COSTING:Journal of Economic, Business and Accounting
Volume 7 Nomor 4, Tahun 2024
e-ISSN : 2597-5234

THE EFFECT OF INTERNAL ENVIRONMENTAL MANAGEMENT ON THE PERFORMANCE OF CEMENT COMPANIES IN INDONESIA WITH MEDIATION GREEN SUPPLY CHAIN MANAGEMENT PRACTICES

Wayan Rendy Armilando[1], Iveline Anne Marie[2], Wahyuningsih Santoso[3]
Program Studi Magister Manajemen, Universitas Trisakti, Indonesia
Email : wayanrendyarmilando@gmail.com, iveline.annemarie@trisakti.ac.id, wahyuningsih@trisakti.ac.id

ABSTRACT

The global challenge of preserving the environment, meeting demand, and ensuring corporate sustainability drives the cement industry to implement strategies in its supply chain. The practice of green supply chain management is one of the strategies that are well applied in the face of the challenges to the cement industry. Through the GSCM practical dimension consisting of green manufacturing, green purchasing, green transportation, and green facilities, this research will test the impact of the application of GSCM on the performance of cement companies in Indonesia. The thesis used primary data and obtained 224 respondents from 13 groups of cement companies that are part of the Indonesian Cement Association (ASI). The data were analyzed through descriptive statistics and partial least squares (PLS) techniques using smartPLS software version 3.2.9. Research results show that internal environmental management influences GSCM practices and influences the performance of cement companies in Indonesia. Green purchasing only has a positive impact on operational performance and has no impact on the environmental, economic, or social performance of the company. Green transportation is positive for the economic, operational, and social performances of the enterprise but does not have an impact on environmental performance. The study also found that green supply chain management practices strengthen the relationship between internal environmental management and the performance of cement companies in Indonesia.
Keywords : Green Supply Chain Management, Internal Environmental Management, Corporate Performance, Partial Least Square, Cement Industry

INTRODUCTION

One of the problems in the world that has long been a concern of the public is climate change. The impacts of climate change can be found on various aspects of life including health, food security, and ecosystems. The Government of Indonesia, as a country with the third largest population in the world, has committed through a document called *Enhanced Nationally Determined Contribution* (NDC) on September 23, 2022 to set a target to reduce carbon dioxide (CO2) emissions without international assistance (by 29%) or with international assistance (by 41%) from the *Business as Usual* (BaU) reference by 2030.

In order to achieve this target, sustainable development to reduce greenhouse gas emissions needs to be carried out in the manufacturing sector, starting from production systems, energy consumption, waste management, and the use of sustainable alternative energy (Habib et al., 2022).

Global *challenges* and the Government's commitment to meeting emission reduction targets have a significant impact on policies in the cement industry. Carrying out production and operational activities for the company's sustainability and meeting the demand for national cement needs but also implementing commitments to reduce greenhouse gas emissions, so that cement industry players need to implement the right strategies and policies. According to Xu *et al.,* (2022) the supply chain method that can be used to achieve this target is *Green Supply Chain Management* or also known as Green Supply Chain Management (GSCM). The focus of GSCM is in an effort to increase environmental impact, including minimizing waste, reusing and recycling materials and energy at every stage of the production or manufacturing process, including design, procurement, production, distribution, and product recovery (Hejazi *et al.,* 2023).

Cement companies can apply GSCM to reduce the effects of the company's production activities, as stated by Khan (2017) that companies that implement GSCM practices can improve the company's operational performance. conducted research on the garment industry which showed that the implementation of GSCM had a significant effect on company performance, especially the company's environmental, economic, and operational performance. Research conducted by Huma and Siddiqui (2022) on the Manufacturing Industry in Pakistan shows that the implementation of the Manufacturing Industry GSCM practice in Pakistan can provide a positive impact on company operations and strengthen the company's Habib et al., (2022)*market performance*, this also encourages the company's organization to be in a position to become a more *"greener"* company and improve company performance. (Huma et al., 2023)

Based on the exposure to the background related to global problems, greenhouse gas emission reduction targets by the Government of Indonesia,

problems in the cement industry in Indonesia and previous research shows that GSCM practices have had an impact on the company's performance. This has sparked the interest of researchers in investigating how the implementation of GSCM practices has an impact on the performance of the Indonesian cement industry. The purpose of the following research is to evaluate the implications of the implementation of GSCM *(green manufacturing*, *green purchasing*, *green transportation*, and *green facilities*) practices on environmental, financial, operational, and social performance in the cement industry in Indonesia. The researcher chose 4 dimensions of GSCM practice in this regard*: green manufacturing, green purchasing*, *green transportation*, and *green facilities* because based on the McKinsey (2020) report, making production efficiency, energy use, and transportation are the main things that need to be done to reduce the environmental implications raised by the company. This research also aims to provide an overview of the business world and the Indonesian government regarding how companies that carry out green initiatives can have an impact on company performance. It is hoped that the results of this research will encourage various companies in Indonesia to carry out green corporate practices. This research will be carried out on cement companies that produce in Indonesia.

LITERATUR REVIEW

Supply Chain Management

According to Jay Heizer et al. (2017), supply chain management includes coordinating all activities carried out by the supply chain to increase customer value. Supply chain management is a philosophy that is integrated to manage all flows from suppliers to customers, encompassing the collaborative relationship between customers and suppliers during the production process by paying attention to the products produced and will be sent to customers through such a process, so that customers get products that are valuable and according to expectations (Shirzad Talatappeh & Lakzi, 2020).

Creating the best Supply Chain requires money, time, talent, energy, focus, commitment, and courage. Supply chain management is not only about manufacturers and suppliers, but also about the process of delivery, warehousing, distributors, and customers (Chopra, 2019). In essence, Supply Chain activities are summarized into five factors, namely; plan (supply chain planning), source (input source process), make (convert input into output), deliver (send output to consumers) and return (return output from consumers) (Martono, 2019). The key to success in the Supply Chain in a company is efficiency and a detailed understanding of the integration of the five factors above. To maximize service levels while minimizing costs, supply chain management considers all the fundamentals that affect product production and the costs required to meet customer demand (Warella *et al.,* 2021).

Based on these definitions, supply chain management is defined as a process that includes inputs such as coordination, scheduling, and material control; after that, the production of raw materials becomes a semi-finished product or finished product, and the output is a product that is ready to be delivered to consumers. The key to the success of supply chain management lies in efficiency and a deep understanding of integration.

Internal Environmental Management (IEM)

Internal environmental management is how a company creates its own environmental protection policies and environmental targets to ensure environmental protection (Chan *et al.,* 2012). Activities at the top level and support of mid-level managers towards environmental practices, interdepartmental cooperation for environmental improvement, and setting up environmental management systems are issues that exist within the scope of internal environmental management (Zhu *et al.,* 2005). According to Green (2012), a company must focus its efforts internally and build a sustainable environment internally before implementing green supply chain practices. Previous research has shown that protecting the environment is implemented as a mandatory strategy and needs to receive support and commitment from employees and management, after which new companies can implement green supply chain practices (Green *et al.,* 2012). IEMs have been identified as the necessary pioneers for the successful implementation of green supply chain practices (Balasubramanian and Shukla, 2017a). As per Zhu et al. (2013) establishing internal environmental management, it will establish the basis for improving the implementation/practice of green supply chain immediately by immediately putting it into practice in the company's body. Internal organizational factors are a significant obstacle to the implementation of green supply chain management.

Green Supply Chain Management

Supply chain strategies in an environmental or environmentally friendly context are often called green supply chain management (GSCM). The innovative approach of green supply chain management (GSCM) is embedded in the management of reducing, reusing, recycling, and replacing materials. This includes product design, raw material sourcing, production, delivery of consumer products, and inventory management. Green supply chain management includes green production and delivery as one of its core roles. Also included in the category of environmentally friendly distribution operations is logistics and

environmentally friendly packaging (Ninlawan *et al.*, 2010). The most common GSCM method involves a supplier's environmental performance assessment, which involves suppliers to ensure the environmental quality of their products and evaluate the cost of waste in their operating systems (Handfield *et al.*, 2002). In other words, GSCM involves internal and external practices that play a role in the green supply chain.

There are five main dimensions in GSCM, namely *Green Design*, *Green Purchasing*, *Green Transformation*, *Green Logistics*, and *Reverse Logistics* (Uygun and Dede, 2016). *Green Design* is an aspect in the design phase, such as product features, material selection, manufacturing operation design, energy use, by involving consideration of product life cycle design, eco-design or environmentally friendly design. *Green Purchasing* is the procurement of recycled materials that can be reused, or recycled. *Green transformation* is a transformation process that emphasizes environmental aspects, consisting of *green manufacturing*, *green packaging* and *green stock politics*. *Green Logistics* is a logistics strategy and operation activity that is designed in such a way that it has a smaller negative impact on the environment. Meanwhile, *Reverse Logistics* is a stage after a product is used, in other words, activities that are carried out in terms of reusing product materials through recycling (Uygun & Dede, 2016).

