

# Uncertain Supply Chain Management

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## The impact of global green supply chain management practices on performance: The case of Vietnam

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### CHRONICLE

#### Article history:

Received January 29, 2020

Received in revised format March 2, 2020

Accepted March 11 2020

Available online

March 14 2020

#### Keywords:

*Green supply chain*

*management*

*Global collaboration*

*capability*

*Firm performance*

*Moderate model*

*Vietnam*

### ABSTRACT

The objective of this paper is to assess the impact of green supply chain management on global collaboration capability and firm performance of Vietnamese enterprises. The study is performed on 890 enterprises in 8 economic sectors of Vietnam. After a period of 6 month of data collection, the analysis results show that green supply chain management had a positive impact on global collaboration capability. At the same time, green supply chain management had a positive impact on firm performance. Finally, global collaboration capability had a positive impact on firm performance. However, according to previous studies, the scale of enterprises size had a statistically significant moderate role in the relationship between green supply chain management and firm performance, but in the context of Vietnamese enterprises, the role moderate of size is not statistically significant.

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## 1. Introduction

Climate change and global warming are major issues, which have attracted the attention of the public. People are destroying themselves by overexploiting natural resources. At the same time, past production and consumption of goods and services have had serious consequences for the environment. Therefore, the need to produce and consume products that cause less harm to the environment is gradually replacing the old way of production and consumption. With the old way of production and consumption, the supply chain is considered to have a negative impact on the natural environment. So, the supply chain needs to be changed towards using fewer natural resources and emitting less CO<sub>2</sub>. If we look at another aspect, greening the supply chain in the world can be considered as an indispensable when the fuel is running out. At that time, people will find alternative sources of energy that are more sustainable and have less environmental impact. Of course, this change will have a great impact on the world economy in general and the economies of developing countries in particular. Countries, regions and especially businesses around the world are increasingly paying more attention to environmentally friendly products and services. So, greening the supply chain has been a global trend recently. By

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greening the supply chain, businesses not only “work well”, but they can also benefit from this process. Businesses are gradually raising awareness of the impact of integrating supply chains and environmental management systems to create a sustainable business strategy. It can be understood here that the green supply chain or sustainable supply chain not only brings optimal benefits to businesses but also optimal benefits to the environment. In addition, customers are also becoming more and more “fastidious” and tend to favor green goods and services. Therefore, enterprises implementing greener supply chains will gain a better competitive advantage. Therefore, there has been a shift in most industries towards green supply chain management to create value for customers and stakeholders.

The reality and similar figures in the world today have shown the current status and increasing awareness of businesses about the supply chain greening process. The cause of this phenomenon is: Firstly, environmental issues are issues of a global nature, so all must have responsibilities and obligations to participate in environmental protection. Second, when large enterprises conduct greening of their supply chains, it is imperative that their stakeholders, especially transportation and logistics firms, also green them to meet the standards of large enterprises. Third, greening the supply chain is no longer a “charitable” act that can bring profits to businesses. Fourthly, customers are becoming more and more interested in green goods and green purchasing is becoming more and more popular. The customers here can be big businesses asking logistics businesses to provide green goods. Or consumers may also be governmental when they require that goods and services meet environmental criteria.

However, studies on the effects of green supply chain management on performance also show conflicting results. There are studies that show positive results, there are studies that show negative results, even studies that prove no relationship between green supply chain management and performance. In the context of a developing country with an emerging economy like Vietnam, research is very limited on this topic. Therefore, we conduct this study with the desire to contribute to the evidence of the relationship between green supply chain management and performance in Vietnamese businesses.

The structure of the article includes: Introduction, research overview, research methods, research results and conclusions.

## **2. Literature review**

### *2.1. Global supply chain management*

In trade, global supply chain management (GSCM) is defined as distributing goods and services across the global network of transnational companies in order to maximize profits and minimize waste (Bhatnagar, 2012). Basically, global supply chain management is the same as supply chain management, but it focuses on transnational companies and organizations. Global supply chain management has six main areas of focus: logistics management, competitor orientation, customer orientation, supply chain coordination, supply management and operations management (Tomas & Hult, 2003). These six focus areas can be divided into four main areas: marketing, logistics, supply management and operations management (Tomas & Hult, 2003). Successful management of the global supply chain also requires compliance with various international regulations set by many non-governmental organizations (e.g., the United Nations).

Global supply chain management may be affected by a number of actors imposing policies that govern certain aspects of the supply chain. Governmental and non-governmental organizations play an important role in this area when they create and enforce laws or regulations that companies must comply with (McKinnon, 2012). These regulatory policies often regulate social issues related to the

implementation and operation of global supply chains (e.g. labor, environment, etc.). These regulatory policies force companies to comply with the regulations that often affect company profits.

