

THE CONFIRMATORY FACTOR ANALYSIS OF STAKEHOLDER, SUSTAINABLE SUPPLY CHAIN PERFORMANCE, AND GREEN SUPPLY CHAIN MANAGEMENT PRACTICES OF ROAD TRANSPORTATION SERVICE PROVIDERS IN THAILAND

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ABSTRACT

Abstract— The objectives of this research are to 1) study the levels of stakeholders (STHD), green supply chain management practices (GSCM), and sustainable supply chain performance (SSCP), and 2) study the factors of STHD, GSCM, and SSCP on each other in the context of Thailand road transportation service providers. The study used quantitative method research. The sample was 300 Thailand road transportation service providers, arisen from stratified sampling. The instruments used in the research were questionnaires. The statistics used for quantitative data analysis were frequency, percentage, mean, standard deviation, confirmative factor analysis and structural equation modeling. The findings revealed that the levels of STHD, GSCM and SSCP were at a high level. In addition, STHD comprised regulatory, internal and market-based stakeholders, GSCM consisted of internal environmental management, green purchasing, cooperation with customers and eco-design, SSCP contained economic, social and environmental performances. For practical recommendation, such findings can be a guideline for road transportation service providers to improve their sustainable supply chain performance. Regulators should design strictly environmental rules, while customers should pay attention to company's environmental practices. Entrepreneurs, moreover, should inspect on environmental management within the firm. In addition, government agencies can apply the results of research to formulate policies for helping entrepreneurs. For theoretical recommendation, academicians and interested persons can bring the research results to conduct further research on other potential industries. Likewise, the roles of other dynamics should be considered since they are essential factors in logistics and supply chain management.

Keywords—Stakeholders, Green Supply Chain Management Practices, Sustainable Supply Chain Performance

INTRODUCTION

The following study is designed to examine the role of stakeholders (STHD) on sustainable supply chain performance (SSCP). Additionally, the mediating role of Green Supply Chain Management (GSCM) is also determined under this study. The STHD has gained the interest of recent investigations due to its association with the environment. Additionally, the role of STHD itself is pivotal for indicating the sustainable performance of a supply chain. Nonetheless, the SSCP of road transportation service providers (TSPs) is likewise a precarious concern of the recent studies (Aunyawong et al., 2021). For example, quality of services, eco-centralism, and sustainable development are some of the most mutual strands in the global market (Aunyawong et al., 2020a).

Moreover, the adaptation of sustainable business development has also become another important service value between contemporary businesses (Nualkaw et al., 2021). Consequently, this study will inspect the effect of STHD on SSCP with reference to road transportation service providers. In correspondence, a quantitative research approach has been employed in this study to signify the mediating role of GSCM on the relationship between STHD and SSCP. The roles of STHD and GSCM on the supply chain performance have been plentifully surveyed. In connotation with this, a contradicting view has been obtained from the literature. It is because STHD and GSCM pose penetrating economic costs that are strongly dominant on the SSCP (Namagembe et al., 2019; Rad & Nahavandi, 2018; Yuyangyuen & Aunyawong, 2023). For example, the adaptation of GSCM and the pressure of STHD necessitate an improvement of all the procedures in the old-style supply chain. Therefore, GSCM and STHD negatively influence on the supply chain performance in the shorter-term as the firm and supply chain partners to cope with extreme cost-effective processes (Wisedsin et al., 2020). On the other hand, the compliance of STHD and adaptation of GSCM is certainly a cost-efficient procedure for longer-terms because

STHD and GSCM generate sustainable practices of physical supply, product/packaging design and product disposal.

With respect to this, the opposing effect of the traditional supply chain cannot be abandoned. Temporarily, the environment is meaningfully getting demolished with old-style supply chain practices as carbon emissions from such practices are changing the atmosphere (Suryanto et al., 2018). Regarding this decisive subject, the following study has been developed to list the impact of STHD on the SSCP of road TSPs with reference to the mediating effect of GSCMP. This study is significant as it makes a contribution on sustainable environment and supply chain performance by inspiring road TSPs towards the adaptation of GSCM and the compliance of STHD. The following core objective of this study is developed from the review presented above: to examine the levels and factors of STHD, GSCM and SSCP of road TSPs.

LITERATURE REVIEWS

1. Sustainable Supply Chain Performance

SSCP refers to the profitability of a business entity arisen from the flow of a product or service from the supplier to the end of the customer through all the moderate-level entities. SSCP can be measured by economic, social and environmental performances (Aunyawong et al., 2021; Aunyawong et al., 2018), while STHD are individuals, communities or organizations that are interested in the performance of the firm, comprising regulatory, internal and marketing stakeholders (Soewarno & Tjahjadi, 2020; Pakornpongwatthana & Aunyawong, 2022). Stakeholders influence management decisions at all levels of sustainable supply chain management. These include risk management, communication, collaboration, information sharing and building trust between members in the supply chain. Stakeholders, including from customers, governments, non-governmental organizations (NGOs), media, investors, competitors and employees, will indirectly impact SSCP in environmental, economic and social dimensions (Chen and Kitsis, 2017; Wararatchai et al., 2022). From a sustainable supply chain perspective, the main barriers to adopting a sustainable approach in supply chains are government stakeholders who set regulations. Fair pricing is a key issue in moving towards sustainable supply chain management (Waiyawuththanapoom et al., 2023; Sooksai et al., 2021; Sooksai et al. 2022). In addition, reducing bureaucracy through simple and efficient processes will encourage more sustainable practices in the supply chain. Stakeholders such as NGOs, local governments, retailers and regulators play a key role in supporting the company's movement towards sustainability in the supply chain (Elias et al., 2021).