Company Performance

Various kinds of activities carried out by the company and obtaining results, are activities related to the company's performance. In practice, company performance can be seen by analyzing operational performance, economic performance, environmental and social performance (Zhu *et al.*, 2008; Younis et al., 2016). Environmental performance refers to a company's capacity to reduce its impact on the environment by reducing emissions of hazardous substances and the amount of toxic and hazardous products it uses (Zhu *et al.*, 2008). Economic performance is the capacity of an industry to reduce input expenditures including raw materials, energy, processing waste, and environmental damage. Operational performance is the industry's ability to produce and deliver products more efficiently to customers. Meanwhile, social performance is the capacity of business organizations to implement the concept of corporate social responsibility, social response processes, and policies, programs, and outcomes related to these areas (Zhu *et al.*, 2008; Younis, 2016).

Conceptual Framework

Huma and Siddiqui (2022) stated that the implementation of green supply chain management (GSCM) practices in the Manufacturing Industry can have a positive impact on company operations and strengthen *the company's market performance*. The implementation of GSCM practices also encourages the company's organization to be in a position to become a more *"greener" company* while the company continues to improve the company's performance competition. In this research, it will be tested whether there is a positive influence between the company's internal environmental management on the company's environmental, financial, operational, and social performance, both directly mediated by green supply chain management practices. The conceptual framework designed from the previous research is:(Huma et al., 2023)

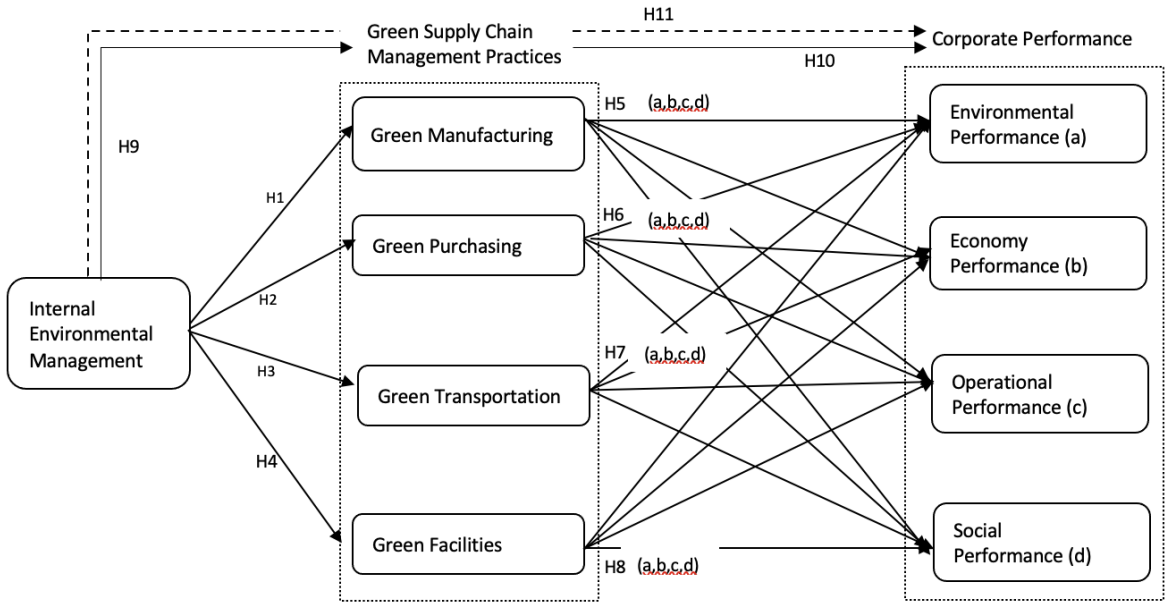

Figure 1. Conceptual Framewor

Hypothesis Development

Previous research has shown that protecting the environment is implemented as a mandatory strategy and needs to receive support and commitment from employees and management, after which new companies can implement green supply chain practices (Green *et al.,* 2012). IEMs have been identified as the necessary pioneers for the successful implementation of green supply chain practices (Balasubramanian and Shukla, 2017a). As per Zhu et al. (2013) establishing internal environmental management, will establish the basis for improving the implementation/practices of green supply chain immediately by immediately putting into practice within the company. Internal organizational factors are a significant obstacle to the implementation of green supply chain management. However, until now, there has been no research related to understanding the role of internal factors in implementing green supply chains in the cement industry (Dhull & Narwal, 2016). Based on this matter, the hypothesis is determined, namely:

H1: *Internal environmental management* has a positive effect on the implementation of *green manufacturing.*

H2: *Internal environmental management* has a positive effect on the implementation of *green purchasing.*

H3: *Internal environmental management* has a positive effect on the implementation of *green transportation.*

H4: *Internal environmental management* has a positive effect on the implementation of *green facilities.*

H9: *Internal environmental management* have a positive effect on *green supply chain management practices.*

H10: *Green supply chain management practices* have a positive effect on *corporate performance.*

Any effort made by companies to reduce the negative implications raised by their products or services on the environment is included in GSCM practices. These efforts result in improved environmental performance by reducing the consumption of hazardous substances and solid and liquid waste, reducing the number of environmental accidents, and improving public health (Eltayeb *et al.*, 2011). In Lee's (2009) case study on green practices, these green practices have reduced material and water consumption and waste production to the lowest level. Similarly, Azevedo (2011) states that green practices improve environmental performance by reducing company waste. In summary, research shows that green initiatives help environmental performance by reducing the amount of waste and the use of energy and materials (Kung *et al.,* 2012; Famiyeh *et al.*, 2018). Based on this matter, hypotheses are designed, namely:

H5a: *Green manufacturing* has a positive effect on the company's environmental performance

H6a: *Green purchasing* has a positive effect on the company's environmental performance

H7a: *Green transportation* has a positive effect on the company's environmental performance

H8a: *Green facilities* have a positive effect on the company's environmental performance.

Having GSCM practices will ultimately reduce waste from operations, which helps manufacturers to achieve increased economic development (Ahmed *et al.,* 2018). In addition, through GSCM, an organization will have long-term benefits in terms of profitability and sales performance (Bowen *et al.,* 2001). Especially in the context of developing countries, it helps to explore new business opportunities and improve competitiveness (Esfahbodi *et al.,* 2016). It also improves the efficiency of the company by increasing energy consumption, reducing operating waste, optimizing material purchases and managing production waste (Zailani *et al.,* 2012). Furthermore, the application of GSCM practices directly affects the company's financial performance (Vanalle *et al.,* 2017). So the hypothesis was determined, namely:

H5b: *Green manufacturing* has a positive effect on the economic performance of companies.

H6b: *Green purchasing* has a positive effect on the company's economic performance.

H7b: *Green transportation* has a positive effect on the company's economic performance.

H8b: *Green facilities* have a positive effect on the company's economic performance.

According to Zhu et al. (2013), Operational refers to a company's ability to product and transport products to its customers quickly and efficiently. As required by the Company's GSCM practice to maintain close relationships with their suppliers and customers, it is easier for them to facilitate continuous improvement strategies such as *total quality management, just in time* etc., which can lead to higher operational performance (Fang and Zhang, 2018). In previous research (Zhu *et al.,* 2013; Raut *et al.,* 2019) have indicated that the implementation of some or all dimensions of GSCM practices (either within the company or throughout the supply chain) can help to improve the company's operational performance from the perspective of inventory levels, quality, lead times, and customer satisfaction. Based on this matter, the hypothesis is determined, namely:

H5c: *Green manufacturing* has a positive effect on the company's operational performance.

H6c: *Green purchasing* has a positive effect on the company's operational performance.

H7c: *Green transportation* has a positive effect on the company's operational performance.

H8c: *Green facilities* have a positive effect on the company's operational performance.

Companies around the world have been encouraged to participate in social responsibility due to the global shifts and changes that have occurred in recent years. People have been asked to acknowledge what the company does. As a result, it has become clear that social sustainability is essential to maintaining the sustainability of a company. In addition, business stakeholder relationships are crucial. Practices such as social projects, the well-being of all stakeholders, and educational opportunities for all employees are examples of the social performance dimension. The study mentioned above observes how GSCM affects economic and environmental performance. Nevertheless, topics related to GSCM often overlook social performance (Eltayeb *et al.*, 2011; Rajeev *et al.*, 2017). Increasing corporate awareness of social responsibility also requires consideration of social issues in supply chain management. By reducing environmental damage, green supply chain practices will allow companies to have a better picture in the eyes of the public, customers, staff, stakeholders, and governments. A positive image is essential for customer satisfaction and employee loyalty. Hoffman (2001) According to Testa and Iraldo (2010) and Xie and Breen (2012), GSCM can improve brand reputation, stakeholder relationships, and employee motivation. In summary, effective environmental practices can improve the relationship between a company and its stakeholders.
H5d: *Green manufacturing* has a positive effect on the company's social performance.
H6d: *Green purchasing* has a positive effect on the company's social performance.
H7d: *Green transportation* has a positive effect on the company's social performance.
H8d: *Green facilities* have a positive effect on the company's social performance.
H10: *Green supply chain management practices* have a positive effect on *corporate performance.*
H11: *Green supply chain management practices* positively mediate the relationship between *internal environmental management* and *corporate performance.*

RESEARCH METHODS

This study will use a hypothesis testing design to test *independent variables (internal environmental management),* mediation variables (*green manufacturing, green purchasing, green transportation* and *green facilities*) and *dependent* variables, namely environmental, financial, operational and social performance. The use of this study uses a structural equation model with main component analysis (SEM-PLS) to determine the nature and direction of the relationship between the bound, independent and mediating variables. There are three variables in this study, namely independent or independent variables, dependent or bound variables and also mediating variables. The table of variables and measurements used in this study can be seen in appendix 1.

