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The Role of Green Supply Chain Management in Predicting Indonesian Firms' Performance: Competitive Advantage and Board Size Influence

Maya Novitasari[1]* | Ali Saleh Alshebami[2] | M. Agus Sudrajat[3]

[1]*Universitas PGRI Madiun, Faculty of Economics and Business, Madiun, Indonesia*
[2]*King Faisal University, Applied College, Alahsa, Saudi Arabia*
[3]*Universitas PGRI Madiun, Faculty of Economics and Business, Madiun, Indonesia*

*Correspondence to: Maya Novitasari, Universitas PGRI Madiun, *Faculty of Economics and Business*, Department of Accounting, Jalan Auri 14–16, Madiun, 63117, Indonesia.
E-mail: maya.novitasari@unipma.ac.id

Abstract: This study examines the effect of green supply chain management (GSCM) on firm performance, with competitive advantage as mediation and board size as moderation. Purposive sampling method was used to examine 516 PROPER companies from 2010 to 2018. Data were obtained from the Indonesia Stock Exchange. Results show that GSCM has a positive effect on competitive advantage but does not affect firm performance, whereas competitive advantage has a positive effect on firm performance. Moreover, competitive advantage can mediate the relationship between GSCM and firm performance. Board size cannot moderate the relationship between GSCM and competitive advantage, but it can moderate the relationship between competitive advantage and firm performance and the relationship between GSCM and firm performance. The results of this study can be used to improve firm performance of companies concerned with environmental impact. The research findings contribute to the idea that board size has a role in strengthening the implementation of GSCM to create competitive advantages that can increase firm performance.

Keywords: competitive advantage, firm performance, green supply chain management.

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INTRODUCTION

The Indonesian government is committed to the 2020 World Economic Forum and must continue to improve its commitment to save the environment and nature of Indonesia (Elliott & Setyowati, 2020). Companies have the responsibility for decreasing environmental impacts in product development, design process, logistics, company operations, marketing, compliance with regulations, and waste management (Al-Ghwayeen & Abdallah, 2018). To reduce the environmental impacts in carrying out the production process, companies can apply green operations to face the company's competitive advantage from the GSCM process to the improvement of company performance. Facing environmental impacts and intense competition, companies must have the ability to compete in order to maintain and enhance the performance of their companies. Green supply chain management (GSCM) is a company strategy for environmental development in the long term to face market competition, aiming to increase profits and decrease environmental impacts (Khaksar et al., 2016).

GSCM pays attention to environmental impacts in a company's supply chain involving suppliers to distributors. Conflicts between economic growth and environmental impacts do not occur in the academic world only, but also companies and communities. To achieve a competitive advantage through GSCM, companies must be strict in selecting suppliers and distributors, particularly those related to environmental capabilities (Kim et al., 2016; Handayani et al., 2017). GSCM is a company's strategic ability in practices and policies for managing environmental impacts in the supply chain (Kirchoff et al., 2016). Two approaches to GSCM, Chu et al. (2017) include first, the monitoring approach, in which the company participates in gathering information and setting standards for suppliers. Second, the collaborative approach is to provide training and education programs to assist management policies in implementing "green" and obtaining environmental certification. In this case, GSCM is a great opportunity in a competitive advantage to enhance company performance. The company's logistics is an essential part of the supply chain and is integrated with enhancing the company's support for GSCM (Khan et al., 2018).

Competitive advantage is formed if the company can combine and expand resources and capabilities efficiently. It is the company's ability to face competition in market share, whether the company is above or below competing companies (Yunus & Michalisin, 2016; Ploenhad et al., 2019). In enhancing company performance, competitive advantage is measured by the extent to which the company can achieve production targets, human resource goals, marketing, and finance (Abeysekara et al., 2019). Competitive advantages are divided into three types, including 1) company policy in providing products and services at the lowest prices in the market, 2) differentiation of company services and products, and 3) ability to meet targets and be responsive to the demands of the market segments and customers (Potjanajaruwit, 2018). By having them, the company will be able to face market competition, create new products, increase productivity, sales, and company performance.

Board size is an internal mechanism in corporate governance and has a primary role in company management. It has a role in decision making in company management, aiming of improving firm performance. Agency theory revealed that the board size can provide advice, supervise, and be responsible for the company management (Ntim et al., 2015). Board size is considered an essential internal mechanism to improve company revenue (Aygun et al., 2014).

