

Corporate Sustainability Performance in the Indonesian Fertilizer Industry: A Strategic Approach with PT Pupuk Indonesia (Persero)



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ABSTRACT: This study investigates the determinants of Corporate Sustainability Performance (CSP) in PT Pupuk Indonesia (Persero), a leading state-owned enterprise in Indonesia's fertilizer industry. The research focuses on the impact of Environmental, Social, Governance (ESG), Operational, Leadership, and Strategic Transformation factors on CSP. Utilizing a Structural Equation Modeling-Partial Least Squares (SEM-PLS) approach, the study reveals that Operational Performance is the most significant driver of CSP, with Governance and Social factors also playing crucial roles. However, Environmental, Leadership, and Strategic Transformation variables show limited direct influence on CSP. These findings suggest that while operational efficiency and governance are critical for enhancing sustainability, the importance of social responsibility, visionary leadership, and long-term environmental strategies should not be underestimated. The study offers strategic insights for corporate leaders, emphasizing a balanced and comprehensive approach to achieving sustainable growth in energy-intensive industries.

KEYWORDS: Corporate Sustainability Performance, Operational Performance, Governance, Social Responsibility, Structural Equation Modeling (SEM-PLS).

I. INTRODUCTION

Sustainable development is one of the greatest challenges facing humanity today. The concept of sustainability centers on the ability of current generations to meet their needs without compromising the ability of future generations to meet theirs. This principle, often summarized as the "Triple Bottom Line" (Profit, People, Planet), is foundational to corporate sustainability. As a leading representative of the fertilizer industry, PT Pupuk Indonesia (Persero) has embraced this principle by optimizing resources, building productive collaborations with communities, partnering with the government, and engaging other stakeholders in the pursuit of sustainability. Their approach serves as a model within the industry, demonstrating how sustainability can be integrated into core business strategies.

Corporate sustainability performance refers to a company's efforts to prioritize social responses to environmental and economic challenges (Meadows et al., 1972). These efforts are intended to meet the needs of the present while safeguarding the interests of future generations (WCED, 1987). As sustainability concepts evolve, they are increasingly being integrated into business and investment strategies. This integration helps enhance business practices by balancing the needs of current and future stakeholders (Pemer et al., 2020). The emphasis on stakeholder interests spans economic, social, operational, and environmental dimensions of corporate performance. Svenson (2016) analyzed various measures associated with the three pillars of sustainability, often referred to as the "3P" framework: Profit, People, and Planet. Each pillar encompasses specific aspects that are critical for achieving corporate sustainability:

- Economic Pillar (Profit):** Svenson highlighted profitability, competitiveness, financial performance, and brand strength as key measures. These aspects are crucial for the long-term financial viability of a company, ensuring it remains competitive and profitable while building and maintaining a strong brand reputation in the market.
- Environmental Pillar (Planet):** For the environmental dimension, Svenson examined measures such as product carbon footprint, climate change programs, decarbonization efforts, and waste management practices. These initiatives are essential for reducing environmental impact, addressing climate change, and contributing to a more sustainable planet.
- Social Pillar (People):** The social aspect of sustainability, as analyzed by Svenson, includes corporate culture, company reputation, reporting practices, and employee health programs. These factors are vital for fostering a positive workplace environment, ensuring transparency and accountability, and promoting the well-being of employees.

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For customers, PT Pupuk Indonesia (Persero) fulfills its responsibilities through product and service innovations that offer greater choices and maximize customer satisfaction. Improvements in service quality and product innovation are reflected in customer satisfaction surveys. In alignment with its commitment to enhancing employee competencies, PTPI conducts various educational and training programs. The company is also committed to creating a safe and healthy work environment, which has led to significant achievements, such as a zero fatality rate in workplace accidents (PTPI Annual Report, 2022).

The strategic business transformation model for achieving corporate sustainability performance at PT Pupuk Indonesia (Persero) is illustrated in Figure 1.

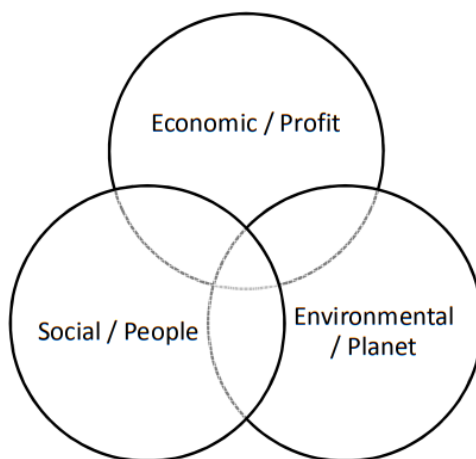


Figure 1. Triple bottom line

Source: Wilson (2015)

According to Shaw (2003), two main theories are associated with Good Corporate Governance (GCG): stewardship theory and agency theory. Stewardship theory is based on the philosophical assumption about human nature, which posits that people are inherently trustworthy, capable of acting responsibly, and possess integrity and honesty towards others. This aligns with the fiduciary relationship desired by shareholders. On the other hand, agency theory views corporate management as "agents" for shareholders, suggesting that managers will act in their own self-interest rather than as wise and just stewards for the shareholders.

