

## Green Supply Chain Management in Vietnam Industrial Zone: Province-Level Evidence

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### Abstract

The main purpose of this paper is to explore how green supply chain management (GSCM) and its evaluative factors have affected green supply chain management practice and performance in industrial zone. This study proposes a structural equation model of the relationships among four factors: internal awareness (IA); suppliers' pressure (SP); customers' awareness (CA); and regulations pressure (RP) and their effect on GSCM practice (PA) and GSCM performance (PE). We used a survey questionnaire to elicit perceptions/opinions about GSCM from three level of managers of 322 companies in Bac Ninh Province's industrial zones, Vietnam. PLS-SEM 3.0 software was applied to analyze and verify the gathered data, and the proposed hypothesis model. The results of path analysis show that internal awareness and customers' awareness are positively related to the GSCM practice and GSCM performance. However, suppliers' pressure and regulations pressure just impacted on GSCM practice. As a result, the testing of the relationship between GSCM practice and GSCM performance has been verified and supported. The findings of this study can help manager of companies in industrial zone understand the structure of GSCM, associate with the green supply chain management practice and green supply chain management performance, and be successful in green management organizations.

**Keywords :** GSCM Practice, GSCM Performance, Industrial Zone, PLS-SEM, Vietnam

**JEL Classification Code:**

### 1. Introduction

In recent decades, people are facing the challenge of finding a balance between sustainable economic development, and environmental damage. As the research of Shultz and Holbrook (1999) pointed out that balancing between economic and environmental performance has

become increasingly important for organizations facing competitive, regulatory, and community pressures. In this case, supply chain management has received a greater attention by manufacturing organizations. Firms increasingly rely on their supply network to handle more complex technologies and higher customer expectation. As a result, integrating environmental concerns into green supply chain management has become increasingly important for manufacturers to gain and maintain competitive advantage (Zhu et al., 2008).

While the GSCM has become popular in the world for many years, especially in the US, the European Union (EU), Japan, and it has become an important concern for manufacturers. GSCM emerges as a new systematic environmental approach in green supply chain management and has been increasingly accepted and practices by forward-thinking organization (Bhool and Narwal, 2013). In a survey conducted in 17 countries with more than 13,000 respondents, about 70% of Japanese consumers were willing to accept paying 5% higher prices, followed by Australia with 57% and Singapore at 55 % for green products (Vietnam Logistics Review, 2015). Although, this is an interesting development

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trend globally in recent years, GSCM is still a relatively new concept in Vietnam academic research.

Currently, Vietnam has 326 industrial zones established, with a total area of nearly 93,000 hectares. Of which, more than 250 industrial parks have been put into operation with occupancy rates of over 73%. So far, the industrial parks and economic zones have attracted about 8,000 foreign direct investment (FDI) projects, the total registered investment capital is estimated at over USD145 billion and about 7,500 domestic investment projects, the total registered capital is estimated at nearly VND970 trillion. In the context of the Industrial Revolution 4.0, inputs such as cheap labor and abundant resources are no longer the strength of Vietnam, which urge center government and localities plan to develop green industrial zone with a suitable model to attract large-scale projects and modern technology. Besides, the socio-economic development strategy for the period of 2011-2020 in Decision No. 432/QĐ-TTg of the Prime Minister on approving the Vietnam Sustainable Development Strategy for the 2011-2020, Vietnamese Government has pointed out that the environment, in many places heavily polluted, resources, and land are not well managed, with inefficient exploitation and use. That situation poses a task for Vietnam to restructure the economy, implement in-depth growth model of transformation, and implement greening the economy to ensure sustainable development, including green production, green consumption, and green lifestyles.

Bac Ninh has become one of the leading provinces in the northern region of industrial zone development. After 20 years of construction, and development of industrial zones, Bac Ninh has 16 concentrated industrial parks approved and adjusted by the Prime Minister, with a total area of 6,397 hectares. In which, 10 industrial parks have been put into operation and attracted many large economic groups in the world, such as Samsung, Canon, Pepsi, ABB, Foxcon, etc. Green supply chain management is known as a form of environmental improvement. It is an operational initiative, which is adopted by many organizations to address such environmental issues.