In previous research, the elements contained in GSCM positively affect firm performance. Companies are constantly looking to implement GSCM from a wider perspective (Chu et al., 2017; Bu et al., 2020). Inconsistent results were found by Zhu et al. (2007); Younis et al. (2016) that not all implementation of GSCM significantly affects firm performance. GSCM has a significant effect on competitive advantage (Masoumik et al., 2014; Nanath & Pillai, 2017). Competitive pressure can force companies to always improve their competitive advantage and firm performance. There is a significant and positive relationship between competitive advantage and firm performance, where the competitive advantage of the company has two basic characteristics, including being able to increase profits in firm performance and competing companies cannot imitate the company's strategy (Chen et al., 2017; Ferreira & Coelho, 2017). Larger board size is considered a more active indicator and influences the company's decision to improve firm performance (Nas & Kalaycioglu, 2016). Therefore, it is increasingly significant to have GSCM, competitive advantage, the board size, and firm performance for companies in Indonesia. Firm performance can present the right financial position to achieve company goals both in the short and long terms.

This study examined the relationship between GSCM, competitive advantage, and firm performance with direct and indirect effects. Besides, there is also a moderating variable, namely the board size. Because the previous studies still have some gaps between GSCM, competitive advantage, board size, and firm performance, then this research can provide information and knowledge, particularly for go public companies

in Indonesia. The pressure from the government and other stakeholders together can encourage companies to comply with and implement GSCM to enhance company performance (Ahmed et al., 2019). Since GSCM tends not to be able to increase firm performance, then companies need to expand their focus on customer satisfaction (Laari et al., 2016). GSCM is a "green" concept in the supply chain to be more integrated, which ultimately results in a competitive advantage (Stindt, 2017). Porter's strategy in implementing competitive advantage in addition to improving market performance is also able to improve company performance (Anwar et al., 2018). Board size is a company's requirement to increase the trust of company management, which can improve firm performance (Haider & Fang, 2016b). Because of the existence of these gaps, this research will be able to answer: 1) whether GSCM and competitive advantage have a positive effect on firm performance?, 2) whether GSCM has a positive effect on competitive advantage, 3) can competitive advantage mediate the relationship between GSCM and firm performance?, and 4) whether the board size can moderate the relationship between GSCM and competitive advantage, the relationship between competitive advantage and firm performance, and the relationship between GSCM and firm performance. This study aimed to improve firm performance through GSCM and competitive advantage, while board size can play a role in improving firm performance.

Pressure from stakeholders and institutions are the main drivers of companies in implementing GSCM by implementing an environmentally friendly strategy to maintain competitive advantage and improve company performance (Vanalle et al., 2017). Companies adopting GSCM can reduce pollution and environmental problems in the supply chain from upstream to downstream of the company (Govindan et al., 2014). In adopting GSCM, companies cannot achieve competitive advantage only, but also open new market opportunities and can lobby the government for legal protection for firm performance (Mitra & Datta, 2014).

In implementing GSCM, there is an increased interest of investors in companies with the 6R concept (remanufacturing, redesign, recover, recycle, reuse, and reduce) as evolution and sustainable production (Vanalle & Santos, 2014). The relevance of "green" highly fits for company learning and human resource practices because both help reduces barriers to adopting GSCM (Teixeira et al., 2016). Suppliers are significant partners in the company's supply chain since they are a major factor in supporting the organization's environmental initiatives and participating in improving environmental performance (Yu et al., 2014).

Firm performance is an effort made to achieve the company's multi-dimensional purposes based on conceptualization, on the multidimensional goal of firm performance. Besides increasing profits, the other three indicators include production, finance, and marketing (Tuan et al., 2016; Schmidt et al., 2017). The firm performance presents the company's success in implementing and completing work with maximum profit (Golicic & Smith, 2013). Firm performance is essentially a description of the company in achieving its economic goals, such as target market share and increased sales (Lirn et al., 2014). Firm performance can provide information to stakeholders regarding the condition of the company in market share competition.