Operating and managing global supply chains come with a number of risks. These risks can be divided into two main types: supply and demand risks (Manuj et al., 2014). Supply-side risk is a portfolio of risks associated with the availability of raw materials that affect a customer's ability to meet demand (Manuj et al., 2014). Demand side risk is a list of risks associated with the availability of finished products (Manuj et al., 2014). Depending on the supply chain, managers may choose to minimize or accept these risks (Manuj et al., 2014). Successful global supply chain management occurs after the implementation of an appropriate centralized framework, in compliance with international regulations set by governments and non-governmental organizations, and recognizing and properly handling Related risks while maximizing profits and minimizing waste.

## *2.2. Green supply chain management*

In the context of the world economy is transitioning to green economy, the development of green supply chain (GSC) is considered a new approach for many businesses (businesses) to improve competitiveness as well as the substitutes for each brand.

A green supply chain can be defined as the process of using environmentally friendly inputs and turning the by-products of use into something that can be improved or recycled in the current environment. This process enables the outputs and by-products to be reused at the end of their lifecycle, thus creating a sustainable supply chain.

Narasimhan and Carter (1998) define green supply chain management with regard to the use of methods of reducing materials in addition to recycling and reuse.

Godfrey (1998) defines green supply chain management as the business (DN) to constantly monitor the environmental impacts of a supply chain and improve its outcomes.

Sarkis (2003) also defines green supply chain management as a combination of operations of an environmental and recovery logistics company, emphasizing the importance of the latter.

Johnny (2009) defines green supply chain management as the process of adding “green” elements to an existing supply chain and creating a recalled supply chain as a way of rebuilding the system. create. This includes not only the pursuit of efficiency, but also supply chain innovation related to costs, profits, and the environment.

While many different concepts are presented depending on the perspective of each study, all in common all of them have in common that affirming that a green supply chain must ensure two issues to minimize costs and more environmentally friendly.

The first benefit of a green supply chain is about resource efficiency and environmental protection. Most logistics and transportation providers implementing green supply chain models have improvements in reducing energy and waste as well as reducing packaging in distribution (Industries Canada, 2008). Businesses must comply with all environmental and legal regulations. For any international organization, expanding and increasing new regulations can cause difficulties for the business itself. But rules have been put in place and they have to comply if they want to continue doing business. The problem is how to create a flexible and adaptive supply chain that can respond quickly and with the least amount of resources.

## *2.3. Green and global supply chain strategy*

Green and global supply chain strategies are as follows:

- Multinational companies have the ability to transfer knowledge to expand pollution reduction strategies in global operations, due to scale, high research and development investment and coordination of international production (Lee et al., 2015).
- Global companies with a high social responsibility mission, therefore, are subject to great external pressure on environmental issues (Ramanathan et al., 2011).
- Regulations on environmental issues vary from country to country, so when participating in globalization, businesses will have to strictly follow different environmental standards, resulting in self-regulation and improvement. more (Zhu et al., 2008).

Besides the views that support the global green supply chain management strategy, there are still factors that hinder the implementation of this strategy. For example: Different laws in each country are a big barrier for businesses. Multinational operations make businesses facing different environmental regulations of each country, thereby making it difficult to source goods, transport distance leading to environmental pollution. This research investigates the inconsistencies between this global and green supply chain strategy, including the United Nations Environmental Survey (Lee et al., 2015) and empirical evidence from multinational companies in the field. telecommunications sector (Dangelico et al., 2013).

The literature includes case studies examining the possible results of green and global supply chain strategies (Rettie et al., 2012). For example, with the aim of producing greener and cleaner production, the Ford Motor Group is continuing to minimize its environmental impact through sharing leading sustainability experiences with suppliers around the world. bridge. In addition to the sustainable development practices being applied in the manufacturing sector, Ford is continuing to add new solutions, helping suppliers reduce waste and CO<sub>2</sub> emissions, as well as water and energy consumption. more effectively. This has helped the number of companies participating in the program to more than 40 companies within 2 years. PACE is currently capable of affecting nearly 1,100 supply chain facilities in more than 40 countries. Programs such as PACE have demonstrated Ford's commitment to sustainability and civic responsibility for the environment. This makes the car company on the List of the Most Ethical Companies for 8 consecutive years published by the Ethisphere Institute.

#### *2.4. Firm performance*

There are different goals in every stage of business development, but it can be said that every business doing business with any type of ownership has a long-term overarching goal of maximum. profit. Then, besides social efficiency, economic efficiency is the main criteria used to evaluate the performance of enterprises.

Business efficiency is an economic category in depth, reflecting the level of exploitation of resources and the level of resources cost in the reproduction process to achieve business objectives.

Business efficiency is an economic category in depth, reflecting the level of exploitation of resources and the level of cost resources in the reproduction process to achieve business goals (Phan et al., 2020). The efficiency of production and business today becomes more and more important for economic growth and is the basis for assessing the implementation of the economic goals of the enterprise in each period.

