

## The role of green innovation and green supply chain management on the sustainability of the performance of SMEs

Agus Purwanto<sup>a,b\*</sup>, Khaerul Fahmi<sup>a</sup>, Irwansyah<sup>a</sup>, Rastanto Hadinegoro<sup>a</sup>, Imbuh Rochmad<sup>a</sup>, Syahril<sup>a</sup> and Eva Sulastril<sup>a</sup>

<sup>a</sup>Universitas Pramita Indonesia, Indonesia

<sup>b</sup>Kaizan School and Management, India

### CHRONICLE

#### Article history:

Received: January 2, 2022

Received in revised format: June 18, 2022

Accepted: August 15, 2022

Available online:

September 15, 2022

#### Keywords:

SMEs

Supply chain Management

Green supply chain management (GSCM)

Green Innovation

Environmental Performance

### ABSTRACT

The purpose of this study is to analyze the effect of green innovation (GI) on environmental performance (EI), the effect of green supply chain management (GSCM) on GI, and finally the effect of GI on environmental performance (EP) in the digital era. The study uses quantitative research methods and descriptive statistics. The sampling technique used is non-probability sampling with the type of purposive sampling. Respondents used in this study were 190 employees of small and medium enterprises (SMEs). Data was obtained by distributing online questionnaires through social media. The analytical technique used in this research is based on descriptive analysis and Structural Equation Model (SEM) using Partial Least Square (PLS). The results of this study indicate that GSCM practices have a significant positive effect on EI, GSCM practices have a significant positive effect on GI, GI has a significant positive effect on EP and, finally, GI mediates the relationship between GSCM and EP.

© 2022 by the authors; licensee Growing Science, Canada

## 1. Introduction

In the digital era, development will continue and cannot be stopped, since development is directly proportional to the increase in population and the number of community needs (Yang & Wang, 2020). The more the population, the more land that must be used to make settlements where they live. This means that the more people there are, the more the need for basic materials, which would lead to more and more development. According to Burki (2018) and Chiou et al. (2011) green supply chain management (GSCM) is one solution to reduce environmental damage caused by development or business processes which are not environmentally friendly. According to Roh et al. (2022) and Silva et al. (2019), GSCM is defined as a strategic capability that includes strategies, implementations, and policies that focus on managing the environmental impacts of supply chain activities. This definition indirectly includes an ecosystem philosophy of reducing externalities (waste and pollution) and material recovery while still focusing on the economic benefits of environmental responsibility. According to Seman et al. (2019) and Zhang et al. (2017), the application of Green Innovation (GI) is one of the incentives for companies to participate in protecting the environment in a sustainable manner. GI is referred to as a revolutionary environmental practice, processes, managerial, and marketing, resulting from the implementation of GSCM which has brought improvements in organizational environmental performance. According to Novitasari and Agustia (2021) and Seman et al. (2019), Supply Chain Management (SCM) serves to create an effective and efficient supply chain. The development of modern SCM has the aim of reducing uncertainty and risk in the supply chain and this positively affects inventory, cycle time, processing time and customer service. Therefore, SCM plays a critical role in increasing the competitiveness and profitability of the company. Meanwhile, according to Burki (2018), Chiou et al. (2011) and Cheng (2020), the supply

\* Corresponding author.

E-mail address: [agozpor@gmail.com](mailto:agozpor@gmail.com) (A. Purwanto)

ISSN 2816-8151 (Online) - ISSN 2816-8143 (Print)

© 2022 by the authors; licensee Growing Science, Canada

doi: 10.5267/j.jfs.2022.9.003

chain is the entire network from suppliers to end users, whose activities are related to the flow and transformation of goods, products, information and money. GSCM is an idea to eliminate or minimize waste along the chain. According to Burki (2018) and Zhang et al. (2017), GSCM can be defined as integrating environmental thinking into supply chain management, including product design, material sourcing and selection, manufacturing processes, final delivery of products to consumers and end-of-life management of products after their useful lives.

According to Burki (2018), Seman et al. (2019) and Zhang et al. (2017), the concept of GI is another concept of environmental management, which was recently introduced with the aim of eliminating negative environmental consequences. In order to enhance the future growth of business organizations, GI is especially prepared to build new markets, given its alarming growth over the coming decades, which offer a lot of potential and opportunities. According to Seman et al. (2019) and Zhang et al. (2017), GI is referred to as a revolutionary environmental innovation of practice, process, managerial, and marketing, resulting from the implementation of GSCM that has brought about improvements in organizational environmental performance. According to Seman et al. (2019) and Zhang et al. (2017), environmental performance (EP) is the company's performance in creating a good (green) environment. Burki (2018) and Chiou et al. (2011) explained that the concept of environmental performance refers to the level of environmental damage caused by the activities carried out by the company, a lower level of environmental damage indicates a better environmental performance of the company. Vice versa, the higher the level of environmental damage, the worse the environmental performance of the company.