The National Committee on Governance Policy (KNKG) in Indonesia has established five key pillars of GCG, commonly known as the TARIF concept: Transparency, Accountability, Responsibility, Independence, and Fairness. Transparency involves openness in decision-making processes and the disclosure of material and relevant information about the company. Accountability refers to the clarity of functions, execution, and responsibility within the organization, ensuring effective management. Responsibility emphasizes compliance with applicable laws and sound corporate principles in company management. Independence is characterized by the professional management of the company without conflicts of interest or undue influence from external parties, in accordance with laws and healthy corporate principles. Fairness entails justice and equality in fulfilling the rights of stakeholders, as stipulated by agreements and laws.

These five components are crucial because the consistent application of good corporate governance principles has been proven to enhance the quality of financial reporting and can also prevent performance manipulation that could result in financial statements not reflecting the company's fundamental value.

PT Pupuk Indonesia (Persero), a dominant state-owned enterprise in Indonesia, plays a pivotal role in the fertilizer industry, encompassing both the production and marketing of fertilizers as well as non-fertilizer products, including agricultural chemicals. As the largest fertilizer company in Indonesia and a state-owned entity, PT Pupuk Indonesia bears a significant responsibility to provide high-quality fertilizers to farmers nationwide, serving as a critical pillar in supporting the country's agricultural sector. However, in recent years, the company has faced a series of challenges that have negatively impacted its profitability. Financial reports from 2016 to 2020 indicate a downward trend in profitability, signaling underlying issues affecting the company's performance. Over these five years, net income and total comprehensive income experienced declines of -9.88% and -51.6%, respectively.

Several factors have contributed to the declining profitability of PT Pupuk Indonesia, including intensifying competition and a shrinking market share due to the increasing number of competitors in the fertilizer industry. The company's reputation, the types of fertilizers used, and changes in subsidy policies have also influenced its competitiveness (Wahyuningdyah et al., 2021; Laszlo & Zhexembayeva, 2017). Additionally, market dynamics, fluctuations in international prices, and shifts in demand trends for commercial products have played a role in the company's performance (Alssayah & Krishnamurti, 2013; Nilsson et al., 2011). Potential changes in subsidy policies, such as improper allocation or the removal of support for certain chemical fertilizers, have had a significant impact on the company's profitability (Osorio et al., 2011; Fabi & Munthe, 2016). External factors such as raw

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material price fluctuations, currency volatility, and changes in global economic conditions have also affected production costs and the competitiveness of PT Pupuk Indonesia's fertilizer products in international markets (Hignett, 1985).

II. STUDY LITERATURE

A gap analysis explains the differences between previous research results and the current study. This research focuses on the influence of the 3P (People, Planet, and Profit) on the sustainability performance of PT Pupuk Indonesia (Persero) and explores the factors related to corporate sustainability performance. The study aims to formulate strategies for achieving corporate sustainability performance at PT Pupuk Indonesia (Persero).

Business presence is expected to go beyond profit generation, contributing to sustainable benefits that can be enjoyed in the future (Jørgensen and Pedersen, 2018). Sustainable business model innovation involves the analysis and planning of business model transformations that are more sustainable. This transformation can take various forms, such as sustainable entrepreneurship, sustainable business model transformation, diversification of sustainable business models, and acquisition of sustainable business models (Geissdoerfer et al., 2018).

Trends in sustainable business models can comprehensively transform the processes of production, consumption, and recycling of residual materials (Boons & Lüdeke-Freund, 2013). Sustainable business model innovation can serve as a growth strategy for business development (Nathaniela, 2022). Utilizing resources effectively and efficiently through product and service adjustments enhances offerings to potential customers.

The Triple Bottom Line (TBL) concept measures performance across three pillars: economic (financial), social, and environmental. Typically, companies measure financial performance using metrics such as Return on Assets, Return on Equity, absolute profitability, and various accounting measures. Social and environmental performance is often evaluated through Corporate Social Responsibility (CSR) initiatives. The TBL pillars support sustainability, reinforcing each other and contributing to the overall sustainability of the business.