There are many organizations in Bac Ninh, in particular, and in Vietnam, generally, which have undertaken significant efforts towards establishing green supply chain management initiatives. Lin (2013) has been concerned with the motivation and driving forces for these initiatives and examined these organizations although no previous research has tested an empirical link between such efforts and GSCM practices (Tseng et al., 2019). A review of the literature on green supply chain management published from 1998 to 2017 reveals that research on drivers or barriers analysis of green supply chain management is a declining trend. Le (2020) shows that in Vietnam, opinions of green supply chain as well as GSCM have not received strong attention by policy-makers, businesses, and researchers. The objective

of this study aims to explore how GSCM and its evaluative factors have affected green supply chain management practice and performance in Bac Ninh Province's industrial zones, Vietnam.

## 2. Literature Review

Green supply chain management can be considered the involvement of the purchasing function in activities that include reduction, recycling, reuse and replacement of materials in the 1990s (Narashiman and Carter, 1998). Jain and Sharma (2014) showed that GSCM is a closed loop supply chain with minimal use of resources and is environment friendly. Moreover, Sarkis (2012) defined that GSCM as a combination of a revamped environmental and logistics company, which emphasizes the importance of reverse logistic. Do et al. (2020) showed that GSCM is the process of adding 'green' elements to existing supply chains and creating a recalled supply chain as a rebuilding system for a bright way. This includes not only on effective pursuit, but also innovation in the supply chain related to costs, profits, and the environment. Consumers increasingly expect from companies they purchase goods to ensure not only the quality and value-for-money, but also the environmental safeguard and social sustainability (Nguyen et al., 2014).

From product design to production process development and logistics management, the supply chain has a major impact on the environment, and simply trying to minimize the environmental footprint is not enough for companies to pursue the GSCM strategy. Zhu and Sarkis (2004) pointed out five GSCM practices include: internal environmental management practice, green suppliers' selection, cooperation with customers for green buying, investment recovery, and eco-design practices. To be accepted and successful, the strategy must bring great value throughout the company. GSCM is the integration of innovative and environmentally-friendly methods into the supply process. In a standard supply chain process, economists have noticed growing concern about climate change and pressure on companies to reduce emissions. Holt and Ghobadian (2009) identified seven types of green supply chain initiatives that support companies in improving their environmental performance by classifying the organizations involved as follows: governments, trade associations and sector bodies, partnership groups, individual companies, business support organizations, non-for-profit green business-support organizations, and green business clubs.

Nguyen et al. (2014) showed that, to ensure environmental excellence, top management must be totally committed. The support from middle managers is also essential to the successful implementation of GSCM practices as concluded by the study of Diabat and Govindan (2011), which found the positive relationships between middle-

level managers' perceptions of corporate environmental proactivity and environmental management. Do et al. (2020) showed that communication between business managers and environmental professionals is also important in a successful business and environmental relationship. Chien and Shih (2007) noted that "it is important to evaluate the performance of GSCM inside the organization." Environmental performance is commonly measured through operative performance indicators, and management performance indicators (Cagno et al., 2011). Moreover, for companies that pay special attention to the performance of GSCM, internal environmental management (IEM) is more influential in stressing GSCM. For applied GSCM, all members in companies must be willing to embrace GSCM practice. Xue (2014) pointed out that since the 1990s, the studies within the production had focused on introducing the concept of green manufacturing supply chain, namely: (i) the concept and green manufacturing process; (ii) technologies and green manufacturing process; (iii) the applied research on green manufacturing; and (iv) the assessment of green manufacturing system.

Lin (2013) stated that "due to customer demands for green products, which are manufactured using environmentally-friendly raw materials and green production process, firms have to integrate their environmental goals with long-term strategic management." Alves and Nascimento (2014) showed that reasons for the slow development of the GSCM concept in Brazil are related to the characteristics of the national market, businesses focus on internal aspects, and low consumer pressure. Other studies such as Nguyen et al. (2014), Do et al. (2020), and Do and Luu (2019), showed that consumer pressure certainly stimulates the environmental performance of all industries, while the growth of boutique eco-product suggests a growing clientele for such products, all organizations must ensure the sustainability of all components of their products.