Data collection uses primary data by distributing questionnaires online using *google forms* and disseminated through social media platforms such as WhatsApp and Linkedin to workers in the Cement Industry located in Indonesia. The list of companies in the cement industry sector in Indonesia through the Indonesian Cement Association whose data is published through the official ASI website in 2023. The questionnaire submission starts from January 20, 2023 – February 30, 2023. Sampling by the purposive sampling method with the population used are sector workers in the Cement Industry with the criteria of having a cement production factory in Indonesia that has worked for more than 1 year in the *Department of Environement / Warehouse & Distribution / Logistics / Production / PPIC / Demand Planning / QA / QC / R&D / Engineering / Procurment / Finance / Marketing.* In this study, seven variables with a total of 44 indicators were used. Thus, in accordance with the statement of Hair et al. (2019) that the sample used uses the assumption of n x indicator, which is 5 x 44 which produces 220 samples. Data collection was carried out for a period of 21 days, starting from February 26, 2024 and ending on March 17, 2024, with the total amount of data collected amounting to 244 respondents. The data analysis method of this study is using SmartPLS version 3.2.9. The results used in SmartPLS are summarized as follows:

Table 1. Assessment Criteria in PLS

Criterion	**Parameter**	**Terms and Conditions**
Evaluation of Measurement Model (*Outer Model*)		
Convergence Validity Test	*Loading Factor*	> 0.70
Discrimination Validity Test	*Cross loading*	> 0.70
	HTMT	< 0.9
	Fornell Larcker Criterion	$\sqrt{AVE} > AVE$
Reliability Test	*Composite Reliability*	> 0.70
	Cronbach's Alpha	> 0,70
Structural Model Evaluation (*Inner Model*)		
Uji Goodness of Fit	Standardized Root Mean Square (SMRN)	< 0.1

Criterion	Parameter	Terms and Conditions
Determination Test	Adjusted R2	0.67 (good), 033 (moderate) and 0.19 (weak).
Uji Hipotesis	t-*value*	> 1.96 (Hip. accepted) / < 1.96 (Hip. rejected)

Source: Ghozali & Latan, (2015)

RESULTS AND DISCUSSIONS

The respondents targeted to fill out the questionnaire were respondents who had worked for more than one year and worked in the *HSE/Enviroment, Production, Warehouse/Distribution, Procurment, PPIC, Supply Chain, QA/QC, Engineering, Marketing/Sales, Finance* divisions in the cement industry sector in Indonesia as many as 244 respondents. The majority of respondents who participated in this study were male respondents as many as 152 people or 62%, in terms of education, the majority of respondents were bachelors (S1), namely 215 or 88%. As for the positions where the majority of employees work as environmental *sustainability* as many as 56 people or 23%, followed by positions dominated by staff, namely 151 or 62%, with a working period between 2 to 5 years as many as 102 or 42% of all respondents.

Table 2. Descriptive Statistics

Variable	Item	Mean	Std. Deviation
Internal Enviromental Management	6	4.0458	0.71615
Green Manufacturing	5	4.0041	0.67949
Green Purchasing	5	3.7156	0.73987
Green Transpotation	4	4.0123	0.67002
Green Facilities	4	3.9355	0.70323
Environmental Performance	5	4.1877	0.62461
Economy Performance	5	3.9213	0.71253
Operational Performance	5	3.8885	0.67650
Social Performance	5	4.2967	0.60218

Source: Primary Analysis Data, 2024

Based on the table above, the *Internal Environmental Management* variable with an average assessment of 4.0458, it can be interpreted that the company is committed to preserving the environment and the company is committed and plans to implement a green supply chain. Then in the Green Manufacturing variable , a mean value of 4.0041 was obtained, which is interpreted as the Company considers using energy-saving technology and renewable energy sources in the production process and reducing industrial waste in production. The *Green Purchasing* variable obtained a mean value of 3.7156. This means that the Company collaborates with suppliers in improving environmental improvements and conducts environmental evaluations of second-level and lower-level suppliers. *Green Transportation* obtained a mean value of 4.0123, this means that periodic maintenance/replacement of old vehicles is carried out to improve fuel efficiency and vehicle route arrangement is very important in minimizing mileage.

Based on the table above, the *Green Facilities* variable obtained a mean value of 3.9355, a sign that the Company implements energy-efficient lighting systems in facilities (e.g. factories, warehouses, offices, etc.) and the Company considers the use of natural ventilation and natural lighting in facilities. *Environmental Performance* obtained a mean value of 4.1877, a sign that the company can reduce waste and production waste produced, reduce the frequency of accidents/environmental damage and can reduce the use of hazardous and toxic materials. *Economy Performance* obtained a mean value of 3.9213, which means that the Company can reduce the use of hazardous and toxic materials. *Operational Performance* obtained a mean value of 3.8885, meaning that the company was able to increase the number of production and on-time delivery and product quality. *Social Performance* obtained a mean value of 4.2967, meaning that the company is able to improve relations with community stakeholders, for example, non-governmental organizations and community activists, is able to improve the company's image in the eyes of the public and customers and safeguard the rights of local residents.

Evaluation of Measurement Model (*Outer Model*)

The measurement model (*outer model*) functions to see the relationship between indicators and their latent variables. This model is evaluated with *convergent validity, discriminant validity. The*

convergent validity of each indicator (manifest variable) in measuring latent variables is indicated by the magnitude of the *loading factor*. An indicator is said to be valid if the *loading factor* of an indicator has a positive value and > of 0.7 and *the recommended average variance extracted* (AVE) value is greater than 0.5. *Discriminant validity*, in this test there are two measurements, namely looking at the value *of the Fornell Larcker Criterion* ($\sqrt{AVE} > AVE$). The square root of AVE is that if the √AVE latent variables are greater than the latent variable correlation, it indicates that the variable indicators have good *discriminant* validity. The following are the results of the convergent and discriminatory validity tests in this study.

Table 3. Validity Test Results

Variables & Items	**Convergence Validity Test**		**Discrimination Validity Test**	**Results**
	Loading Factor	***AVE***	***Fornell Larcker Criterion***	
Internal Enviromental Management		0.648	0.805	Valid
IEM1	0.828			Valid
IEM2	0.700			Valid
IEM3	0.861			Valid
IEM4	0.796			Valid
IEM5	0.818			Valid
IEM6	0.819			Valid
Green Manufacturing		0.616	0.785	Valid
GM1	0.788			Valid
GM2	0.737			Valid
GM3	0.801			Valid
GM4	0.762			Valid
GM5	0.833			Valid
Green Purchasing		0.676	0.822	Valid
GP1	0.791			Valid
GP2	0.832			Valid
GP3	0.822			Valid
GP4	0.837			Valid
GP5	0.828			Valid
Green Transpotation		0.627	0.792	Valid
GT1	0.712			Valid
GT2	0.774			Valid
GT3	0.813			Valid
GT4	0.861			Valid
Green Facilities		0.648	0.805	Valid
GF1	0.841			Valid
GF2	0.766			Valid
GF3	0.808			Valid
GF4	0.805			
Environmental Performance		0.625	0.791	Valid
ENP1	0.766			Valid
ENP2	0.772			Valid
ENP3	0.812			Valid
ENP4	0.823			Valid
ENP5	0.779			Valid
Economy Performance		0.662	0.814	Valid
ECP1	0.784			Valid
ECP2	0.794			Valid
ECP3	0.864			Valid
ECP4	0.826			Valid
ECP5	0.798			Valid
Operational Performance		0.641	0.801	Valid
OP1	0.810			Valid

Variables & Items	Convergence Validity Test		Discrimination Validity Test	Results
	Loading Factor	*AVE*	*Fornell Larcker Criterion*	
OP2	0.773			Valid
OP3	0.779			Valid
OP4	0.819			Valid
OP5	0.820			Valid
Social Performance		0.639	0.799	Valid
SP1	0.799			Valid
SP2	0.749			Valid
SP3	0.794			Valid
SP4	0.815			Valid
SP5	0.838			Valid

Source: Field Data, 2023

Based on table 4 above, it can be seen that all indicators used in the study have *valid criteria* because they have *an outer loading* > 0.7 and have an AVE value of > 0.5. This means that all variable results are declared to have good convergent validity. Similarly, other variables where the square root of the AVE variable is greater than the correlation between the variables. Then the *discriminant validity* for the variable is met. So it can be concluded that latent constructs are completely different from other constructs, which means that a construct is unique and has the ability to explain the phenomenon being measured.