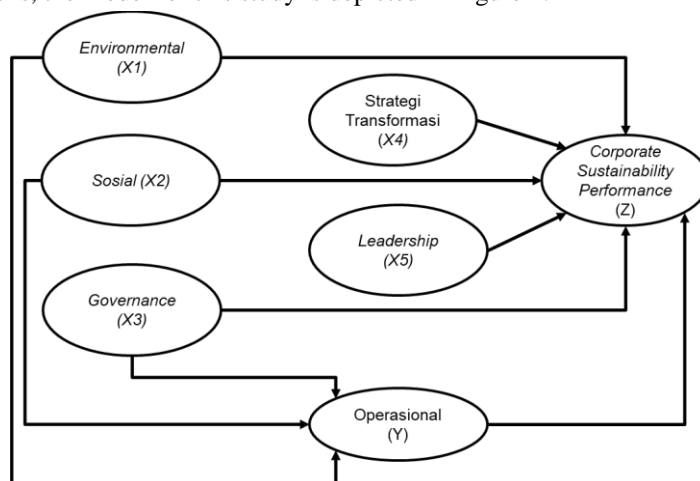
III. METHODOLOGY

The method represented by the figure is based on Structural Equation Modeling (SEM), which is a statistical technique used to analyze complex relationships between observed and latent variables. Here's an explanation of the method in the context of the model for PT Pupuk Indonesia (Persero):

1. Model Construction

- Latent Variables: The model includes several latent variables, which are not directly observed but inferred from other variables. In this case, the latent variables include Environmental (X1), Social (X2), Governance (X3), Operational (Y), Strategic Transformation (X4), Leadership (X5), and Corporate Sustainability Performance (Z).
- Path Diagram: The figure is a path diagram, which visually represents the hypothesized relationships between these latent variables. Arrows indicate the direction of influence, showing how one variable is expected to impact another.

Based on the above explanations, the model for this study is depicted in Figure 2.



In this mode, Environmental (X1), Social (X2), and Governance (X3) are the exogenous variables, representing the external factors that could influence the company's sustainability performance. These variables align with the triple bottom line (3P) approach: Planet (Environmental), People (Social), and Profit (Governance). Operational (Y) serves as another exogenous variable, likely representing the internal operational efficiency and effectiveness within the company.

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Strategic Transformation (X4) and Leadership (X5) are mediating variables in the model. They suggest that the company's strategic transformation initiatives and the quality of leadership influence the direct relationship between the exogenous variables and the Corporate Sustainability Performance (Z).

Corporate Sustainability Performance (Z) is the endogenous variable or the primary outcome of interest, reflecting how well PT Pupuk Indonesia performs in terms of sustainability.

2. Hypothesis

The hypotheses presented here explore the relationships between environmental, social, governance, and operational factors and their impact on corporate sustainability performance at PT Pupuk Indonesia (Persero). The company's efforts, aligned with sustainable development principles, demonstrate a comprehensive approach to balancing profit, people, and the planet in its pursuit of long-term success. Further research and analysis will provide deeper insights into the effectiveness of these strategies and their implications for corporate sustainability.

Hypothesis 1: Environmental Factors Influence Corporate Sustainability Performance PT Pupuk Indonesia (Persero) has developed a decarbonization roadmap to support the government's Net Zero Emission target by 2060. This initiative aligns with the Ministry of State-Owned Enterprises Circular No. SE-6/MBU/12/2022 on Decarbonization Programs and Carbon Value Implementation in State-Owned Enterprises. The company is also developing green ammonia, produced from renewable energy sources, to support its sustainability commitment. The strategic initiatives implemented in 2022 led to the highest profit in the company's history, totaling IDR 18.51 trillion (PTPI Annual Report, 2022). Therefore, Hypothesis 1 is formulated to examine the impact of environmental factors on Corporate Sustainability Performance.

Hypothesis 2: Social Factors Influence Corporate Sustainability Performance Corporate Social Responsibility (CSR) is defined as a business's commitment to ethical behavior and contributions to economic development, improving the quality of life for employees, their families, local communities, and society at large (WBCSD, 2007). Consistent CSR efforts can foster community acceptance of a company's presence. According to John Elkington (1998), companies aiming for sustainability must address the "3P" (People, Planet, Profit), involving themselves in social welfare and environmental preservation. Thus, Hypothesis 2 explores the influence of social factors (people) on Corporate Sustainability Performance.

Hypothesis 3: Governance Influences Corporate Sustainability Performance Good Corporate Governance (GCG) and sustainability report disclosures are crucial for enhancing corporate performance. Effective implementation of GCG is expected to drive economic growth and transparency, benefiting various stakeholders (Bondy et al., 2008). GCG structures typically include managerial ownership, institutional ownership, audit committees, and independent commissioners. Hence, Hypothesis 3 investigates the relationship between Governance and Corporate Sustainability Performance.

Hypothesis 4: Operational Factors Influence Corporate Sustainability Performance PT Pupuk Indonesia (Persero) is committed to managing the impact of its operations on sustainable development. The company's Strategy House outlines strategic pillars focused on customer satisfaction, supported by research, innovation, operational excellence, and supply chain management. These efforts aim to contribute to food security, business continuity, environmental preservation, and social welfare (PTPI Annual Report, 2022). Therefore, Hypothesis 4 examines the influence of operational factors on Corporate Sustainability Performance.