Vachon and Klassen (2006) pointed out that the pressure from customers will improve the environmental performance of companies and encompass green procurement activities, such as setting an assessment criterion and evaluating the environmental performance of incoming goods, and the suppliers. Ricky and Lorett (2002) in the study comparing the green purchasing behaviors between American and Chinese consumers, showed that American consumers have more intention to align their behavior to green purchasing than Chinese consumers. However, Majumdar and Sinha (2019), analyzing the important barriers of green textile and apparel supply chain management in Southeast Asian countries, showed that concerted efforts regarding green technological innovation, consumers' awareness and support of the regulatory bodies are needed for effective implementation of green supply practices in textile and apparel supply chains.

Lee (2008), in the study of drivers in green supply chain initiatives, showed that cooperating with business partners in green supply chain initiatives is not an easy task. Alves and Nascimento (2014) emphasized that the GSCM involves supplier development, to share skills and risks, to adopt activities with cleaner technologies, appropriateness of specific rules and laws of the acting industry, reuse of materials, savings in water and energy, use of environmentally-friendly raw materials, production processes more streamlined, and flexible and responsibilities for all participants to the supply chain. It requires that the attitude towards these green initiatives may vary depending on their internal characteristics (Lee, 2008). Vachon and Klassen (2006), Sundarakani et al. (2010) argued that technology and innovation, transparency, and the enhancement of supplier relationships are important factors in the management of green supply chains, many factors that should be considered in green supply chain management. According to the theories mentioned above, the relationship with suppliers is the most important factor for GSCM. Furthermore, Ho et al. (2009) also indicated that building a good relationship with suppliers can benefit both parties when they work together to improve product design and product efficiency, which can lead to more waste reduction.

Zhu et al. (2008) concluded that the success of eco-design requires internal, cross-functional cooperation within the company, and external cooperation with other partners throughout the supply chain. According to Vachon and Klassen (2006), it is better for corporations to establish long-term relationships with suppliers, which includes establishing requirements for product quality, following environmental regulations at the manufacturing level, having green packaging and distribution strategies and delivering high-quality products to customers (Xu and Gursoy, 2015). Majumdar and Sinha (2019) showed the importance of suppliers' role in term of GSCM, concluding their study that "Lack of green suppliers is the most dependent barrier which is influenced by all other barriers considered."

In considering why firms use green supply chains, a series of studies argued that compliance with regulations is a major driver that contributes to the implementation of green supply chains. Zhu and Sarkis (2004) divided the regulatory environment into three levels: regional environmental regulations, central government environmental regulations, and international environmental regulation agreements. To slow environmental degradation, sustainability is advocated (Jang et al., 2015). In considering this issue, developed countries took several measures, such as publishing certain laws and standards to control environmental impacts (Xu and Gursoy, 2015). However, in developing countries such as Vietnam, sustainability is still a new topic. Policies and approaches related to sustainability are incomplete, and the development of sustainability is at an early stage.

However, Tseng et al. (2019) found a consistent growth in the evaluation of green supply chain management practices and performance.

Cousins et al. (2019) pointed out that GSCM practices are associated with improvements in both environmental, and cost-based performance. Furthermore, higher levels of eccentricity and supply chain traceability are associated with stronger relationships between GSCM practices and cost performance. The costs that pressure companies to apply GSCM include: cost for disposal of hazardous materials, cost of environmentally-friendly goods, and cost of environmentally-friendly packaging (Laosirihongthong et al., 2013). Based on the perspective of sustainable development supply chain, several factors that lead the industries practice the green supply chain management and its performance results, includes: Internal awareness, suppliers' pressure, customers awareness, cost related pressure, and regulations.

In the macroeconomic level, Balasubramanian and Shukla (2017), Wang and Dai (2018), and Le (2020) indicated the positive relationship of GSCM practice and economic, environmental, and social performance. Besides, Green et al. (2012), De Giovanni and Vinzi (2012) indicated that environmental management such as GSCM has a positive relationship with an organization's economic performance, operational performance (increase amount of goods delivered on time, decreased inventory levels, decreased scrap rate, promote products' quality, increased product line, improved capacity utilization) and environmental performance. Based on the literature review as well as previous studies, this research has come up with the following hypotheses:

H<sub>1</sub>: Internal awareness has positive relationship with green supply chain management practice and green supply chain management performance

H<sub>2</sub>: Suppliers' pressure has positive relationship with green supply chain management practice and green supply chain management performance.

H<sub>3</sub>: Customers' awareness has positive relationship with green supply chain management practice and green supply chain management performance.

