Green Supply Chain Management Practices and Environmental Performance: The Moderating Role of Supply Chain Traceability

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Abstract. The practice of green supply chain management is considered a series of activities in an organization in order to encourage environmental performance. The role of green supply chain management practices is more effective in environmental performance if the organization has supply chain traceability. Supply chain traceability provides a greater level of monitoring to green supply chain management practices so that environmental performance also improves. This study aims to analyze the effect of green supply chain management practices on environmental performance with supply chain traceability as moderation. This study uses a sample of 62 on Micro, Small, and Medium Enterprises (MSMEs) in the creative industry sector in Yogyakarta, Indonesia. The data collection method uses a questionnaire. The results of this study show that green supply chain management practices have a positive effect on environmental performance, supply chain traceability has no positive effect on environmental performance, and supply chain traceability does not moderate the positive effects of green supply chain management practices on environmental performance.

Keywords: Green Supply Chain Management Practices; Supply Chain Traceability; Environmental Performance

1. Introduction

The level of public awareness of eco-friendly products encourages organizations to adopt eco-friendly concepts. To produce environmentally friendly products, organizations can also adopt green supply chain management practices / GSCMP (1). GSCMP have been developed into integrated inter-organizational concepts to improve environmental health and organizational performance (2). Several previous studies have shown the positive influence of GSCMP on environmental performance (EP) (3). Revealed that substantial EP can be achieved with GSCMP especially in waste elimination. Explained that the components of GSCMP such as product innovation and process innovation are able to improve EP (4).

ICBEESS 2024, August 01, Gresik, Indonesia

DOI 10.4108/eai.1-8-2024.2354148

GSCMP can also affect supply chain traceability (SCT) within an organization (5; 6). Explained that SCT is the level of knowledge of organizations related to the location and process of products from the original source to the end customer. GSCMP greatly affect the performance of an organization's SCT. Without SCT, an organization's efforts to improve EP environmental performance can be hampered. SCT reinforces the positive influence of GSCMP on EP (7; 8). This means that SCT is able to strengthen the influence of GSCMP on EP. The existence of SCT plays a role in strengthening the influence of GSCMP in identifying certain environmental risks in the supply chain so that EP improves. This study aims to re-examine the consistency of previous research related to the effect of GSCMP on EP moderated by SCT.

This study takes research on Micro, Small, and Medium Enterprises (MSMEs) of the creative industry sector in the Yogyakarta, Indonesia. MSMEs in the creative industry sector have contributed to the development of the industry in Yogyakarta. Previous research has examined the influence of GSCMP using the scale of large companies as the object of research. This study examines the scale of small or medium-sized companies in the form of MSMEs in the creative industry sector in Yogyakarta, Indonesia.

2. Literature Review

2.1 Green Supply Chain Management Practices

Explain that GSCMP are a concept to improve environmental sustainability and sustainable development (10). GSCMP focus on reducing ecological burden that covers all aspects of product manufacturing, logistics use, waste management, reuse and recycling of products (11)

2.2 Supply Chain Traceability

SCT is the ability to identify or verify components and all sets of events throughout the supply chain (12). SCT systems have been shown to increase consumer confidence in food systems and reduce consumer costs associated with repairs sustainable for producers (13). SCT systems are an essential tool for managing safety risks, food quality, and promoting effective management development (14).

2.3 Environmental Performance

EP is a measure of an organization's interest in maintaining environment (15). EP is also an organization's ability to minimize and repair environmental damage caused by its activities. EP is an organization's strategic activity that focuses on control of organizational performance towards the environment (16). Define EP as the organization's ability to reduce air emissions, waste, material consumption and other environmental pollution (17).

2.4 Hypothesis Development

2.4.1 Positive Effects of GSCMP on EP

Explained that organizations are able to improve EP by implementing GSCMP correctly (18).

Argue that GSCMP are an effective approach to improve environmental resilience organization by integrating supplier distribution channels to customer (19). GSCMP able to reduce the waste burden on the manufacturing aspect of the product so that EP is improved.