IV. SEM ANALYSIS (STRUCTURAL EQUATION MODELING)

Model Fit Analysis Based on the model fit analysis, there is a match between the saturated model and the estimated model, indicating compatibility between the alternative hypothesis (Ha) and the null hypothesis (Ho). As presented in Table 1, the SRMR (Standardized Root Mean Square Residual) meets the marginal fit criteria with a value of 0.125, which is greater than 0.08. Similarly, the values for d_ ULS (Unweighted Least Squares Discrepancy) and d_ G (Geodesic Discrepancy) also meet the criteria, with values greater than the Cut-Off Value of 0.05 ($46.002 > 0.05$ and $12.197 > 0.05$, respectively), indicating a good model fit. The Normed Fit Index (NFI) has an output value of 0.436, which is less than 0.90, indicating a marginal fit. Since the majority of the model fit criteria are met, the model produced in this study can be considered good.

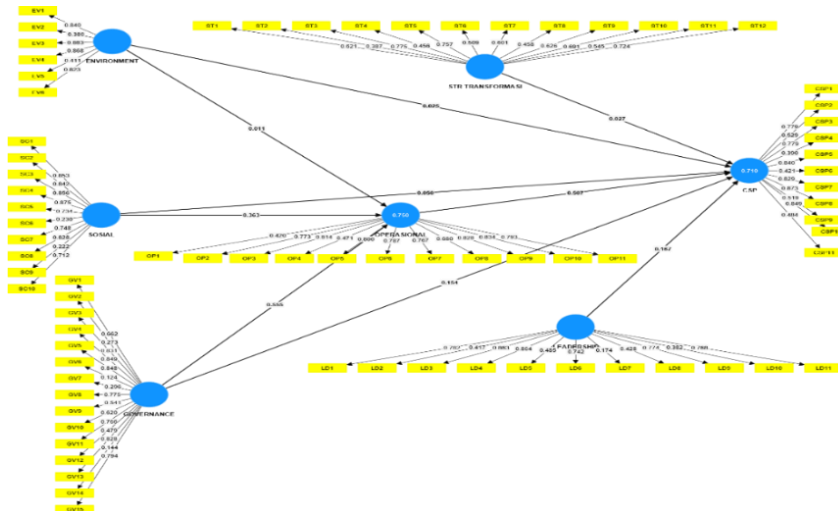
Table 1: Model Fit Analysis (Goodness of Fit Test)

GOF	Cut off Value	Saturated Model	Estimated Model	Description
SRMR	$SRMR \leq 0.08$	0.125	0.125	Marginal fit
d_ ULS	$d_ ULS > 0.05$	45.970	46.002	Good fit
d_ G	$d_ G > 0.05$	12.192	12.197	Good fit
Chi-square	Preferably smaller than Df	6437.902	6441.053	Good fit
NFI	$NFI \geq 0.90$	0.437	0.436	Marginal fit

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Structural Model Evaluation (Inner Model)

In PLS (Partial Least Squares), the testing of each relationship is conducted using a bootstrapping simulation on the sample. This test aims to minimize the issue of non-normal data. The results of the bootstrapping method from PLS analysis are shown in Figure 3.



A. Direct Effects

Table 2 states that the direct relationships between the formative latent variables are all significant (t-statistic > 1.96 or p-value < 0.05), with the respective path coefficient values.

Table 2: Path Coefficients of Direct Effects on Latent Variables

Direct Effects	Original (O)	sample T ((O/STDEV))	P values
ENVIRONMENTAL -> CSP	0.030	0.296	0.767
ENVIRONMENTAL -> OPERATIONAL	0.011	0.123	0.902
GOVERNANCE -> CSP	0.436	3.770	0.000
GOVERNANCE -> OPERATIONAL	0.555	8.682	0.000
LEADERSHIP -> CSP	0.167	1.717	0.086
OPERATIONAL -> CSP	0.507	4.501	0.000
SOCIAL -> CSP (significant at 10 %)	0.234	1.925	0.055
SOCIAL -> OPERATIONAL	0.363	4.099	0.000
STR TRANSFORMASI -> CSP	0.027	0.257	0.798

The structural equation models for CSP, Environmental, Governance, Leadership, Operational, Strategic Transformation, and Social are as follows:

$$CSP = 0.03 * Environmental + 0.436 * Governance + 0.167 * Leadership + 0.507 * Operational + 0.234 * Social + 0.027 * Strategic Transformation + \epsilon \text{ (Equation 1)}$$

$$Operational = 0.011 * Environmental + 0.555 * Governance + 0.363 * Social + \epsilon \text{ (Equation 2)}$$

Governance has a strong positive influence on both CSP (0.436) and Operational performance (0.555), while Operational performance itself significantly boosts CSP (0.507). Social factors contribute significantly to Operational performance (0.363) and have a marginal effect on CSP (0.234), significant at the 10% level. Conversely, Environmental factors and Strategic Transformation show no significant direct effects on CSP or Operational performance. Leadership has a near-significant impact on CSP (0.167), but its influence is not statistically strong. Overall, Governance and Operational performance are the most critical factors driving CSP, suggesting that improvements in these areas are essential for enhancing corporate sustainability.

