International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

The Influence of Green Logistics Management on Financial Outcomes with Market Performance as an Intermediary: A Case Study of the Indonesian Trucking Association, Surabaya Branch

Muchammad Zuhri Ramadhani Abanan[1], Christin Susilowati[2]

[1]Student, Department of Economics and Business, Brawijaya University
[2]Doctoral, Department of Economics and Business, Brawijaya University

Abstract
The objective of this research is to investigate the impact of green logistics management practices on company performance. The research involved surveying 140 directors and top management of member trucking companies Aptrindo DPC Surabaya, using quantitative techniques, and analyzing the collected information using SmartPLS (Partial Least Squares). The results show that green logistics management practices have a positive and important impact on company financial performance, with market performance acting as a mediator in this relationship (partial mediation). Additionally, this research demonstrates that green logistics management practices are effective in improving marketing efforts and customer service, which can result in improved company financial performance. Therefore, companies that can achieve and maintain competitive advantage can automatically achieve good financial performance.

Keywords: Green Logistics Management Practices, Market Performance, Financial Performance, Indonesian Trucking Association

1. Introduction & Literature Review

1.1 Introduction

Based on data from the International Energy Agency (IEA), global CO2 emissions from energy production and industrial activities reached 36.8 gigatons in 2022, rising by about 0.5 gigatons from 2021 and setting a new record. The European Union's data indicates that China and the United States were the top CO2 emitters in 2021, while Indonesia ranked 11th with emissions of 602.59 million metric tons (1.59% of the global total).

The Central Bureau of Statistics noted that the transportation and warehousing sector experienced the highest production growth in 2022, reaching 19.87%. This surge in demand for goods and services, along with the sector's expansion, has led to increased resource and energy consumption, resulting in more environmental pollutants and hazardous waste (Dekker et al., 2012; Wang et al., 2018). According to a 2022 greenhouse gas inventory, Surabaya City's total emissions from four sectors were 15,205.95 Gg

CO2, with the energy sector, including transportation, being the largest contributor at 14,437.227 Gg CO2 or 94.94%.

Beyond environmental issues, financial challenges are also prominent for companies. The average profit/loss values in the transportation and logistics sector have shown significant fluctuations, generally trending downwards without achieving positive values (IDX, 2022). For instance, in 2017, the average loss was IDR 171.18 billion, which dropped to IDR 50.01 billion the following year. This trend continued, with average losses reaching IDR 71.60 billion in 2019 and IDR 1.91 trillion in 2020. Although there was some improvement in 2021, the sector did not return to positive values as seen between 2017 and 2019 (IDX, 2022).

Environmental Protection and Management Law No. 32 of 2009 provides a general framework for environmental protection in Indonesia. Additionally, KIR testing for all commercial mandated by Law No. 22 of 2009 on Road Traffic and Transportation (UU LLAJ) ensures roadworthiness. Article 53 paragraph (1) of UU LLAJ requires periodic testing for public passenger cars, buses, freight vehicles, trailers, and semi-trailers operating on public roads.

In response to stakeholder demands for pollution reduction and public safety, many companies have adopted environmentally friendly logistics practices. This shift has sparked interest from both practitioners and academics, leading to research on the potential benefits of such practices for environmental sustainability, business continuity, and shareholder value (Baah et al., 2019; Agyabeng Mensah et al., 2019a, b, c; Wang et al., 2018; Turki et al., 2018). The focus on green logistics has become crucial, emphasizing traffic management, optimized delivery routes, efficient storage and retrieval, and the use of sustainable energy (Agyabeng-Mensah et al., 2020). These green initiatives offer dual benefits: reducing environmental impact and lowering operational costs.

Market performance, which includes revenue growth and market share, has been linked to effectiveness by Lanier et al. (2019) and Baah & Jin (2019). While some studies (Hajmohammad et al., 2013; Feng et al., 2017) have found negative correlations between green supply chain practices and market performance, others (Suganthi, 2019; de Sousa Jabbour, 2015) argue that environmental efforts can add significant value. Social performance is also vital in the logistics industry due to the close relationships between companies, employees, consumers, and the broader community. Research by Baah et al. (2019) indicates that green logistics practices improve community health and well-being by minimizing air pollution from transportation.

