
Wiley Online Library

Corporate Social Responsibility and Environmental Management



Edited By: Prof. Richard Welford, Sasin School of Management, Bangkok

Impact factor (2021): 8.464

Journal Citation Reports (Clarivate, 2022): 33/155 (Business) 12/127 (Environmental Studies) 37/226 (Management)

Online ISSN: 1535-3966

© ERP Environment and John Wiley & Sons Ltd

[HOME](#)

[ABOUT](#) ▼

[CONTRIBUTE](#) ▼

[BROWSE](#) ▼

[ASSOCIATED TITLES](#) ▼

Editorial Board

EDITOR

Prof. Richard Welford, Sasin School of Management, Bangkok

EDITORIAL BOARD

Dr Samuel Adomako, University of Bradford, UK
Bruce Erik Bergstrom, Hang Seng Management College, Hong Kong
Sara Bice, The University of Melbourne, Australia
Dr Margaret Brunton, Massey University, New Zealand
Dr Pontus Cerin, University of Umeå, Sweden
Assoc.Prof Ching-Hsun Chang, National Taiwan Normal University, Taiwan
Prof. Jo Crotty, Edge Hill University, UK
Assoc. Prof. Nicola Cucari, Sapienza University of Rome, Italy
Prof. Rosa Maria Dangelico, Sapienza University of Rome
Prof. Peter Dobers, Södertörn University, Sweden
Dr Bob Doherty, Liverpool Hope University, UK
Assoc. Prof. Paolo Esposito, University of Sannio, Italy
Professor Gabriel Eweje, Massey University, New Zealand
Prof. Dr. Matthias Fifka, University of Erlangen-Nuremberg, Germany
Dr Yu Gong, University of Southampton, UK
Prof. Andy Gouldson, University of Leeds, UK
Diane Holt, University of Essex, UK
Prof. Barbara Iannone, "Gabriele d'Annunzio" University of Chieti-Pescara, Italy
Prof. Dima Jamali, American University of Beirut, Lebanon
Dr Matthew Johnson, University of Hamburg, Germany
Prof. Mee Kam Ng, The Chinese University of Hong Kong
Dr Deanna Kemp, University of Queensland, Australia
Dr Tarja Ketola, University of Vaasa, Finland
Assoc. Prof. Paolo Landoni, Politecnico di Torino University, Italy
Prof. Ki-Hoon Lee, Griffith Business School, Australia
Zhongju Liao, Zhejiang Sci-Tech University, China
Prof. Lassi Linnanen, Lappeenranta University of Technology, Finland
Dr David Littlewood, University of Sheffield, UK
Prof. Rosa Lombardi, Sapienza University of Rome, Italy
Dr Rodrigo Lozano, University of Gävle, Sweden
Prof. Hualiang Lu, Nanjing University of Finance & Economics, China
Prof. Maria Mazzuca, University of Calabria, Italy
Prof. Chiara Mio, Ca' Foscari University of Venice, Italy
Prof. Marc Orlitzky, University of South Australia Business School, Australia
John Owen, University of Queensland, Australia
Dr Rajat Panwar, Appalachian State University, USA
Prof. Jose A. Plaza-Úbeda, University of Almería, Spain
Dr Cheryl Rodgers, University of Portsmouth, UK
Dr Arunaditya Sahay, Birla Institute of Management Technology, India
Prof. Bert Scholtens, University of Groningen, Netherlands
Prof. Dr Stefan Schaltegger, University of Lüneburg, Germany
Dr Peter Strachan, The Robert Gordon University, UK
Dr Rory Sullivan, University of Leeds, UK
Dr Takuya Takahashi, University of Shiga Prefecture, Japan
Dr Mohammad Talha, Prince Mohammad Bin Fahd University, Saudi Arabia
Dr David Tappin, Massey University, New Zealand
Associate Professor Francesco Testa, Sant'Anna School of Advanced Studies, Italy

RESEARCH ARTICLES

Does corporate environmental responsibility contribute to financial performance? A dual path analysis through operational efficiency and the cost of debt

Lan Gao, Liang Wan

- Version of Record online: 17 August 2022

<https://doi.org/10.1002/csr.2356>

- [Abstract](#)
- [Full text](#)
- [PDF](#)
- [References](#)
- [Request permissions](#)

Longer board tenure and audit committee tenure. How do they impact environmental performance? A European study

Francesco Paolone, Matteo Pozzoli, Nicola Cucari, Rosario Bianco

- Version of Record online: 16 August 2022

<https://doi.org/10.1002/csr.2359>

- [Abstract](#)
- [Full text](#)
- [PDF](#)
- [References](#)
- [Request permissions](#)

Institutional and stakeholder pressures on organisational performance and green human resources management

Luca Marrucci, Tiberio Daddi, Fabio Iraldo

- Version of Record online: 16 August 2022

<https://doi.org/10.1002/csr.2357>

- [Abstract](#)
- [Full text](#)
- [PDF](#)
- [References](#)
- [Request permissions](#)

Open Access

A need for assurance: Do internal control systems integrate environmental, social, and governance factors?

Murad Harasheh, Roberta Provasi

- Version of Record online: 16 August 2022

<https://doi.org/10.1002/csr.2361>

- [Abstract](#)
- [Full text](#)
- [PDF](#)
- [References](#)
- [Request permissions](#)

Open Access

Sustainable service ecosystems from the transformative value perspective: A study in tourism destinations

Miguel Ángel Moliner-Tena, Diego Monferrer-Tirado, Marta Estrada-Guillén, Lidia Vidal-Meliá

- Version of Record online: 16 August 2022

<https://doi.org/10.1002/csr.2358>

- [Abstract](#)
- [Full text](#)
- [PDF](#)
- [References](#)
- [Request permissions](#)

Open Access

Does a country's environmental policy affect the value of small and medium sized enterprises liquidity in the energy sector?