B. Indirect Effects

Table 3 states that the indirect relationships between the formative latent variables are all significant (t-statistic > 1.96 or p-value < 0.05), with the respective path coefficient values.

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Table 3: Path Coefficients of Indirect Effects on Latent Variables

Indirect Effects	Original sample (O)	T statistics (O/STDEV)	P values
ENVIRONMENTAL -> CSP	0.005	0.122	0.903
GOVERNANCE -> CSP	0.281	3.742	0.000
SOCIAL -> CSP	0.184	3.021	0.003

The structural equation models for CSP, Operational, Environmental, Governance, and Social are:
 $CSP = 0.005 * Environmental + 0.281 * Governance + 0.184 * Social + \epsilon$ (Equation 3)

The table reveals that Governance and Social factors significantly influence CSP through indirect pathways, with Governance showing a strong indirect effect (0.281) and a highly significant T-statistic (3.742) and p-value (0.000). Social factors also exhibit a significant indirect effect on CSP, with a path coefficient of 0.184, a T-statistic of 3.021, and a p-value of 0.003. However, Environmental factors do not show a significant indirect impact on CSP, as indicated by a very low path coefficient (0.005), a T-statistic of 0.122, and a p-value of 0.903.

C. Specific Indirect Effects

Table 4 states that the specific relationships between the formative latent variables are all significant (t-statistic > 1.96), with the respective path coefficient values.

Table 4: Path Coefficients of Specific Indirect Effects on Latent Variables

Specific Indirect Effects	Original sample (O)	T statistics (O/STDEV)	P values
ENVIRONMENTAL -> OPERASIONAL -> CSP	0.005	0.122	0.903
GOVERNANCE -> OPERASIONAL -> CSP	0.281	3.742	0.000
SOCIAL -> OPERATIONAL -> CSP	0.184	3.021	0.003

The structural equation models for CSP, Operational, Environmental, Governance, and Social are:
 $CSP = 0.005 * Environmental * Operational + 0.281 * Governance * Operational + 0.184 * Social * Operational + \epsilon$ (Equation 4)

The results indicate that Governance and Social factors have significant specific indirect effects on CSP via Operational performance. Governance shows the strongest specific indirect effect, with a path coefficient of 0.281, a T-statistic of 3.742, and a p-value of 0.000. Social factors also exhibit a significant indirect effect on CSP through Operational performance, with a path coefficient of 0.184, a T-statistic of 3.021, and a p-value of 0.003. However, Environmental factors do not significantly impact CSP through Operational performance, as shown by a low path coefficient (0.005), a T-statistic of 0.122, and a p-value of 0.903.

D. Total Effects

Based on the analysis of total effects from the exogenous variables, the intervening variable (Operational) on the endogenous variable (CSP), the highest total effect is on the influence of Operational on CSP with a value of 0.507 (Operational -> CSP), followed by the effect of Governance -> CSP with a value of 0.436 and Social -> CSP with a value of 0.234. The total effect of each variable is shown in Table 5.

Table 5: Path Coefficients of Total Effects on Latent Variables |

Relationship/Direct Effect	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
ENVIRONMENTAL -> CSP	0.030	0.025	0.102	0.296	0.767
ENVIRONMENTAL -> OPERATIONAL	0.011	0.013	0.086	0.123	0.902
GOVERNANCE -> CSP	0.436	0.429	0.116	3.770	0.000
GOVERNANCE -> OPERATIONAL	0.555	0.558	0.064	8.682	0.000
LEADERSHIP -> CSP	0.167	0.164	0.097	1.717	0.086
OPERATIONAL -> CSP	0.507	0.507	0.113	4.501	0.000

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SOCIAL -> CSP (nyata 10 %)	0.234	0.236	0.122	1.925	0.055
SOCIAL -> OPERATIONAL	0.363	0.361	0.089	4.099	0.000
STR TRANSFORMASI -> CSP	0.027	0.043	0.105	0.257	0.798

Based on the total effects analysis of exogenous variables (Environmental, Governance, Leadership, Social, Strategic Transformation) and the intervening variable (Operational) on the endogenous variable (Corporate Sustainability Performance or CSP), the most significant total effect is the direct influence of Operational performance on CSP, with a path coefficient of 0.507. This demonstrates the crucial role Operational performance plays in enhancing CSP, supported by a high T-statistic (4.501) and a p-value of 0.000, confirming its statistical significance.