Given the mixed results of previous studies on the impact of green logistics on financial performance (Baah et al., 2019; Bajdor et al., 2012; Lai et al., 2012; Agyabeng Mensah et al., 2019a, b, c), further research is needed to provide clearer insights and guide managers in adopting sustainable practices that enhance both performance and sustainability. Turki et al. (2018) highlight the necessity for logistics companies to restructure their operations to be more environmentally friendly.

1.2 Literature Review

1.2.1 Green Logistics Management Practices

Green Logistics Management Practices (GLMP) contribute to environmental sustainability and financial performance by reducing waste and implementing efficiency strategies in the use of energy and resources (Hartmann and Germain, 2015). These eco-friendly principles and strategies are integrated into logistics activities to decrease energy and resource consumption, as well as to mitigate their negative impacts on the environment and society, thereby enhancing company performance (Agyabeng-Mensah et al., 2020).

Numerous green practices have been adopted across various logistics functions, such as procurement, warehousing, distribution, product design, transportation, and packaging, aimed at improving social and environmental sustainability (Khan et al., 2020).

1.2.2 Financial Performance

Financial performance refers to the overall financial health of a business (Agyabeng-Mensah et al., 2020). It is the ability of an organization to achieve optimal outcomes in terms of sales growth, profit growth, operational efficiency, and market share growth by effectively using available resources to meet organizational goals and objectives (Jiang et al., 2018).

1.2.3 Market Performance

According to Lanier et al. (2019) and Baah & Jin (2019), market performance involves various aspects such as revenue growth and market share, which can be categorized into effectiveness, efficiency, and adaptability. It measures how well a company's environmental practices and strategies meet customer needs to achieve a competitive advantage, encompassing market growth, increased sales, customer loyalty, customer acquisition, brand awareness, and customer perception (Agyabeng-Mensah et al., 2020).

2. Research Methodology

2.1 Research Approach

This study employed a quantitative methodology to investigate the influence of green logistics management practices on financial performance through market performance. The type of research used was explanatory research.

2.2 Rationale for the Study

The trucking sector in Indonesia is undergoing rapid changes, influenced by technological advancements, evolving market trends, and changing customer preferences. To maintain a competitive edge and effectively meet client needs, industry leaders must understand how these factors impact their business performance.

2.3 Statement of Problem

This study aims to fill the gap in research on green logistics management practices in the Indonesian trucking sector. It focuses on identifying the importance of green concepts that influence financial performance. By providing valuable insights, this research aims to help truck business owners determine the right strategies through green logistics management practices to achieve the best financial performance.

2.4 Significance of the Study

The results of this study are expected to increase the understanding of green logistics management practices strategies in the Indonesian trucking industry. Ultimately, this will equip directors and top management with the knowledge necessary to set the right strategies and drive business success. Decision makers in the trucking industry can leverage these valuable insights to gain a competitive advantage and improve their company's financial performance.

2.5 Research Objectives

1. To identify the key factors that influence financial performance in the logistics industry.
2. To examine the impact of factors such as green logistics management practices and market performance on financial performance.
3. To provide recommendations for the logistics industry to improve their understanding of financial performance and adjust their marketing strategies accordingly.

2.6 Scope of the Study

This research focused on logistics companies, especially trucking companies and aimed to collect data from 140 respondents. The study examined factors such as green logistics management practices and market performance in the Indonesian logistics industry.

2.7 Research Design

The research design used in this study was descriptive, aiming to analyze the factors that influence financial performance in the Indonesian logistics industry.

2.8 Data Collection Instrument

For the collection of primary data in this study, a structured questionnaire was the primary tool. This questionnaire was used to gather data from the respondents. The distribution of the research questionnaire was carried out using Google Forms.