Tiziana La Rocca, Maurizio La Rocca, Francesco Fasano, Alfio Cariola

- Version of Record online: 12 August 2022

<https://doi.org/10.1002/csr.2354>

- [Abstract](#)
- [Full text](#)
- [PDF](#)
- [References](#)
- [Request permissions](#)

How does multi-agent govern corporate greenwashing? A stakeholder engagement perspective from “common” to “collaborative” governance

Wei Wang, Ziyuan Sun, Weixing Zhu, Lin Ma, Yuting Dong, Xiao Sun, Fengzhi Wu

- Version of Record online: 10 August 2022

<https://doi.org/10.1002/csr.2355>

- [Abstract](#)
- [Full text](#)
- [PDF](#)

RESEARCH ARTICLE

Corporate social responsibility and firm performance: Green supply chain management as a mediating variable

Maya Novitasari¹ | Anggita Langgeng Wijaya¹ | Nindya Mariana Agustin¹ |
Ardi Gunardi² | Leo-Paul Dana³

¹Faculty of Economics and Business,
Universitas PGRI Madiun, Madiun, Indonesia

²Faculty of Economics and Business,
Universitas Pasundan, Bandung, Indonesia

³Rowe School of Business, Dalhousie
University, Halifax, Canada

Correspondence

Ardi Gunardi, Faculty of Economics and
Business, Universitas Pasundan, Jl. Tamansari
No. 6-8 Bandung 40116, Indonesia.
Email: ardigunardi@unpas.ac.id

Abstract

The objective of this study is to test the impact between corporate social responsibility and firm performance using green supply chain management as mediation. The type of this study is quantitative research, using purposive method sampling with 211 PROPER corporates listed in the 2015–2019 period. The study data were obtained from the Indonesia Stock exchange market. The study resulted in an indication of the positive effect of corporate social responsibility implementation on green supply chain management, the firm performance benefits positively from green supply chain management, corporate social responsibility has a positive effect on firm performance and green supply chain management can be a mediating variable between corporate social responsibility and firm performance. Corporates in Indonesia are faced with pressure from stakeholders regarding their environmental impact. This could push the application of corporate social responsibility and green supply chain management in Indonesian corporates to increase their firm performance.

KEYWORDS

corporate social responsibility, green supply chain management, firm performance, PROPER firms, path analysis

1 | INTRODUCTION

The Indonesian government issued a corporate social responsibility regulation. Corporate social responsibility is a corporate commitment to improving the continuous economy which increases the quality of life and environment that benefits the corporate and the public (UU No. 40 Tahun 2007, 2007). The government regulate the implementation of corporate social responsibility to increase awareness, fulfill the legal development need and reinforce the other regulation regarding social responsibility and the environment in Indonesia (PP No. 47 Tahun 2012, 2012). Then the implementation of corporate social responsibility is written in the corporate report. With internal and external pressure, the corporate social relation with society and the environment can create environmental development that benefits the firm performance (Maji et al., 2020). Thus, corporate social

responsibility and green supply chain management can increase firm performance.

The increase in corporate impact on society and environmental awareness make corporate social responsibility an important aspect of a corporate (Amran et al., 2017). There are a few methods to realize corporate social responsibility, including helping the supplier to develop products and using environment-friendly technology and process (Agan et al., 2016). Corporates that actively implement corporate social responsibility activities could become the best-performing companies (Martinez-Conesa et al., 2017). Green supply chain management is a corporate supply network that considers the environment and social impact. Corporates tend to benefit from the application of green supply chain management when they consider it as a main selling value and implement it in the corporation (Choi et al., 2017). This is because the green supply chain management implementation has a

significant impact on the environment, social, operation, and economic performance (Qorri et al., 2018).

There is a previous study discussing corporate social responsibility's effect on firm performance (Kuo et al., 2021; Okafor et al., 2021) but, there is a deviation in the corporate social responsibility and firm performance study results (Hu et al., 2021; Ikram et al., 2020). Corporate social responsibility has a positive effect on firm performance. This signifies that the corporate social responsibility program could act as a corporate decision-making strategy in its social and environmental responsibility to increase the firm performance (Kong et al., 2020; Wei et al., 2020; Yeon et al., 2021). The opposing results that state that corporate responsibility does not signify firm performance shows that implementing the corporate social responsibility as a social duty needs extra cost and this will worsen the firm performance that leads to a "competitive disadvantage" (Riyadh et al., 2019; Yoon & Chung, 2018). There is a positive relationship between corporate social responsibility and green supply chain management in corporate social responsibility implementation. A corporation that is actively involved in ecological care for green supply chain management practice that collaborates with suppliers and customers (Wang et al., 2020; Xu et al., 2022) shows that green supply chain management has a positive impact on firm performance. Green supply chain management can develop a unique ability that leads to competitive supremacy and increases firm performance (Bu et al., 2020; Zhu et al., 2017). The goals of this study are to empirically prove that corporate social responsibility can increase the green supply chain management implementation in order to resolve the environmental effect and increase firm performance. Thus, increasing the importance of corporate social responsibility and green supply chain management implementation is essential because it benefits the firm performance.

This research is to test the direct and indirect relationship between corporate social responsibility, green supply chain management, and firm performance. Green supply chain management is used as a mediating variable in corporate social responsibility's impact on its firm performance. A company that involves social responsibility allows its management to increase its social image and set its performance standard higher for the company management (Naseem et al., 2020). Companies tend to get less pressure from the stakeholder when the corporate social responsibility is implemented, this allows the green supply chain management to be realized (Sarkis et al., 2011; Wolf, 2014). Green supply chain management benefits the firm performance, especially in the environmental aspect that can be realized from operational and economic performance (Fang & Zhang, 2018). This study can answer: (1) Does corporate social responsibility and green supply chain management have a positive impact on firm performance? (2) Does corporate social responsibility have a positive impact on green supply chain management? (3) Does green supply chain management could mediate the relationship between corporate social responsibility and firm performance? This research used PROPER (Companies Performance Rating Program) companies that are listed on the Indonesia Stock Exchange Market (IDX) in the 2015–2019 period. PROPER is an Indonesia Ministry of Environment policy tool that intends to increase companies' environment management and awareness policy.

This research contributes to the corporate environment and social responsibility with its corporate and green supply chain management implementation to increase its firm performance. Corporate social responsibility is external and internal corporate social and environmental duty using continuous economic development means. Meanwhile, green supply chain management is a corporate supply network that considers the health and environment aspect as its basis. The study intends to increase corporate environment and social responsibility with green supply chain management implementation to increase firm performance. This study uses PROPER companies listed on the Indonesia Stock Exchange. Because companies listed on the Indonesia Stock Exchange show those that are large in scale when compared to other companies, they can make comparisons between one company and another.