Table 4. Results of the Validity Test of Discrimination with HTMT

	ECP	ENP	GF	GM	GP	GT	IEM	ON	SP
ECP									
ENP	0.596								
GF	0.765	0.607							
GM	0.785	0.624	0.878						
GP	0.447	0.355	0.501	0.632					
GT	0.798	0.504	0.895	0.872	0.489				
IEM	0.810	0.557	0.844	0.900	0.619	0.900			
ON	0.731	0.515	0.665	0.762	0.631	0.753	0.792		
SP	0.608	0.793	0.550	0.588	0.334	0.604	0.626	0.574	

Source: SmartPLS 3.2.9

Based on table 5 above, it can be seen that the HTMT value of each variable pair is less than 0.90, then the *discriminant validity* test with HTMT is said to be fulfilled for each variable.

Table 5. Reliability Test

Variable	Item	*Cronbach Alpha*	*Composite Reliability*	Information
Internal Enviromental Management	6	0.890	0.907	Relialibel
Green Manufacturing	5	0.844	0.893	Relialibel
Green Purchasing	5	0.881	0.880	Relialibel
Green Transpotation	4	0.800	0.889	Relialibel
Green Facilities	4	0.819	0.913	Relialibel
Environmental Performance	5	0.872	0.870	Relialibel
Economy Performance	5	0.850	0.917	Relialibel
Operational Performance	5	0.860	0.899	Relialibel
Social Performance	5	0.859	0.898	Relialibel

Source: SmartPLS 3.2.9

The results shown in table 6 show that the seven variables used in this study have *Cronbach alpha* and *composite reliability* values of more than 0.70. For example, *the internal environmental management (IEM)* variable has a *composite reliability* (CR) value of 0.917 ≥ 0.70 which indicates that each indicator that measures IEM is

consistent or reliable in measuring IEM. Thus, it can be concluded that all the variables used in this study are reliable.

In the evaluation of the structural model, the results *of the goodness of fit* test and determination test will be explained, then the hypothesis test of the results of *bootstrapping will be explained*.

Table 6. Test *of Goodness of Fit* and Determination

Uji *Goodness of fit*	**SRMR**	**Conditions**	**Results**
All Variable	0,086	< 0,08 s/d < 0.1	*Good fit*
Determination Test	**R2**	**Conditions**	**Results**
GoF index	0,556	>0,36	Big

Source: SmartPLS 3.2.9

Based on the *goodness of fit* test above, it can be seen that this research model has an SRMR value of 0.086. Because it is still below 0.1, it can be concluded that the estimation model of this study can be said to be *a good fit*. This means that there is a fit or compatibility between the theories used to build a path of influence in a hypothesis, in accordance with existing data or facts. Or in other words, the model is considered suitable or *fit*. Then the results shown in table 7 show that the GoF value of the index obtained from the calculation is 0.556. Because the GoF value of the Index > 0.36, it can be concluded that the model has a large GoF.

Uji Hipotesis

The *Structural Equation Model-Partial Least Square* (SEM-PLS) analysis method was used to test the hypothesis. The SEM-PLS method is based on *the Bootstrapping* method developed by Geisser & Stone. Hypothesis testing is carried out by looking at probability values (p-value) and statistics (t-test). The hypothesis used in this study is a *one-tailed hypothesis*, then the hypothesis is said to be acceptable if the T-Statistical value > 1.64 and the P-Value value < 0.05. The results of the direct effect test can be seen in the following table.

Tabel 7. Hasil *Path Coefficients* (*Output Bootstrapping*) Hipotesis

Hypothesis	**Original Sample (O)**	**Average Sample (M)**	**Standard Deviation (STDEV)**	**T Statistical (| O/STDEV |)**	**P Values**	**Conclusion**
IEM -> GM	0.873	0.873	0.016	55.288	**0.000**	H1 Accepted
IEM -> GP	0.554	0.555	0.047	11.818	**0.000**	H2 Accepted
IEM -> GT	0.769	0.770	0.034	22.428	**0.000**	H3 Accepted
IEM -> GF	0.726	0.731	0.038	18.895	**0.000**	H4 Accepted
GM -> ENP	0.349	0.353	0.100	3.493	**0.000**	H5a Accepted
GP -> ENP	0.018	0.020	0.059	0.304	**0.380**	H6a Rejected
GT -> ENP	-0.035	-0.033	0.102	0.346	**0.365**	H7a Rejected
GF -> ENP	0.270	0.262	0.109	2.478	**0.007**	H8a Accepted
GM -> ECP	0.294	0.298	0.088	3.355	**0.000**	H5b Accepted
GP -> ECP	0.020	0.018	0.046	0.443	**0.329**	H6b Rejected
GT -> ECP	0.292	0.289	0.083	3.522	**0.000**	H7b Accepted
GF -> ECP	0.219	0.221	0.109	2.006	**0.023**	H8b Accepted
GM -> OP	0.259	0.261	0.091	2.862	**0.002**	H5C Accepted
GP -> ON	0.270	0.275	0.067	4.025	**0.000**	H6c Accepted
GT -> ON	0.317	0.321	0.093	3.415	**0.000**	H7c Accepted
GF -> OP	0.028	0.021	0.109	0.258	**0.398**	H8c Rejected
GM -> SP	0.237	0.243	0.093	2.550	**0.006**	H5d Accepted
GP -> SP	0.008	0.008	0.048	0.164	**0.435**	H6d Rejected
GT -> SP	0.266	0.257	0.094	2.815	**0.003**	H7d Accepted
GF -> SP	0.101	0.106	0.091	1.110	**0.134**	H8d Rejected

Source: SmartPLS 3.2.9

Table 8 shows the results of testing the *direct effect* hypothesis using the *bootstrapping method*. Of the 20 hypotheses, 14 hypotheses were accepted (H1, H2, H3, H4, H5a, H5b, H5c, H5d,

H6c, H7b, H7c, H7d, H8a, H8b) because the T-statistical value was above 1.64 and the P value < 0.05 and 6 hypotheses (H6a, H6b, H6d, H7a, H8c, H8d) were rejected because the T-Statistical value was below 1.64 and the P value > 0.05.

Then the results of the relationship test in the second-level research model for direct *effect* and indirect *effect* can be seen in tables 9 and 10.

Tabel 8. Hasil *Specific Direct Effect* (*Output Bootstrapping*) Hipotesis

Hypothesis	Original Sample (O)	Average Sample (M)	Standard Deviation (STDEV)	T Statistical (| O/STDEV |)	P Values	Conclusion
IEM -> GSCMP	0.881	0.881	0.013	68.325	**0.00**	H9 Accepted
GSCMP -> CP	0.784	0.785	0.03	26.015	**0.00**	H10 Accepted

Source: SmartPLS 3.2.9

Tabel 9. Hasil *Specific Indirect Effect* (*Output Bootstrapping*) Hipotesis

Hypothesis	Original Sample (O)	Average Sample (M)	Standard Deviation (STDEV)	T Statistical (| O/STDEV |)	P Values	Conclusion
ICM -> GSCMP -> CP	**0.691**	**0.691**	**0.031**	**22.453**	**0.00**	**H11 Accepted**

Source: SmartPLS 3.2.9

Based on tables 9 and 10 above, the results of the H9 test show that the coefficient value (Original *Sample column*) = 0.881, has positive and significant values, with p-Values = 0.000 < 0.05. This shows that the hypothesis is accepted so that it can be concluded that *Internal Environmental Performance* has a significant positive influence on *Greeen Supply Chain Management Practices.* Then the results of the H10 test showed that the value of the coefficient (Original *Sample column*) = 0.784, had positive and significant values, with p-Values = 0.000 < 0.05. This shows that the hypothesis is accepted so that it can be concluded that *Greeen Supply Chain Management Practices* have a significant positive influence on *Corporate Performance.* Meanwhile, the results of the H11 test show that the value of the coefficient (*Original Sample column*) = 0.691, has a positive and significant value, with p-Values = 0.000 < 0.05. This shows that the hypothesis is accepted so that it can be concluded that *Green Supply Chain Management Practices* positively mediate the relationship between *Internal Environmental Management* and *Corporate Performance.*

Internal environmental management* has a positive effect on *green manufacturing.

Based on the hypothesis test, it can be seen that H1 has a p-value of 0.000 and a T-statistic of 55.288 > 1.64. These results show that the hypothesis is accepted so that it can be concluded that *internal environmental management* has a positive and significant effect on *green manufacturing*. This is also shown by *the contribution of internal environmental management* of 87.3% to *green manufacturing*. Or it can be interpreted that an increase in one unit of *IEM* will increase *green manufacturing* by 87.3%.

This is in line with the research stating that commitment and strategy in environmental management and support from the management and the entire company organization will encourage the implementation of green et al. (2012)*green supply chain management practices*, in this case *green manufacturing*. IEMs have been identified as the necessary pioneers for the successful implementation of green supply chain practices (Balasubramanian and Shukla, 2017a). The results of this study also support the research conducted by , which shows a strong consensus that Habib et al. (2022)Zhu & Sarkis (2007),Zhu et al. (2005)SROUFE (2003)*Internal Environmental Management* (IEM) has a positive impact on the implementation and effectiveness of *Green Manufacturing* (GM). An effective internal environmental management system, supportive policies, and attention to human resources factors all contribute to the success of *green manufacturing practices*. Based on the results of this study, it can be concluded that with good internal environmental management, awareness of internal management in environmental management, support for companies and employees to move towards a greener industry has a significant impact on the implementation of green manufacturing in the cement industry in Indonesia. The implementation of *green*

manufacturing is indeed a key effort in reducing emissions from cement production and in an effort to achieve the target of reducing the greenhouse gas effect produced by the cement industry.(Czigler et al., 2020; Dubey et al., 2012; Junianto et al., 2023; Zeb et al., 2019)

Internal environmental management* has a positive effect on *green purchasing.