Firm performance in research is approached in two aspects: financial efficiency and environmental efficiency.

Assessing and measuring corporate financial performance is one of the most controversial and discussed issues in financial management. The use of any tool to evaluate the financial performance of

enterprises plays an important role. There are many indicators for measuring the financial performance of businesses, but the most commonly used indicators in the studies can be divided into two main groups: The first group of indicators, using accounting tools that have many impacts. Using the previous studies, it is the ratio between the results achieved (net income, net profit) and the inputs (assets, capital, investment capital, equity property); The second set of indicators includes economic models based on market value.

Environmental efficiency is the evaluation factor of environmental indicators such as: CO<sub>2</sub> emissions, treated wastewater, solid waste, ....

### *2.5. The relationship between green supply chain management to firm performance*

Benefits of greening the supply chain for businesses are:

- + Saving operating costs due to waste reduction
- + Reduce medical costs and safety costs
- + Lower labor costs - better working conditions can increase motivation and productivity, and reduce the need for logistics staff.
- + Reduce transportation costs, energy, fuel
- + Reduce the dependence on price fluctuations of resources
- + Increase compliance with regulations
- + When greener activities will help improve the reputation in the eyes of suppliers and customers, not to mention investors
- + Increasing sales due to better relationship with customers - improving automation supply chain increases contract value

From the above benefits of implementing green supply chain management is improved firm performance.

## **3. Research method**

### *3.1. Background and research sample*

Vietnam is strongly undertaking integration and opening. Therefore, Vietnam cannot be out of the global trend. In the coming period, Vietnam will aim to increase exports and reduce imports. Therefore, Vietnamese enterprises must pay attention to environmental issues in production and business to gradually green their products. Businesses cannot produce as a single individual. They are forced to be in a continuous value chain and when the value chain is tending to be green, businesses will be forced to change. In fact, Vietnamese businesses are trying to integrate more deeply into the global production and consumption network. In order to do this, it is imperative to gradually integrate environmental management into the supply chain. It is argued that Vietnamese businesses do not necessarily become a part of the global green value chain, instead, they can create their own products and market them. However, even if that is the case, their customers will be more concerned about the environment and will choose greener products. Moreover, Vietnam's orientation in attracting foreign businesses will gradually move towards high-quality businesses with modern and environmentally friendly technologies. Therefore, Vietnamese businesses will have to change in the long term to be able to compete with foreign ones.

The study was conducted on 890 enterprises in 8 economic sectors of Vietnam. We conducted a survey of Vietnamese businesses from June to December 2019. After 6 months of collecting data via email and through direct interviews we collected 1253 questionnaires. However, after the process of data entry and elimination of the questionnaire were not eligible, only 890 questionnaires were left eligible to be analyzed for 890 enterprises in 8 major economic sectors of the Vietnam such as: Textile, fishery, chemicals, construction materials, food, etc.

### 3.2. Research models

The research variables were developed from the research of Choi and Hwang (2015); Phan et al. (2020) and Mafini and Muposhi (2017). Details of scales are presented in Appendix 1.

The research hypotheses are as follows:

H1: Green supply chain management has a positive impact on Global collaboration capability.

H2: Green supply chain management has a positive impact on Firm performance.

H3: Global collaboration capability has a positive impact on Firm performance.

H4: Size plays a role of regulating on the relationship between Green supply chain management and Firm performance.