2 | LITERATURE REVIEW

2.1 | Corporate social responsibility

Corporate social responsibility is a company management duty that extends from increasing company profit with regard to the social and human aspects. Corporate social responsibility is a corporation concept that integrates three elements which include social, environmental, and economic on company business operation and stakeholder interaction (Chouaibi, Chouaibi, & Rossi, 2022). Corporate social responsibility is continuous means for a corporation to achieve social reputation and company accountability with an effective report to increase company transparency for its stakeholder (Mohd-Said et al., 2018). Corporate social responsibility can increase corporate internal management welfare using the company's short-term profitability and increase market value using good reputation and customer loyalty (Price & Sun, 2017; Yoon & Chung, 2018). Corporate social responsibility could also increase company profit through relative pressure and evaluation activity (Jia, 2020; Saha et al., 2020). Corporate social responsibility as a corporation's social and environmental duty should be responsible to society and the environment in all products, and services that involve workers, customers, community environment and stakeholders (Fuji et al., 2013).

2.2 | Green supply chain management

Green supply chain management could be defined as the business integration process of company management using a collaboration between partners, supply networks, and other stakeholders. Demand to respond to the environment from the stakeholder makes the company tends to involve with green supply chain management implementation to achieve legitimation, support and resources from stakeholders (Bu et al., 2020). Green supply chain management is an integration of environment-friendly initiatives into all chain supply network activity. Not only integrates the manufacturing process and distribution to customers, but it also involves sourcing, product



design, product development, manufacture, transport, packaging, collection, disposal and after-sale services, and includes its post-wear product management (Chiu & Hsieh, 2016; Min & Kim, 2012). Resource and energy efficiency, waste reduction and less packaging usage are a few corporate activities in an environment-friendly process that help the company develop its environmental performance. This allows for production cost reduction and increases the company's resource efficiency (Yildiz Çankaya & Sezen, 2019).

2.3 | Firm performance

Firm performance is a reflection of a company's abilities in its profit accumulation activity. Firm performance increase is an important factor for companies to do decision-making process, policy implementation, and certain organizational practices (Yang et al., 2019; Zhu et al., 2016). It consists of asset, profit, and investment return (Minh et al., 2020). Firm performance could also show how far certain companies can achieve production, human resources, marketing, and profit purpose (Abeysekara et al., 2019). Internal management practice, especially on environmental performance and economic performance, is an efficient increase in firm performance (Fang & Zhang, 2018). Firm performance will help the investor to put their stock in the company.

2.4 | Corporate social responsibility and green supply chain management

The relationship between corporate social responsibility and green supply chain management is that corporate social responsibility implementation can consider the environment and society in strategic decision-making. This can give benefit to green supply chain management. Corporate social responsibility allows the management to do its duty for the society, environment and government through decision-making (Coluccia et al., 2016). Corporate social responsibility is an action taken by the corporate that balances the environment, social, and economic factors (Halkos & Nomikos, 2020). Corporate social responsibility has a positive impact on green supply chain management. This is because the company that adopts green supply chain management has more insight from the corporate social responsibility act (Wang et al., 2020). Green supply chain management helps the company in its capability improvement to fulfill environmental awareness, customer needs, increase the company's reputation and lessen the legal risk that is related to environmental violations (Bu et al., 2020; Chan, 2005). Corporate social responsibility is a mechanism that pushes companies to be more innovative, efficient, and effective (Martinez-Conesa et al., 2017). Based on the literature review above, the researcher proposes this hypothesis:

H1. Corporate social responsibility has a positive impact on green supply chain management.

2.5 | Green supply chain management and firm performance

The relationship between green supply chain management and firm performance is in the company's effort to preserve the nature within its supply network. It could minimize the material cost of using recyclable materials and increase the firm performance. Green supply chain management has a positive impact on firm performance, meaning that green supply chain management practice could lead the environmental performance and economic performance and increase the firm performance (Ahmed et al., 2020; Samad et al., 2021). In the means to produce a safer and cheaper product, there is a need to find and manage the relationship with environment-friendly suppliers. This is done to respond to the increase of environment-friendly products, government and society demand. (Bu et al., 2020; Khan & Qianli, 2017; Laari et al., 2016; Zhu et al., 2017). Based on these reasons, the researcher proposes this hypothesis:

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

2.6 | Corporate social responsibility and firm performance

Corporate involvement in social responsibility practice and non-monetary disclosure could contribute to increasing firm performance effectivity (Chouaibi, Rossi, et al., 2022). Corporate social responsibility has a positive impact on firm performance. This shows that corporate social responsibility practice can help the corporation in building a reputation to increase customer trust and collect support from stakeholders, thus increasing the firm performance (Hunjra et al., 2021; Maury, 2022). The application of corporate social responsibility to a corporation aims at maximum profitability because corporate social responsibility can build a positive image for the corporation so the corporate gets the public and society's trust and gets the maximum profitability (Choongo, 2017; Javeed & Lefen, 2019). Contributing to society and concerning with environmental problems are the things that must be done by managers in corporate social responsibility implementation (Jang et al., 2019). Based on the explanation, the researcher proposes this hypothesis:

H3. Corporate social responsibility has a positive impact on firm performance.

2.7 | Mediation effect of green supply chain management

There are a few prior studies that state the relationship between corporate social responsibility with firm performance but, another variable needs to be added as a mediator in the corporate social responsibility and firm performance relationship. Green supply chain

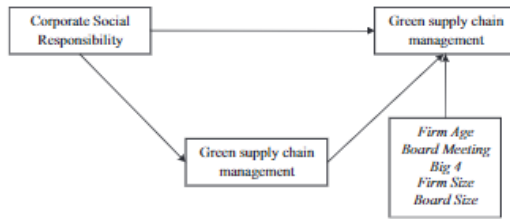


FIGURE 1 Conceptual research framework

management is a mediation variable in this research. Green supply chain management's practical implementation in corporate can be pushed by corporate social responsibility activities, such as minimizing the environment's negative impact, increasing stakeholders' internal interest, and social welfare (Wang et al., 2020). In the actual implementation, green supply chain management practice can show effective management mechanisms to achieve environmental performance and corporate economic performance from the perspective of customer relationships (Zhu et al., 2017). Based on the explanation, the researcher proposes this hypothesis:

- H4.** Green supply chain management is able to mediate the relationship between corporate social responsibility and firm performance.

3 | RESEARCH MODEL

This research focuses on corporate social responsibility, green supply chain management, and firm performance. The goals of this research are to test the direct and indirect relationship between those three variables. The conceptual frame from this research is depicted in the figure below (Figure 1).