According to Shafique et al. (2017) and Wong et al. (2020), many consumers decide to buy environmentally friendly products since they care about the current environmental issues. Entrepreneurs respond to this as an idea for industrial development by implementing marketing strategies that are appropriate to environmental issues. According to Burki Seman et al. (2019) and Zhang et al. (2017), this is a marketing strategy that continuously has a positive impact on the environment and is known as green marketing which focuses on selling products and services that pay attention to benefits that not only reach customer satisfaction but also environmental conditions.

## 2. Method

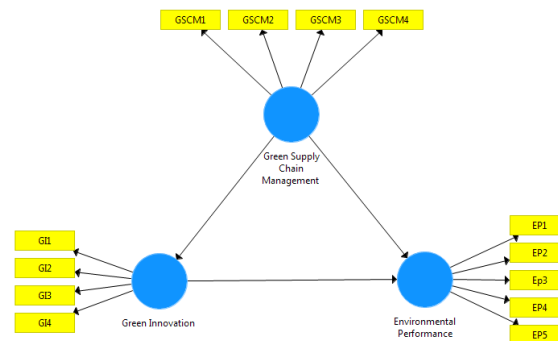
This study uses quantitative research methods and is based on descriptive statistics. The sampling technique used in this research is non-probability sampling with the type of purposive sampling. Respondents used in this study were 190 SMEs employees. Data was obtained by distributing online questionnaires through social media. The analytical technique used in this research is descriptive analysis and Structural Equation Model (SEM) using Partial Least Square (PLS) is used though the implementation of Statistical Analysis with SmartPLS 3.0 software tools.

### 2.1 Research Hypothesis

**H<sub>1</sub>:** Green supply chain management has a significant positive effect on environmental performance.

**H<sub>2</sub>:** Green supply chain management has a significant positive effect on green innovation.

**H<sub>3</sub>:** Green innovation has a significant positive effect on environmental performance.

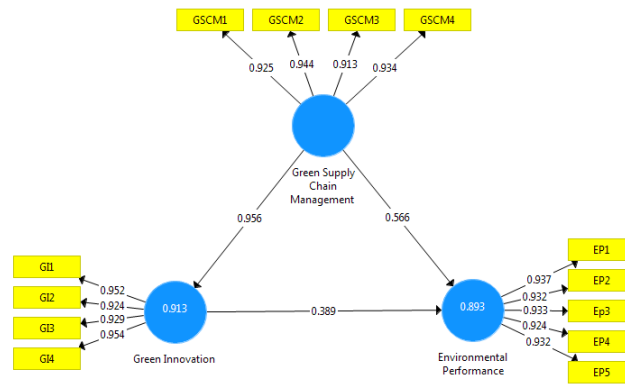


**Fig. 1.** Research Model

## 3. Result and discussion

### 3.1 R-Square ( $R^2$ )

R-Squared is implemented to determine the magnitude of the effect of the endogenous variables each other. The results of  $R^2 > 0.67$  for endogenous latent variables in the structural model indicate the relatively strong effect of exogenous variables on endogenous variables. If the result is 0.33–0.67, it is in the medium category and if the result is 0.19–0.33, it is in the weak category. Based on the results of data processing, the R-Square results are obtained as follows.



**Fig. 2.** Results of R-Square

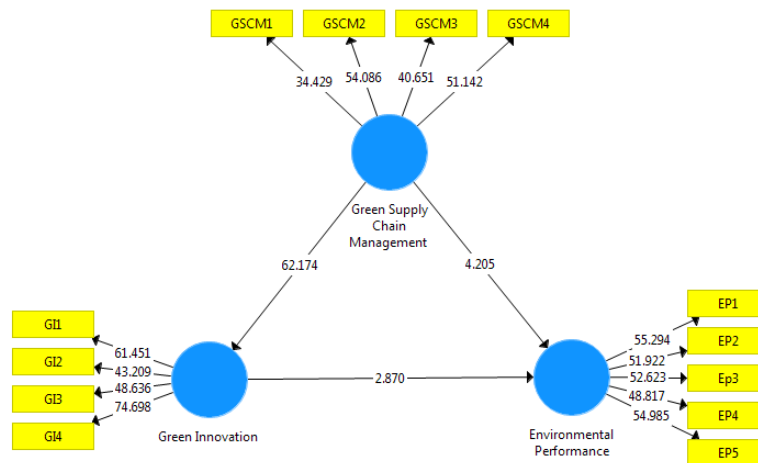
According to the calculation results in Fig 1, it can be seen that the results of  $R^2$  for the GI variable represent about 0.913 which is included in the strong category, and it shows that the contribution of the influence of the GSCM variable on GI is 91.3%, while the ratio for EP is approximately 0.893 and it is located in the good category. This shows that the contribution of the influence of the GSCM variable and GI on EP is about 83.9%.

