmental information sharing and management performance, and such sharing has a mediating effect on the relationship between suppliers' environmental consciousness and environmental management performance. The fact that environmental consciousness affects environmental management performance indicates that environmental consciousness is not just a concept of values such as the firm's belief or will, but a part of the firm's actual goal of performance. Therefore, suppliers have difficulties in reality such as a lack of professional manpower or guideline, but it is necessary to enhance the importance of environmental consciousness and promote environmental information sharing.

Keywords: Environmental Consciousness, Environmental Information Sharing, Environmental Management Performance, Supplier

JEL Classification Code: D80, M00, Q50

1. Introduction

Corporate sustainability is a concept that integrates a firm's performance in the environmental, social, and economic aspects and its strategic and operational activities (Claudy et al., 2016). Seeking sustainability in an uncertain business environment is a major business task for firms. Environmental, social, and governance (ESG) criteria,

which are a major topic among firms worldwide, have been emphasized even more since the COVID-19 pandemic, and ESG activities are part of sustainable management. Firms are striving to derive specific measures against environmental issues out of ESG criteria due to changes in the external environment such as the Green New Deal and government energy transformation policies. Firms must acknowledge environmental values for sustainable economic performance (Tate & Bals, 2018), and perceive environmental management as a measure of social performance (Yawar & Seuring, 2017). They must also quickly identify environmental changes in external situations to practice sustainable management. Moreover, high environmental consciousness is necessary to actively cope with these changes.

According to the resource-based theory, environmental consciousness is the source of corporate competitiveness. To achieve a sustainable competitive advantage, a firm must have resources that are difficult to imitate. In other words, for them to be the source of sustainable competitive advantage,

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a firm's managerial resources must be valuable, rare, completely inimitable, and have low substitutability (Barney, 1997). In particular, a firm's intangible resources are not easily imitated by its competitors since they are embodied as the organization's unique strengths after a long period of accumulation, and also affect the sustainability of corporate advantage (Carmeli, 2001; Fernández et al., 2000). Resources are all tangible and intangible subjects that can be controlled by a firm when establishing and implementing strategies, and the difference in competitiveness among firms arises from the gap between resources owned by the firm and its ability to utilize them (Barney, 1991). A firm's environmental consciousness is formed by combining multiple factors such as its attributes, value beliefs, and situations, and thus can be regarded as intangible resources differentiated from other firms. Thus, environmental consciousness can be a factor that enhances corporate competitiveness as well as a core competence of the firm.

From the consumer perspective, environmental consciousness is how interested consumers are in the environment (Dunlap & Jones, 2002), and it is a part of personal belief that induces them to do something beneficial for it (Abd'Razack et al., 2017). Moreover, this factor brings a positive change to the attitude toward the environment and affects the buying behavior of eco-friendly products (Law et al., 2017). In other words, consumers' purchase decisions are based on their attitudes toward the environment (McIntosh, 1991), and their interest in the environment, as well as responsibility, leads to buying behavior toward eco-friendly products (Young et al., 2010).

Studies on environmental consciousness from the organizational perspective have revealed that firms with high environmental consciousness consider stakeholder interests top priority in management and tend to reflect stakeholders' opinions on business activities (Banerjee, 2001; Buysse & Verbeke, 2003; Huang & Kung, 2010). Menguc and Ozanne (2005) discovered a significant positive correlation between environmental orientation and the economic performance of firms. Karagozoglu and Lindell (2000) argued that strict environmental regulations induce more competition in terms of coexistence and create innovation and efficiency.

Previous studies were mostly conducted on environmental consciousness from the consumer perspective based on correlations with concepts, attitudes, and behaviors, whereas there are insufficient studies on environmental consciousness and environmental management performance at the organizational level. Therefore, this study conducts an empirical analysis of suppliers' environmental consciousness and environmental management performance based on the following points of difference.

First, this study extends the scope of environmental consciousness that had been mostly examined from the consumer perspective to the organizational perspective.

Social pressure on firms is further increasing due to changes such as consumers' high environmental consciousness and the transition to a low-carbon economy, which requires firms to take prompt measures. It is necessary to examine the behavior of firms due to the external conditions as well as the consciousness of the internal environment. This is because environmental consciousness within the firm may determine its behavior. In other words, environmental factors are critical to the sustainable growth of firms, and there is significance in studying how environmental consciousness that lays the groundwork for pro-environmental behavior of consumers affects the relationship with the organization and how it is correlated with environment-related variables.