H<sub>4</sub>: Regulations pressure has positive relationship with green supply chain management practice and green supply chain management performance.

H<sub>5</sub>: Green supply chain management practice has positive relationship with green supply chain management performance

### 3. Research Methods and Materials

#### 3.1. Research Model

Based on the literature discussed above, the technique for the creation of attributes for this research is based on

the literature review, pilot sample, researcher's judgment, and experts. The structured questionnaire is employed. The communication approaches selected are both "survey via personal interview" and "self-administered survey."

For this study, we have chosen the form of interview as a method to collect data. Our goal is to collect 500 samples of survey questions from different units of companies in the Bac Ninh industrial zone, Vietnam. This study used a survey questionnaire to elicit perceptions/opinions about GSCM from managers. The survey instrument included questions seeking demographic information. The questionnaires were mailed to managers working in Bac Ninh Province's industrial zone from October 2019 to February 2020. SPSS 20.0 and PLS-SEM 3.0 software were applied to analyze and verify the gathered data, and the hypothesis developed.

This study reviews scholars' literature based on the research and practice of GSCM, the appropriate measurement scales of Zhu et al. (2008), Diabat and Govindan (2011), Cousins et al. (2019), Abdel-Baset et al. (2019), Chen et al. (2019), Esfahbodi et al. (2016), Laari et al. (2016), Mamdouh Mahmoud Hamdy et al. (2018), and information gathered from expert interviews (see Table 1).

The questionnaires were distributed firstly to 30 managers who were attending an MBA class in Vietnam National University and ten Professors on September 2019 to check how they understand the questions. Based on the suggestions from respondents in two workshops, minor modifications were made to the questionnaire. Afterward, questionnaires were revised and finalized and ready for collecting data.

500 questionnaires were distributed to managers at all levels who were working in Bac Ninh Province's industrial zone, 423 questionnaires were sent back of which 322 were valid, accounting for a response rate of 64,4%. Table 2 shows the respondent information by nation, sector of industry, and number of employees.

The usable questionnaires were almost evenly distributed across national lines; among the 322 respondents 64.9% were Foreign companies and 35.1% Vietnamese companies.

Companies into the automobile sector represented 16.1%; those in the electrical and electronics, 54.7%; the chemical sector accounting for 15.5%; the textile sector, only 7.5%; and the other sectors, 6.2%.

Regarding the size of companies (represented by the number of employees), 21.7% had more than 1,000 employees, 46.9% had from 300 to 1000 employees, and 31.4% has less than 300 employees.

### 4. Results and Discussion

#### 4.1. Reliability and Validity of Model

Construct validity, determined through the presence of convergent and discriminant validity, demonstrates how



**Table 1:** Factors and items

Factors	Items	Code	Source
Internal awareness (IA)	Awareness GSCM from senior managers	IA1	Revised from Zhu et al. (2008), Cousins et al. (2019), and Abdel-Baset et al. (2019)
	Awareness GSCM from middle managers	IA2	
	Awareness GSCM from functional managers	IA3	
	Cross-functional cooperation for environmental improvements	IA4	
Suppliers' pressure (SP)	Supplier's advances in developing environmentally friendly goods	SP1	Revised from Zhu et al. (2008), Chen et al. (2011), Esfahbodi et al. (2016), Laari et al. (2016) Mamdouh Mahmoud Hamdy et al. (2018)
	Supplier's advances in developing environmentally friendly packages	SP2	
	Environmental partnership with suppliers	SP3	
	Supplier's environmental mission	SP4	
Customers awareness (CA)	Customer's demand for eco-design	CA1	Revised from Zhu et al. (2008), Diabat and Govindan (2011), and Chen et al. (2019)
	Customer's demand for cleaner production	CA2	
	Customer's demand for green packaging	CA3	
Regulations pressure (RP)	Central governmental environmental regulations	RE1	Revised from Zhu et al. (2008), An et al. (2008)
	Regional environmental regulations	RE2	
	International environmental regulation agreements	RE3	
Green supply chain management practice (PA)	Environmental management systems exist in companies	PA1	Revised from Zhu et al. (2008), Chen et al. (2019), Laari (2016), Mamdouh Mahmoud Hamdy et al. (2018)
	Cooperation with suppliers for environmental objectives (friendly goods and packages)	PA2	
	Cooperation with customer for green design, produce and packages	PA3	
Green supply chain management performance (PE)	Improve an enterprise's environmental situation	PE1	Revised from Zhu et al. (2008), Esfahbodi et al. (2016), Laari et al. (2016) Mamdouh Mahmoud Hamdy et al. (2018)
	Increase products' quality and quantity and Improved capacity utilization	PE2	
	Increase profit, market share and save cost	PE3	