2.9 Sampling Design

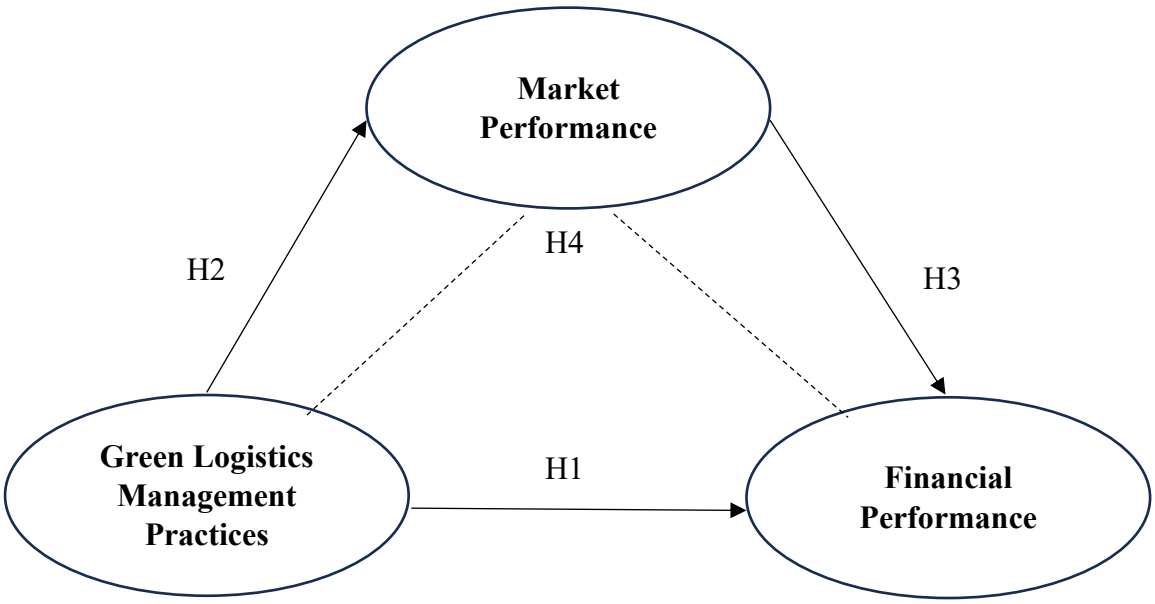
- **Sample Size:** 140 respondents were selected for this research.
- **Sampling Method:** The saturated sampling or census method was used in this research, where the samples were all trucking companies that were members of the Indonesian Trucking Association, Surabaya Branch.
- **Sampling Unit:** The sample unit was the directors or top management of a trucking company that was a member of the Indonesian Trucking Association, Surabaya Branch.

2.10 Limitations of the Project

- Research was limited to the Surabaya area, which may not have represented all trucking companies in Indonesia.
- The study acknowledges that self-reported data, obtained through methods such as questionnaires, might have been susceptible to response bias.

2.11 Empirical Research Method

Figure 1. Empirical Research Method



2.12 Measurement

All indicators used to measure the four variables were derived from various previous studies. The indicators for green logistics management practices were adapted from studies by Longoni et al. (2016)

and Agyabeng-Mensah et al. (2020), consisting of two indicators. Financial performance variables were also measured using two indicators from Longoni et al. (2016) and Agyabeng-Mensah et al. (2020). Market performance variables were assessed using two indicators sourced from Hartanty & Ratnawati (2013) and Agyabeng-Mensah et al. (2020). Social performance variables were evaluated using two indicators from Agyabeng-Mensah et al. (2020).

2.13 Analysis

SmartPLS (Partial Least Squares) is a robust tool used in social sciences to examine complex relationships between various constructs within a study. It utilizes structural equation modeling (SEM), an advanced multivariate analysis technique, leveraging statistical methods to analyze multiple variables simultaneously. SEM assesses people, organizations, events, activities, and circumstances together, offering a comprehensive understanding of the intricate factors involved in a study. The current study employed a two-stage SEM approach, beginning with the evaluation of the measurement model, followed by the assessment of the structural model.