Based on the hypothesis test, it can be seen that H3 has a p-value of 0.000 and a T-statistic of 11.818 > 1.64. These results show that the hypothesis is accepted so that it can be concluded that *internal environmental management* has a positive and significant influence on *green purchasing*. This is also shown by *the contribution of internal environmental management* of 55.4% to *green purchasing*. Or it can be interpreted that increasing *internal environmental management* commitments will increase the implementation of *green purchasing* by 55.4%. This is in line with research that states thatChien et al. (2007)Habib et al. (2022) *internal environmental management* has a positive and significant influence on *green purchasing*. The results of this study also support research conducted by which it shows that strong internal environmental management encourages Zhu & Sarkis (2006),BOWEN et al. (2001)*green purchasing* practices by increasing corporate awareness and commitment to sustainability and internal environmental management contributes positively to *green purchasing*, with companies that have a good environmental management system more able to adopt green purchasing practices. *Green purchasing* or green purchasing in this greatly affects the sustainability of the relationship between the company's internal and external to be able to collaborate together in improving the company's performance. In the cement industry itself, green purchasing is something that is done in order to support the achievement of the company's targets in environmental performance, this is in line with the 2022 Semen Indonesia Sustainability Report that the company has made green purchases starting from *alternative* fuels and raw materials for the environment and encourages suppliers to implement ISO 14001 or carry out greener production. Other research also emphasizes the importance of green purchasing in the cement industry as part of a strategy to reduce environmental impact and meet increasingly stringent regulations. By integrating greener purchasing practices, the cement industry can improve sustainability and overall environmental performance.(Gelderman et al., 2015; Govindan et al., 2013; Kumar & Chandrakar , 2012)

Internal environmental management* has a positive effect on *green transportation.

Based on the hypothesis test, it can be seen that H3 has a p-value of 0.000 and a T-statistic of 22.428 > 1.64. These results show that the hypothesis is accepted so that it can be concluded that *internal environmental management* has a positive and significant influence on *green transportation*. This is also shown by the contribution of *internal environmental management* of 76.9% to *green transportation* or it can be interpreted that an increase in one *internal environmental management unit* will increase the implementation of *green transportation* by 76.9%. This is in line with research that observes that Habib et al. (2022)*internal environmental management* has a positive and significant influence on *green transportation*. The results of this study also support research conducted by which shows that strong C.-S.Yang et al. (2013)*internal environmental management* can encourage green supply chain management (GSCM) practices, including *green transportation*, by increasing corporate awareness and commitment to sustainability. The impact of *green transportation* is the opportunity to reduce transportation costs and reduce emissions arising from the transportation process in the company environment and outbound. The focus on green transportation is to reduce fuel, maximize delivery routes, reduce emissions through environmentally friendly vehicles and carry out periodic rejuvenation and maintenance of vehicles. *Green transportation* is one of the efforts that the cement industry can make in reducing cost effectiveness and achieving emission reduction targets.(Czigler et al., 2020; Fore & Mbohwa, 2015)

Internal environmental management* berpengaruh positif terhadap *green facilities

Based on the hypothesis test, it can be seen that H4 has a p-value of 0.000 and a T-statistic of 18.895 > 1.64. These results show that the hypothesis is accepted so that it can be concluded that *internal environmental management* has a positive and significant influence on the implementation of GSCMP, namely *green facilities*.

This is also shown by *the contribution of internal environmental management* of 72.6% to the implementation of *green facilities*. Or it can be interpreted that the commitment *of internal environmental management* will increase the implementation of *green facilities* by 72.6%. This result is in line with research that found Habib et al. (2022)*that internal environmental management* has a positive and significant influence on the implementation of GSCMP, namely *green facilities.* This research also supports research that has been conducted that the implementation of strong internal environmental management contributes to the adoption of Zhu et al. (2013)*green supply chain practices*, including the management of green facilities that improve the company's environmental and operational performance. Green Facilities aims to carry out energy efficiency in facilities such as *warehouses* and production facilities to reduce the carbon footprint caused by activities at these facilities. The application of green facilities in the cement industry is expected to improve the company's environmental and operational performance. (Rehman Khan et al., 2022)

***Green manufacturing* has a positive effect on the company's environmental performance**

Based on the hypothesis test, it can be seen that H5a has a p-value of 0.000 and a T-statistic of 3.493 > 1.64. These results show that the hypothesis is accepted so that it can be concluded that *green manufacturing* has a positive and significant influence on *environmental performance*. This is also shown by the contribution of *green manufacturing* of 34.9% to *environmental performance*. Or it can be interpreted that increasing the implementation of *green manufacturing* in the cement industry will increase *environmental performance* by 34.9%. This result is in line with research conducted by those who found that green manufacturing has a positive and significant effect on Yildiz Çankaya & Sezen (2019)*the company's* environmental performance.*Green manufacturing* is one of the most important steps in GSCM activities. Green production is the adoption and planning of activities that will require less energy and resource use in the production system and cause minimal environmental pollution (Gao et al., 2009). Green manufacturing aims to continuously improve industrial processes and products to prevent or reduce air, soil, and water pollution. In summary, green manufacturing aims to produce environmentally friendly products with minimal resources (materials, energy and water) and minimal waste (Routroy, 2009). In the cement industry, green manufacturing is the main action in the implementation of GSCM in achieving emission reduction targets, in the cement industry, the highest emissions are production activities or energy use. It also stated that to achieve the target of reducing emissions in the cement industry by 2030 or zero emissions by 2050, the cement industry needs to transform cement production to be greener or green manufacturing. Based on the results of this study, cement companies in Indonesia need to focus on making the transition to greener production starting from minimizing fuel use, using environmentally friendly energy and reducing waste generated from production, this will have a significant impact on the achievement of all company targets ranging from environmental, financial, operational and social performance. (Czigler et al., 2020)(International Energy Agency, n.d.)*The Sustainability Report* of PT Semen Bangun Indonesia (2022) also shows that the cement industry has carried out manufacturing transformation by prioritizing the use of alternative energy for cement production energy sources, PT SBI in 2022 has used approximately 10% of alternative energy to replace coal.

***Green purchasing* has a positive effect on the company's environmental performance.**

Based on the hypothesis test, it can be seen that H6 has a p-value of 0.380 and a T-statistic of 0.304 < 1.64. These results show that the hypothesis is rejected so that it can be concluded that *green purchasing* has no effect on *environmental performance*. This is also shown by the contribution of *green purchasing* of 1.8% to *environmental performance*. Or it can be interpreted that the increase in the implementation of *green purchasing* is not significant, having an impact on *environmental performance* by only 1.8%. The results of this study are quite in line with those that show that (Yildiz Çankaya & Sezen, 2019; Younis et al., 2016)*green purchasing* has no effect on the company's environmental performance. In this study, it does not show a relationship between *green purchasing* and *environmental performance*, this may be due to the fact that green purchasing focuses more on improving the environmental performance of suppliers in general, the company has environmental performance because the company itself is not from the company's partners. The

success of (Eltayeb et al., 2011)*green purchasing* in supporting environmental performance if carried out consistently and every supplier in the supply chain provides support for the sustainability of the *green purchasing* program. At this time, the cement industry still lacks the availability of suppliers who are able to meet the needs and demands. green purchasing in the cement industry.

***Green transportation* has a positive effect on the company's environmental performance**

Based on the hypothesis test, it can be seen that H7a has a p-value of 0.365 and a T-statistic of 0.346 <1.64. These results show that the hypothesis is rejected so that it can be concluded that *green transportation* has no effect on *environmental performance*. This is also shown by the contribution of *green transportation* of -3.5% to *environmental performance*. Or it can be interpreted that the increase in the implementation of *green purchasing* is not significant, having an impact on *environmental performance* of only -3.5%. The results of this study are quite in line with what shows that Yildiz Çankaya & Sezen (2019)*green transportation* has no effect on the company's environmental performance. This study does not show a relationship between green transportation and *environmental performance*, this may be because the application of *green transportation* is only a small amount applied by the cement industry in Indonesia, operational vehicles in cement distribution and factory operations have not implemented *green transportation*. Based on a report by PT Semen Indonesia (Kompas, 2023), an example of the implementation of *green transportation* is the replacement of conventional vehicles with electric vehicles for employee operations and peak management operational vehicles. As stated by Abbasi, M., & Nilsson, F. (2012) the impact of *green transportation* on environmental performance is not always visible due to various obstacles such as expensive costs and lack of infrastructure.