A five-point scale: 1=not at all, 2=a little, 3= to some degree, 4= relatively significant and 5=significant

**Table 2:** Respondent information

		Frequency	Percent
<b>Nation</b>	Foreign	209	64.9
	Vietnam	113	35.1
<b>Sector of industry</b>	Automobile	52	16.1
	Electrical and electronic	176	54.7
	Chemical	50	15.5
	Textile	24	7.5
	others	20	6.2
<b>Size (Number of employees)</b>	>1000	70	21.7
	300 - 1000	151	46.9
	<300	101	31.4
<b>Total</b>		<b>322</b>	<b>100.0</b>

well the measurement items related to the constructs. To demonstrate convergent validity, we use three tests: item reliability, composite reliability, and average variance extracted.

Cronbach's alpha also provides evidence of composite reliability and values above 0.6, demonstrating that it is adequate. All the composite reliabilities for our constructs were above 0.7 and all the Cronbach's alpha are above 0.6 (see Table 3). Finally, the average variance extracted (AVE) represents the amount of variance a construct captures via its items relative to the amount of variation due to measurement error. We found that each construct's variance extracted was above the recommended value of 0.5 (Hair et al., 2016).

For testing the discriminant validity this paper used two tests for discriminant validity: comparison of item loadings with item cross loadings and comparison of the variance extracted from the construct with shared variance. Each item should load more highly on its intended construct than on other constructs. Results from Table 4 find that all items satisfied the condition of discriminant validity.

## 4.2. PLS Structural Model Results

To examine the overall explanatory power of the structural model and the variance explained by the independent variables, and the magnitude and strength of its paths, each of our hypotheses corresponds to a specific structural model path.

We used  $R^2$  Adjusted to measure the model's explanatory power, interpreted in the same way as for the regression analysis. The explained variation should exceed 10% to qualify for suitable explanatory power. The analysis revealed that the structural model explained about 57% of the variation of GSCM practice and 45% GSCM performance suggesting that the structural model provided adequate explanatory.

Table 5, shows that other indices also have the goodness index such as VIF value of all variables in the model is less than 3 (Hair et al., 2014), so there is no multicollinearity problem. The value of  $f^2$  function represents the level of influence of the structure (factor) when removed from the model. Structures with small  $f^2$  values (less than 0.02) demonstrate a low level of influence in the model. In this model the result indicated that all relationship is highly influential ( $f^2 > 0.02$ ).

Results from Table 6 and Figure 1 indicate that three of five hypotheses in our conceptual model are fully supported, two hypotheses are partly supported.

$H_1$  shows that internal awareness has positive relationship with green supply chain management practice ( $\beta = 0.2$ ,  $t = 2.88$ ,  $P < 0.01$ ) and green supply chain management performance ( $\beta = 0.28$ ,  $t = 4.93$ ,  $P < 0.01$ ). This result shows that if internal awareness by senior managers, middle managers and functional managers of the benefit of GSCM is improved, so the GSCM practice and performance also improved.

**Table 3:** Construct Reliability and Validity

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Internal awareness	0.86	0.86	0.91	0.78
Suppliers' pressure	0.88	0.89	0.92	0.74
Customers awareness	0.81	0.83	0.89	0.73
Regulations pressure	0.78	0.79	0.87	0.70
GSCM practice	0.88	0.88	0.93	0.81
GSCM performance	0.86	0.86	0.91	0.78

**Table 4:** Discriminant validity

	Internal awareness	Suppliers' pressure	Customers awareness	Regulations pressure	GSCM practice	GSCM performance
Internal awareness	0.88					
Regulations pressure	0.55	0.84				
Suppliers' pressure	0.57	0.56	0.86			
Customers awareness	0.51	0.59	0.85	0.82		
GSCM practice	0.55	0.57	0.54	0.54	0.90	
GSCM performance	0.65	0.53	0.55	0.56	0.68	0.88