3. Results and Discussion

3.1 Descriptive Statistics

Data collection was conducted from December 2023 to April 2024, with 140 completed questionnaires distributed. Regarding the gender distribution among makeup artist companies, a significant majority were male, with 135 respondents representing 96.5% of the total. The age demographic of the directors in Aptrindo DPC Surabaya member companies predominantly fell within the middle-aged range of 40-59 years. In terms of educational background, 78 respondents, accounting for 55.7%, held a bachelor's degree. When looking at the number of employees, most of the member trucking companies of Aptrindo DPC Surabaya had between 1 to 25 employees, making up 97.8% of the total. Furthermore, the statistical data indicate that the majority of these trucking companies have been in operation for 6 to 10 years, comprising 85.7% of the total.

3.2 Measurement Model Testing

In this study, we investigated complex constructs operationalized at a more abstract level using high-level models (Hair et al., 2017). Following the two-stage SEM (Structural Equation Modelling) method, we began by examining the measurement model using factor outer loadings and Average Variance Extracted (AVE). The outer loading factors for each indicator had to be above 0.5, with a minimum AVE value of 0.5. Table 1 shows that the remaining items for all three variables meet these required values, allowing us to conclude that the items are valid.

Table 1. Convergent Validity

Variable	Indicator	Item	Outer Loading	AVE	Decision
Green Logistics Management Practices	Operational	GLMP1	0,790	0.680	Valid
		GLMP2	0,821		
	Performance and system recovery	GLMP3	0,886		
		GLMP4	0,805		
	Human resources training and involvement	GLMP5	0,696		
		GLMP6	0,868		
		GLMP7	0,889		

Market Performance	Service volume	MP1	0,874	0.671	Valid
		MP2	0,774		
	Customer growth	MP3	0,807		
		MP4	0,819		
Financial Performance	Profitability	FP1	0,774	0.769	Valid
		FP2	0,949		
	Environmental costs	FP3	0,892		
		FP4	0,884		

The reliability of our measurement model was tested using Cronbach's alpha and composite reliability. According to Hair et al. (2017), a minimum value of 0.7 for both Cronbach's alpha and composite reliability is considered acceptable. As presented in Table 2, our analysis shows that our measurement model meets this requirement, allowing us to conclude that our measurement model is reliable.

Table 2. Reliability Test

Variable	Composite Reliability	Cronbach's Alpha	Conclusion
Green Logistics Management Practices	0.937	0.921	Reliable
Market Performance	0.891	0.854	Reliable
Financial Performance	0.930	0.898	Reliable

We proceeded to analyze the structural model to evaluate its predictive ability and the interrelationships between constructs (Hair et al., 2017). This evaluation comprises two components: Predictive Relevance (Q^2), which gauges the predictive power of exogenous variables on endogenous variables; R-Square (R^2), which measures the model's predictive power. For the market performance variable, the R^2 value is 0.279 or 27.9%. This means that the green logistics management practices variable can account for 27.9% of the market performance variable, with the remaining 72.1% attributed to other variables not studied. The R^2 value for the financial performance variable is 0.560 or 56%. This value shows that green logistics management practices can explain 56% of the financial performance variable, while other variables not explored in the study account for the remaining 44%. The Q-square value indicates that the model has predictive relevance for both the competitive advantage and business performance variables. In conclusion, the model's strength suggests that exogenous factors can moderately explain business performance.

Table 3. Structural Model Test

	R-Square	Adjusted R-Square
Market Performance	0.279	0.274
Financial Performance	0.560	0.553

3.3 Hypotheses Testing

Following the establishment of construct validity and reliability, the proposed hypotheses underwent evaluation using the SmartPLS (Partial Least Squares) algorithm and bootstrapping. The objective of this section is to test the hypotheses as originally proposed and assess the suitability of the research model. Table 4 presents the direct relationships between the variables, while Table 5 showcases the specific

indirect effects that test the mediating impact of competitive advantage. Additionally, Figure 2 presents the output of SmartPLS.