Second, this study suggests environmental information sharing as the variable to explain how environmental consciousness affects environmental management performance. Information sharing affects supply chain performance (Whipple & Russell, 2007), and is a key factor of supply chain management along with supply chain collaboration (Olorunniwo & Li, 2010). However, when there is information sharing between the supplier and buyer, there may be issues of opportunism and dependency for both organizations. This study limits the research scope of information sharing to environmental information sharing. Such sharing is different from information sharing in supply chain management. This substantially eliminates the issues of opportunism and dependency that occur in information sharing in the supply chain. This is because environment-related information today is based on the legitimacy that requires all firms to consider and practice sustainable management. This study has significance in providing and analyzing environmental information sharing, which connotes features other than conventional information sharing, as a research variable.

2. Literature Review

2.1. Environmental Consciousness

Environmental consciousness must include knowledge, attitude, and behavior (Diamantopoulos et al., 2003). Specific and extensive attitudes toward environmental issues and pro-environmental behavior originate from environmental beliefs (Dunlap et al., 2000). Environmental consciousness is the conceptualized attitude to reduce environmental concerns and problems (Kaffashi & Shamsudin, 2019), and it indicates individual and organizational views about environmental safety, control, and policies (Ahmed et al., 1998). Environmental responsibility awareness, green attitude, and green knowledge positively influence green purchase intention (Nguyen et al., 2022). Moreover, Wagner et al. (2009) claimed that environmental consciousness is a key factor that affects consumer purchase intention. Joshi

and Rahman (2015) argued that the key motive for pro-environmental purchase behavior begins from the high level of consumer interest in environmental issues. Environmental knowledge among the elements of environmental consciousness is preceded by environmental attitude and behavior (Kollmuss & Agyeman, 2002). Another study proved that pro-environmental attitude and behavior exhibit a significant correlation with the improvement of environmental knowledge (Haryanto, 2014; Hsu & Roth, 1998). On the other hand, Schultz et al. (1995) discovered that previous research proves the insignificant correlation between environmental interest and recycling behavior. Brand (1997) argued that pro-environmental behavior must be explained in the situational context like institutional environment or economic conditions instead of values or attitudes.

Expanding environmental consciousness from the consumer perspective to the organizational perspective, environmental management that lays the groundwork for environmental consciousness can be considered a major business strategy for firms. Customers want firms to provide them with sustainable goods and services (Kovács, 2008), and to meet their needs, firms provide them with pro-environmental products. Moreover, there is no problem with the logic that if consumers or individuals have an interest in major environmental issues that affect their economic performance, social stakeholders or firms can also have environmental consciousness (Clarkson et al., 2004; Kriwy & Mecking, 2012).

The environmental consciousness of organizations is affected by their relationships with many stakeholders including shareholders. Firms related to extensive stakeholders tend to actively implement environmental strategies (Buysse & Verbeke, 2003). Stakeholders demand that they reduce factors that may have a negative impact on the environment due to business activities (Longoni et al., 2018). Accordingly, firms must seek profitability and maximize public interests while maintaining a balance between shareholders and stakeholders (Hillman & Keim, 2001). In summary, firms' environmental consciousness is a comprehensive concept that encompasses their knowledge, attitude, and behavior related to the environment, and it is a key factor that precedes their attitude and behavior.

This study discusses environmental consciousness from the perspective of organizations, especially suppliers.

2.2. Environmental Information Sharing

Information sharing refers to the degree to which important information is delivered to subcontractors (Mohr & Spekman, 1994), and has the meaning of a strategic alliance between firms (Devlin & Bleackley, 1988). Accurate sharing of extensive information between firms can not only reduce

costs but also increase customer satisfaction and improve the performance of stakeholders involved in the entire supply chain (Azadegan et al., 2008; Hsu et al., 2008; Humphreys et al., 2004). Information sharing helps deal with demand uncertainty and decision complexity and avoid asymmetric information, thereby providing substantial benefits for the members of the supply chain (Simatupang et al., 2004). Information sharing is one of the effective ways to improve performance in a buyer-supplier relationship (Al-Shboul et al., 2017), and sharing information with subcontractors is the source of a powerful competitive advantage for firms (Jones & George, 1998). However, from a different perspective, there are difficulties in actually sharing information due to the concern over the opportunistic behavior of subcontractors (Cousins et al., 2006; Dyer & Chu, 2003).