4 | RESEARCH METHODOLOGY

4.1 | Research design

This research used quantitative methods that focus on the empirical effect of corporate social responsibility on firm performance. To test the direct relation of the variables, SPSS was used. Meanwhile, the Sobel calculator (www.quantpsy.org) was used to test the indirect relation. The data type in this research is secondary data, the sample is selected using the purposive sampling method. The population in this research is PROPER corporates that are listed on the Indonesia Stock exchange for the 2015–2019 period with a total of 211 companies. PROPER is an Indonesian environment management performance evaluation program. The data were taken from the Indonesian Stock exchange market and OSIRIS software. There are two equations used in this research, which are:

$$GSCM = \alpha_1 + \beta_1 CSR + e \quad (1)$$

$$FP = \alpha_2 + \beta_2 CSR + \beta_3 GSCM + \beta_4 FA + \beta_5 BM + \beta_6 Big4 + \beta_7 FS + \beta_8 BS + e \quad (2)$$

5 | OPERATIONAL VARIABLE DEFINITION

Firm performance is a corporation's ability in using its resource to make profits and operated as asset return (ROA) (Liu et al., 2020). In this research, ROA used as firm performance calculation ratio (Novitasari & Agustia, 2021; Novitasari et al., 2021). ROA could show performance in the corporate operation period and is expressed as (Ciftci et al., 2019):

$$ROA = \frac{EBIT}{TA}$$

where ROA, return on assets; EBIT, earnings before interest and tax; TA, total assets.

Corporate social responsibility is a continuous corporate operation in the economic, social and environment (Riyadh et al., 2019). Corporate social responsibility is done by the corporation to solve environmental and social problems (Halkos & Nomikos, 2020). In the 2015–2019 period, corporate social responsibility calculated conforms to global reporting initiative (GRI) standard (Chowdhury et al., 2021). If the corporate applies a standard report, the corporate gets 1 value point. But if the company does not apply the standard report using the GRI standard, it gets 0 value point (Vacca et al., 2020).

Green supply chain management is a practice that is adopted by the company in its operation that involves green policy, transportation, and environment-friendly sales (Laari et al., 2016). Green supply chain management is obtained from the company's annual report by using a few indicators and is calculated in ratio. The indicator that is used in this research is: (1) have ISO 9000 or ISO 1400 certificate, (2) application of green distribution and marketing, (3) the products use reverse logistic, the packaging is reusable and recyclable (4) have supplier relationship closeness, know the purchase and material criteria from the suppliers, and (5) the product quality fulfill the customer needs (Asif et al., 2020; Sharma et al., 2017; Yıldız Çankaya & Sezen, 2019).

Few of the control variable that are used in this research are firm age, board meeting, big 4, firm size dan board size. The control variable is used to prevent biased calculation results and as a controlled variable so that the influence of the independent variable on the dependent variable is not influenced by external factors that are not examined. Firm age could be calculated by using operational years as an algorithm (Ciftci et al., 2019). Board meeting is obtained from the total top management meeting that is done in a year (Eluyela et al., 2018). Big 4 accountant office is obtained by giving 1 point to



TABLE 1 Descriptive statistics

	N	Mean	Median	SD	Minimum	Maximum
FP	211	0.078	0.075	0.058	−0.115	0.235
GSC	211	0.584	0.600	0.177	0.000	1.000
CSR	211	45.858	43.000	22.069	3.000	85.000
Firm size	211	13.761	15.000	3.862	4.341	19.679
Firm age	211	3.614	3.689	0.448	1.792	4.771
Board size	211	5.085	5.000	2.564	1.000	21.000
Board meeting	211	10.052	8.000	8.663	0.000	52.000
Big4	211	0.365	0.000	0.483	0.000	1.000

TABLE 2 Pearson correlation

	FP	GSCM	CSR	Firm size	Firm age	Board size	Board meeting	Big4
FP	1.000							
GSCM	0.291*** (0.000)	1.000						
CSR	0.278*** (0.000)	0.242*** (0.000)	1.000					
Firm size	0.348*** (0.000)	0.204*** (0.003)	0.240*** (0.000)	1.000				
Firm age	−0.028 (0.685)	0.037 (0.592)	−0.039 (0.575)	0.134* (0.053)	1.000			
Board size	−0.014 (0.835)	0.234*** (0.001)	0.147** (0.033)	0.086 (0.214)	0.094 (0.176)	1.000		
Board meeting	0.102 (0.139)	0.085 (0.221)	0.058 (0.399)	0.109 (0.116)	0.030 (0.666)	0.213*** (0.002)	1.000	
Big4	0.109 (0.113)	0.058 (0.401)	0.218*** (0.001)	0.022 (0.755)	−0.075 (0.275)	0.163** (0.018)	0.001 (0.987)	1.000

***Shows 1% significant.

**Shows 5% significant.

*Shows 10% significant.

the corporate that is audited by a public accountant and 0 points for the corporate that is accounted by other accountant offices (Dinarjito & Febriansyah, 2020). Firm size is obtained by using the total corporate asset algorithm (Wang & Zhao, 2020). Board size is calculated from the commissaries that seat on corporate boards (Said et al., 2009).

6 | RESULT AND DISCUSSION

6.1 | Descriptive statistics and correlation

Table 1 shows descriptive statistics for the independent, dependent and control variables. Samples in this research use PROPER corporates that are listed on the Indonesia Stock Exchange in the 2015–2019 period. The descriptive statistic table below shows the minimum and maximum firm performance which is −0.115 and 0.235, the maximum and minimum corporate social responsibility at 3.000

and 85.000, and green supply chain management value at 0.000 and 1.000.

Table 2 shows the Pearson correlation test. The correlation between corporate social responsibility and green supply chain management is positive with 1% significant value. The correlation between green supply chain management dan firm performance is positive with 1% significant value. Correlation between corporate social responsibility and firm performance is positive with 1% significant value.

6.2 | Model 1

Model 1 in this research uses simple linear regression to test the effect of corporate social responsibility on firm performance. The simple linear regression result can be seen in Tables 3 and 4. Based on the *t* test, it can be known that corporate social responsibility on the green supply chain management is 3.61 with a significant value of

TABLE 3 Firm performance and green supply chain management regression result

	(1) GSCM	(2) Firm performance
CSR	0.002*** (3.61)	0.000*** (2.33)
GSCM		0.073* (3.34)
Firm size		0.004*** (4.20)
Firm age		0.007*** (−0.80)
Board size		0.003*** (−2.05)
Board meeting		0.001*** (1.18)
Big 4		0.009*** (1.16)
_cons	0.495 (18.12)	0.009 (−0.27)
R ²	0.0587	0.2220
Ajd R ²	0.0542	0.1962
N	211	211

***Show 1% significant.

**Show 5% significant.

*Show 10% significant.

