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Business Student's Perspectives On Green Supply Chain Strategies' Effects On Environmental And Economic Efficiency

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Abstract

Motivation: The main purpose of this research was to determine the relationship between GSCM practices and sustainability performance of economic students in Can Tho City, Vietnam.

Methodology: A structured questionnaire was used to collect data from 430 economic students from business administration, international business, hospitality management, and multimedia communication disciplines. Purposive sampling was used to select respondents due to their in-depth knowledge and involvement in execution and strategy formulation with regard to issues related to supply chains and logistics. All selected students had experienced courses such as supply chain management, global procurement, logistics, and omni-channels. In 10 weeks (November 1, 2022–January 15, 2023), QR codes were used to gather class follow-ups. The structural Equation Modeling (SEM) estimation in applied in this study, which involved an iterative process based on theoretical and empirical analyzes to obtain a structural

model fit. This was done to evaluate the rationality of the fundamental multidimensional constructs. The SEM evaluates not only the measurement model but also the structural model. This study focus on five factors off GSCM (internal environmental management, green procurement, green manufacturing, green distribution, and environmental education) and three sustainability performance dimensions (economic, environmental, and social performance).

Findings: This research found that GSCM impacts economic and environmental performance differently. This research shows green procurement and green manufacturing factors impact positively on economic and environmental performance. This study expands GSCM practice and sustainability literature. This research analyzes GSCM, and economic and environmental aspects of sustainability. The findings highlight the need for universities to emphasize five areas (internal environmental management, green procurement, green manufacturing, green distribution, and environmental education) that are crucial to the long-term success of the economic, and environmental aspects.

Conclusion: Economic student are more likely to become successful business owners who benefit their firms and the economy. Corporate social responsibility, community service, and environmentally responsible production should be taught to students to protect business, communities, and ecosystems.

Keywords: Business student, Green supply chain management, Sustainability.

1 Introduction

Climate change is one of society's most polarizing and complex problems, and its implications on business are already enormous and will expand. Nearly 200 countries joined "The Paris Accord" to address this critical problem in December 2015. The Paris accord seeks to limit global warming to 2oC and phase out fossil fuels. Industry affects climate. Business supports the Paris Climate Agreement. About 350 companies supported the Agreement at COP22. Businesses may minimize CO2 emissions to support global agreements and save money. Adopting a carbon strategy may provide companies an advantage. Companies must adapt and use climate change to compete. Thus, industry businesses and decision makers need assistance [1].

Sustainable development is growing in global industry and economics. Sustainable supply chains incorporate economic, environmental, and social aspects. Scientists and entrepreneurs are increasingly interested in business strategies that include sustainable development concepts and tools [2]. Environmental concerns have dominated supply chain design research. GHG emissions from different transportation types and energy-saving technologies in transportation and industries have been researched [3]. Green supply chains take environmental factors into account. Companies are also building the "Green Supply Chain" (GSC). Businesses prioritize green supply chain management (GSCM) techniques. Long-term Green Supply Chain Strategy (GSCS) incorporates environmental thinking into supply chain management to obtain a competitive advantage [4]. This work improved the GSCS carbon emission indicator [1].

To maintain a competitive advantage, organizations must emphasize green supply chain management (GSCM) [5]. In the US, EU, and Japan, GSCM has been debated for years. Forward-thinking firms globally embrace GSCM, a new

systematic environmental approach to green supply chain management [6]. GSCM has been growing worldwide, although Vietnam is only starting to research it [7]. Businesses require methods to find new revenue streams, generate value, improve brand image, save costs, and reduce risks. This report recommends using the Green Supply Chain Strategy. It guides from evaluation to outcome monitoring [8]. The criteria are reference models for evaluating green supply chain management in sustainable development. GSCM's impact on sustainability performance has been studied, but economic students' understanding of its role in corporate success has not. The purpose of this paper is to gather primary data on how well economic students at universities in Can Tho, Vietnam understand the impact of green supply chain management (GSCM) on sustainability performance.