Previous studies on environmental information sharing investigated the effects of environmental information, promotion of collaboration, knowledge transfer (Sharfman et al., 2009; Zhang et al., 2014), and environmental information sharing (Al-Tuwajri et al., 2004; Cormier et al., 2005). Environmental information for manufacturers refers to information that directly or indirectly affects the environment by manufacturing goods. This includes information about pollution, waste, energy consumption, depletion of raw materials, recycling, and efficiency (Watson et al., 2010). Suppliers outsource many components and raw materials in the manufacturing process. This indicates that suppliers must first minimize the negative elements of the environment.

This study reduced the meaning of environmental information sharing unlike that in supply chain management and examined how environmental information sharing is related to environmental consciousness and environmental management performance.

2.3. Environmental Management Performance

A firm's management and environmental performances can be improved by actively implementing environmental management (Zhu et al., 2017; Latan et al., 2018). This is a set of activities carried out by a firm to reduce energy consumption or waste, use sustainable resources, and implement an environmental management system through products, processes, and policies (Bansal & Roth, 2000). Environmental performance includes using biodegradable ingredients in products, reducing the source of pollution and waste, reducing environmentally hazardous substances, and improving energy efficiency (Zhu et al., 2010). Firms' environmental performance has been studied in various aspects. Environmental performance has a mediating effect on the relationship between Carbon emission disclosure and firm value (Hardiyansah et al., 2021). A firm's environmental performance has a positive effect on its financial performance

(Soedjatmiko et al., 2021). Sidik et al. (2019) discovered that energy efficiency had a significant positive effect on environmental performance and competitive advantage. Latan et al. (2018) proved that environmental management accounting had a significant positive effect on environmental management performance.

More direct environmental performance can be identified through manufacturing suppliers. Environmental performance such as the reduction of atmospheric emissions and waste is related to the capacity of manufacturing plants. It is also important to reduce the use of hazardous materials and the frequency of accidents related to the environment (Zhu et al., 2008). This is why the constant improvement of production sites that seek process integrity naturally leads to waste reduction and promotes energy efficiency, ultimately producing environmentally positive effects (Cherrafi et al., 2017; Simpson & Power, 2005).

Based on these previous studies, this study selects and uses pollutants, waste reduction, and efficiency as measurement items among variables of environmental management performance.

3. Hypothesis and Research Model

3.1. Environmental Consciousness and Environmental Information Sharing

Ramayah et al. (2010) argued that environmental consciousness is related to attitude toward recycling intention, and both attitude and social norms affect recycling behavior. Antil (1984) and Roberts (1996) presented environmental interest as an antecedent of pro-environmental behavior. Environmental consciousness, which precedes attitude and behavior, is a concept that includes intrinsic values such as belief and confidence along with trust, which is why the relationship between environmental consciousness and environmental information sharing can be inferred by studying trust. Mentzer et al. (2001) claimed that trust, immersion, and dependence are key antecedent variables affecting information sharing and collaboration between firms. Li et al. (2006) presented firm relationships as an antecedent variable affecting information sharing and information quality. They also empirically analyzed the relationship between information sharing and trust among supply chain partners. Many studies argued that costs of environmental practices, lack of knowledge and consciousness, insufficient environmental experts, and lack of local environment and environmentally friendly suppliers are the major barriers to environmental activities (Balasubramanian & Shukla, 2017; Sajjad et al., 2020; Seuring & Müller, 2008). Therefore, environmental consciousness is a key variable that leads to pro-environmental behavior, and environmental information

sharing is a territory of an organization's specific behavior. Based on the literature review, the following hypothesis is formulated.

H1: Suppliers' environmental consciousness will have a positive effect on environmental information sharing.