0.000 (sig <1%). This shows that corporate social responsibility has a positive impact on green supply chain management, thus accepting the H1. The first hypothesis shows that corporate social responsibility can push green supply chain management applications. This result is linear with findings by Wang et al. (2020) that state that corporate social responsibility can give insight in the green supply chain management adoption.

6.3 | Model 2

Model 2 in this research uses twin linear regression to test the effect of the corporate social responsibility, green supply chain management, firm size, firm age, board size, board meeting dan big 4 on its firm performance. In Table 3, it can be seen that the t value for the green supply chain management variable on its firm performance is 3.34 with 0.001 (sig <5%) significant value. This shows that corporate social responsibility has a positive impact on firm performance, thus accepting the H2. This result is linear with a study by Fang and Zhang (2018) that stated that the green supply chain management application has a positive impact on the firm performance. Eco-design green supply chain management applications could increase economic performance, thus increasing the firm performance. t Test value on the corporate social responsibility on its firm performance is 2.33 with 0.021 (sig <5%) significant value. This shows that corporate social

responsibility has a positive impact on the firm performance, thus H3 is accepted. This finding is linear with a study by Choongo (2017) that stated that the firm performance can be increased through corporate social responsibility activities, such as workers' training and development to increase workers' commitment to the corporation. The firm size control variable with a t test value of 4.20 with 0.000 significant value (sig <1%) shows that firm size has a positive impact on its firm performance. Firm age has t test value of −0.80 with significant value at 0.422 (sig >10%). This shows that firm age does not affect the firm performance. Board size has t test value of −2.05 with 0.041 significant value (sig <5%). This shows that board size has a positive impact on firm performance. Board meeting has t test value of 1.18 with 0.240 significant value (sig >5%). This shows that board meeting does not affect the firm performance. Big 4 has t test value at 1.16 with 0.246 significant value (sig >5%). This shows that the big 4 does not affect firm performance.

6.4 | Mediation effect

The mediation test for this research can be seen in Table 5. The indirect relation in Table 5 shows that the t value is 2.48 with a significant value of 0.013 (sig <5%). This shows that green supply chain management can mediate the relationship between corporate social responsibility on firm performance, thus, H4 is accepted. This result is linear with a study by Wang et al. (2020) and it can be interpreted that the corporate social responsibility activities can increase green supply chain management and result in better firm performance.

7 | CONCLUSION, IMPLICATION, LIMITATION, AND FUTURE RESEARCH

This study examines the direct and indirect impact of corporate social responsibility, green supply chain management and firm performance. The result obtained from this research, in the first hypothesis is a positive impact of corporate social responsibility on green supply chain management. Corporate social responsibility can increase corporate social duty to minimize environmental pollution and support the green supply chain management activities. This is in line with a study by Huang et al. (2021) that stated that corporate social responsibility can motivate the companies in their environment management to improve their green supply chain management activities.

The second hypothesis states that green supply chain management has a positive impact on firm performance. Green supply chain management can allow the corporate to better use its resource in resolving the environmental problem. These can give a better impression to the customer of the firm performance. This is in accordance with studies by Bag et al. (2021) and Jiang et al. (2020) that stated that green supply chain management consists of the elements of the sustainable environment, such as green purchasing, green distribution, green consumption and recycling of resources that can increase firm performance.

TABLE 4 Hypothesis test result

		Regression coefficient	t value	p value	Note
H1	CSR → GSCM	0.0026198	3.61	0.000***	Positive impact
H2	GSC → FP	0.0729149	3.34	0.001***	Positive impact
H3	CSR → FP	0.0004124	2.33	0.021**	Positive impact
H4	CSR → GSCM → FP	0.0001414	2.48	0.013**	Positive impact

***Show 1% significant.

**Show 5% significant.

*Show 10% significant.

TABLE 5 Mediation test result

	Input	Test statistic	SE	p value
a	0.0001414	2.48	0.000057	0.013
b				
Sa				
Sb				

The third hypothesis shows that corporate social responsibility has a positive impact on firm performance. A corporation that adopts corporate social responsibility can use this as a strategy to promote its corporate reputation to the stakeholders and this will increase the firm performance. This result is linear with studies by Pham and Tran (2020), Sardana et al. (2020). Corporate social responsibility practice can give a better impression of the stakeholders' expectations and push the firm performance.

The research result that shown by the fourth hypothesis is green supply chain management is able to mediate corporate social responsibility's effect on the firm performance. Green supply chain management can help the corporation to minimize the environmental impact on its chain supply process. This shows that corporate social responsibility is a part of green supply chain management to help corporations take a decision on their social and economic duty by paying attention to the environmental aspect in order to increase firm performance (Balon, 2020; Jawaad & Zafar, 2020).

There is a theory implication in the study result. First, there is a finding that gives an answer to the research question and enriches a literary about corporate social responsibility. This research also improves literature about corporate social responsibility and green supply chain management by finding a positive impact of corporate social responsibility on green supply chain management. On one side, the study results prove that corporate social responsibility activities can become a solution in environmental management that helps green supply chain application. This expands corporate social responsibility value as a solution in environment management practice on whole chain supply. Second, the study proves that green supply chain management yields a positive impact on firm performance. The results of this study show that, in pursuing firm performance, a strategic environment alignment as a green solution is the potential in bringing economic benefits.

The managerial implication in this study gives answer that corporate social responsibility can help the corporate in applying green

supply chain management. The corporate must run its corporate social responsibility practice wisely. Corporate social responsibility can be a tool to manage the environment of the chain supply, thus improving their green supply chain management practice. Green supply chain management practice can align its green strategy to increase its reputation and customer satisfaction. Thus, the manager must be aware of the importance of corporate social responsibility to pursue green supply chain management to increase firm performance.

This research has several limitations: first, only PROPER corporations in Indonesia were used as data where PROPER itself is an environmental company management rank system. Second, this research only used PROPER corporations that are listed on the Indonesia Stock exchange market in the 2015–2019 period. Third, this research only analyzed corporate social responsibility, firm performance and green supply chain management. It is recommended for the next researchers to consider performance and other green applications, such as green innovation, green purchasing, and so forth. Also, future research should consider another kind of corporation and lengthen the research periods.