2 Methodology

2.1 Sampling technique

The main purpose of this research was to determine the relationship between GSCM practices and sustainability performance of economic students in Can Tho City, Vietnam. Before developing the questionnaire, three academicians and 30 supply chain managers and scholars were asked which dimensions of GSCM practices should be considered. As a result, five dimensions were considered for analysis (internal environmental management, green procurement, green manufacturing, green distribution, and environmental education). A structured questionnaire was used to collect data from 430 economic students from business administration, international business, hospitality management, and multimedia communication disciplines. Purposive sampling was used to select respondents due to their in-depth knowledge and involvement in execution and strategy formulation with regard to issues related to supply

chains and logistics. All selected students had experienced courses such as supply chain management, global procurement, logistics, and omni-channels. In 10 weeks (November 1, 2022–January 15, 2023), QR codes were used to gather class follow-ups. After ten weeks of data collection, 430 questionnaires were retrieved, representing an 85% response rate, which was deemed appropriate for data analysis.

2.2 Empirical model

The success of the sustainability initiative is analyzed from a variety of perspectives, including economic, environmental, and social aspects.

Economic performance: Organizations utilize GSCM to improve economic performance, or profitability. Economic performance is an organization's capacity to save money via wise buying, waste management, energy consumption, waste disposal, and environmental fines [5]. Thus, the research classified GSCM practice-economic performance connection studies that assessed economic performance using objective or perceived sales, profit, and market share gains [9-10].

Environmental performance usually incorporates energy savings, waste reduction, and emission reduction. Environmental performance includes reducing air emissions, water waste, and solid wastes, and reducing hazardous product usage [11]. Energy conservation, waste, pollution, and emission reduction are environmental performance criteria [12, 13].

Social performance is used to measure the impact of GSCM practices on product and company image, employee health and safety, and customer loyalty and satisfaction [14, 15].

Research hypothesis

This literature review analyzed supply chain GSCM practice. [11] described GSCM as internal environmental management, external GSCM, eco-design, and investment recovery. GSCM tasks include logistics, supplier assessment and evaluation, green procurement and logistics laws, supplier education and mentorship, and industrial networks [16]. Sustainable manufacturing requires green procurement, production, distribution, and logistics [17, 18]. [19] offered GSCM methods such internal environmental management, green information systems, green buying, customer interaction, eco-design, and investment recovery. [13] defined GSCM as internal environmental management, green procurement, customer collaboration, and eco-design. This study examined internal environmental management, green procurement, manufacturing, distribution, and education [18].

"Intra-organizational environment management" (IEM) refers to an organization's environmental sustainability practices. Studies have demonstrated this [20].

H_1: There is a positive influence of internal environment management on sustainability

Green procurement: An organization selects suppliers based on their environmental competence, technical and eco-design capabilities, environmental performance, ability to produce environmentally friendly products, and support of the main company's environmental goals [21]. An company chooses suppliers based on their technical, environmental, and social skills through green procurement. This study emphasizes the 3Rs—reuse, recycle, and reduce—as part of the green procurement process for paper and part containers (plastic bag/box), placing purchasing orders via email (paperless) [13], eco-labeling products, ensuring suppliers' environmental

compliance certification, and auditing suppliers' internal environmental management.

H_2 : There is a positive influence of green procurement on sustainability.

Green manufacturing actively designs and redesigns green processes [13, 19] to reduce hazardous substances, boost energy efficiency in lighting and heating, practice 3Rs, and limit waste [17]. In order to be considered "green," a company's product designs must allow for easy reuse, recycling, and recovery of part.

H_3: There is a positive influence of green manufacturing on sustainability.

Green distribution involves minimizing packaging, utilizing "green" materials, recycling and reusing, standardizing vendor packaging, and encouraging returnable packaging: reduce material and unpacking time [17], use recyclable pallets, and save warehouse energy [16].

H_4: There is a positive influence of to green distribution on sustainability.