3.2. Environmental Information Sharing and Environmental Management Performance

A firm's operational performance can be improved through information sharing in the supply chain (Krause et al., 2007). The scope of information sharing in supply chain management includes the type and quality of shared information, information sharing skills, and implementation process (Marshall, 2015). Effective information sharing directly affects transport performance within the supply chain. Gurin (2000) conducted a case study on Ford and UPS and discovered how information was shared to improve Ford's delivery and transport performance. Information sharing between the buyer and supplier in the supply chain reduces total logistics costs and delivers greater value to customers (Sánchez-Rodríguez et al., 2005). Moreover, information sharing is an effective approach that adjusts the production process in the supply chain to reduce operational costs (Taylor & Xiao, 2010; Ha et al., 2011).

In terms of the environment, Meacham et al. (2013) proved that information sharing and environmental performance have a positive effect on the supply chain. Lai et al. (2015) claimed that sharing environmental management information with suppliers has a significant positive effect on environmental performance. Based on the above, the following hypotheses are established.

H2-1: Environmental information sharing will have a positive effect on environmental management performance.

H2-2: Environmental information sharing will mediate the relationship between the environmental consciousness of suppliers and environmental management performance.

3.3. Environmental Consciousness and Environmental Management Performance

Environmental performance depends on how a firm reflects the quality of eco-friendly products, environmentally friendly processes and product innovation, and ecological sustainability issues on corporate management and product development (Chen et al., 2015). Ethical and environmental consciousness can be understood and interpreted in the same context since they both include beliefs, obligations, and values. Thus, the relationship between environmental consciousness and environmental management performance can be inferred

via previous studies on ethics. Chang (2011) argued that a firm’s environmental ethics affect preventive environmental activities and environmental performance. This indicates that environmental ethics is the firm’s intangible asset that can improve its environmental performance and competitive advantage (Chang, 2011; Chen, 2008). Furthermore, a firm’s environmental ethics policies formalize the values and expectations for ethical behavior, affecting environmental performance and competitive advantage (Chang, 2011). Due to the government’s regulations for carbon emissions and the environmental consciousness of consumers, firms are using clean energy and developing green technologies to reduce carbon emissions (Yang & Chen, 2018). Therefore, to validate the causal relationship between environmental consciousness and the environmental management performance of suppliers, this study formulated the following hypothesis.

H3: *Environmental consciousness of suppliers will have a positive effect on the environmental management performance of suppliers.*

Based on the above hypotheses, this study developed a research model as illustrated in Figure 1.

4. Research Methods and Results

4.1. Data Collection and Sample Characteristics

A survey was conducted on suppliers to collect the empirical data necessary for this study. The survey was outsourced to a survey company and conducted in December 2021, and a total of 300 copies of the questionnaire were collected (Table 1). After refinement, 295 copies were used in statistical analysis excluding five with inadequate responses. As for the industrial distribution of suppliers, most were in machinery/equipment (20.3%), followed by electronic components (16.9%), automobiles (14.9%), and textiles (10.5%), indicating that they are mostly composed of major manufacturing businesses. A total of 97.3% had an annual revenue under 12 billion KRW, and 80% had fewer

than 300 employees. These companies are classified as small enterprises according to Article 2 of the Framework Act on Small and Medium Enterprises and Article 3 of the Enforcement Decree of the same Act. Moreover, how many times the suppliers discussed environmental issues with major buyers was measured to identify how much environmental information is shared with buyers. A total of 49.8% of the suppliers discussed environmental issues with major buyers once a year. This suggests that environmental information is shared between suppliers and buyers.

4.2. Operational Definitions of Variables and Measurement

Items to measure each factor are as presented in Table 2, all rated on a 7-point Likert scale. EC1-EC5 to measure environmental consciousness were developed based on measurement items by Dunlap et al. (2000) and Bohlen et al. (1993). It is a concept comprising knowledge, attitude, and behavior (Bohlen et al.,1993). EIS1-EIS5 to measure environmental information sharing were developed with reference to measurement items by Simatupang et al. (2004) and Nguyen et al. (2019) and Flynn et al. (1994). EP1-EP5 to measure environmental management performance were developed based on studies by Zhu et al. (2013) and Link and Naveh (2006).