***Green facilities* have a positive effect on the company's environmental performance.**

Based on the hypothesis test, it can be seen that H8a has a p-value of 0.007 and a T-statistic of 2.478> 1.64. These results show that the hypothesis is accepted so that it can be concluded that *green facilities* have a positive influence on the company's environmental performance. This is also shown by the contribution of *green facilities* of 27% to the company's environmental performance. This result is in line with research that shows a positive and significant influence between the application of green facilities principles on the company's environmental performanceAaltonen et al. (2013). This research also provides an overview as has been done by Chiarini, A. (2014) with green facilities in the manufacturing process significantly improving the company's environmental performance. These practices include more efficient use of energy and the use of alternative energy. The application of *green facilities* in the cement industry has been carried out in several companies in Indonesia, for example through the *Sustanability Report* of PT Semen Indonesia (2023) stating that efforts to utilize renewable energy through the construction of solar panel pilot projects in a number of factories and have been carried out to expand the use of new and renewable energy are further strengthened by the collaboration between GIS and PT PLN (Persero) through the signing of a memorandum *Memorandum of Understanding* (MoU) for the development of solar PV.

***Green manufacturing* has a positive effect on the company's economic performance.**

Based on the hypothesis test, it can be seen that H5b has a p-value of 0.000 and a T-statistic of 3.355 > 1.64. These results show that the hypothesis is accepted so that it can be concluded that *green manufacturing* has a positive and significant influence on *economic performance*. This is also shown by the contribution of *green manufacturing* of 29.4% to *economic performance*. Or it can be interpreted that an increase in one unit of *green manufacturing* will increase *economic performance* by 29.4%. The results of this study support the research conducted by those who show that (Yildiz Çankaya & Sezen, 2019)*green manufacturing* has a positive and significant effect on improving the company's economic performance. Through green production, manufacturing companies can produce products with minimal use of resources and energy (Qiu et al., 2020). With green production, distribution, and packaging practices, businesses will be able to use their resources more efficiently. This will allow companies to reduce their production costs and improve their efficiency. It is also mentioned in the literature that green production practices can help businesses increase their productivity (Luthra et al., 2016) and increase

profits (Luthra et al., 2016; Hsu et al., 2016) and market share growth (Hsu et al., 2016). This research also proves that there is an influence of the implementation of green production on the cement industry in Indonesia, *the Sustanaibility Report* of PT Solusi Bangun Indonesia (2023) which states that there is an increase in green solution programs consisting of environmentally friendly cement products, value-added construction solutions, and integrated waste management services, contributing 42.21% to the company's revenue, PT SBI also managed to take advantage of 1,660. 932 tons of garbage and waste as *alternative energy* sources (AF) in cement kilns which indirectly have an impact on the company's economic performance, because the price of the AF used is cheaper than the price of coal that is commonly used as an energy source.

***Green purchasing* has a positive effect on the company's economic performance.**

Based on the hypothesis test, it can be seen that H6b has a p-value of 0.329 and a T-statistic of 0.443< 1.64. These results show that the hypothesis is rejected so that it can be concluded that *green purchasing* has no influence on *economic performance*. This is also shown by the contribution of *green purchasing* to economic performance of only 0.2%. The results of this study are in line with research conducted by which shows that Zhu et al. (2007)*green purchasing* has no relationship with improving the company's economic performance. Green purchasing is an external factor of GSCM that does not directly affect the economic performance of companies, As stated by Hall (2000), the participation of dominant organizations is necessary for external GSCM practices to succeed because these companies are under constant environmental pressures, and they have a considerable impact on their suppliers. Therefore, there must be a strong relationship between producers and suppliers for successful green/green purchasing practices. in the cement industry, especially in Indonesia, it is still focused on the implementation of *green manufacturing* because according to the International Energy Agency (2020) that reducing emissions and achieving the target of reducing the effect of greenhouse gases in the cement industry must be done on energy efficiency and production, indirectly in the cement industry there has been no significant collaboration in *green purchasing* between cement producers and suppliers in their supply chains.

***Green transportation* has a positive effect on the company's economic performance.**

Based on the hypothesis test, it can be seen that H7b has a p-value of 0.000 and a T-statistic of 3.522 > 1.64. These results show that the hypothesis is accepted so that it can be concluded that *green transportation* has a positive and significant influence on *economic performance*. This is also shown by the contribution of *green transportation* of 29.2% to *economic performance*. The results of this study are in line with research conducted by Yang et al. (2017) which shows that the implementation of *green transportation* has an effect on improving the economic performance of companies. Evangelistaet et al. (2017) found that logistics container shipping companies that implement *green transportation practices* have experienced improved economic performance. Research by Kazancoglu et al. (2018) conducted on a delivery logistics company in Turkey shows that the implementation of green transportation significantly improves the economic performance of companies. The reduction of operational costs and the improvement of operational efficiency contribute greatly to the company's economic performance. In the cement industry, the application of *green transportation* will be carried out on the delivery of cement to distributors, the efficiency of vehicles in the factory, periodic vehicle maintenance and starting to use environmentally friendly vehicles in operations and distribution, this certainly has a direct impact on the company's economic performance.

***Green facilities* have a positive effect on the company's economic performance.**

Based on the hypothesis test, it can be seen that H6 has a p-value of 0.023 and a T-statistic of 2.006 > 1.64. These results show that the hypothesis is accepted so that it can be concluded that *green facilities* have a positive and significant influence on *economic performance*. This is also shown by the contribution of *green facilities* of 21.9% to *economic performance*. The results of this study support the research conducted by Wong et al. (2014) that investment in *green facilities* contributes to improving the economic performance of companies by reducing energy and operational costs and improving resource efficiency. The cement industry

in Indonesia has also begun to apply the principle of *green facilities*, for example PT Solusi Bangun Indonesia has collaborated with PT Energi Mitra Indika Tenaga Surya (EMITS) on January 31, 2023, at the Narogong Factory. This project aims to replace most of the electrical energy needs in the operations of factories, offices, and supporting facilities with clean and renewable solar energy (PT SBI's *Sustanabillity Report*, 2023). Based on this, it shows that investment in *green facilities* has a positive and significant influence on the company's economic performance. Benefits such as improved energy efficiency, reduced operational costs, improved company reputation, and customer satisfaction contribute to improved economic performance of companies that implement hija facilities

***Green manufacturing* has a positive effect on the company's operational performance.**

Based on the hypothesis test, it can be seen that H5c has a p-value of 0.002 and a T-statistic of 2.862 >1.64. These results show that the hypothesis is accepted so that it can be concluded that *green manufacturing* has a positive and significant influence on *operational performance*. This is also shown by the contribution of *green manufacturing* of 25.9% to *operational performance.* Or it can be interpreted that an increase in one unit of *green manufacturing* will increase *operational performance* by 25.9%. The results of this study support the research conducted by those who show that green manufacturing has a positive and significant effect on the company's operational performance. The main factors of green manufacturing activities affect operations due to the reduction of operational costs, increased production efficiency and reduction of production waste are some of the key factors that support the improvement of operational performance. Khan et al. (2023)(Khan et al., 2023; W. Yu et al., 2014; Zhu et al., 2013)In the cement industry, by implementing greener production, companies can save resources, reduce energy use, minimize waste produced and carry out more effective production.

***Green purchasing* has a positive effect on the company's operational performance.**

Based on the hypothesis test, it can be seen that H6c has a p-value of 0.000 and a T-statistic of 4.025 > 1.64. These results show that the hypothesis is accepted so that it can be concluded that *green purchasing* has a positive and significant influence on *operational performance*. This is also shown by the contribution of *green manufacturing* of 27% to *operational performance*. The results of this study support the research conducted by which shows that Younis et al. (2016)*green purchasing*/green purchasing has a positive and significant effect on improving the company's operational performance. Other research also states that there is a positive and significant relationship between green purchasing and the company's operational performance, starting from operational efficiency and reducing resource use. (Green et al., 2012)Green purchasing, refers to the practice of choosing environmentally friendly and sustainable products and services. In the cement industry, the adoption of green purchasing can improve operational performance, through the purchase of more environmentally friendly materials can help reduce energy consumption in the cement production process. The practice of purchasing environmentally friendly fuels such as waste or garbage that can be an alternative fuel has been implemented by the cement industry in Indonesia ((Muhammad & Hidayatno , 2021)

***Green* transportation has a positive effect on the company's operational performance.**

Based on the hypothesis test, it can be seen that H7c has p-values of 0.000 and T-statistics of 3.14 > 1.64. These results show that the hypothesis is accepted so that it can be concluded that *green purchasing* has a positive and significant influence on *operational performance*. This is also shown by the contribution of *green manufacturing* of 31.7% to *operational performance*. The results of this study are in line with research conducted by which shows that Zhu et al. (2005)*green transportation* has a positive and significant effect on improving the company's operational performance. Through the implementation of *green transportation*, operational activities will have a significant impact starting from the delivery of raw materials, product distribution, monitoring and evaluation of shipments, which have a direct impact on operations. In the cement industry with 24-hour manufacturing activities, it is important to prioritize (Sahoo & Vijayvargy , 2020; Zhu et al., 2013)*green transportation* activities because based on this research, green transportation has an effect of 31.7% on the company's operational performance in the cement industry.