**Table 5:** VIF,  $f^2$ ,  $R^2$  và  $R^2$  Adjusted value

	Internal awareness		Customers awareness		Suppliers' pressure		Regulations pressure		GSCM practice		$R^2$	$R^2$ Adjusted
	(VIF)	$f^2$	(VIF)	$f^2$	(VIF)	$f^2$	(VIF)	$f^2$	(VIF)	$f^2$		
GSCM practice	1.88	0.09	1.89	0.042	1.97	0.039	2.10	0.02	-	-	0.56	0.57
GSCM performance	1.95	0.141	1.97	0.02	2.05	0.018	2.16	0.013	1.80	0.20	0.44	0.45

**Table 6:** Hypothesis result

		Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	P Values	Hypothesis result
Internal awareness	->	0.20	0.19	0.07	2.88	0.00	Supported
GSCM practice							
Internal awareness	->	0.28	0.28	0.06	4.93	0.00	Supported
GSCM performance							
Suppliers' pressure	->	0.22	0.22	0.08	2.69	0.01	Partly Supported
GSCM practice							
Suppliers' pressure	->	0.01	0.01	0.05	0.18	0.86	Partly Supported
GSCM performance							
Customers awareness	->	0.21	0.21	0.07	3.16	0.00	Supported
GSCM practice							
Customers awareness	->	0.12	0.12	0.06	2.04	0.04	Partly Supported
GSCM performance							
Regulations pressure	->	0.17	0.18	0.07	2.62	0.01	Partly Supported
GSCM practice							
Regulations pressure	->	0.09	0.09	0.06	1.69	0.09	Partly Supported
GSCM performance							
GSCM practice	->	0.40	0.39	0.05	7.44	0.00	Supported
GSCM performance							

$H_2$  estimations for the relationships of the suppliers' pressure with GSCM practice and GSCM performance are partly supported, while suppliers' pressure have a positive relationship with GSCM practice ( $\beta = 0.22$ ,  $t = 2.69$ ,  $P < 0.01$ ). However, suppliers' pressure has no positive relationship with GSCM performance ( $P > 0.01$ ). This result indicates that the developing environmentally-friendly goods suppliers have an impact on GSCM practice, however it is not the cause of GSCM performance (Cousins et al., 2019; Le, 2020).

The results of  $H_3$  shows the positive relationship between customers' awareness and GSCM practice ( $\beta = 0.21$ ,  $t = 3.16$ ,  $P < 0.01$ ) and the relationship between customers' awareness and GSCM performance ( $\beta = 0.12$ ,  $t = 2.04$ ,  $P < 0.01$ ). This result indicates the sensitive meaning while customers'

awareness of green product impacts on both GSCM practice and GSCM performance of companies. As Le (2020) and Tseng et al. (2019) indicated the role of customer.

The  $H_4$  results also are partly supported by the model when the prediction of relationship between regulations pressure and GSCM practice are supported ( $\beta = 0.17$ ,  $t = 2.62$ ,  $P < 0.01$ ), while the prediction of relationship between regulations pressure and GSCM performance is not supported ( $P > 0.05$ ). This result notes that regulations from all level may make the company practice the GSCM, but may not have the result of GSCM performance or some time it may come from the way company practice.

Finally, the testing of the relationship between GSCM practice and GSCM performance has been verified and is supported ( $H_5$ :  $\beta = 0.4$ ,  $t = 7.44$ ,  $P < 0.01$ ).