4.3. Reliability and Validity Testing

This study conducted an analysis using SPSS 23 and AMOS 23 to test the hypotheses in the research model. Reliability to ensure internal consistency of latent variables was measured using Cronbach’s alpha. The results revealed that environmental consciousness was 0.896, environmental information sharing was 0.936, and environmental management performance was 0.899. Cronbach’s alpha of all latent variables exceeded 0.7, thereby ensuring the reliability of the research (Hair et al., 2010). Next, confirmatory factor analysis was conducted to test the convergent validity, for which the fit indices of the research model were measured. The results indicated that the comparative fit index (CFI) was

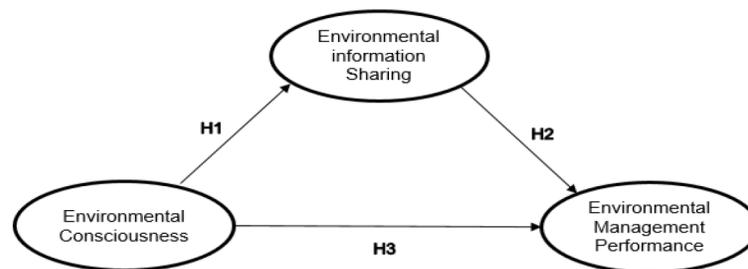


Figure 1: Research Model

Table 1: Sample Characteristics

	Characteristic	Frequency (N)	Percentage (%)
Industry	Machinery/Equipment	60	20.3
	Electronic Components	50	16.9
	Automobiles	44	14.9
	Textiles	31	10.5
	Others	110	37.2
Annual Revenue	More than a billion KRW	165	55.9
	Less than 12 billion KRW	122	41.4
	More than 12 billion KRW ~ less than 150 billion KRW	8	2.7
Firm Size (No. of employees)	Less than 300	236	80
	More than 300	59	20
The number of discussions on environmental issues with major buyers	1 time/year	147	49.8
	1 time/2–3 years	109	36.9
	1 time/4–5 years	34	11.5
	Others	5	1.7

Table 2: Operational Definition of Variables

Variable	Variable Measurement	References
Environmental Consciousness	Environmental activities affect corporate survival (EC1)	Dunlap et al.(2000); Bohlen et al.(1993)
	Environmental activities affect corporate growth (EC2)	
	Knowledge of environmental issues (EC3)	
	Environmental responsibility (EC4)	
	Implementation of environmental activities (EC5)	
Environmental Information Sharing	Sharing general environmental information (EIS1)	Simatupang et al.(2004); Nguyen et al.(2019); Flynn et al.(1994)
	Sharing environmental policy information (EIS2)	
	Sharing of environmental operation information (EIS3)	
	Sharing environmental performance (EIS4)	
	Sharing environmental performance feedback (EIS5)	
Environmental Management Performance	Reduce environmental waste and pollutant emissions (EP1)	Zhu et al.(2013); Link and Naveh (2006)
	Reduce carbon emissions (EP2)	
	Reduce the number of violations of environmental laws (EP3)	
	Reduce the number of environmental issues (EP4)	
	Increase the efficiency of energy use (EP5)	

Table 3: Result of Discriminant Validity Analysis

	EC	EIS	EP
Environmental Consciousness (EC)	0.795		
Environmental Information Sharing (EIS)	0.778	0.871	
Environmental Management Performance (EP)	0.753	0.790	0.807

0.975, Tucker-Lewis index (TLI) was 0.969, and root mean square error of approximation (RMSEA) was 0.059, thereby confirming that the fit is acceptable (Hair et al., 2010).

Convergent validity was analyzed using construct reliability (CR) and average variance extracted (AVE). It was found that in all latent variables such as environmental consciousness (CR = 0.895, AVE = 0.632), environmental information sharing (CR = 0.940, AVE = 0.759), and environmental management performance (CR = 0.903, AVE = 0.652), CR exceeded 0.7, and AVE exceeded 0.5, which ensured convergent validity (Hair et al., 2010).

Finally, discriminant validity was analyzed by comparing the square root of AVE and the correlation coefficient of the constructs, assuming that there is discriminant validity when the square root of AVE is greater than the correlation coefficient (Hair et al., 2010). In this study, the square root of AVE for each construct was greater than the correlation coefficient among other constructs as reported in Table 3, thereby proving that there is discriminant validity.