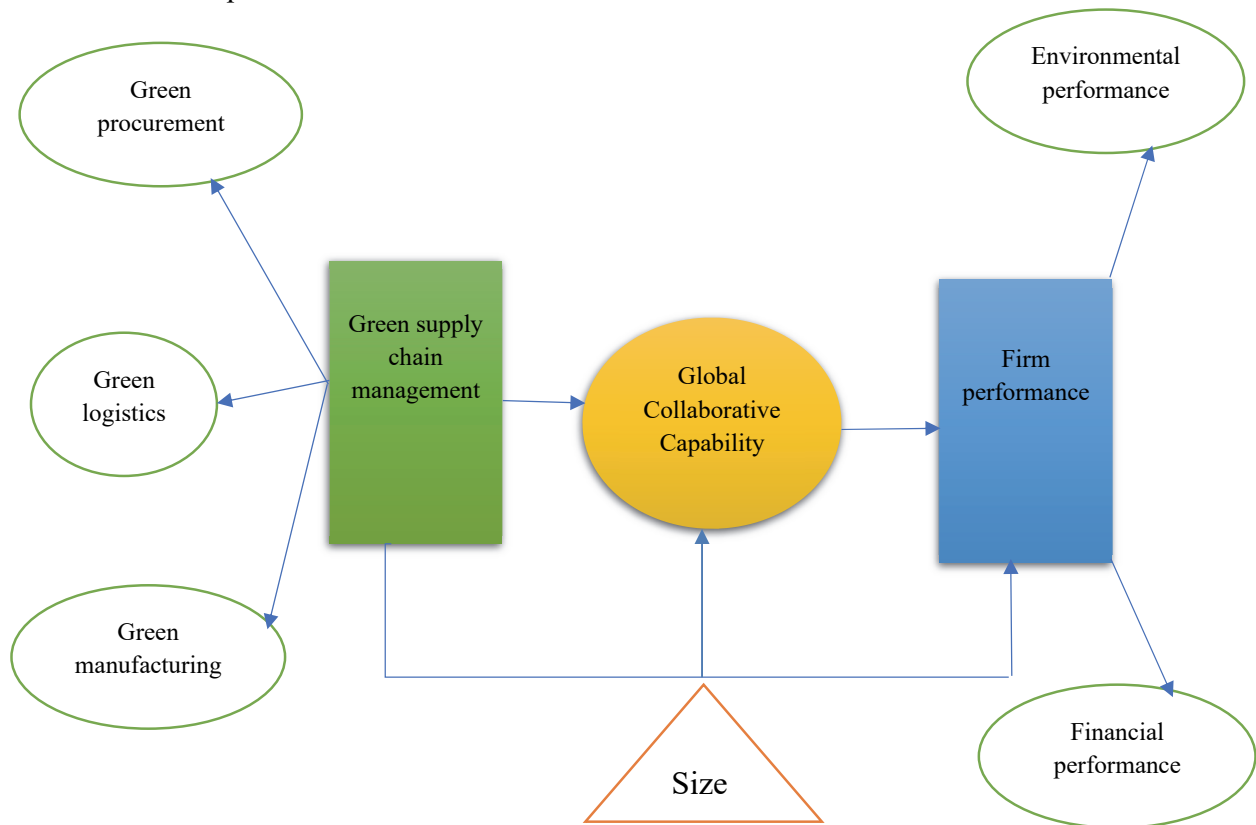


Fig. 1. Research Model

### 3.3. Analytical techniques

We use SPSS 24.0 software for descriptive statistics and at the same time, use SMART PLS 3.0 software to evaluate the scale and determine the importance of factors as well as test hypotheses.

- Descriptive statistics by SPSS:

- Check the reliability of the scale: Cronbach's Alpha coefficient  $\geq 0.6$ , total correlation coefficient  $> 0.3$  (Hair et al., 2013).
- Explore factor analysis (EFA):
  - + Using extracted variance to evaluate the scale: The scale is accepted when the variance extracted  $> 50\%$  and Eigenvalue  $> 1$  (Hair et al., 2011, 2013, 2014). Factor loading factor (Factor loading)  $\geq 0.5$  (Hair et al., 2011).
  - Evaluation of measurement model: assessment of reliability of the scale is done through PLS Algorithms in SMART PLS, including 3 values: reliability, convergence value and discriminant value.
  - + Evaluating general reliability measuring the reliability of a set of observed variables measuring a concept (factor) and CA reliability coefficient measuring intrinsic consistency throughout the set of variables of the answer. Aggregate confidence is significant when the value is greater than 0.7 and the CA reliability is 0.6 or higher.
  - + Evaluation of convergence value of the scale: The scale achieves convergence value when the standardized weights (Outer loading) of the scale are both high ( $> 0.5$ ) and statistically significant ( $p < 0.5$ ) (Henseler et al., 2009) and the total variance extracted reflect the overall variance of observed variables explained by the latent variable (Henseler et al., 2009) is significant when values are above 0.5.
  - + Evaluation of discriminant value: According to Henseler et al. (2009, 2015), discriminant value is the degree of distinguishing a concept of a specific latent variable from the concept of other potential variables. There are two ways to use this assessment:
    - The cross-loading factor must have a weighting factor of the latent variable representation that must have a higher value than the others.
    - The condition area of Fornell and Larcker (1981) compares the square root of AVE of each concept with the correlation (Pearson) between the concept or the underlying variable. The square root of AVE should be higher than the correlation of other concepts.
  - Evaluation of structural models: to check the relationship between the concepts, the impact, the intensity of the independent variables on the dependent variable through intermediate variables. Evaluation criteria are as follows:
    - + Measurement of the overall coefficient of determination (R-square value), is an indicator to measure the suitability of the model of the data (explanatory power of the model). Henseler et al. (2009) describe R-square values of 0.67, 0.33 and 0.19 in PLS path models which are strong, medium and weak respectively.
    - + Path Coefficient (impact weight) of the PLS structure model: the degree of impact of concepts together, can be understood as the standard beta coefficient of the least squares regression, providing a real confirmation part of the theoretical hypothetical relationship between the underlying variables. This coefficient bears the sign (+) which is acting in the same direction, bearing the sign (-) is the opposite effect.
    - + T-value: If the T-value value is  $> 1.96$ , the test is statistically significant at 5%.
  - Bootstrap estimation test: Non-parametric Bootstrap (Henseler et al., 2009) procedure can be used in PLS sampling paths to provide confidence intervals for all estimated parameters, build a basis for statistical inference. The Bootstrap pattern is created by randomly drawing instances with replacements from the original samples. PLS estimates the path model for each Bootstrap pattern. The path model

coefficients that make up a bootstrap distribution can be considered as an approximation of the sampling distribution.