Table 4. Path Coefficient

Relationship	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Result
GLMP → FP	0.650	0.640	0.065	10.063	0.000	Accepted
GLMP → MP	0.528	0.546	0.040	13.227	0.000	Accepted
MP → FP	0.162	0.177	0.061	2.653	0.008	Accepted

Note. GLMP=Green Logistics Management Practices, MP=Market Performance, FP=Financial Performance

Table 5. Specific Indirect Effect

Relationship	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	t-Statistics (|O/STDEV|)	P Values	Result
GLMP→MP→FP	0.086	0.097	0.037	2.302	0.022	Accepted

Note. GLMP=Green Logistics Management Practices, MP=Market Performance, FP=Financial Performance

Based on the analysis in Table 4, it is clear that green logistics management practices have a strong and positive impact on financial performance, with a significance level of 0.05. These results support H1, which has a path coefficient of 0.650, a t statistic of 10.063, and a p-value of less than 0.05. Additionally, H2 was verified with a path coefficient of 0.528, a t statistic of 13.227, and a p-value less than 0.05, showing that green logistics management practices also have a positive and significant effect on market performance. Finally, H3 was confirmed with a path coefficient of 0.162, a t statistic of 2.653, and a p-value less than 0.05, indicating that market performance has a positive and significant influence on financial performance.

The indirect effect test yielded a path coefficient of 0.086, a p-value less than 0.05, and a t statistic value of 2.302. These findings demonstrate that the relationship between green logistics management practices and financial performance is mediated by market performance, thereby supporting H4. Following the mediation analysis procedure outlined in Hair et al. (2017), we determined that market performance serves as a complementary mediation (partial mediation) of the relationship between green logistics management practices and financial performance, as both the direct and indirect effects are significant and positive.

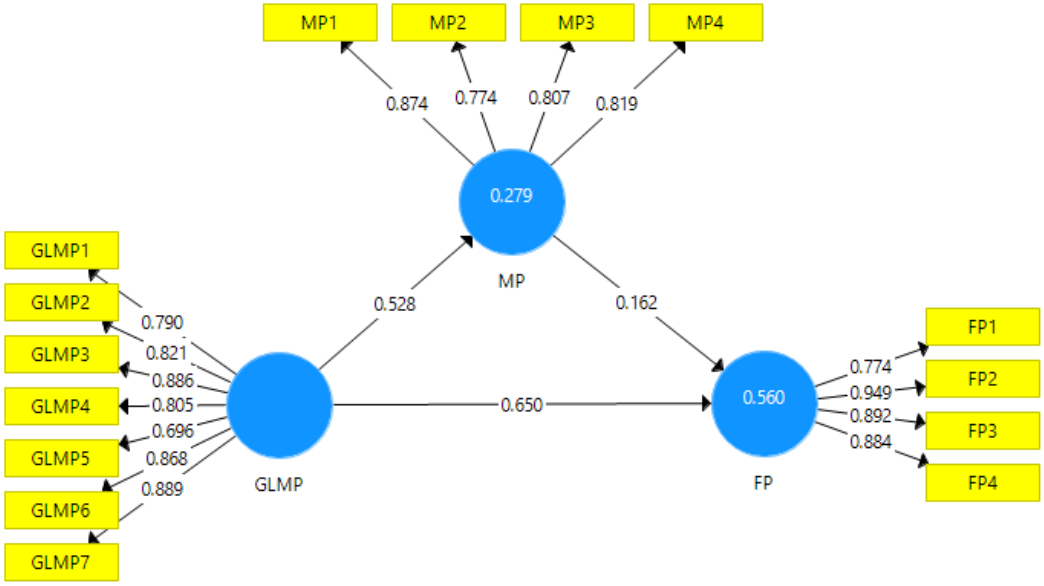


Figure 2. Structural Model

3.4 Discussion

The research findings indicate that implementing green logistics management practices has a substantial positive effect on financial performance. The study reveals that trucking companies adopting environmentally sustainable practices, such as utilizing more efficient fuels, managing waste properly, and optimizing routes, experience significant financial improvements. These improvements are evident through increased revenues, reduced operational costs, and the avoidance of fines or penalties related to environmental infractions. Consequently, these sustainable practices not only benefit the environment but also markedly enhance the financial health of trucking companies in Surabaya. These results are consistent with Baah et al. (2019), who noted that minimizing waste and environmental pollution leads to cleaner production processes, thereby helping companies avoid environmental fines and penalties and save on costs.