Porter & Linde (1995) argued that the environmental aspect must be included in businesses that function to increase resources and competitive advantage. Competitive advantage is the strategy for the company to obtain long-term benefits and cannot be overcome by its competitors through a strategy of product replication or imitation (Ge et al., 2018). Competitive advantages in the long term must be able to develop, update, and improve the company's product portfolio by adjusting to customer desires, increasingly sophisticated technological advances, and increasingly tight competition (Ohvanainen & Hietikko, 2012). Competitive advantage aims to be able to create and maintain competitiveness to increase company profits (Sinaga et al., 2019). To achieve a competitive advantage, a company must combine its resources and capabilities efficiently.

Larger board size is less effective than a smaller one (Shakir, 2008). Lipton & Lorsch (1992) pioneered research on board size. Principles of organizational theory also oppose larger groups since they require a

relatively longer time to make decisions and therefore, require more input time for particular levels of output (Ansong, 2015). The company's performance enhances with increasing board size and the contribution of additional board members decreases when the company's size increases.

GSCM for a company serves as a strategy of sustainable resources and the ability to achieve a competitive advantage, in terms of market share, competing companies, and performance (Liu et al., 2012). GSCM has a significant effect on competitive advantage (Khaksar et al., 2016). This shows that supply chain management focusing on environmental impact can improve industrial activities to increase competitive advantage. By implementing environmental management, companies can strengthen competitiveness and create a competitive advantage (Marhamati & Azizi, 2017). It shows that the existence of supply chain management focusing on environmental impact can improve industrial activities to enhance competitive advantage. By implementing environmental management, companies can strengthen competitiveness and create a competitive advantage (Mee-ngoen et al., 2020). The company's strategy in competitive advantage that cannot be imitated by competitors is an attempt to reduce huge costs, that will be able to increase firm performance (Rauf et al., 2019). In a differentiation strategy, the company must create a unique and different product so that it cannot be imitated by competitors, will form a competitive advantage for the company, and decrease the company's costs (Khan et al., 2019). This cost reduction can increase the company's profitability or performance (Songling et al., 2018; Brulhart et al., 2019). Competitive advantage will enable the company to have product characteristics that cannot be duplicated by competitors.

GSCM will help companies manage and cooperate with suppliers and create environmentally friendly products as they are received by consumers. Therefore, it helps companies reduce costs so that they can improve company performance (Bu et al., 2020). GSCM has a significant effect on firm performance (Jassim et al., 2020). It indicates that with the existence of GSCM, sustainable business purposes can be achieved, which ultimately increases firm performance. The implementation of GSCM contributes to reducing environmental impacts such as pollution, waste, air emissions, and the use of toxic materials (Habib et al., 2020). In its process, GSCM covers the capacity and ability of the company to conduct its operational activities (Bag et al., 2021). Green practice in supply chain management is a beneficial philosophy for companies in firm performance to generate maximum profit.

Several previous studies researched the relationship between GSCM and firm performance. Competitive advantage is added as a mediating variable because companies need to increase their competitive advantage in order to compete in market share (Wu et al., 2017). "Green" used by companies in supply chain management will form a competitive advantage that can increase firm performance (Lee et al., 2015). With the competitive advantage, the company will benefit, such as reducing costs by preventing pollution, monitoring stakeholders on products that cannot be published so as to prevent competitors, and long-term synergistic development (Pålsson & Kovács, 2014), which will greatly assist the company in improving firm performance.

The presence of a board size in a company will be able to improve firm performance since the board size is the decision making for firm performance. The idea for a small board size will be more productive to improve firm performance (Haider & Fang, 2016a). However, Qadorah & Fadzil (2018) argued that a large board size will provide good management control of the company to improve firm performance. With the existence of board size, the company will be very helpful to increase firm performance (Anazonwu et al., 2018).

This study focused on the exploration of GSCM, competitive advantage, board size, and firm performance. It aimed to examine the direct and indirect relationships between competitive advantage, GSCM, and firm performance, with the moderating variable of the board size between GSCM, competitive advantage, and firm performance. The conceptual framework that can be formed in this research is as follows:

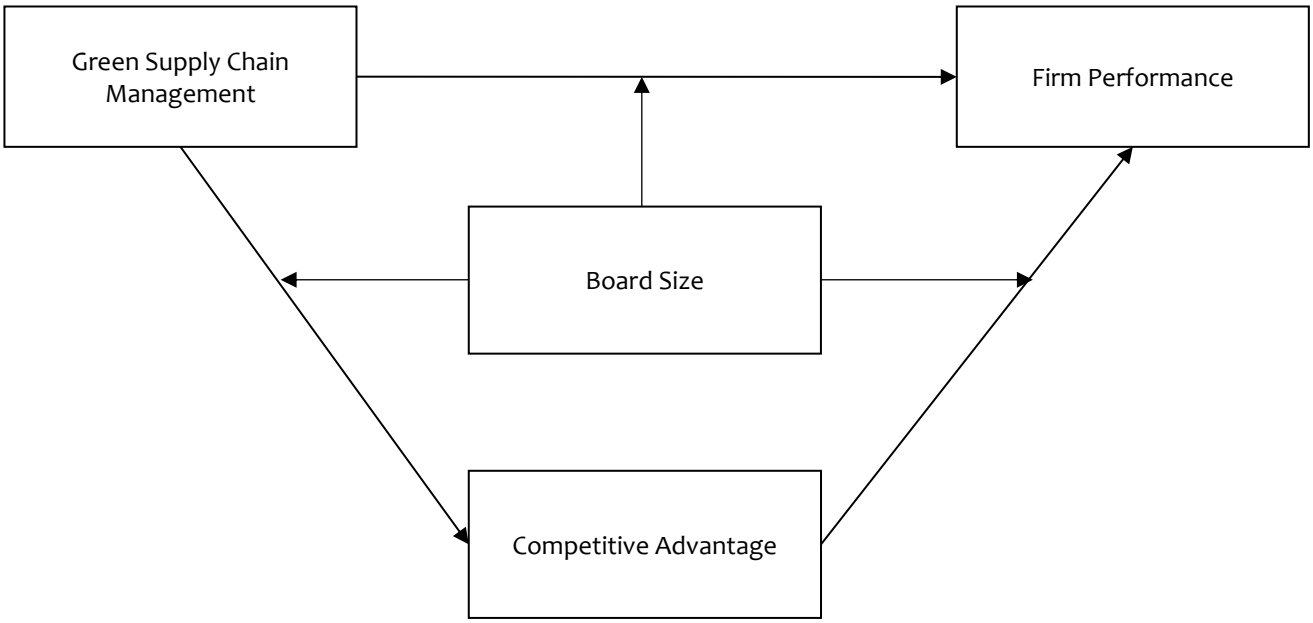

Figure 1 Conceptual Framework

METHODS

Quantitative research and secondary data are used in this study. The model used in this study was multiple linear regression. The population used in this study were companies registered in the PROPER program in 2010-2018. The data sample was selected using purposive sampling, taken from the Indonesia Stock Exchange and OSIRIS software. Therefore, the sample used was 516 companies. The test in this study uses STATA and a Sobel calculator to test the path analysis and MRA. The regression equation used is as follows:

$$FirmPerformance = \alpha 1 + \beta 1GSCM + \beta 2CA + e \ldots (1)$$
$$CA = \alpha 2 + \beta 3GSCM + e \ldots (2)$$
$$FirmPerformance = \alpha 3 + \beta 4GSCM + \beta 5CA + \beta 6BS + e \ldots (3)$$
$$FirmPerformance = \alpha 4 + \beta 7GSCM + \beta 8CA + \beta 9BS + \beta 10GSCM*BS + \beta 11CA*BS + e \ldots (4)$$
$$CA = \alpha 5 + \beta 12GSCM + \beta 13BS + e \ldots (5)$$
$$CA = \alpha 6 + \beta 14GSCM + \beta 15BS + \beta 16GSCM*BS + e \ldots (6)$$

The multiple regression equation above explains that competitive advantage mediates the relationship between GSCM and firm performance, with the board size as a moderating variable between GSCM and competitive advantage, competitive advantage and firm performance, and GSCM and firm performance.

The dependent variable in this study was a proxy of firm performance. Firm performance is the effort of stakeholders in managing the company to improve resources, products that cannot be imitated, and cannot be published. The firm performance will be beneficial for the company since it can increase profit, competitive advantage, target market share, sales, and customer satisfaction. According to Vithessonthi & Racela (2016) and Mukhtaruddin et al., (2019), the ratio of firm performance used is ROA with the formula of the earnings before interest and tax (EBIT) is divided by total assets.