#### 4. Research results

The reliability test results using Cronbach's Alpha coefficient show that the components of the scale are presented in Table 1. The results of testing the components of the scale have Cronbach's Alpha > 0.6 and no measurement variables. Any correlation is less than 0.3.

**Table 1**  
Construct Reliability and Validity

Environmental performance	0.871	0.877	0.872	0.579
Financial performance	0.917	0.917	0.917	0.689
Firm performance	0.949	0.951	0.949	0.653
Global Collaborative Capability	0.920	0.920	0.920	0.696
Green logistics	0.911	0.911	0.911	0.672
Green manufacturing	0.910	0.911	0.910	0.629
Green procurement	0.898	0.898	0.898	0.637
Green supply chain management	0.968	0.969	0.968	0.657

The reliability test results using Cronbach's Alpha coefficient show that the components of the scale are presented in Table 1. The results of testing the components of the scale have Cronbach's Alpha > 0.6 and no measurement variables. Any correlation is less than 0.3. As the results of Table 1 show, all the latent variables satisfy the conditions and calculate the value and the reliability.

**Table 2**  
Discriminant Validity (Fornell-Larcker Criterion)

	Environmental performance	Financial performance	Firm performance	Global Collaborative Capability	Green logistics	Green manufacturing	Green procurement	Green supply chain management
Environmental performance	0.761							
Financial performance	0.054	0.830						
Firm performance	0.078	0.058	0.808					
Global Collaborative Capability	0.218	0.320	0.512	0.835				
Green logistics	0.422	0.377	0.392	0.450	0.820			
Green manufacturing	0.120	0.380	0.393	0.174	0.020	0.793		
Green procurement	0.360	0.416	0.430	0.470	0.009	0.050	0.798	
Green supply chain management	0.429	0.386	0.400	0.260	0.032	0.048	0.047	0.811

From the results in Table 2, the variables in the model are suitable and ensure conditions for further analysis.

**Table 3**  
R Square

	R Square	R Square Adjusted
Environmental performance	0.162	0.163
Financial performance	0.119	0.119
Firm performance	0.362	0.360
Global Collaborative Capability	0.235	0.226
Green logistics	0.065	0.065
Green manufacturing	0.098	0.098
Green procurement	0.095	0.095



From Table 3, the variables in the model explain about 36% of the variation in the Firm performance variable.

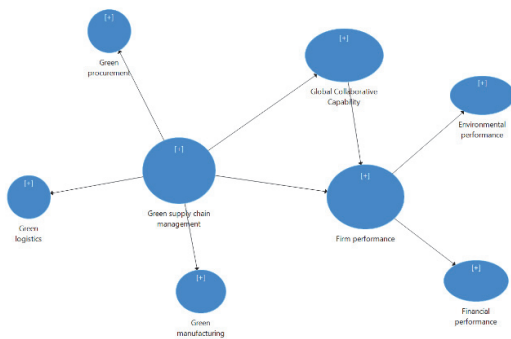
**Table 4**  
f Square

	Environmental performance	Financial performance	Firm performance	Global Collaborative Capability	Green logistics	Green manufacturing	Green procurement	Green supply chain management
Environmental performance								
Financial performance								
Firm performance	0.195	0.210						
Global Collaborative Capability			0.355					
Green logistics				0.218				
Green manufacturing				0.301				
Green procurement				0.236				
Green supply chain management				0.203	0.262	0.198	0.215	

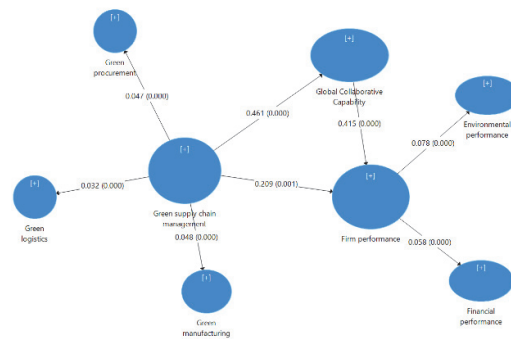
**Table 5**  
Model Fit Summary

	Saturated Model	Estimated Model
SRMR	0.060	0.068
d ULS	0.221	0.228
d_G1	0.553	0.563
d_G2	0.461	0.489
Chi-Square	1,659.382	1,698.263
NFI	0.885	0.886

From the results of Table 5, data is consistent with the research model. The hypothesis test results are given in Fig. 2. The results of data analysis through bootstrap technique on Smart PLS software are given in Fig. 3.