Green environmental education has long been considered essential for human growth and open access in a sustainable society. Environmental education has two goals. First, teach employees about a company's environmental policies. Each person's actions may improve global stability and responsibility [22].

H_5 : There is a positive influence of environmental education on sustainability.

3 Results and discussion

Relationships between dependent and independent variables are estimated using modern statistical methods, such as structural equation modeling (SEM) [23]. AMOS.22 was used to conduct Structural Equation Modeling (SEM) to test the hypotheses. Confirmatory factor analysis (CFA) was used to check the reliability and validity (CFA). The loading intervals and reliability estimates are summarized for each construct in Table 1. Cronbach's alpha for internal environment management, green procurement, green manufacturing, green distribution, environmental education, economic performance, and environmental performance were 0.858, 0.942, 0.866, 0.904, 0.913, 0.907, and 0.824, respectively. All Cronbach's alpha values were higher than 0.7, indicating that the correlations between the observable and latent variables were reliable [24].

Table 1. Factor loading and the Cronbach's α estimates (Cronbach's Alpha)

Internal environment management (Cronbach's Alpha)		**0.858**
IEM1	Commit senior managers to GSCM	0.802
IEM2	Mid-level managers support GSCM	0.818
IEM3	Team together cross-functionally	0.826
IEM4	Green quality criterion	0.832
Green procurement (Cronbach's Alpha)		**0.942**
GP1	Check vendors' environmental goals.	0.931
GP2	Suppliers must have ISO 14000.	0.929
GP3	Buy green materials.	0.928
GP4	Buy energy-efficient gear.	0.926
GP5	Buy eco-labeled items.	0.928
Green manufacturing (Cronbach's Alpha)		**0.866**
GM1	Make product recyclable.	0.850
GM2	Reduce packaging and promote reuse and recycling.	0.825

GM3	Life Cycle Assessment to assess environmental burden	0.828
GM4	Make product recyclable.	0.812
Green distribution (Cronbach's Alpha)		**0.904**
GD1	Logistics recyclable packaging or containers	0.891
GD2	Reusing end-of-life product parts	0.891
GD3	Cleaner transportation method?	0.885
GD4	Routing systems minimize travel.	0.878
GD5	Use faulty goods.	0.872
Environmental education (Cronbach's Alpha)		**0.913**
EE1	Attend non-government and government-subsidized GSCM and sustainability programs.	0.874
EE2	Executive GSCM and sustainability training	0.871
EE3	Manager and member GSCM and sustainability training	0.879
Economic Performance (Cronbach's Alpha)		**0.907**
EP1	Reduce green input costs	0.882
EP2	Reduce shipping and trash disposal fees	0.882
EP3	Increase demand, delivery, and manufacturing flexibility.	0.889
EP4	Capture demand for environmentally friendly products	0.902
EP5	Green product warranty certificate.	0.895
EP6	Reduce green input costs	0.895
Environmental Performance (Cronbach's Alpha)		**0.824**
ENP1	Reduce waste, emissions, and pollutants through optimizing process.	0.779
ENP2	Recognize eco-labeled, recyclable, and design-for-assembly items.	0.766
ENP3	Conserve energy and recycle	0.783
ENP4	Promote eco-friendly technology	0.786

Source: Field Survey Data, 2023

The Kaiser-Meyer-Olkin (KMO) test was used to assess relationship performance metrics and scale factor analysis. All

findings were above 0.5. KMO values exceeding 0.5 were statistically significant (0.864). Bartlett's test of spherical lets us know whether the factor variables are related. Bartlett's test shows a substantial correlation between observed variables inside the factor (Sig 0.00). Averaging data for each multivariate construct completed the measuring procedure. The EFA advised placing items in adequate size for investigation, which supported the SEM criteria (Table 2).