4.4. Empirical Results

Once the validity and reliability of the research model were ensured, the hypotheses were tested using path analysis. According to the results, the model fit was CFI = 0.975, TLI = 0.969, and RMSEA = 0.059, thereby meeting the criteria (Hair et al., 2010). The results demonstrated that all hypotheses were accepted.

First, the environmental consciousness of suppliers had a significant effect on environmental information sharing. Second, environmental information sharing had a significant effect on the environmental management performance of suppliers. Third, the environmental consciousness of suppliers had a significant effect on the environmental management performance of suppliers. The results of hypothesis testing are reported in Table 4.

The research model tested the mediating effect of environmental information sharing, which is the mediating variable. Bootstrapping was used to examine the mediating effect of environmental information sharing and the estimation of the mediating effect, standard error, and bootstrap 95% confidence interval were analyzed. As presented in Table 5, the mediating effect of environmental information sharing had maximum and minimum values of 0.150–0.339 at a

Table 4: Hypothesis Verification Results

	Estimate	S.E.	C.R.	p-value	Result
H1	0.778	0.06	13.023	***	Supported
H2	0.489	0.074	6.609	***	Supported
H3	0.32	0.071	4.477	***	Supported

*** $p < 0.001$.

Table 5: Hypothesis Verification Results – Bootstrapping Result

Hypothesis	Estimate	S.E.	95% confidence interval
EC → EIS → EP	0.001	0.049	0.150–0.339

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

95% confidence interval, thereby not including 0. In other words, the mediating effect of environmental information sharing was statistically significant at $p < 0.05$.

Moreover, the Sobel test was conducted to test the indirect effect of environmental information sharing, and the result was $z = 5.887$ ($p < 0.001$), proving that the mediating effect was statistically significant. The results of bootstrapping and the Sobel test supported Hypothesis 2–2 that environmental information sharing will mediate the relationship between environmental consciousness and environmental management performance of suppliers.

5. Discussion, Implications, and Limitations

5.1. Discussion and Implications

This study was conducted to empirically test the effect of environmental consciousness on environmental information sharing and environmental management performance of suppliers. The fact that environmental consciousness affects environmental management performance indicates that environmental consciousness is not just a concept in terms of values such as the firm's belief or will, but a part of the firm's actual goal of performance. Therefore, a firm's

environmental consciousness is a key element of sustainable management, which is the source of its competitive advantage. Firms' environmental consciousness is no longer explained based on moral, ethical, or social demands. Firms must perceive that environmental consciousness is a factor that has a direct impact on generating economic profits and enhancing enterprise values. Firms can establish actual plans for sustainable management once they improve their environmental consciousness. Therefore, suppliers must enhance and internalize the importance of environmental consciousness.

The results of testing the hypotheses set according to the purpose of this study are as follows.

First, the environmental consciousness of suppliers had a significant positive effect on environmental information sharing. This can be interpreted in the same context as the studies from the consumer perspective that individual knowledge and attitude toward environmental issues are the main cause that drives pro-environmental behavior (Cottrell, 2003). The environmental consciousness of organizations that includes knowledge or attitude toward the environment can be an antecedent of organizational behavior. Environmental consciousness in this study is a concept that embraces not only corporate beliefs or trust but also attitude and behavior. Although suppliers perceive the importance of the environment due to social interest in the environment or stricter regulations, there may be difficulties in actually practicing or applying it to corporate management. The fact that suppliers have high environmental consciousness even in this situation proves that this can lead to firm belief, knowledge, intent, and even behavior toward the environment. Therefore, higher environmental consciousness of suppliers will facilitate environmental information sharing with buyers.

Second, environmental information sharing had a significant positive effect on environmental management performance. This can be interpreted based on the results that information sharing in supply chain management has a significant effect on relationship performance, supply chain performance, and logistics performance (Al-Shboul et al., 2017; Chen et al., 2015; Chen, 2007). Due to internal and external environmental changes such as the pursuit of sustainable management by firms and the tighter environmental regulations by the government, firms must control and improve the parts that have a negative impact on the environment as much as possible. Their ability to take preemptive measures against the environment is related to tangible environmental management performance such as reduction of waste and carbon emissions or increase in efficiency. One of the effective approaches of suppliers to improve environmental management performance is environmental information sharing. This is because suppliers can make quick and accurate decisions about environmental

issues by sharing environmental information with buyers. This implies that it is necessary to promote such sharing between suppliers and buyers to improve environmental management performance when there are higher demands about the environment.