H1: GSCMP have a positive effect on EP

2.4.2 Positive Effects of SCT on EP

SCT has been empirically shown to improve environmental initiation and sustainable supplier performance (20; 21). SCT includes e.g. the source of raw materials, chemicals or elements contained in purchased products, monitoring EP throughout the supply chain, processes related to production**.** SCT strengthens organizational operating procedures in improving product quality for external stakeholders, reducing operational costs, and environment-related fines so that EP improves (22).

H2: SCT have a positive effect on EP

2.4.3 Positive Effects of GSCMP on EP with SCT as Moderation

SCT is generally defined as the ability to identify components and sets of activities along the supply chain. Organizations implement SCT to find out the source of raw materials, chemicals, monitor EP throughout the supply chain. SCT provides higher monitoring for organizations especially supplier sustainability in environmental initiatives, improving GSCMP, as well as EP. Without SCT, an organization's efforts to improve EP through GSCMP can be hampered.

H3: SCT Moderates Positive Effects GSCMP on EP

Figure 1 shows a research model to examine the positive effect of GSCMP on EP with SCT as a moderating variable

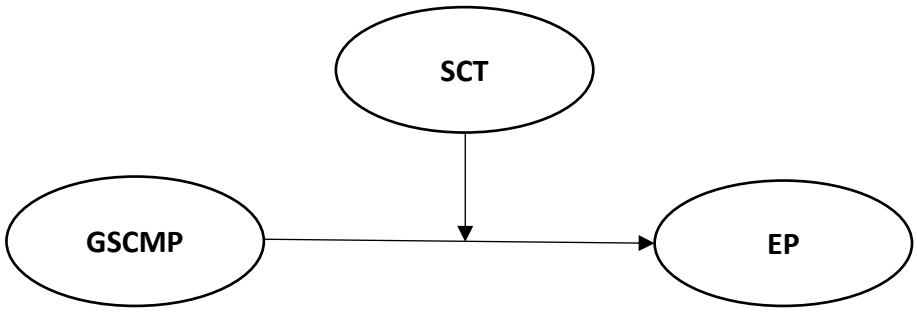

Figure 1. Research Model

3. Research Methods

3.1 Samples and Data Analysis

The number of samples in this study is 62 respondents. The SCT construct is measured using 5 statement indicators sourced from. The GSCMP construct is measured by 7 statement indicators sourced from (23). The construct of EP is measured using 9 statement indicators sourced from. Data analysis in this study uses the outer model measurement which consists of convergent validity and composite reliability. An indicator can be said to be valid and if it has a loading factor value greater than 0,7 (24). A variable is declared reliable if it has a composite reliability value greater than 0.7 and a Cronbach alpha value greater than 0.6 (25). The method to determine the direct effect is bootstrap resampling. Estimate the indirect effect simultaneously using the Triangle PLS-SEM model to determine the indirect effect in the presence of moderating variables. The results of hypothesis testing are interpreted from the p-value and if the p-value is less than 0.05, then the hypothesis was declared acceptable (25).

4. Result and Discussion

Figure 2 describes the structural model in this study. Figure 2 shows the results of the variable test used to examine the moderating effect of SCT on the effect of GSCMP on the EP.