***Green facilities* have a positive effect on the company's operational performance.**

Based on the hypothesis test, it can be seen that H8c has p-values of 0.396 and T-statistics of 0.258 < 1.64. These results show that the hypothesis is rejected so that it can be concluded that *green facilities* have no influence on the company's operational performance. This is also shown by the contribution of *green facilities* to operational performance of only 0.21%. The results of this study are in line with research conducted by which shows that green facilities do not have a significant effect on improving the company's operational performance. (Habib et al., 2022)*Green facilities* are more implemented, focusing more on reducing the resulting emissions which have a greater impact on the company's environmental performance. PT SBI's sustainability report (2023) also states that the cement industry is in the process of replacing energy sources in production buildings with solar panels which aims to reduce the environmental impact and greenhouse gas emissions produced by facilities.

***Green manufacturing* has a positive effect on the company's social performance.**

Based on the hypothesis test, it can be seen that H5d has p-values of 0.006 and T-statistics of 2.55 > 1.64. These results show that the hypothesis is accepted so that it can be concluded that *green manufacturing* has a positive and significant influence on *social performance*. This is also shown by the contribution of *green manufacturing* of 23.7% to *social performance.* Or it can be interpreted that increasing the implementation of *green manufacturing* will increase *social performance* by 23.7%. The results of this study support the research conducted by those who show that (Yildiz Çankaya & Sezen, 2019)*green manufacturing* has a positive and significant effect on *the company's* social performance.Companies that adopt and implement environmentally sensitive production approaches will be able to develop better relationships with the community and with the help of green production, the removal of hazardous chemicals from the production process will prevent workers from being exposed to pollutants and harmful substances.(Hejazi et al., 2023; Çankaya & Sezen, 2019)

***Green purchasing* has a positive effect on the company's social performance.**

Based on the hypothesis test, it can be seen that H6d has p-values of 0.435 and T-statistics of 0.164 < 1.64. These results show that the hypothesis is rejected so that it can be concluded that *green purchasing* has no effect on *environmental performance*. This is also shown by the contribution of *green purchasing* of 0.8% to *social performance*. The results of this study are quite in line with what shows that (Yildiz Çankaya & Sezen, 2019; Younis et al., 2016)*green purchasing* has no effect on the company's social performance. This study does not show a relationship between *green purchasing* and *social performance*, this may be due to the fact that green purchasing focuses more on improving the environmental performance of suppliers in general, the company has social performance because the company itself is not from the company's partners. The success of (Eltayeb et al., 2011)*green purchasing* in supporting environmental performance if carried out consistently and every supplier in the supply chain provides support for the sustainability of the *green purchasing* program. At this time, the cement industry still lacks the availability of suppliers who are able to meet the needs and demands. green purchasing in the cement industry.

***Green transportation* has a positive effect on the company's social performance.**

Based on the hypothesis test, it can be seen that H7d has p-values of 0.003 and T-statistics of 2.815 > 1.64. These results show that the hypothesis is accepted so that it can be concluded that *green transportation* has a positive and significant influence on *social performance*. This is also shown by the contribution of *green transportation* of 26.6% to *social performance*. The results of this study are in line with research conducted by which shows that Zhu et al. (2022)*green transportation* has a positive and significant effect on improving corporate social performance. The implementation of green transportation practices not only helps companies in achieving environmental sustainability but also improves their overall social performance, Key benefits include improving the welfare and safety of local communities, reducing the negative impact of transportation on society, increasing corporate social responsibility, and reducing emissions that are detrimental to public health (Chen et., al. 2021).

***Green facilities* have a positive effect on the company's social performance.**

Based on the hypothesis test, it can be seen that H6d has a p-value of 0.134 and a T-statistic of 1.11< 1.64. These results show that the hypothesis is rejected so that it can be concluded that *green facilities* have no effect on *environmental performance*. This is also shown by the contribution of *green purchasing* of 0.8% to *social performance*. The results of this study are quite in line with the research of Delmas et al. (2018) which shows that *green purchasing* has no effect on corporate social performance. The main focus of green facilities tends to be energy efficiency and environmental impact reduction, rather than social aspects. Although *green facilities* contribute to improving a company's environmental and economic performance, its impact on social aspects such as employee well-being, community involvement, and corporate social responsibility is not always significant. This suggests that companies may need to adopt more comprehensive and integrated strategies to improve social performance beyond simply implementing green facilities (Zeng et., al. 2019).

Internal environmental management* berpengaruh positif terhadap *green supply chain management practices.

Based on the hypothesis test, it can be seen that H9 has a p-value of 0.000 and a T-statistic of 68.325 > 1.64. These results show that the hypothesis is accepted so that it can be concluded that *internal environmental management* has a positive and significant effect on the implementation of *green supply chain management practices.* This is also shown by *the contribution of internal environmental management* of 88.1% to *GSCM Practices*. Or it can be interpreted that an increase in one unit of *IEM* will increase *GSCMP* by 88.3%. The results of this study are quite in line with what shows that (Habib et al., 2022)*IEM* has a positive and significant effect on the company's policy in implementing GSCM practices. The GSCM practice is a strategy that companies can apply in reducing the impact of production by placing green elements along the supply chain. Cement companies in Indonesia have committed and targeted in reducing the emissions produced, therefore the cement industry in Indonesia through internal management has implemented many GSCM practices in the company.(Chiarini, 2014; Li & Li, 2022; Park et al., 2022; Teixeira et al., 2023; Yildiz Çankaya & Sezen, 2019)

Green supply chain management practices* have a positive effect on *corporate performance.

Based on the hypothesis test, it can be seen that H10 has a p-value of 0.000 and a T-statistic of 26.015 > 1.64. These results show that the hypothesis is accepted so that it can be concluded that *green supply chain management practices* have a positive and significant effect on the implementation of *corporate performance.* This is also shown by the contribution of *GSCM Practices management* of 78.4% to *corporate performance*. The results of this study are quite in line with what shows that GSCM practices have a positive and significant effect on company policies in implementing company performance. The GSCM practice is a strategy that companies can apply in reducing the impact of production by placing green elements along the supply chain. Implementing GSCM practices is an action that needs to be taken by the cement industry to achieve sustainability, the implementation of GSCM practices will have a direct impact on emission reduction, production costs, energy efficiency, social performance and help the cement industry in achieving greenhouse gas emission targets. (Agyabeng -Mensah et al., 2020)(Chiarini, 2014; Li & Li, 2022; Park et al., 2022; Teixeira et al., 2023; Yildiz Çankaya & Sezen, 2019)

Green supply chain management practices* positively mediate the relationship between *internal environmental management* and *corporate performance.

Based on the hypothesis test, it can be seen that H11 has a p-value of 0.000 and a T-statistic of 22.453> 1.64. These results show that the hypothesis is accepted so that it can be concluded that *Green supply chain management practices* positively and significantly mediate the relationship between *internal environmental management* and *corporate performance*. Or it can be interpreted that an increase in one unit of *IEM* will increase *corporate performance* through *GSCM practices* by 69.1%. The results of this study are quite in line with those that show that GSCM practices have a positive and significant effect on strengthening the relationship between internal environmental management and company performance. Implementing GSCM practices is an action that needs to be taken by the cement industry to achieve sustainability, the implementation of GSCM practices will have a direct impact on emission reduction, production costs, energy efficiency, social performance and

help the cement industry in achieving the company's performance targets. GSCM is a strategy that can be applied by internal management in achieving targets in the environmental, economic, operational and social fields(Khan et al., 2023)

CONCLUSION AND SUGGESTION

This study shows that internal environmental management has a positive influence on the implementation of green supply chain management (GSCM) practices in cement companies in Indonesia, with dimensions including green manufacturing, green purchasing, green transportation, and green facilities. Green manufacturing provides the highest contribution of 87.3% to the environmental performance of cement companies. GSCM practices have been proven to significantly contribute to company performance in environmental, economic, operational, and social sectors. Green manufacturing and green facilities significantly impact environmental performance, while green purchasing does not have a direct impact. Green transportation positively affects economic, operational, and social performance but not environmental performance. This study also found that GSCM practices mediate the relationship between internal environmental management and company performance, thus promoting corporate sustainability. These findings provide input for company managers to focus on implementing green manufacturing and green facilities to achieve high performance targets. The study suggests further research involving other GSCM strategy variables and including different industries to see their broader impacts.

REFERENCES

International Energy Agency, I. (n.d.). *Technology Roadmap - Low-Carbon Transition in the Cement Industry*. www.wbcsdcement.org.