Table 2. Scale of factors and test parameters in exploratory factor analysis (EFA)

Parameters of test	Values
Kaiser-Meyer-Olkin (KMO)	0.864
Cumulative % (Initial Eigenvalues)	73.877%
Bartlett's Test of Sphericity (Sig.)	0.000
Initial Eigenvalue	1.173

Source: Field Survey Data, 2023

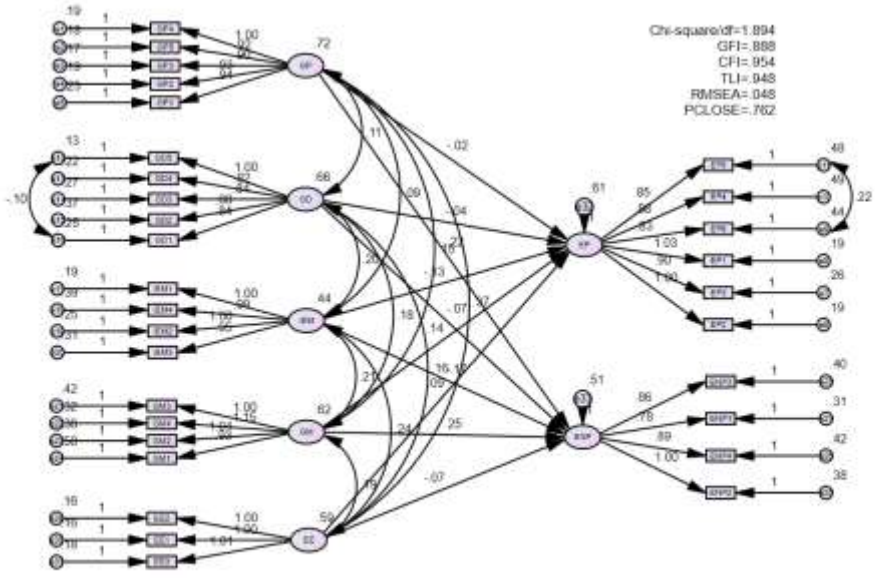

Figure 1. SEM model of GSCM and economic and environmental performance

The covariance connection between E9 and E11 was determined using a modified index. Similarly, the covariance relationships between E12 and E16, were also obtained (Figure 1). The investigation resulted in the generation of a fit-generated structural model that indicated a p-value of 0.000 (p-value less than 0.01), and goodness of fit index (GFI) of 0.888 (> 0.800). According to [25], this index can be accepted at a value of 0.8. Other acceptable values include a Tucker-Lewis index (TLI) of 0.948 (> 0.900), a comparative fit index (CFI) of 0.954 (> 0.900), and a root mean square error of approximation (RMSEA) of 0.048 (less than or equal to 0.080. In these findings, the research model was put through its pace, and the outcomes proved that the model is appropriate (Table 3).

Table 3. Model fit indicators in SEM

Indicators	Cut-off values	Calculated values	Conclusion
Chi-square/df	**≤ 5.000**	1.894	Fit
CFI	**≥ 0.900**	0.954	Fit
GFI	**≥ 0.800**	0.888	Fit
TLI	≥ 0.900	0.948	Fit
RMSEA	**≤ 0.080**	0.048	Fit

Source: Field Survey Data, 2023

Note: Cut-off values adopted from [26]

Impact of GSCM on economic performance

The value of R=0.203 shows a strong and positive link between GSCM practices and economic performance (Table 4). GSCM practices improve economic performance (1a-1e). Table 4 shows that green manufacturing has a positive value of = 0.135 and P-value of 0.00. It means that hypotheses 1d

is accepted. Green procurement, green distribution, internal environmental management, and environmental education have negative betas for economic performance. Thus, GSCM practice invalidate hypotheses 1a, 1b, 1c, and 1e.

Table 4. Final Estimates of relationship between GSCM and EP

Relationship	Estimate β	S.E	C.R	P – value	Hypothesis Result
EP ← GP	-0.023	0.065	-0.358	0.720	Not accepted
EP ← GD	-0.036	0.058	-0.626	0.531	Not accepted
EP ← IEM	-0.126	0.088	-1.440	0.150	Not accepted
EP ← GM	0.135	0.065	3.853	***	Accepted
EP ← EE	-0.070	0.081	-0.870	0.385	Not accepted
R^2 = 0.203 (EP)					

Source: Field Survey Data, 2023

Note: *, **, and *** indicate significance at P < 0.05, P < 0.01, and P < 0.001, respectively.