Following this, Governance also has a substantial total effect on CSP, with a path coefficient of 0.436 and a highly significant T-statistic of 3.770 and p-value of 0.000. This underscores the strong influence of governance practices on sustainability performance. Social factors also have a notable total effect on CSP, albeit with a smaller path coefficient of 0.234, significant at the 10% level (T-statistic of 1.925, p-value of 0.055).

In contrast, Environmental factors have a minimal impact on CSP, with an insignificant path coefficient of 0.030 and a low T-statistic (0.296). Similarly, Leadership has a modest effect on CSP with a path coefficient of 0.167, approaching significance (p-value of 0.086), while Strategic Transformation shows no significant effect on CSP with a path coefficient of 0.027 (T-statistic of 0.257, p-value of 0.798).

Based on the results of the calculations and analysis above, the SEM-PLS model produced, explain the endogenous latent variable of sustainable corporate performance is significantly influenced by three exogenous latent variables: Operational, Governance, and Social. Additionally, there is an indirect influence through the moderation between the Social variable with Operational and the Governance variable with Operational on the endogenous latent variable of sustainable corporate performance. The main indicators related to the influence of their respective exogenous latent variables are also highlighted.

The significance of the prediction model in the structural model test can be seen from the t-statistic value of the independent variables on the dependent variable and the direct effect value (path coefficient) in Table 6. The table shows the hypothesis testing results of the structural model in the study. Based on the hypothesis testing results, it is known that three hypotheses are accepted.

Table 6: Direct Hypothesis Testing Results

Hypothesis	Relationship	T-value 10% (≥ 1.67)	Effect	Hypothesis Conclusion
H-I	Environmental -> CSP	0.267	0.790	Rejected
H-II	Environmental -> Operational	0.123	0.902	Rejected
H-III	Governance -> CSP	3.770	0.000	Accepted
H-IV	Governance -> Operational	8.682	0.000	Accepted
H-V	Leadership -> CSP	1.717	0.086	Accepted
H-VI	Operational -> CSP	4.501	0.000	Accepted
H-VII	Social -> CSP	1.925	0.055	Accepted
H-VIII	Social -> Operational	4.099	0.000	Accepted
H-IX	Strategic Transformation -> CSP	0.257	0.798	Rejected

Based on the test results for the seven hypotheses above, five hypotheses (H-III, H-IV, H-V, H-VI, and H-VII) are accepted. Meanwhile, four hypotheses (H-I, H-II, H-VIII, and H-IX) are rejected. The results of the structural model test, as presented in Table 6, demonstrate the significance of five out of nine hypotheses, indicating key implications for Corporate Sustainability Performance (CSP) and Operational performance. Hypotheses H-III, H-IV, H-V, H-VI, and H-VII were accepted, showing that Governance, Leadership, Operational, and Social factors have a significant impact on CSP and Operational outcomes. Specifically, Governance plays a dual role in positively influencing both CSP and Operational performance, underscoring the critical importance of governance structures in achieving sustainability and operational success. Additionally, Leadership and Social factors contribute meaningfully to CSP, with Social factors also enhancing Operational performance, suggesting that investing in leadership and social initiatives can yield sustainability benefits.

Conversely, the rejection of hypotheses H-I, H-II, and H-IX, which relate to Environmental and Strategic Transformation factors, indicates that these variables do not have a significant direct impact on either CSP or Operational performance in this model. This suggests that while environmental and strategic transformation efforts may be important, they may not exert a direct influence on performance metrics in the short term or through the pathways tested in this study. Consequently, organizations may need to integrate these factors more effectively with governance and operational practices to realize their potential benefits.

V. IMPLICATIONS

The results of testing each research hypothesis are explained in the following discussion. The discussion of test results and research findings is explained based on the results of descriptive analysis and verification results which are then compared with the theory and results of previous research.

a. Hypothesis I: Environmental affects CSP

The analysis results show that environmental does not affect CSP with a t-value of $0.267 < t$ table alpha 10% (1.67) so it can be concluded that Hypothesis 1 is rejected. This means that every one unit increase in environmental is not able to increase CSP by 0.790 units.

b. Hypothesis II: Environmental affects Operations

The analysis results show that environmental does not affect operations with a t-value of $0.123 < t$ table alpha 10% (1.67) so it can be concluded that Hypothesis 2 is rejected. This means that every one unit increase in environmental is not able to increase operations by 0.902 units.

c. Hypothesis III: Governance affects CSP

Governance does not affect CSP with a t-value of $1.174 < t$ table alpha 10% (1.67). With this value, it can be concluded that Hypothesis 3 is rejected, meaning that every increase in Governance by one unit does not increase CSP by 0.241 units.

d. Hypothesis IV: Governance affects Operations

The role of governance is able to influence operations with a t-value of $8.682 > t$ table alpha 10% (1.67) so it can be concluded that Hypothesis 4 is accepted. Every increase of one unit of Governance will increase Operations by 0.000 units.