ACKNOWLEDGMENTS

We appreciate the time and effort to review. The comments are extremely helpful for us to revise this paper. Please deliver our sincere thanks to the reviewers for their valuable time to review the paper extensively and suggest the necessary corrections.

ORCID

Maya Novitasari  <https://orcid.org/0000-0001-6406-9830>

Ardi Gunardi  <https://orcid.org/0000-0002-0372-7067>

Leo-Paul Dana  <https://orcid.org/0000-0002-0806-1911>

REFERENCES

- Abeysekara, N., Wang, H., & Kuruppuarachchi, D. (2019). Effect of supply-chain resilience on firm performance and competitive advantage: A study of the Sri Lankan apparel industry. *Business Process Management Journal*, 25(7), 1673–1695. <https://doi.org/10.1108/BPMJ-09-2018-0241>
- Agan, Y., Kuzey, C., Acar, M. F., & Açıkgöz, A. (2016). The relationships between corporate social responsibility, environmental supplier development, and firm performance. *Journal of Cleaner Production*, 112, 1872–1881. <https://doi.org/10.1016/j.jclepro.2014.08.090>
- Ahmed, W., Najmi, A., & Khan, F. (2020). Examining the impact of institutional pressures and green supply chain management practices on firm performance. *Management of Environmental Quality: An International Journal*, 31(5), 1261–1283.

- Amran, A., Fauzi, H., Purwanto, Y., Darus, F., Yusoff, H., Zain, M. M., Naim, D. M. A., & Nejadi, M. (2017). Social responsibility disclosure in Islamic banks: A comparative study of Indonesia and Malaysia. *Journal of Financial Reporting and Accounting*, 15(1), 99–115. <https://doi.org/10.1108/JFRA-01-2015-0016>
- Asif, M. S., Lau, H., Nakandala, D., Fan, Y., & Hurriyet, H. (2020). Adoption of green supply chain management practices through collaboration approach in developing countries—From literature review to conceptual framework. *Journal of Cleaner Production*, 276, 124191. <https://doi.org/10.1016/j.jclepro.2020.124191>
- Bag, S., Gupta, S., Kumar, S., & Sivarajah, U. (2021). Role of technological dimensions of green supply chain management practices on firm performance. *Journal of Enterprise Information Management*, 34(1), 1–27.
- Balon, V. (2020). Green supply chain management: Pressures, practices, and performance—An integrative literature review. *Business Strategy and Development*, 3(2), 226–244. <https://doi.org/10.1002/bsd2.91>
- Bu, X., Dang, W. V. T., Wang, J., & Liu, Q. (2020). Environmental orientation, green supply chain management, and firm performance: Empirical evidence from Chinese small and medium-sized enterprises. *International Journal of Environmental Research and Public Health*, 17(4), 1199. <https://doi.org/10.3390/ijerph17041199>
- Chan, R. Y. K. (2005). Does the natural-resource-based view of the firm apply in an emerging economy? A survey of foreign invested enterprises in China. *Journal of Management Studies*, 42(3), 625–672.
- Chiu, J. Z., & Hsieh, C. C. (2016). The impact of restaurants' green supply chain practices on firm performance. *Sustainability (Switzerland)*, 8(1), 1–14. <https://doi.org/10.3390/su8010042>
- Choi, S. B., Min, H., Joo, H. Y., & Choi, H. B. (2017). Assessing the impact of green supply chain practices on firm performance in the Korean manufacturing industry. *International Journal of Logistics Research and Applications*, 20(2), 129–145. <https://doi.org/10.1080/13675567.2016.1160041>
- Choongo, P. (2017). A longitudinal study of the impact of corporate social responsibility on firm performance in SMEs in Zambia. *Sustainability (Switzerland)*, 9(8), 1300. <https://doi.org/10.3390/su9081300>
- Chouaibi, S., Chouaibi, J., & Rossi, M. (2022). ESG and corporate financial performance: The mediating role of green innovation: UK common law versus Germany civil law. *EuroMed Journal of Business*, 17(1), 46–71. <https://doi.org/10.1108/EMJB-09-2020-0101>
- Chouaibi, S., Rossi, M., Siggia, D., & Chouaibi, J. (2022). Exploring the moderating role of social and ethical practices in the relationship between environmental disclosure and financial performance: Evidence from ESG companies. *Sustainability (Switzerland)*, 14(1), 1–17. <https://doi.org/10.3390/su14010209>
- Chowdhury, E. H., Rambaree, B. B., & Macassa, G. (2021). CSR reporting of stakeholders' health: Proposal for a new perspective. *Sustainability (Switzerland)*, 13(3), 1–10. <https://doi.org/10.3390/su13031133>
- Ciftci, I., Tatoglu, E., Wood, G., Demirbag, M., & Zaim, S. (2019). Corporate governance and firm performance in emerging markets: Evidence from Turkey. *International Business Review*, 28(1), 90–103. <https://doi.org/10.1016/j.ibusrev.2018.08.004>