The study findings suggest that adopting green logistics management strategies greatly benefits market performance. When trucking companies integrate environmentally friendly practices such as using more efficient fuels and implementing better waste management, they typically see improvements in market performance indicators. These improvements may manifest as increased market share, heightened customer demand, or an enhanced brand image. Hence, these eco-friendly initiatives not only promote environmental sustainability but also positively impact the market standing and performance of trucking companies in Surabaya. These results corroborate with the assertion made by D'Souza et al. (2020) that companies prioritizing sustainability tend to attract more consumers and business partners, thereby enhancing brand perception and customer trust. Consequently, this fosters greater customer satisfaction, market expansion, sales, profit margins, and return on investment.

The study findings suggest that embracing green logistics management practices yields a notable positive impact on social performance. It is observed that the methods employed by trucking companies to bolster their market performance, such as adept marketing strategies, product distinction, or suitable pricing strategies, directly affect the financial well-being of the company. Essentially, companies in the trucking sector that can establish and uphold a robust market presence often witness growth in revenue, enhanced profitability, and overall improved financial performance. Consequently, proficient strategies for market

performance play a pivotal role in attaining financial prosperity for trucking enterprises in Surabaya. These findings resonate with earlier research conducted by Agyabeng-Mensah et al. (2020), which highlighted a positive correlation between market performance and financial performance.

The study findings reveal that market performance plays a partial mediating role in the impact of green logistics management practices on financial performance. It suggests that adopting environmentally friendly logistics management practices can enhance a company's reputation among consumers and stakeholders, thereby stimulating market interest and customer demand. Consequently, this may result in heightened sales, expanded market share, and an overall enhancement in financial performance. Hence, market performance serves as an intermediary link between sustainable logistics management practices and the financial performance of trucking companies.

Understanding this mediation can help trucking companies devise more efficient strategies for implementing sustainable practices. By recognizing the interplay among sustainable practices, market performance, and financial performance, companies can pinpoint areas where they can enhance operational efficiency and effectiveness, while also delivering added value to customers and stakeholders.

4. Conclusions and Suggestions

By implementing green logistics management practices, such as endorsing environmental sustainability, utilizing more efficient fuel, implementing effective waste management, and optimizing travel routes, companies can avoid penalties and fines associated with environmental breaches. This, in turn, can result in cost reductions, potentially improving the financial performance of trucking companies affiliated with the Indonesian Trucking Entrepreneur Association DPC Surabaya. Embracing a green entrepreneurial orientation can serve as a strategic approach to enhance favorable customer perceptions of the company's brand and reinforce customer trust, thereby positively impacting customer satisfaction, market expansion, and sales.

The company's endeavors to safeguard employees and the community from potential adverse environmental effects that could jeopardize health and safety are integral to its environmentally focused social responsibility. Through adept company marketing strategies, product differentiation, or appropriate pricing strategies, the company directly influence its financial status. Essentially, trucking companies that can establish and sustain a robust market position typically witness growth in revenue, enhanced profitability, and improved financial performance.

The trucking logistics sector heavily relies on operational efficiency and cost management. Elements like fuel prices, vehicle maintenance, and route planning have a more immediate impact on financial performance than social initiatives. In fiercely competitive sectors like trucking logistics, customers often prioritize price and service reliability over corporate social responsibility practices. Competitive pricing and dependable service usually take precedence for customers.

Conflict of Interest

The authors declare that the study was conducted without any commercial or financial links that could be seen as a potential conflict of interest.

Acknowledgement

The authors would like to thank all respondents who have participated and sacrificed their time to fill out the questionnaires for this study.