**Fig. 2.** Model research



**Fig. 3.** Hypothesis test results

As we can observe, the Green supply chain management has a strong impact on the Global collaborative capability with an impact factor of 0.461 at 1% significance level (P\_value = 0.000). This means that the implementation of green supply chain management will help Vietnamese businesses improve their global cooperation. Since the inevitable development trend of the world is sustainable development, so when doing green business will help businesses more easily have a common voice worldwide. Next, Green supply chain management has a strong impact on Firm performance with a strong impact coefficient with an impact factor of 0.209 at 1% significance level (P\_value = 0.001). Implementing green supply chain management will help businesses participate in the global supply chain, help

customers more loyal, improve business reputation, thereby increasing firm performance. Finally, the Global Collaborative capability strongly affects firm performance with an impact factor of 0.415 at 1% significance level ( $P\_value = 0.000$ ). When businesses have the ability to link global cooperation, it will improve the competitiveness of businesses, create competitive advantages and thereby increase firm performance. Summary of hypothesis testing results is summarized through the following table:

**Table 6**  
Path Coefficients (Mean, STDEV, T-Values, P-Values)

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ((O/STDEV))	P Values
Firm performance → Environmental performance	1.078	1.078	0.008	128.371	0.000
Firm performance → Financial performance	1.058	1.058	0.007	155.805	0.000
Global Collaborative Capability → Firm performance	0.415	0.413	0.056	7.355	0.000
Green supply chain management → Firm performance	0.209	0.215	0.062	3.391	0.001
Green supply chain management → Global Collaborative Capability	0.461	0.463	0.045	10.346	0.000
Green supply chain management → Green logistics	1.032	1.033	0.012	85.018	0.000
Green supply chain management → Green manufacturing	1.048	1.048	0.008	130.507	0.000
Green supply chain management → Green procurement	1.047	1.047	0.008	129.363	0.000

The following are the total effects of the pre-hidden variables in the model extracted from the analysis results from the Smart PLS software. The results show that all hypotheses are statistically significant.

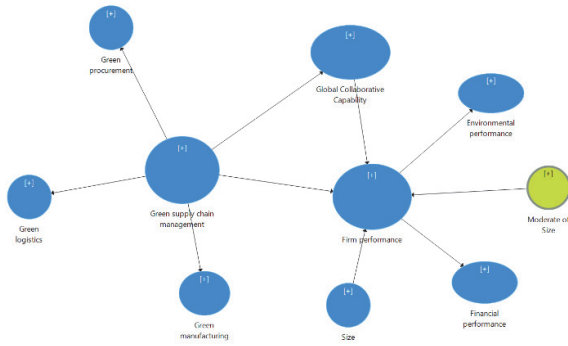
**Table 7**  
Total Effects (Mean, STDEV, T-Values, P-Values)

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ((O/STDEV))	P Values
Firm performance → Environmental performance	1.078	1.078	0.008	128.371	0.000
Firm performance → Financial performance	1.058	1.058	0.007	155.805	0.000
Global Collaborative Capability → Environmental performance	0.448	0.445	0.061	7.327	0.000
Global Collaborative Capability → Financial performance	0.439	0.436	0.060	7.345	0.000
Global Collaborative Capability → Firm performance	0.415	0.413	0.056	7.355	0.000
Green supply chain management → Environmental performance	0.432	0.438	0.052	8.358	0.000
Green supply chain management → Financial performance	0.424	0.430	0.051	8.302	0.000
Green supply chain management → Firm performance	0.401	0.406	0.049	8.248	0.000
Green supply chain management → Global Collaborative Capability	0.461	0.463	0.045	10.346	0.000
Green supply chain management → Green logistics	1.032	1.033	0.012	85.018	0.000
Green supply chain management → Green manufacturing	1.048	1.048	0.008	130.507	0.000
Green supply chain management → Green procurement	1.047	1.047	0.008	129.363	0.000

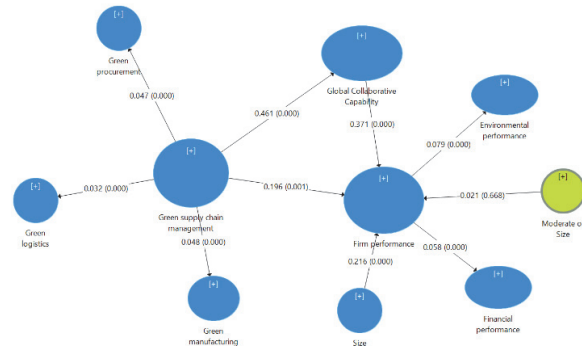
To check the moderate role we perform the following steps on Smart PLS software:

Step 1. We create additional Size variables and affect the Firm performance

Step 2: We create additional size moderator variables created directly on the software (See Fig. 4)



**Fig. 4.** Create more moderator variables on SEM model on Smart PLS software



**Fig. 5.** The results of the moderate role test

Step 3: Use bootstrap technique and follow the following method

Two-stage (default)

This approach uses the latent variable scores of the latent predictor and latent moderator variable from the main effects model (without the interaction term). These latent variable scores are saved and used to calculate the product indicator for the second stage analysis that involves the interaction term in addition to the predictor and moderator variable.

After performing 3 steps, we get the test results with regulatory variables as follows:

From the results in Fig. 5 shows that firm size has a positive impact on Firm performance with a fairly strong impact coefficient of 0.216 at the 1% significance level (P\_value = 0.000). However, it is also from the above results that Size does not have a statistically significant regulatory role in the relationship between Green supply chain management because the value of P\_value = 0.668.

**Table 8**

Path Coefficients (Mean, STDEV, T-Values, P-Values for moderate model)

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Firm performance → Environmental performance	1.079	1.078	0.009	116.044	0.000
Firm performance → Financial performance	1.058	1.058	0.007	143.922	0.000
Global Collaborative Capability → Firm performance	0.371	0.374	0.061	6.122	0.000
Green supply chain management → Firm performance	0.196	0.197	0.059	3.304	0.001
Green supply chain management → Global Collaborative Capability	0.461	0.463	0.045	10.188	0.000
Green supply chain management → Green logistics	1.032	1.031	0.012	86.043	0.000
Green supply chain management → Green manufacturing	1.048	1.047	0.008	138.874	0.000
Green supply chain management → Green procurement	1.047	1.046	0.008	139.100	0.000
Moderate of Size → Firm performance	0.021	0.021	0.048	0.429	0.668
Size → Firm performance	0.216	0.218	0.048	4.539	0.000

**5. Conclusion**

Green growth is an irreversible new trend of development in the world. In the context of strong globalization and fossil exhaustion, the environment is severely damaged due to immediate economic benefits without paying attention to sustainable development and green growth. is a new development

method that creates a comprehensive, sustainable and harmonious development between people and nature. Many countries in the world, especially developed countries, have considered green growth as an important driving force and direction to drive the activities of the government, businesses and people. Not only in developed economies, the trend of moving from "brown" to "green" has also begun to become more pronounced and become more and more pronounced in developing economies, especially are the countries with good income level among developing countries.

The results of the study have shown that the implementation of greening the supply chain had a positive impact on operational efficiency, so we propose some solutions as follows:

The important role of the state should be promoted in supporting investment in science and technology, in research and development (R&D), and in training people to help businesses improve public capacity. Technology, improves the ability of applying technology towards greening in practical production and business activities.

- It is necessary to design incentive policies and financial incentives and develop the science and technology market to encourage enterprises to invest in science and technology and enhance the application of science and technology in practice. Policies such as incentives on taxes, fees, priority concessions in bidding, access to capital, land, etc. can be applied as incentives for businesses and households to implement greening. production and business activities in product chains.

Organize training sessions, guide businesses and households to participate in government product supply chains to ensure greening of products provided to the government as well as to ensure capacity building competitiveness of enterprises in the export markets of the world and the region are necessary.

### Acknowledgement

This research is funded by National Economics University, Hanoi, Vietnam.

### References

- Bhatnagar, K (2012). *Customer-Oriented Global Supply Chains: Concepts for Effective Management*. Hershey, Pennsylvania: Information Science Reference.
- Choi D. & Hwang T. (2015). The impact of green supply chain management practices on firm performance: the role of collaborative capability. *Operations Management Research*, 8, 69–83.
- Dangelico, R.M., Pontrandolfo, P. & Pujari, D., (2013). Developing sustainable new products in the textile and upholstered furniture industries: Role of external integrative capabilities, *Journal of Product Innovation Management*, 30(4), 642–658.
- Fornell, C. & Larcker, D.F.,(1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18, 39–50.
- Godfrey, R. (1998). *Ethical purchasing: developing the supply chain beyond the environment*. Greener Purchasing: Opportunities and Innovations, edited by Russel, T., Sheffield, Greenleaf Publishing, pp. 244-251.
- Hair, J.F., Ringle, C.M. and Sarstedt, M. (2011). PLS-SEM: in deed a silver bullet, *Journal of Marketing Theory and Practice*, 19(2), 139-151.
- Hair, J.F., Hult, G.T.M., Ringle, C., & Sarstedt, M. (2013). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, Sage Publications Ltd, London.
- Hair, J.F., Henseler, J., Dijkstra, T., Sarstedt, M., Ringle, C., Diamantopoulos, A., Straub, D., Ketchen, D., GTM, H., & Calantone, R. (2014). Common beliefs and reality about partial least squares: comments on Rönkkö and Evermann, *Organizational Research Methods*, 17(2), 182-209.
- Henseler, J., Ringle, C.M., & Sinkovics, R.R. (2009). *The use of partial least squares path modeling in international marketing*, in Sinkovics, R.R. and Ghauri, P.N. (Eds), *New Challenges to International Marketing*, Emerald Group Publishing Limited