- Coluccia, D., Fontana, S., & Solimene, S. (2016). Disclosure of corporate social responsibility: A comparison between traditional and digital reporting. An empirical analysis on Italian listed companies. *International Journal of Managerial and Financial Accounting*, 8(3–4), 230–246. <https://doi.org/10.1504/IJMAFA.2016.081854>
- Dinarjito, A., & Febriansyah, L. (2020). Analysis of the effect of public accounting firms reputation on audit quality. *International Journal of Scientific and Technology Research*, 9(1), 1787–1797.
- Eluyela, D. F., Akintimehin, O. O., Okere, W., Ozordi, E., Osuma, G. O., Ilgoh, S. O., & Oladipo, O. A. (2018). Board meeting frequency and firm performance: Examining the nexus in Nigerian deposit money banks. *Heliyon*, 4, 1–14. <https://doi.org/10.1016/j.heliyon.2018.000850>
- Fang, C., & Zhang, J. (2018). Performance of green supply chain management: A systematic review and meta analysis. *Journal of Cleaner Production*, 183, 1064–1081. <https://doi.org/10.1016/j.jclepro.2018.02.171>
- Fuzi, N. M., Habidin, N. F., Desa, A. F. N. C., Zamri, F. I. M., & Hibadullah, S. N. (2013). Corporate social responsibility practices, ISO 26000 efforts and CSR performance in Malaysian automotive industry. *International Journal of Managerial and Financial Accounting*, 5(3), 277. <https://doi.org/10.1504/ijmfa.2013.058550>
- Halkos, G., & Nomikos, S. (2020). Corporate social responsibility: Trends in global reporting initiative standards. *Economic Analysis and Policy*, 69, 106–117. <https://doi.org/10.1016/j.eap.2020.11.008>
- Hu, Q., Zhu, T., Lin, C. L., Chen, T., & Chin, T. (2021). Corporate social responsibility and firm performance in China's manufacturing: A global perspective of business models. *Sustainability (Switzerland)*, 13(4), 1–17. <https://doi.org/10.3390/su13042388>
- Huang, X., Yang, S., & Shi, X. (2021). How corporate social responsibility and external stakeholder concerns affect green supply chain cooperation among manufacturers: An interpretive structural modeling analysis. *Sustainability (Switzerland)*, 13(5), 1–17. <https://doi.org/10.3390/su13052518>
- Hunjra, A. I., Boubaker, S., Arunachalam, M., & Mehmood, A. (2021). How does CSR mediate the relationship between culture, religiosity and firm performance? *Finance Research Letters*, 39, 1–12. <https://doi.org/10.1016/j.frl.2020.101587>
- Ikram, M., Sroufe, R., Mohsin, M., Solangi, Y. A., Shah, S. Z. A., & Shahzad, F. (2020). Does CSR influence firm performance? A longitudinal study of SME sectors of Pakistan. *Journal of Global Responsibility*, 11(1), 27–53. <https://doi.org/10.1108/JGR-12-2018-0088>
- Jang, S. S., Ko, H., Chung, Y., & Woo, C. (2019). CSR, social ties and firm performance. *Corporate Governance*, 19(6), 1310–1323. <https://doi.org/10.1108/CG-02-2019-0068>
- Javeed, S. A., & Lefen, L. (2019). An analysis of corporate social responsibility and firm performance with moderating effects of CEO power and ownership structure: A case study of the manufacturing sector of Pakistan. *Sustainability (Switzerland)*, 11(1), 1–25. <https://doi.org/10.3390/su11010248>
- Jawaad, M., & Zafar, S. (2020). Improving sustainable development and firm performance in emerging economies by implementing green supply chain activities. *Sustainable Development*, 28(1), 25–38. <https://doi.org/10.1002/sd.1962>
- Jia, X. (2020). Corporate social responsibility activities and firm performance: The moderating role of strategic emphasis and industry competition. *Corporate Social Responsibility and Environmental Management*, 27(1), 65–73. <https://doi.org/10.1002/csr.1774>
- Jiang, S., Zhaojun, H., & Baofeng, H. (2020). Patterns of IT use: The impact on green supply chain management and firm performance. *Industrial Management and Data Systems*, 120(5), 825–843.
- Khan, S. A. R., & Qianli, D. (2017). Impact of green supply chain management practices on firms' performance: An empirical study from the perspective of Pakistan. *Environmental Science and Pollution Research*, 24, 16829–16844. <https://doi.org/10.1007/s11356-017-9172-5>
- Kong, Y., Antwi-Adjei, A., & Bawuah, J. (2020). A systematic review of the business case for corporate social responsibility and firm performance. *Corporate Social Responsibility and Environmental Management*, 27(2), 444–454. <https://doi.org/10.1002/csr.1838>
- Kuo, T. C., Chen, H. M., & Meng, H. M. (2021). Do corporate social responsibility practices improve financial performance? A case study of airline companies. *Journal of Cleaner Production*, 310, 1–13. <https://doi.org/10.1016/j.jclepro.2021.127380>
- Laari, S., Töyli, J., Solakivi, T., & Ojala, L. (2016). Firm performance and customer-driven green supply chain management. *Journal of Cleaner Production*, 112, 1960–1970. <https://doi.org/10.1016/j.jclepro.2015.06.150>