2. Stakeholders

STHD of the company that consist of from regulatory or government agencies, executives, employees, medias, competitors and customers, have a positive indirect effect on a company's environmental and economic performance, which is considered to be a component of SSCP with the mediation effect of GSCMP. The companies, therefore, must focus on stakeholders along with turning the internal resources into competitive resources to use these resources in GSCMP, leading to the enhancement of firm's competitive advantages as well as environmental and economic performances (Huang et al., 2021).

3. Green Supply Chain Management Practices

GSCM refers to activities of firms showing awareness of environmental friendliness, consisting of internal environmental management, green purchasing, cooperation with customers and eco-design (Pintuma & Aunyawong, 2021). The organization's stakeholders act as an incentive for the organization to adopt environmental practices, in which they also influence every part in supply chain. The organization also limits activities that can negatively affect the environment to avoid prosecution and use environmental strategies to build good relationships with stakeholders and meet stakeholder expectations. Stakeholders are therefore more likely to influence corporate decision-making in implementing GSCM (Baah et al., 2020). Additionally, the relationship between stakeholders and GSCM is conflicted since some studies depict a negative relationship while others show no relationship at all. Various stakeholders, such as regulators, shareholders, employees and customers, enable businesses to apply environmental management in their operations. Stakeholders can be classified into three attributes: the power to influence the company, the legitimacy of the relationship with the company, and the claims of stakeholders within the company. Governments and regulators that have these characteristics will have a significant impact on the decisions of business executives (Baah et al., 2021).

Previous literature on GSCM has classified internal stakeholders from regulatory and marketing stakeholders of the firm. When the regulatory stakeholder establishes the relevant regulations, companies often have to follow in order to survive. Such stakeholders often have a compulsory and formal relationship with the company. The Adoption of GSCM includes practices that promote environmental performance along the chain, for example, product design, production and customer management. Whenever internal stakeholders such as shareholders or employees force the company to comply with environmental regulations, the company will do its best to prevent the withdrawal of shareholders' shares. In addition, the company pays attention to customer satisfaction and always wants to achieve a competitive advantage (Huang et al., 2021).

Companies implementing GSCM in the processes of design, production, distribution and logistics management will result in higher improvements in supply chain performance than companies that do not adhere to GSCM. This GSCM will help build a good corporate image for society, increase the company's financial efficiency, and maximize social, economic and environmental benefits (Martínez and Mathiyazhagan, 2020). GSCM, moreover, will improve overall performance throughout the supply chain, especially the environmental performance. Internal environmental management according to ISO 14001 (Environmental Management System Standard) and green purchasing from suppliers with such standard are essential to SSCP. Today, environmentally conscious supply chain management is a strategic imperative based on customer needs (Zhang et al., 2020).

In addition, businesses' focus on GSCM will cause performance improvements in operational, marketing, financial, social, economic and environmental aspects. These performances are dimensions of SSCP and business performance. GSCM are the mediating variable between the influence of green human resource management practices on operational, marketing, financial, social, economic and environmental performances (Acquah et al., 2020).

METHODS

This research is quantitative research. The population in this section includes 20,285 road transport service providers in Thailand registered with the Ministry of Commerce (Bureau of Trade Policy and Strategy Ministry of Commerce, 2021). The sample consisted of 300 Thailand road TSPs, calculated from the sample size according to the condition for statistical analysis of the Structural Equation Modeling (SEM) not less than 20 times the observed variables in the model (Hair et al., 2010). From the research conceptual framework, there were 4 10 observable variables. Therefore, a sample of not less than or equal to 200 (10 x 20) was required. The sampling was done by stratified sampling by area.

A questionnaire and interview form was an instrument used as research instrument to collect data. The instrument accuracy was checked for validity and reliability. The validity consisted of content validity using IOC >0.5 and construct validity using confirmatory factor analysis (CFA), while the reliability was checked for Cronbachs' alpha coefficient >0.8 (Cronbach, 1990). The five-point Likert scale questionnaire comprised the items related on research variables and based on the concepts of past studies as discussed in literature review. For quantitative data interpretation, the criteria were recommended by Best and Kahn (2006).