Aaltonen, A., Määttänen, E., Kyrö, R., & Sarasoja, A. L. (2013). Facilities management driving green building certification: A case from Finland. *Facilities*, *31*(7), 328–342. https://doi.org/10.1108/02632771311317475

Agyabeng-Mensah, Y., Ahenkorah, E., Afum, E., Nana Agyemang, A., Agnikpe, C., & Rogers, F. (2020). Examining the influence of internal green supply chain practices, green human resource management and supply chain environmental cooperation on firm performance. *Supply Chain Management*, *25*(5), 585–599. https://doi.org/10.1108/SCM-11-2019-0405

BOWEN, F. E., COUSINS, P. D., LAMMING, R. C., & FARUKT, A. C. (2001). THE ROLE OF SUPPLY MANAGEMENT CAPABILITIES IN GREEN SUPPLY. *Production and Operations Management*, *10*(2), 174–189. https://doi.org/10.1111/j.1937-5956.2001.tb00077.x

Chiarini, A. (2014). Sustainable manufacturing-greening processes using specific Lean Production tools: An empirical observation from European motorcycle component manufacturers. *Journal of Cleaner Production*, *85*, 226–233. https://doi.org/10.1016/j.jclepro.2014.07.080

Chien, M. K., Shih, L.-H., & Shih, ; L H. (2007). The user has requested enhancement of the downloaded file. An empirical study of the implementation of green supply chain management practices in the electrical and electronic industry and their relation to organizational performances. *Int. J. Environ. Sci. Tech*, *4*(3), 383–394. https://www.researchgate.net/publication/26483201

Czigler, T., Raiter, S., Schulze, P., & Somers, K. (2020). *Laying the foundation for zero-carbon cement*.

Dubey, R., Singh, T., & Tiwari, S. (2012). *Supply Chain Innovation is a Key to Superior Firm Performance an Insight from Indian Cement Manufacturing* (Vol. 4).

Flynn, B., Huo, B., & Zhao, X. (2010). The Impact of Supply Chain Integration on Performance: A Contingency and Configuration Approach. *Journal of Operations Management - J OPER MANAG*, *28*, 58–71. https://doi.org/10.1016/j.jom.2009.06.001

Fore, S., & Mbohwa, C. (2015). Greening manufacturing practices in a continuous process industry: Case study of a cement manufacturing company. *Journal of Engineering, Design and Technology*, *13*(1), 94–122. https://doi.org/10.1108/JEDT-04-2014-0019

Gelderman, C. J., Semeijn, J., & Bouma, F. (2015). Implementing sustainability in public procurement: The limited role of procurement managers and party-political executives. *Journal of Public Procurement*, *15*(1), 66–92. https://doi.org/10.1108/JOPP-15-01-2015-B003

Govindan, K., Khodaverdi, R., & Jafarian, A. (2013). A fuzzy multi criteria approach for measuring sustainability performance of a

supplier based on triple bottom line approach. *Journal of Cleaner Production*, *47*, 345–354. https://doi.org/10.1016/j.jclepro.2012.04.014

Green, K. W., Zelbst, P. J., Meacham, J., & Bhadauria, V. S. (2012). Green supply chain management practices: Impact on performance. *Supply Chain Management*, *17*(3), 290–305. https://doi.org/10.1108/13598541211227126

Habib, M. A., Balasubramanian, S., Shukla, V., Chitakunye, D., & Chanchaichujit, J. (2022). Practices and performance outcomes of green supply chain management initiatives in the garment industry. *Management of Environmental Quality: An International Journal*, *33*(4), 882–912. https://doi.org/10.1108/MEQ-08-2021-0189

Hejazi, M. T., Al Batati, B., & Bahurmuz, A. (2023). The Influence of Green Supply Chain Management Practices on Corporate Sustainability Performance. *Sustainability*, *15*(6), 5459. https://doi.org/10.3390/su15065459

Hopkin, P. (2014). Achieving enhanced organisational resilience by improved management of risk: Summary of research into the principles of resilience and the practices of resilient organisations. *Journal of Business Continuity & Emergency Planning*, *8*, 252–262.

Huma, S., Ahmed Siddiqui, D., & Ahmed, W. (2023). Understanding the impact of Green supply chain management practices on operational competitive capabilities. *TQM Journal*, *35*(3), 796–815. https://doi.org/10.1108/TQM-08-2021-0246

Junianto, I., Sunardi, & Sumiarsa, D. (2023). The Possibility of Achieving Zero CO2 Emission in the Indonesian Cement Industry by 2050: A Stakeholder System Dynamic Perspective. *Sustainability (Switzerland)*, *15*(7). https://doi.org/10.3390/su15076085

Khan, M. T., Idrees, M. D., & Haider, Y. (2023). Industry 4.0 impacts on operational and green innovation performances with the mediation of green practices. *International Journal of Productivity and Performance Management*. https://doi.org/10.1108/IJPPM-06-2022-0277

Kumar, R., & Chandrakar, R. (2012). Overview of Green Supply Chain Management: Operation and Environmental Impact at Different Stages of the Supply Chain. In *International Journal of Engineering and Advanced Technology (IJEAT)* (Issue 3). www.ijeat.org

Li, L., & Li, W. (2022). The Promoting Effect of Green Technology Innovations on Sustainable Supply Chain Development: Evidence from China's Transport Sector. *Sustainability (Switzerland)*, *14*(8). https://doi.org/10.3390/su14084673

Muhammad, I., & Hidayatno, A. (2021). Exploring the Variables Interactions for Cement Industry Policies to Support Sustainable Development Aspect in Indonesia through Green Manufacturing. *4th Asia Pacific Conference on Research in Industrial and Systems Engineering 2021*, 295–300. https://doi.org/10.1145/3468013.3468349

Park, S. R., Kim, S. T., & Lee, H. H. (2022). Green Supply Chain Management Efforts of First-Tier Suppliers on Economic and Business Performances in the Electronics Industry. *Sustainability (Switzerland)*, *14*(3). https://doi.org/10.3390/su14031836

Rehman Khan, S. A., Yu, Z., Sarwat, S., Godil, D. I., Amin, S., & Shujaat, S. (2022). The role of block chain technology in circular economy practices to improve organisational performance. *International Journal of Logistics Research and Applications*, *25*(4–5), 605–622. https://doi.org/10.1080/13675567.2021.1872512

Sahoo, S., & Vijayvargy, L. (2020). Green supply chain management practices and its impact on organizational performance: evidence from Indian manufacturers. *Journal of Manufacturing Technology Management*, *32*(4), 862–886. https://doi.org/10.1108/JMTM-04-2020-0173

SROUFE, R. (2003). EFFECTS OF ENVIRONMENTAL MANAGEMENT SYSTEMS ON ENVIRONMENTAL MANAGEMENT PRACTICES AND OPERATIONS. *Production and Operations Management*, *12*(3), 416–431. https://doi.org/10.1111/j.1937-5956.2003.tb00212.x

Teixeira, A. A., Moraes, T. E. C., Teixeira, T. B., Battistelle, R. A. G., Araújo, E. G., & de Seabra, Q. A. C. (2023). The Role of Green Supply Chain Management Practices on Environmental Performance of Firms: An Exploratory Survey in Brazil. *Sustainability*

(Switzerland), *15*(15). https://doi.org/10.3390/su151511843

Yang, C.-S., Lu, C.-S., Haider, J. J., & Marlow, P. B. (2013). The effect of green supply chain management on green performance and firm competitiveness in the context of container shipping in Taiwan. *Transportation Research Part E: Logistics and Transportation Review*, *55*, 55–73. https://doi.org/10.1016/j.tre.2013.03.005

Yildiz 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

Younis, H., Sundarakani, B., & Vel, P. (2016). The impact of implementing green supply chain management practices on corporate performance. *Competitiveness Review*, *26*(3), 216–245. https://doi.org/10.1108/CR-04-2015-0024

Yu, K., Luo, B. N., Feng, X., & Liu, J. (2018). Supply chain information integration, flexibility, and operational performance. *The International Journal of Logistics Management*, *29*(1), 340–364. https://doi.org/10.1108/IJLM-08-2016-0185

Yu, W., Chavez, R., Feng, M., & Wiengarten, F. (2014). Integrated green supply chain management and operational performance. *Supply Chain Management*, *19*, 683–696. https://doi.org/10.1108/SCM-07-2013-0225

Zeb, K., Ali, Y., & Khan, M. W. (2019). Factors influencing environment and human health by cement industry. *Management of Environmental Quality: An International Journal*, *30*(4), 751–767. https://doi.org/10.1108/MEQ-06-2018-0112

Zhu, Q., & Sarkis, J. (2006). An inter-sectoral comparison of green supply chain management in China: Drivers and practices. *Journal of Cleaner Production*, *14*(5), 472–486. https://doi.org/10.1016/j.jclepro.2005.01.003

Zhu, Q., & Sarkis, J. (2007). The moderating effects of institutional pressures on emergent green supply chain practices and performance. *International Journal of Production Research*, *45*(18–19), 4333–4355. https://doi.org/10.1080/00207540701440345

Zhu, Q., Sarkis, J., & Geng, Y. (2005). Green supply chain management in China: pressures, practices and performance. *International Journal of Operations & Production Management*, *25*(5), 449–468. https://doi.org/10.1108/01443570510593148

Zhu, Q., Sarkis, J., & Lai, K. (2007). Initiatives and outcomes of green supply chain management implementation by Chinese manufacturers. *Journal of Environmental Management*, *85*(1), 179–189. https://doi.org/10.1016/j.jenvman.2006.09.003

Zhu, Q., Sarkis, J., & Lai, K. (2013). Institutional-based antecedents and performance outcomes of internal and external green supply chain management practices. *Journal of Purchasing and Supply Management*, *19*(2), 106–117. https://doi.org/10.1016/j.pursup.2012.12.001