EP = 0.135 GM (1)

Only green manufacturing of GSCM practice influences economic performance, as shown in equation (1). Green manufacturing boosts economic performance , according to the original sample's 0.135 value. This indicates that manufacturing process that fulfill strict sustainability requirements may improve economic productivity.

Impact of GSCM on environmental performance

Table 5 shows the results of Hypotheses 2a, 2b, 2c, 2d, and 2e that GSCM practices improve environmental performance.

The beta values of green procurement (0.216), and green manufacturing (0.249) revealed a strong link with social performance (Table 5). Hypotheses 2a, and 2d are accepted because the P-value of green procurement, and environmental education is 0.000, which is less than 0.001. Finally, internal environmental management beta values of 0.169 showed that environmental performance was negatively associated, disproving Hypotheses 2c.

Table 5. Final Estimates of relationship between GSCM and ENP

Relationship	Estimate β	S.E	C.R	P – value	Hypothesis Result
EP ← GP	0.216	0.064	3.367	***	Accepted
EP ← GD	-0.069	0.057	-1.219	0.223	Not accepted
EP ← IEM	-0.169	0.086	-1.960	**	Not accepted
EP ← GM	0.249	0.065	3.853	***	Accepted
EP ← EE	-0.070	0.081	-0.870	0.385	Not accepted
R^2 = 0.219 (EP)					

Source: Field Survey Data, 2023

Note: *, **, and *** indicate significance at P < 0.05, P < 0.01, and P < 0.001, respectively.

$$ENP = 0.216\ GP - 0.069\ IEM + 0.249\ GM \quad (2)$$

Equation (2) shows green procurement and green manufacturing impact on environmental performance. Managers using GSCM to establish green purchase department and green manufacturing process effectively may enhance environmental performance. The relationship between environmental performance and green

procurement and green manufacturing factors adversely correlate.

4 Conclusion

This research examines GSC practice that influences economic and environmental performance. This research verifies GSCM practice, sustainable performance and adds economic issues to our empirical knowledge. Green supply chain activities affect the economic and environmental performance indicators. This research shows green procurement and green manufacturing factors impact positively on economic and environmental performance. This study expands GSCM practice and sustainability literature. This research analyzes GSCM and economic, and environmental aspects of sustainability.

References

1. Carola, P. T., García, A., Coves, A. M.: A proposal for a green supply chain strategy. Journal of Industrial Engineering and Management, 11(3): 445-465 (2013).
2. Blanka, T.: Evaluation of green supply chain-reference models approach. Paper presented at the DIEM: Dubrovnik International Economic Meeting, 5(1): 129-142 (2020).
3. Pan, S., Ballot, E., Fontane, F.: The reduction of greenhouse gas emissions from freight transport by pooling supply chains. International Journal of Production Economics, 143(1): 86-94 (2013).
4. Kumar, S., Teichman, S., Timpernagel, T.: A green supply chain is a requirement for profitability. International Journal of Production Research, 50: 1278-1296 (2011).
5. Zhu, Q., Sarkis, J., Lai, K.-h.: Confirmation of a measurement model for green supply chain management practices implementation. International Journal of Production Economics, 111(2): 261-273 (2008).
6. Bhool, R., Narwal, M.: An analysis of drivers affecting the implementation of green supply chain management for the

Indian manufacturing industries. International Journal of Research in Engineering and Technology, 02: 242-254 (2013).