- Liu, Y., Lei, L., & Buttner, E. H. (2020). Establishing the boundary conditions for female board directors' influence on firm performance through CSR. *Journal of Business Research*, 121, 112–120. <https://doi.org/10.1016/j.jbusres.2020.08.026>
- Maji, S. G., De, U. K., & Gunardi, A. (2020). Simultaneous association between quality of corporate environmental performance and financial performance: Evidence from select Asian countries. *Indonesian Journal of Sustainability Accounting and Management*, 4(1), 78–92. <https://doi.org/10.28992/ijSAM.v4i1.206>
- Martinez-Conesa, I., Soto-Acosta, P., & Palacios-Manzano, M. (2017). Corporate social responsibility and its effect on innovation and firm performance: An empirical research in SMEs. *Journal of Cleaner Production*, 142, 2374–2383. <https://doi.org/10.1016/j.jclepro.2016.11.038>
- Maury, B. (2022). Strategic CSR and firm performance: The role of prospector and growth strategies. *Journal of Economics and Business*, 118, 1–16. <https://doi.org/10.1016/j.jeconbus.2021.106031>
- Min, H., & Kim, I. (2012). Green supply chain research: Past, present, and future. *Logistics Research*, 4(1–2), 39–47. <https://doi.org/10.1007/s12159-012-0071-3>
- Minh, N. N., Loc, N. D., & Author, C. (2020). The moderating effect of green supply chain management: Evidence from, 7(19), 2823–2832.
- Mohd-Said, R., Shen, L. T., Nahar, H. S., & Senik, R. (2018). Board compositions and social reporting: Evidence from Malaysia. *International Journal of Managerial and Financial Accounting*, 10(2), 128–143. <https://doi.org/10.1504/IJMAFA.2018.091661>
- Naseem, T., Shahzad, F., Asim, G. A., Rehman, I. U., & Nawaz, F. (2020). Corporate social responsibility engagement and firm performance in Asia Pacific: The role of enterprise risk management. *Corporate Social Responsibility and Environmental Management*, 27(2), 501–513. <https://doi.org/10.1002/csr.1815>
- 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. <https://doi.org/10.28992/ijSAM.v5i1.246>
- Okafor, A., Adusei, M., & Adeleye, B. N. (2021). Corporate social responsibility and financial performance: Evidence from U.S. tech firms. *Journal of Cleaner Production*, 292, 1–11. <https://doi.org/10.1016/j.jclepro.2021.126078>
- Pham, H. S. T., & Tran, H. T. (2020). CSR disclosure and firm performance: The mediating role of corporate reputation and moderating role of CEO integrity. *Journal of Business Research*, 120, 127–136. <https://doi.org/10.1016/j.jbusres.2020.08.002>
- PP No. 47 Tahun 2012. (2012). Peraturan Pemerintah Republik Indonesia Nomor 47 Tahun 2012 Tentang Tanggung Jawab Sosial Dan Lingkungan Perseroan Terbatas.
- Price, J. M., & Sun, W. (2017). Doing good and doing bad: The impact of corporate social responsibility and irresponsibility on firm performance. *Journal of Business Research*, 80, 82–97. <https://doi.org/10.1016/j.jbusres.2017.07.007>
- Qorri, A., Mujkić, Z., Gashi, S., & Kraslawski, A. (2018). Green supply chain management practices and company performance: A meta-analysis approach. *Procedia Manufacturing*, 17, 317–325. <https://doi.org/10.1016/j.promfg.2018.10.052>
- Riyadh, H. A., Sukoharsono, E. G., & Alfaiza, S. A. (2019). The impact of corporate social responsibility disclosure and board characteristics on corporate performance. *Cogent Business and Management*, 6(1), 1–18. <https://doi.org/10.1080/23311975.2019.1647917>
- Saha, R., Cerchione, R., Singh, R., & Dahiya, R. (2020). Effect of ethical leadership and corporate social responsibility on firm performance: A systematic review. *Corporate Social Responsibility and Environmental Management*, 27(2), 409–429. <https://doi.org/10.1002/csr.1824>
- Said, R., Zainuddin, Y., & Haron, H. (2009). The relationship between corporate social responsibility disclosure and corporate governance characteristics in Malaysian public listed companies. *Social Responsibility Journal*, 5(2), 212–226. <https://doi.org/10.1108/1747110910964496>
- Samad, S., Nilashi, M., Almulhi, A., Alrizq, M., Alghamdi, A., Mohd, S., Ahmadi, H., & Azhar, S. N. F. S. (2021). Green supply chain management practices and impact on firm performance: The moderating effect of collaborative capability. *Technology in Society*, 67, 1–11. <https://doi.org/10.1016/j.techsoc.2021.101766>
- Sardana, D., Gupta, N., Kumar, V., & Terziovski, M. (2020). CSR 'sustainability' practices and firm performance in an emerging economy. *Journal of Cleaner Production*, 258, 120766. <https://doi.org/10.1016/j.jclepro.2020.120766>
- Sarkis, J., Zhu, Q., & Lai, K. H. (2011). An organizational theoretic review of green supply chain management literature. *International Journal of Production Economics*, 130(1), 1–15. <https://doi.org/10.1016/j.ijpe.2010.11.010>
- Sharma, V. K., Chandna, P., & Bhardwaj, A. (2017). Green supply chain management related performance indicators in agro industry: A review. *Journal of Cleaner Production*, 141, 1194–1208. <https://doi.org/10.1016/j.jclepro.2016.09.103>
- UU No. 40 Tahun 2007. (2007). Undang-Undang Republik Indonesia Nomor 40 Tahun 2007 Tentang Perseroan Terbatas.
- Vacca, A., Iazzi, A., Vrontis, D., & Falt, M. (2020). The role of gender diversity on tax aggressiveness and corporate social responsibility: Evidence from Italian listed companies. *Sustainability (Switzerland)*, 12(5), 2007. <https://doi.org/10.3390/su12052007>
- Wang, C., Zhang, Q., & Zhang, W. (2020). Corporate social responsibility, green supply chain management and firm performance: The moderating role of big data analytics capability. *Research in Transportation Business & Management*, 37, 100557. <https://doi.org/10.1016/j.rtbm.2020.100557>
- Wang, J. X., & Zhao, M. Z. (2020). Economic impacts of ISO 14001 certification in China and the moderating role of firm size and age. *Journal of* [su12187545](https://doi.org/10.2187545)
- Wolf, J. (2014). The relationship between sustainable supply chain management, stakeholder pressure and corporate sustainability performance. *Journal of Business Ethics*, 119(3), 317–328. <https://doi.org/10.1007/s10551-012-1603-0>
- Xu, J., Yu, Y., Wu, Y., Zhang, J. Z., Liu, Y., Cao, Y., & Eachempati, P. (2022). Green supply chain management for operational performance: Antecedent impact of corporate social responsibility and moderating effects of relational capital. *Journal of Enterprise Information Management*. <https://doi.org/10.1108/JEIM-06-2021-0260>
- Yang, M., Bento, P., & Akbar, A. (2019). Does CSR influence firm performance indicators? Evidence from Chinese pharmaceutical enterprises. *Sustainability (Switzerland)*, 11(20), 1–18. <https://doi.org/10.3390/su11205656>
- Yeon, J., Lin, M. S., Lee, S., & Sharma, A. (2021). Does family matter? The moderating role of family involvement on the relationship between CSR and firm performance. *International Journal of Contemporary Hospitality Management*, 33(10), 3729–3751. <https://doi.org/10.1108/IJCHM-03-2021-0315>
- Yıldız Çankaya, S., & Sezen, B. (2019). Effects of green supply chain management practices on sustainability performance. *Journal of Manufacturing Technology Management*, 30(1), 98–121. <https://doi.org/10.1108/JMTM-03-2018-0099>
- Yoon, B., & Chung, Y. (2018). The effects of corporate social responsibility on firm performance: A stakeholder approach. *Journal of Hospitality*

- and *Tourism Management*, 37(December), 89–96. <https://doi.org/10.1016/j.jhtm.2018.10.005>
- Zhu, Q., Feng, Y., & Choi, S. B. (2017). The role of customer relational governance in environmental and economic performance improvement through green supply chain management. *Journal of Cleaner Production*, 155, 46–53. <https://doi.org/10.1016/j.jclepro.2016.02.124>
- Zhu, Q., Liu, J., & Lai, K. H. (2016). Corporate social responsibility practices and performance improvement among Chinese national state-owned enterprises. *International Journal of Production Economics*, 171, 417–426. <https://doi.org/10.1016/j.jipe.2015.08.005>

How to cite this article: Novitasari, M., Wijaya, A. L., Agustin, N. M., Gunardi, A., & Dana, L.-P. (2022). Corporate social responsibility and firm performance: Green supply chain management as a mediating variable. *Corporate Social Responsibility and Environmental Management*, 1–10. <https://doi.org/10.1002/csr.2353>