For data analysis, first, the level of variables in the research were analyzed using descriptive statistics, including mean, standard deviation (S.D.), Skewness (Sk), and Kurtosis (Ku). The skewness between -3 and +3 and kurtosis between -10 to +10 indicating a normal distribution when using SEM (Kline, 2011) were considered. Second, discriminant validity was tested based on Maximum Shared Variance (MSV) < Average Variance Extracted (AVE) and Average Squared Shared Variance (ASV) < AVE; Also, the latent variable's AVE should be greater than the squared correlation between the latent variable and all other variables. In addition, the convergent validity was tested taking into account that the composite reliability value must be greater than 0.7 and AVE > 0.5 (Fornell & Larcker, 1981). Third, CFA was used to check the construct validity of the questionnaire using the criteria proposed by Diamantopoulos and Siguaw (2000).

RESULTS

The descriptive statistical results showed that the observed variables averaged between .402 – 4.47, which was at a high level and had a standard deviation between .49 and .69. The variable with the highest mean was internal stakeholders, while the variable with the lowest mean was eco-design. Skewness ranged between -1.283 to -0.209 and Kurtosis ranged between -0.200 to 3.576, so the data was normally distributed, as shown in Table 1.

Table 1
Descriptive Statistics

Variable	Min	Max	Mean	S.D.	Sk	Ku
Sustainable supply chain performance	-	-	4.24	0.03	-	-
Economic performance	1.00	5.00	4.16	0.56	-0.705	1.115
Social performance	1.00	5.00	4.33	0.55	-0.747	1.278
Environmental performance	1.00	5.00	4.23	0.50	-0.209	-0.173
Green supply chain management practices	-	-	4.14	0.05	-	-
Internal environmental management	1.00	5.00	4.16	0.66	-1.283	3.576
Green purchasing	1.00	5.00	4.15	0.69	-0.979	1.724

Variable	Min	Max	Mean	S.D.	Sk	Ku
Cooperation with customers	1.00	5.00	4.24	0.58	-0.747	0.538
Eco-design	1.00	5.00	4.02	0.61	-0.462	0.161
Stakeholders	-	-	4.34	0.07	-	-
Regulatory stakeholders	1.00	5.00	4.26	0.62	-0.933	1.972
Internal stakeholders	1.00	5.00	4.47	0.52	-0.876	0.056
Market-based stakeholders	1.00	5.00	4.29	0.49	-0.360	-0.200

The results of measurement model found that the highest factor loading was green purchasing and the lowest factor loading was eco-design. The standard errors ranged from 0.048-0.071 and t-values ranged from 11.386-19.207, as shown in Table 2. Moreover, the test results on composite reliability, convergent validity and discriminant validity depicted that all factors, comprising sustainable supply chain performance, green supply chain management practices and stakeholders, were meet the acceptable criteria, as shown in Table 3.

Table 2
Measurement Model Results

	Sustainable supply chain performance	Green supply chain management practices	Stakeholders	t	S.E.
ECP	0.800			11.115	0.068
SOP	0.722			11.386	0.063
ENP	0.729			<- ->	<- ->
IEM		0.862		19.207	0.049
GRP		0.882		<- ->	<- ->
COC		0.690		13.956	0.048
ECD		0.685		13.505	0.051
RST			0.742	<- ->	<- ->
IST			0.731	11.705	0.071
MST			0.740	15.249	0.059

Notes: ECP: Economic performance, SOP: Social Performance, ENP: Environmental Performance, IEM: Internal Environmental Management, GRP: Green Purchasing, COC: Cooperation with Customers, ECD: Eco-Design, RST: Regulatory Stakeholders, IST: Internal Stakeholders, MST: Market-Based Stakeholders, <- ->: Constrained Parameter, S.E.: Standard Error

Table 3
Reliability, convergent and discriminant validity

	α	CR	AVE	MSV	ASV
Sustainable Supply Chain Performance	0.946	0.844	0.534	0.436	0.408
Green Supply Chain Management Practices	0.955	0.823	0.569	0.443	0.402
Stakeholders	0.896	0.807	0.550	0.487	0.410

Notes: Threshold of reliability: CR>.70; Convergent validity: AVE>.50; Discriminant validity: AVE>MSV, ASV<AVE. CR =composite reliability; AVE = average variance extracted; MSV = maximum shared variance; ASV = average shared variance.

CONCLUSION AND FUTURE WORK

Such findings can be a guideline for road transportation service providers to improve their sustainable supply chain performance. Regulators should design strictly environmental rules, while customers should pay attention to company's environmental practices. Entrepreneurs, moreover, should inspect on environmental management within the firm. In addition, government agencies can apply the results of research to formulate policies for helping entrepreneurs. For theoretical recommendation, academicians and interested persons can bring the research results to conduct further research on other potential industries, such as automotive (Aunyawong, 2020b), food (Pintuma et al., 2020; Sinthukammoon, 2021), beverage (Wisedsin et al., 2020), fruit (Soonthornpipit et al.

2021), and tourism industries (Setthachotsombut & Aunyawong, 2020). Likewise, the roles of other dynamics such as service value (Nualkaw et al., 2021), environmental uncertainty (Srisawat & Aunyawong, 2021) plus technological and innovative issues (Sommanawat et al., 2021; Tirastittam, 2020; Waiyawuththanapoom, 2020a; Waiyawuththanapoom, 2020b) should be considered since they are essential factors in logistics and supply chain management.

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