The first independent variable used was the GSCM. GSCM is "green" that is combined with supply chain management by considering the environmental impacts, starting from the selection and purchase of materials from suppliers, product materials and design until the products are ready for sale to consumers (Srivastava, 2007). GSCM measurements are taken from the company's annual report using several ratios. GSCM indicators include: 1) there is an ISO 9000 or ISO 14000 certificate, 2) distribution and marketing that is environmentally friendly, 3) product packaging can be recycled, 4) determine suppliers whose criteria and quality are environmentally friendly materials and 5) product quality according to customer criteria (Sharma et al., 2017).

The mediating variable used was a competitive advantage, which is the company's efforts to produce product differentiation so that it cannot be duplicated by competitors and can reduce costs so as to increase firm performance (Tan & Sousa, 2015). Competitive advantage is obtained because the advantage comes from asset turnover (Oppong & Pattanayak, 2019). The more product sales, the higher the company's competitive advantage. Competitive advantage is a company seen from the characteristics and resources to measure better performance than other companies in the same industry or market share, including top management that allows substantial increase and asset utilization (Plastino & Purdy, 2018). Asset utilization can be measured by asset turnover with the formula of sales is divided by the difference between net operating sales this year and net operating sales one year before.

The moderating variable used is the board size which functions a decision-making in company management to improve firm performance. A large board size will increase the leverage to improve firm performance (Abdul-Qadir et al., 2015). The board size can be calculated by the number of commissioners in the company (Handriani & Robiyanto, 2019).

RESULTS AND DISCUSSION

Table 1 shows the descriptive statistics for all variables in this study. As shown in Table 1, the minimum and maximum values are -0.260 and 0.872 for firm performance, 0.000 and 1.000 for GSCM, -266.469 and 620.363 for competitive advantage, and 1.000 and 17.000 for the board sizes, respectively.

Table 1 Descriptive Statistics

	Mean	Std. Dev	Minimum	Maximum
FirmPerformance	0.107	0.127	-0.260	0.872
GSCM	0.535	0.200	0.000	1.000
CA	22.542	68.604	-266.469	620.363
BS	12.291	2.631	1.000	17.000

Notes: This table presents descriptive statistics for the dependent, independent, mediating, and moderating variables. The sample consisted of PROPER companies listed on the Indonesia Stock Exchange (IDX) in 2010-2018.

Table 2 shows the results of the Pearson correlation test to determine the strength of the relationship between variables. The correlation between GSCM and competitive advantage is positive with a significance level of 5%, indicating that a company with good GSCM generates a higher competitive advantage. The correlation between competitive advantage and firm performance is positive with a significance level of 1%, indicating that the better the competitive advantage, the better the firm performance. And the correlation between GSCM and firm performance is positive.

Table 2 Pearson Correlation

		(1)	(2)	(3)	(4)
(1)	FirmPerformance	1.000			
(2)	GSCM	0.037	1.000		
(3)	CA	0.135***	0.088**	1.000	
(4)	BS	-0.023**	0.123	-0.040	1.000

Table 3 shows the use of simple linear regression for model 1. Based on the results of the t-test, it is known that the t value for the GSCM variable on competitive advantage is 2.00 with a significance value of 0.046 (sig. < 5%), indicating that GSCM has a positive effect on competitive advantage (in line). The t value for the variable of competitive advantage on firm performance is 3.02 with a significance value of 0.003 (sig. < 0.01), indicating that competitive advantage has a positive effect on firm performance (in line). The t value for the GSCM variable on firm performance is 0.57 with a significance value of 0.566 (sig. > 0.1). Therefore, it shows that GSCM has no effect on firm performance (not in line).

Table 3 Results of Regression on Firm Performance and Competitive Advantage

	Model 1		Model 2	
	FirmPerformance	CA	FirmPerformance	CA
GSCM	0.016	30.070**	0.018	32.241**
	(0.57)	(2.00)	(0.63)	(2.13)
CA	0.000***		0.000***	
	(3.02)		(2.98)	
BS			-0.001	-1,339
			(-0.48)	(-1.16)
_cons	0.093		0.105	21.748
	(5.88)		(3.61)	(1.38)
r2	0.019	0.156	0.019	0.010
r2_a	0.015	0.144	0.013	0.006
N	516	516	516	516

GSCM has a positive effect on competitive advantage, indicating that companies implementing a GSCM strategy can provide company initiatives to be environmentally aware and improve their competitive advantage (Masoumik et al., 2014). Competitive advantage has a significant effect on firm performance. It shows that high competitive advantage will create superior value and provide customer satisfaction, which will improve firm performance (Saeidi et al., 2015). GSCM focuses on supply chains that consider environmental impacts and highly strict company regulations to support and encourage GSCM (Khan & Qianli, 2017). Therefore, an intermediary between GSCM and firm performance is needed.