7. Do, A. D., Nguyen, Q. V., Le, Q. H., Ta, V. L.: Green Supply Chain Management in Vietnam Industrial Zone: Province-Level Evidence. The Journal of Asian Finance, Economics and Business, 7(7): 403–412 (2020).
8. Luthra, S., Garg, D., Haleem, A.: Identifying and ranking of strategies to implement green supply chain management in Indian manufacturing industry using Analytical Hierarchy Process. Journal of Industrial Engineering and Management, 6(4): 930-962 (2013).
9. Kuei, C.-h., Lu, M. H.: Integrating quality management principles into sustainability management. Total Quality Management & Business Excellence, 24(1-2): 62-78 (2013).
10. Abdullah, N. A. H. N., Yaakub, S. Reverse logistics: pressure for adoption and the impact on firm's performance. International Journal of Business Society, 15(1): 151 (2014).
11. Zhu, Q., Sarkis, J., Geng, Y. Green supply chain management in China: pressures, practices and performance. International Journal of Operations & Production Management, 25(5): 449-468 (2005).
12. Chiou, T.-Y., Chan, H., Lettice, F., Chung, S.-H: The Influence of Greening the Suppliers and Green Innovation on Environmental Performance and Competitive Advantage in Taiwan. Transportation Research Part E-logistics and Transportation Review - TRANSP RES PT E-LOGIST TRANSP, 47: 822-836 (2011).
13. Lee, S. M., Tae Kim, S., Choi, D.: Green supply chain management and organizational performance. Industrial Management & Data Systems, 112(8): 1148-1180 (2012).
14. Zailani, S., Jeyaraman, K., Vengadasan, G., Premkumar, R.: Sustainable supply chain management (SSCM) in Malaysia: A survey". International Journal of Production Economics, 140(1) (2012).
15. Ashby, A., Leat, M., Hudson Smith, M.: “Making connections: A review of supply chain management and sustainability

literature. Supply Chain Management: An International Journal, 17(5): 497-516 (2012).

16. Holt, D., Ghobadian, A.: An Empirical Study of Green Supply Chain Management Practices Amongst UK Manufacturers. Journal of Manufacturing Technology Management, 20 (2009).
17. Ninlawan, C., Papong, S., Tossapol, K., Pilada, W.: The Implementation of Green Supply Chain Management Practices in Electronics Industry. Paper presented at the Lecture Notes in Engineering and Computer Science, Hong Kong (2010).
18. Thoo, C., Huam, T., Sulaiman, Z.: Green Supply Chain Management, Environmental Collaboration and Sustainability Performance. Procedia CIRP, 26: 695-699 (2015).
19. Green, K. W., Zelbst, P. J., Meacham, J., Bhadauria, V. S.: Green supply chain management practices: impact on performance. Supply Chain Management: An International Journal, 17(3): 290-305 (2012).
20. Cheng, B., Ioannou, I., Serafeim, G.: Corporate Social Responsibility and Access to Finance. Strategic Management Journal, 35(1): 1-23 (2014).
21. Paulraj, A.: Understanding the Relationships between Internal Resources and Capabilities, Sustainable Supply Management and Organizational Sustainability. Journal of Supply Chain Management, 47(1): 19-37 (2011).
22. Cankaya, S. Y., Sezen, B.: Effects of green supply chain management practices on sustainability performance. Journal of Manufacturing Technology Management, 30(1): 98-121, (2018).
23. Wang, Y. A., Rhemtulla, M.: Power Analysis for Parameter Estimation in Structural Equation Modeling: A Discussion and Tutorial. 4(1) (2021).
24. De Leeuw, E., Hox, J., Silber, H., Struminskaya, B., Vis, C.: Development of an international survey attitude scale: measurement equivalence, reliability, and predictive validity. Measurement Instruments for the Social Sciences, 1 (2019).

25. Baumgartner, H., Homburg, C.: Applications of structural equation modeling in marketing and consumer research: A review. *International Journal of Research in Marketing*, *13*(2), 139-161 (1996).
26. Yu, W., Chavez, R., Feng, M., Wiengarten, F.: Integrated green supply chain management and operational performance. *Supply Chain Management: an International Journal*, *19*(5/6), 683-696 (2014).