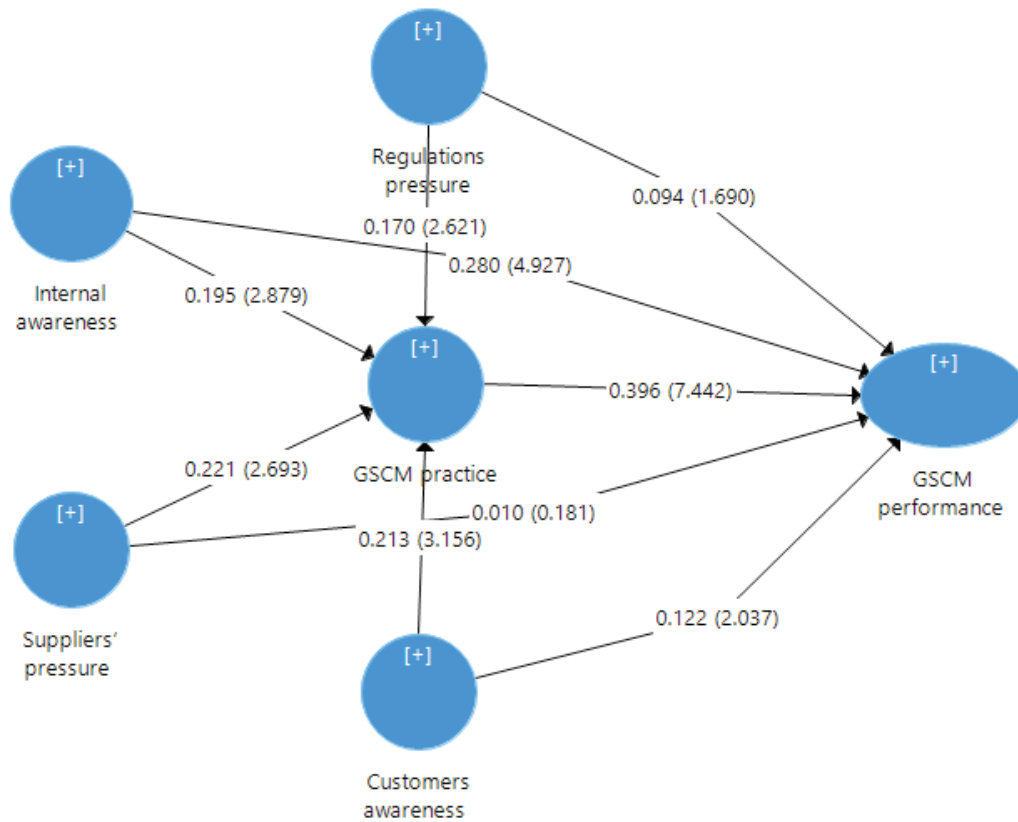


Figure 1: Research model result

## 5. Conclusions

This study provides a framework for understanding the inter relationships among four factors: internal awareness, suppliers' pressure, customers' awareness; regulations pressure; and their effect on GSCM practice, and GSCM performance. By using the PLS- SEM method, this study adds empirical support to the literature and has tested five hypotheses related to the GSCM practice and evaluative factors affecting the GSCM performance of companies in the industry zone of Province-Level in Vietnam. According to the results in this study, three out of five hypotheses are fully supported and two hypotheses are partly supported. Regarding hypothesis H1, the result indicates that internal awareness is positively related to the GSCM practice and GSCM performance. This finding corroborates the findings by Zhu et al. (2008), Cousins et al. (2019), and Abdel-Baset et al. (2019) that the internal awareness of senior managers, middle managers and functional managers has strong impact on GSCM practice and GSCM performance.

However, this study shows that suppliers' pressure and regulations pressure impact on GSCM practice. It is reasonable since this pressure is external to the company and

require it to face this pressure (Chen et al., 2019; Laari et al., 2016; Mamdouh Mahmoud Hamdy et al., 2018). The results from H3 show that customers' awareness has a positive effect on both GSCM practice and GSCM performance. This result indicates the important role of customers in impacting on the GSCM practice attitude of company, and also providing benefits to the company related to its GSCM performance activities (Esfahbodi et al., 2016; Laari et al., 2016; Mamdouh Mahmoud Hamdy et al., 2018; Gandhi et al., 2019).

The findings of this study can help manager of companies in industrial zone to understand the structure of GSCM, associate with the GSCM practice and green supply chain management performance, and be successful in green management organizations. Internal awareness and customer awareness are important factors improving GSCM practice and performance by creating and fulfilling all levels of managers and customer awareness. When managers understand how GSCM can benefit them, they can create more effective campaigns to implement the practice. Our findings could help manager of industrial zone to understand better the structure of GSCM and to identify the related core impacting factor. In addition, suppliers and regulations are



also the two importance external factors that make for better GSCM practice.

Although this study contributes to the theoretical and managerial implications, the model used in this study should be more developed regarding other impacting factors in the future. Namely, another construct could be introduced and tested as it may have a strong impact on GSCM practice and performance. Also, future studies with larger samples could be conducted to allow for comparisons among companies in other industrial zones in Vietnam.

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