e. Hypothesis V: Leadership has an effect on CSP

Based on the research results, it is known that Leadership has no influential role on CSP with a t-value of $1.717 > t$ table alpha 10% (1.67). The test results show that Hypothesis 5 is accepted. Every increase of one unit of leadership will increase CSP by 0.086 units.

f. Hypothesis VI: Operations affect CSP

Operations are able to influence CSP with a t-value of $4.501 > t$ table alpha 10% (1.67), so it can be concluded that Hypothesis 6 is accepted. Every increase of one unit of Operations will increase CSP by 0.000 units.

g. Hypothesis VII: Social has an effect on CSP

Based on the analysis results, it shows that Social does not affect CSP with a t-value of $0.441 < t$ table alpha 10% (1.67), so it can be concluded that Hypothesis 7 is rejected. This means that every increase of one unit of social will not increase CSP by 0.659 units.

h. Hypothesis VIII: Social affects Operations

The analysis results show that social is able to influence Operations with a t-value of $4.099 > t$ table alpha 10% (1.67) so it can be concluded that Hypothesis 8 is accepted. This means that every increase of one unit of social will increase Operations by 0.000 units.

i. Hypothesis IX: Transformation Strategy affects CSP

The results showed that the transformation str variable affects CSP with a t-value of $0.257 < t$ table alpha 10% (1.67) so it can be concluded that Hypothesis 9 is rejected. Every increase of one unit of transformation strategy will not increase the success of CSP by 0.798 units.

Table 7 Results of indirect hypothesis testing

Hypothesis	Relationship	T-value (≥1.67)	Direct Effect	Total Effect	Hypothesis Conclusion
H-Ia	Environmental → Operational → CSP	0.122	0.903	0.903	Rejected
H-IIIa	Governance → Operational → CSP	3.742	0.000	0.000	Accepted
H-VIIa	Social → Operational → CSP	3.021	0.003	0.003	Accepted

The analysis results indicate several important points that decision-makers in organizations need to consider:

First, the company must continue to focus on improving operational performance as the main path to enhancing Corporate Sustainability Performance (CSP). The study shows that operational performance has the most significant impact on CSP, with a t-value of 4.501 (greater than 1.67). Therefore, the board of directors and management must focus on operational efficiency, business process innovation, and the application of appropriate technologies to achieve better outcomes.

Second, the critical role of governance in improving CSP should be acknowledged. Given that governance has a significant influence on CSP (t-value $8.682 > 1.67$), directors and managers need to ensure that good governance practices are implemented at

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every level and throughout the organization. This can include ensuring transparency in decision-making, accountability, and adherence to applicable regulations.

Third, the importance of social aspects in improving CSP is also highlighted. Social factors have a significant impact on operational performance (t -value $4.099 > 1.67$), which then influences CSP. This shows that organizations that prioritize social responsibility and maintain good relationships with communities can achieve better operational performance, ultimately enhancing CSP. Therefore, Corporate Social Responsibility (CSR) programs should be executed effectively and comprehensively.

Fourth, although environmental, leadership, and transformation strategy variables were found to be less significant in directly influencing CSP in the study, directors and management must continue to pay attention to these variables to improve CSP. These variables may not show a direct significant impact on CSP, but they may operate through indirect effects or take longer to show their impact on CSP. It is still necessary to develop comprehensive and effective strategies, both medium- and long-term, with visionary and transformative leadership across various functions or business areas, particularly concerning the environment, to achieve better and more sustainable company performance in the future.

CONCLUSIONS

This research aimed to investigate the relationships between environmental, governance, leadership, social, operational performance, and Corporate Sustainability Performance (CSP) within organizations, particularly energy-intensive industries. Based on the hypothesis testing results, several key insights and conclusions have been drawn, providing valuable guidance for corporate decision-makers seeking to enhance their companies' sustainable performance.