Table 4 Results of Mediation Test

	Input	Test statistic	Std. Error	P-value
a	30.0704	1.6662	0.0044	0.09567
b	0.0002			
Sa	15.0430			
Sb	0.00008			

The results of the mediation test using Sobel are shown in Table 4. The indirect relationship shows that the t value of 1.666 with a significance value of 0.096 (sig. < 0.1), indicating that competitive advantage mediates the relationship between GSCM and firm performance (in line). Competitive advantage refers to the resources and capabilities of a company. Companies implementing GSCM, where the company pays attention to environmental impacts in its management, then the competitive advantage is required to increase firm performance.

The results of the moderation test using moderated regression analysis are shown in Table 5. The t value of moderation of board size between GSCM and competitive advantage is -0.69 with a significance value of 0.49 (sig. > 0.1), indicating that the board size is unable to moderate the relationship between GSCM and competitive advantage (not in line). The t value of moderation of board size between competitive advantage and firm performance is –1.94 with a significance value of 0.05 (sig. < 0.1), indicating that the board size can moderate the relationship between competitive advantage and firm performance, (in line). The t value of moderation of board size between GSCM and firm performance is 1.88 with a significance value of 0.06 (sig. < 0.1), indicating that the board size can moderate the relationship between GSCM and firm performance (in line).

Table 5 Moderation Test Results

	Model 3	
	FirmPerformance	CA
GSCM	-0.026	40.063**
	(0.72)	(2.12)
CA	0.000***	
	(3.07)	
BS	-0.002	-1.206
	(-0.78)	(-1.00)
GSCM*BS	0.008*	-1.531
	(1.88)	(-0.69)
CA*BS	-0.000*	
	(-1.94)	
_cons	0.114	20.195
	(3.81)	(1.24)
r2	0.029	0.011
r2_a	0.019	0.005
N	516	516

The role of the board size highly determines the decision making in a company. In this study, the board size cannot moderate the relationship between GSCM and competitive advantage. Larger board size will exacerbate the coordination issues of internal resource allocation (Hazarika & Zhang, 2019) so that it will not have the effect of increasing competitive advantage. However, on the contrary, the board size can moderate the relationship between competitive advantage with firm performance and GSCM with firm performance. It shows that the greater the number of board sizes, the more decisions that will be made to improve firm performance.

The implications for PROPER companies are relevant. Firm performance can be achieved by understanding the application of GSCM. However, in this application, it is not easy to implement so that the company's readiness is required to implement GSCM. Likewise, the involvement of competitive advantage is needed in implementing GSCM because it can provide satisfaction and increase customer trust. Policy

implementation of GSCM serves as a driver to improve competitive advantage that strengthens firm performance.

CONCLUSION

This study investigated the relationship between GSCM and firm performance using the mediating roles of competitive advantage and board size moderation, where this scope has received only a little attention by researchers. Based on the discussion and the findings described above, the GSCM has a significant effect on competitive advantage, while competitive advantage has a significant effect on firm performance. Meanwhile, GSCM has no significant effect on firm performance. Here, competitive advantage can mediate the relationship between GSCM and firm performance. It shows that competitive advantage has a crucial role for companies that implement GSCM to improve firm performance. The moderating role of board size is unable to moderate the relationship between GSCM and competitive advantage, but it can moderate the relationship between competitive advantage and firm performance and GSCM with firm performance. The board size in this study can prove that it can improve firm performance with the decision to implement GSCM and competitive advantage. Board size has a significant role in company management to pay more attention to environmental impacts and apply "green" to the company. The results of this study are utilized to improve firm performance for companies that pay attention to environmental impacts. The research findings provide a very large contribution to the theory and enrich the latest research on GSCM and firm performance with competitive advantage as the mediating variable. The limitation of this research are the use of companies listed in PROPER and only implements GSCM, competitive advantage, and firm performance. Future studies need to consider performance and other green applications. In further research, variables related to consideration to environmental impacts and use other types of companies such as manufacturing or mining companies can be used.

ORCID

Maya Novitasari https://orcid.org/0000-0001-6406-9830
Ali Saleh Alshebami https://orcid.org/0000-0002-0050-5127

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