- Henseler, J., Ringle, C.M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115-135.
- Industrie Canada (2008). *Green Supply Chain Management Logistics & Transportation Services – A Canadian Perspective*. Canada
- Johnny, C.H., Maurice, K. S., Tzu-Liang, T., and David, S. A. (2009). Opportunities Green Supply Chain Management. *The Coastal Business Journal*, 8(1), 18-31.
- Lee, V., Ooi, K., Chong, A.Y. & Lin, B. (2015). A structural analysis of greening the supplier, environmental performance and competitive advantage, *Production Planning & Control*, 26(2), 116–130.
- Mafini C. & Muposhi A. (2017). The impact of green supply chain management in small to medium enterprises: Cross-sectional evidence. *Journal of Transport and Supply Chain Management*, 11(0), 1-11.
- McKinnon, A (2012). *The role of government in promoting green logistics*. London, UK: Kogan Page Limited.
- Narasimhan, R., & Carter, J. R. (1998). *Environmental Supply Chain Management*, The Center for Advanced Purchasing Studies, Focus Study.
- Phan T. T. H., Doan X. T. & Nguyen T. T. T. (2020). The impact of supply chain practices on performance through supply chain integration in textile and garment industry of Vietnam. *Uncertain Supply Chain Management*, 8(1), 175–186.
- Ramanathan, U., Gunasekaran, A. & Subramanian, N., (2011). Supply chain collaboration performance metrics: A conceptual framework, *Benchmarking*, 8(6), 856–872.
- Rettie, R., Burchell, K. & Riley, D., (2012). Normalising green behaviours: A new approach to sustainability marketing, *Journal of Marketing Management*, 28, 420–444.
- Sarkis, J. (2003). A strategic decision making framework for green Supply Chain Management, *Journal of Cleaner Production*, 11(4), 397–409.
- Tomas, G; Hult, M (2003). Global supply chain management: An integration of scholarly thoughts. *Industrial Marketing Management*, 33, 3-5.
- Zhu Q. Sarkis J., Cordeiro J. J., & Lai K. H. (2008). Firm-level correlates of emergent green supply chain management practices in the Chinese context. *Omega*, 36, 577–591

## Appendix 1: Measurement scales used in the study

Configuration for all measurement scales

1 = strongly disagree; 2 = disagree; 3 = undecided; 4 = agree; 5 = strongly agree.

### Global Collaborative capability

GCC1: We rely on our partners' engineering capability.

GCC2: Our partners' tools and machinery are customized to our needs.

GCC3: Our partners spend a significant amount of time and effort to our relationship.

GCC4: Our partners' knowledge of our procedures, culture, and technological know-how are difficult to replace.

GCC5: The frequent contacts between our partners and our engineers are important.

GCC6: The direction of our communication is bilateral rather than unilateral.

GCC7: Our engineers and sales staff work closely with our partners' staff.

GCC8: We share our high level of engineering capability with our partners.

**Environmental performance**

EP1: Our CO<sub>2</sub> emission has been reduced after the introduction of green management.

EP2: Our waste water has been reduced after the introduction of green management.

EP3: Our solid waste has been reduced after the introduction of green management.

EP4: Our energy consumption has been reduced after the introduction of green management.

**Financial performance**

FP1: High investments and less return-on investments.

FP2: Cost of environment-friendly packaging.

FP3: Availability of bank loans to encourage green processes.

FP4: Risk in hazardous material inventory and high cost of hazardous waste disposal.

**Green procurement**

GP1: Selection of suppliers with ISO 14001 certification.

GP2: Cooperation with suppliers to achieve green goals.

GP3: Available green guidelines to suppliers.

GP4: Assessment of green issues of second-tier suppliers.

GP5: Conducting green audits within the suppliers.

**Green logistics**

GL1: Establishing alternative energy plans of company.

GL2: Monitoring pollutants emitted from vehicles.

GL3: Using recyclable packaging materials and logistics containers.

GL4: Monitoring recycling of transportation waste.

GL5: Environmental management certification, such as the ISO14000 series.

**Green manufacturing**

GM1: Adequate technology competence.

GM2: Compliance with regulations.

GM3: Environmental conservation.

GM4: Sustainable production processes.

GM5: Innovation.



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