*3.2 Hypothesis test*

Testing this hypothesis is set with a significance level of 0.05. The hypothesis can be accepted if the value of t statistic > t-table. The calculation results for hypothesis testing in this study are described in Table 1 as follows:

**Table 1**  
The summary of the results of path coefficients

Relationship	Coefficient	t-value	P-Value
GI → EP	0.389	2.870	0.004
GSCM → EP	0.566	4.205	0.000
GSCM → GI	0.956	62.174	0.000



**Fig. 3.** Hypothesis Testing

Based on the results in Table 1 and Fig. 3, it can be concluded that GSCM practices have a significant positive effect on EP (t-value = 4.205, Sig. = 0.000). Green supply chain management practice has also maintained a significant positive effect on GI and GI has a significant positive effect on environmental performance. GSCM has a significant positive effect on green innovation (t-value = 62.174, Sig. = 0.000). GI also has a significant positive effect on EP (t-value = 2.870, Sig. = 0.004). Companies must have a commitment to intangible environmental proactive activities such as product innovation and corporate social responsibility (CSR) to improve the natural environment, from the term pro-environment used to the term concern for the physical environment. Customers are said to be “green customers” when these customers buy and use environmentally friendly products. Environmental issues tend to influence customer behavior by buying environmentally friendly products on a regular basis aimed at reducing pollution, saving energy and recycling. Thinking rationally and irrationally will be the basis for consumers to decide to buy a product.

#### 4. Conclusion

Based on the results of the study, it was concluded that GSCM practices have a significant positive effect on EP, GSCM has a significant positive effect on GI, GI has a significant positive effect on EP. Innovation mediates the influence between GSCM and EP. SMEs need to always control their raw materials when purchasing by always using green attributes that are easy to recycle. SMEs need to always use environmentally friendly materials in every activity of the development process. SMEs to continue to make improvements to the performance of the company's green manufacturing activities. Suggestions for further research are to identify GSCM performance indicators that are in accordance with the character in the industry. Further research can also increase the number of experts from various competencies related to the GSCM SMEs concept to filter and combine all perceptions to produce a GSCM performance measurement system that is more suitable to be implemented in the oil and gas industry.

#### References

- Burki, U. (2018). Green supply chain management, green innovations, and green practices. In *Innovative Solutions for Sustainable Supply Chains* (pp. 81-109). Springer, Cham.
- Cheng, C. C. (2020). Sustainability orientation, green supplier involvement, and green innovation performance: Evidence from diversifying green entrants. *Journal of Business Ethics*, *161*(2), 393-414.
- Chiou, T. Y., Chan, H. K., Lettice, F., & Chung, S. H. (2011). 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*, *47*(6), 822-836.
- Novitasari, M., & Agustia, D. (2021). Green supply chain management and firm performance: The mediating effect of green innovation. *Journal of Industrial Engineering and Management*, *14*(2), 391-403.
- Roh, T., Noh, J., Oh, Y., & Park, K. S. (2022). Structural relationships of a firm's green strategies for environmental performance: The roles of green supply chain management and green marketing innovation. *Journal of Cleaner Production*, *356*, 131877.
- Schiederig, T., Tietze, F., & Herstatt, C. (2012). Green innovation in technology and innovation management—an exploratory literature review. *R & D Management*, *42*(2), 180-192.
- Seman, N. A. A., Govindan, K., Mardani, A., Zakuan, N., Saman, M. Z. M., Hooker, R. E., & Ozkul, S. (2019). The mediating effect of green innovation on the relationship between green supply chain management and environmental performance. *Journal of Cleaner Production*, *229*, 115-127.
- Shafique, M., Asghar, M., & Rahman, H. (2017). The impact of green supply chain management practices on performance: Moderating role of institutional pressure with mediating effect of green innovation. *Business, Management and Economics Engineering*, *15*(1), 91-108.
- Silva, G. M., Gomes, P. J., & Sarkis, J. (2019). The role of innovation in the implementation of green supply chain management practices. *Business Strategy and the Environment*, *28*(5), 819-832.
- Wong, C. Y., Wong, C. W., & Boon-itt, S. (2020). Effects of green supply chain integration and green innovation on environmental and cost performance. *International Journal of Production Research*, *58*(15), 4589-4609.
- Yang, Y., & Wang, Y. (2020). Supplier selection for the adoption of green innovation in sustainable supply chain management practices: A case of the Chinese textile manufacturing industry. *Processes*, *8*(6), 717.
- Zhang, Q., Zhang, J., & Tang, W. (2017). Coordinating a supply chain with green innovation in a dynamic setting. *4or*, *15*(2), 133-162.



© 2022 by the authors; licensee Growing Science, Canada. This is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC-BY) license (<http://creativecommons.org/licenses/by/4.0/>).