Moreover, the mediating effect of environmental information sharing was verified by the Sobel test and bootstrapping. It was demonstrated that using environmental information sharing as a mediating variable in the relationship between suppliers' environmental consciousness and environmental management performance had a significant effect on improving environmental management performance.

Third, suppliers' environmental consciousness had a significant positive effect on environmental management performance. This is similar to the results of previous studies providing a positive causal relationship between environmental consciousness and the financial performance of firms (Chaudhry et al., 2016; Chen et al., 2007). In other words, improving such environmental consciousness also promotes knowledge, attitude, and behavior about the environment, through which environmental management performance of suppliers can be improved. This Cottrell that environmental consciousness can be a new strategic plan in terms of environmental management performance.

The academic implications based on the results above are as follows.

First, environmental issues are the key topic that must be reviewed for the sustainable management of firms. Thus, research must be conducted not in terms of consumers but also organizations. This study expanded the scope of environmental consciousness, which had previously been mostly focused on consumers, to the organizational level to identify the correlation between environmental consciousness and other variables. In particular, this study has academic significance in that it has intensified the topic of the environment and systematically demonstrated it with a focus on suppliers.

Second, this study limited the scope of information sharing to the environment and suggested it as an antecedent variable of environmental management performance. Moreover, it structurally proved and demonstrated that environmental information sharing had a mediating effect on how the environmental consciousness of suppliers affects environmental management performance. This has academic significance in that the generalized variable of information sharing is interpreted and applied from a different angle and that it has proved the mediating effect of environmental information sharing in the structural relationship between environmental consciousness and environmental management performance.

The practical implications of this study are as follows.

First, the results confirmed that suppliers' environmental consciousness is important in promoting their environmental information sharing and environmental management performance. Since environmental consciousness is a

concept that encompasses knowledge, attitude, and behavior related to the environment, these three must be considered in seeking ways to promote the environmental consciousness of suppliers. To begin with, the management of suppliers must have clear environmental consciousness. Suppliers are aware that they must aim for environmental management in the long run. However, there are difficulties in reality such as a lack of professional manpower or guidelines. If the management has firm environmental consciousness and a strong will to seek environmental management, there will be a positive impact on improving the environmental consciousness of suppliers. The management must provide support for constant education on the environment and also offer substantial assistance necessary for acquiring and managing environmental certificates that can produce tangible results about the environment and developing their environmental management guidelines.

Second, the result that environmental information sharing affects environmental management performance implies that suppliers must promote environmental information sharing with buyers. Suitable supplier systems must be established and operated for the smooth sharing of environmental information. For efficient management, it is necessary to index and quantify all information through the systems instead of merely sharing information in the form of reports. Moreover, Key Indicator Performance (KPI) for environmental information sharing must be adopted, through which the executive ability can be improved. Furthermore, building a system for environmental information sharing must aim for not only data collection but also constant management from environmental consciousness to monitoring. It is also important for suppliers to match their environmental goals with buyers before adopting the environmental information sharing system and decide on the information sharing model that meets their level along with buyers. Building and operating an environmental information sharing system will enable systematic and constant environmental monitoring, while also preventing environmental issues.

5.2. Limitations

The limitations of this study and future research direction are as follows.

First, a cross-sectional study was conducted to measure all variables at one given point in time. This kind of research has limitations in elaborately testing causal inference or identifying the increase or decrease of mediating variables. In other words, it failed to reflect actual changes in supplier consciousness due to the time flow. Thus, a longitudinal study must be conducted in the future to prove the causal relationship among all variables, especially before and after the COVID-19 pandemic.

Second, it is necessary to consider the mediating effect of various other variables aside from environmental information sharing. This study analyzed environmental management performance with environmental information sharing as the mediating variable, which is based on the collaboration between suppliers and buyers. Thus, other factors such as risk sharing, benefit sharing, and joint decision-making were not applied. Future research can apply other mediating factors related to sharing aside from environmental information sharing for a more in-depth review of the relationship between environmental consciousness and environmental management performance.

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