References

1. Agyabeng-Mensah, Y., Ahenkorah, E.N.K., Agnikpe, M.C.G., 2019a. The intermediary role of supply chain capability between supply chain integration and firm performance. J. Supply Syst. Chain Manag. 8 (2). http://publishingindia.com/jscms/
2. Agyabeng-Mensah, Y., Ahenkorah, E.N.K., Korsah, G.N.A., 2019b. The mediating roles of supply chain quality integration and green logistics management between information technology and organisational performance. J. Supply Syst. Chain Manag. 8 (4). DOI:10.5267/j.uscm.2018.11.001
3. Agyabeng-Mensah, Y., Ahenkorah, E.N.K., Osei, E., 2019c. Impact of logistics information technology on organisational performance: mediating role of supply chain integration and customer satisfaction. J. Supply Syst. Chain Manag. 8 (4). http://publishingindia.com/jscms/
4. Baah, C., Jin, Z., 2019. Sustainable supply chain management and organizational performance: the intermediary role of competitive advantage. J. Mgmt. and Sustainabil. 9, 119. DOI: 10.5539/jms.v9n1p119
5. Bajdor, P., 2012. Comparison between sustainable development concept and Green Logistics: the literature review. Polish J. Manag. Stud. 5, 225e233.
6. Dekker, R., Bloemhof, J., Mallidis, I., 2012. Operations Research for green logisticse An overview of aspects, issues, contributions and challenges. Eur. J. Oper. Res. 219 (3), 671e679. https://doi.org/10.1016/j.ejor.2011.11.010
7. D'Souza, A.B.L., 2015. Understanding the genesis of green supply chain management: lessons from leading Brazilian companies. J. Clean. Prod. 87, 385e390. https://doi.org/10.1016/j.jclepro.2014.09.034
8. D'Souza, C., McCormack, S., Taghian, M., Chu, M.T., Mort, G.S., Ahmed, T., 2020. An empirical examination of sustainability for multinational firms in China: implications for cleaner production. J. Clean. Prod. 242, 118446. https://doi.org/10.1016/j.jclepro.2019.118446
9. Hajmohammad, S., Vachon, S., Klassen, R.D., Gavronski, I., 2013. Reprint of Lean management and supply management: their role in green practices and performance. J. Clean. Prod. 56, 86e93.
10. Hair Jr, J. F., Hult, G. T. M., Ringle, C., Sarstedt, M, "A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)", Sage Publications, 2016, Thousand Oaks, CA, USA.
11. Hartmann, J., Germain, R., 2015. Understanding the relationships of integration capabilities, ecological product design, and manufacturing performance. J. Clean. Prod. 92, 196e205.
12. Hartanty, I.T. & Ratnawati, A., 2013. Peningkatan Kinerja Pemasaran Melalui Optimalisasi Keunggulan Bersaing. EKOBIS. 14(2), 72-89. DOI:http://dx.doi.org/10.30659/ekobis.14.1.72-89
13. Jiang, Wenbo, Huaqi Chai, Jing Shao, and Taiwen Feng. 2018. Green entrepreneurial orientation for enhancing firm performance: A dynamic capability perspective. Journal of Cleaner Production. 198: 1311–23. https://doi.org/10.1016/j.jclepro.2018.07.104
14. Khan, Z.R., 2020. Green product innovation and financial resource availability: multi-actor model approach. In: Global Perspectives on Green Business Administration and Sustainable Supply Chain Management. IGI Global, pp. 111e133. DOI:10.4018/978-1-7998-2173-1.ch006
15. Lai, K.H., Wong, C.W., 2012. Green logistics management and performance: some empirical evidence from Chinese manufacturing exporters. Omega 40 (3), 267e282. https://doi.org/10.1016/j.omega.2011.07.002

16. Lanier Jr., D., Wempe, W.F., Swink, M., 2019. Supply chain power and real earnings management: stock market perceptions, financial performance effects, and implications for suppliers. J. Supply Chain Manag. 55 (1), 48e70. https://doi.org/10.1111/jscm.12186
17. Longoni, A., Luzzini, D., Guerci, M., 2016. Deploying environmental management across functions: the relationship between green human resource management and green supply chain management. J. Bus. Ethics 151 (4), 1081e1095. DOI:10.1007/s10551-016-3228-1
18. Turki, S., Rezg, N., 2018. Impact of the quality of returned-used products on the optimal design of a manufacturing/remanufacturing system under carbon emissions constraints. Sustainability. 10 (9), 3197. https://doi.org/10.3390/su10093197
19. Wang, Z., Yang, L., Yin, J., Zhang, B., 2018. Assessment and prediction of environmental sustainability in China based on a modified ecological footprint model. Resour. Conserv. Recycl. 132, 301e313. https://doi.org/10.1016/j.resconrec.2017.05.003