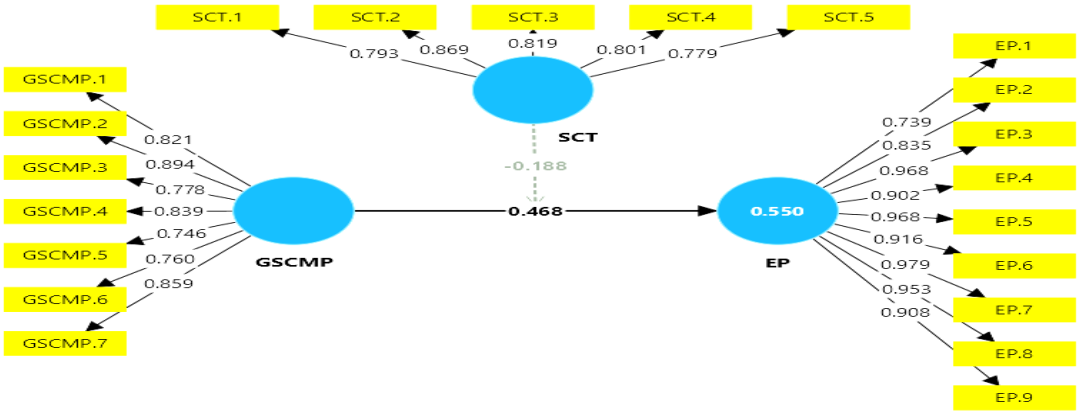

Figure 2. Structural Model Output

Table 1. Discriminant Validity

Variable	Indicator	GSCMP	SCT	EP
GSCMP	GSCMP.1	0.821		
	GSCMP.2	0.894		
	GSCMP.3	0.778		
	GSCMP.4	0.839		
	GSCMP.5	0.746		
	GSCMP.6	0.760		
	GSCMP.7	0.859		
SCT	SCT.1		0.793	
	SCT.2		0.869	

	SCT.3	0.819	
	SCT.4	0.801	
	SCT.5	0.779	
EP	EP.1		0.739
	EP.2		0.835
	EP.3		0.968
	EP.4		0.902
	EP.5		0.968
	EP.6		0.916
	EP.7		0.979
	EP.8		0.953
	EP.9		0.908

Table 2. Construct Reliability

Variable	Cronbach's Alphal	Composite Reliability (rho_a)	Composite Reliability (rho_c)	Average Variance Extracted (AVE)
GSCMP	0.917	0.931	0.933	0.933
SCT	0.872	0.879	0.907	0.661
EP	0.973	0.977	0.977	0.977

Tables 1 and 2 show the tabulation of validity and reliability test results. Table 3 shows the tabulation of the results of hypothesis testing.

Table 3. Hypothesis Testing Result

Hypothesis Testing	Original sample (O)	Sample Mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
GSCMP → EP	0.468	0.461	0.135	3.464	0.001
SCT → EP	0.227	0.247	0.150	1.514	0.130
GSCMP*SCT → EP	-0.188	-0.181	0.086	2.177	0.030

4.1 Positive Effects of GSCMP on EP

The results of this study explain that GSCMP has a positive effect on eliminating or reducing waste along the supply chain so that EP improves (26). Explained that GSCMP substantially increases EP especially in waste elimination. The results of this study are supported by the

research of (27) and (28) which states that GSCMP have a positive effect on EP.

4.2 Positive Effects of SCT on EP

The study implies no impact of SCT in ensuring EP. However, this contradicts the findings based on the literature of (29) that says traceability impacts environmentally sustainable performance. (30) and (31) have also stated that traceability causes EP. SCT only discloses information about the operation, planning, design, and strategy of a product so that in order to achieve certain performance such as EP, some decision-making process or other information processing may be necessary (32).

4.3 Positive Effects of GSCMP on EP with SCT as Moderation

SCT is a risk management tool to reduce information asymmetry between supply chain members, but in this study, SCT weakens the influence of GSCMP on EP. MSMEs in the creative industry sector have not been able to utilize SCT to improve EP even though SCT provides a detailed level of monitoring of sustainable GSCMP and manages EP. Large-scale organizations have an easier time implementing supply chain management compared to small-scale organizations (33). Organizations on a large scale continuously develop all aspects related to the supply chain. MSMEs in the creative industry sector have not used the technology needed to support SCT, so this condition has proven to weaken the influence of GSCMP on EP. SCT must be supported by technology to collect and disseminate information efficiently (34).

5. Conclusion

The study implies that the achievement of EP is influenced by GSCMP. Empirically, this study states that to ensure EP, it is important for organizations to have visibility into GSCMP in sustainable supply chain collaboration. SCT has no positive effect on EP. This study explains that SCT in MSMEs in the creative industry sector does not directly provide transparent information between supply chain partners so that EP decreases. This study fails to empirically validate previous research's argument that SCT moderates the positive effects of GSCMP on EP.

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