- Operational Performance as the Critical Driver of CSP** The analysis revealed that operational performance has the most substantial impact on Corporate Sustainability Performance (CSP). With a t -value of 4.501 (significantly greater than the threshold of 1.67), it was demonstrated that improvements in operational efficiency and effectiveness directly translate into enhanced CSP. This finding suggests that companies must prioritize operational excellence as the cornerstone of their sustainability strategy. Directors and managers should invest in process innovations, technological advancements, and the streamlining of operational activities. Focusing on improving operational performance not only contributes to business efficiency but also drives sustainability outcomes, making this the most critical lever for enhancing CSP in energy-intensive industries.
- The Pivotal Role of Governance in Driving Sustainable Performance** Governance emerged as another significant determinant of CSP, as evidenced by a high t -value of 8.682, demonstrating a robust positive relationship between strong governance practices and CSP. This emphasizes the need for organizations to maintain rigorous governance frameworks that ensure transparency, accountability, and regulatory compliance. Effective governance practices form the foundation for sustainable corporate behavior and long-term success. Organizations must implement best-in-class governance standards, which include responsible decision-making, risk management, and ethical business practices. Strong governance not only enhances organizational reputation but also contributes to a more sustainable and resilient business model.
- The Influence of Social Factors on Operational Performance and CSP** The study highlighted the importance of social factors in influencing both operational performance and, indirectly, CSP. With a significant t -value of 4.099 for social factors affecting operations, it was shown that organizations that prioritize social responsibility, stakeholder engagement, and community relations achieve better operational outcomes. These operational improvements, in turn, contribute to better CSP. This indicates that socially responsible companies are better positioned to achieve sustainable success. Therefore, comprehensive Corporate Social Responsibility (CSR) programs should be a critical component of any company's sustainability strategy. Engaging with communities, ensuring fair labor practices, and addressing social issues can enhance operational performance and foster a positive corporate image, leading to improved sustainability outcomes.
- Limited Direct Impact of Environmental, Leadership, and Transformation Strategy on CSP** While operational performance, governance, and social factors were found to significantly influence CSP, the study revealed that environmental, leadership, and transformation strategy variables did not have a direct, significant impact on CSP in the short term. The environmental variable, for instance, showed a t -value of 0.267, and leadership had a t -value of 1.717, indicating a weaker direct effect on CSP. However, this does not suggest that these variables are unimportant. Rather, their impact may be more long-term or indirect, potentially operating through mediators such as operational performance or governance. These findings highlight the need for organizations to maintain a comprehensive approach to sustainability, even when certain variables do not show immediate or direct effects. Companies should continue to develop robust environmental policies, foster transformative leadership, and implement strategic transformations that align with long-term sustainability goals.
- Strategic Implications for Corporate Leaders** For corporate leaders, the implications of these findings are clear: a multifaceted approach to sustainability is essential. While operational performance should be prioritized due to its direct and immediate impact on CSP, governance and social responsibility should also be integrated into the company's

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sustainability framework. Moreover, leaders must recognize that environmental and transformational strategies, though showing limited short-term effects, are still vital for long-term sustainability. Leadership that champions innovation, responsible environmental practices, and strategic change will be essential for sustaining competitiveness and achieving sustainability targets in the future.

Organizations that aspire to excel in Corporate Sustainability Performance must not only focus on operational excellence but also embrace comprehensive governance frameworks, effective CSR initiatives, and visionary leadership that drives transformation and environmental stewardship. These elements, when harmonized, can create a robust pathway towards sustainable growth and long-term success.

In conclusion, this study emphasizes the critical role of operational performance, governance, and social factors in driving Corporate Sustainability Performance. While the direct influence of environmental, leadership, and transformation strategy variables may not be immediately significant, their importance for long-term sustainability should not be overlooked. A strategic, balanced approach that incorporates operational efficiency, strong governance, social responsibility, and leadership that fosters sustainability will be essential for organizations aiming to thrive in the modern business landscape.

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REFERENCES

- 1) Aydoğmuş M, Gülay G, Ergun K. 2022. Impact of ESG performance on firm value and profitability. *Borsa Istanbul Review*.
- 2) Campagna A, Spellman GK, Mishra S. 2020. ESG Matters. Harvard Law School Forum on Corporate Governance. [accessed 2023 July 24]. <https://corpgov.law.harvard.edu/2020/01/14/esg-matters/>
- 3) Can Ö. 2020. Corporate Sustainability Performance. In: Idowu, S., Schmidpeter, R., Capaldi, N., Zu, L., Del Baldo, M., Abreu, R. (eds) *Encyclopedia of Sustainable Management*. Springer, Cham. https://doi.org/10.1007/978-3-030-02006-4_483-1
- 4) Cupertino S, Vitale G, Riccaboni A. 2021. Sustainability and short-term profitability in the agri-food sector, a cross-sectional time-series investigation on global corporations. *British Food Journal*. 123(13): 317-336.
- 5) Engels, Johannes MM, and Andreas W. Ebert. "A critical review of the current global ex situ conservation system for plant agrobiodiversity. I. History of the development of the global system in the context of the political/legal framework and its major conservation components. *Plants*.10(): 1557.
- 6) Ground J. 2022. ESG Global Study 2022. Capital Group. Harvard Law School Forum on Corporate Governance. [accessed 2023 July 24]. <https://corpgov.law.harvard.edu/2022/06/17/esg-global-study-2022/>
- 7) Hair, J.F., Hult, G.T.M., Ringle, C.M., Sarstedt, M., Danks, N.P., Ray, S. (2021). *An Introduction to Structural Equation Modeling*. In: *Partial Least Squares Structural Equation Modeling (PLS-SEM) Using R*. Classroom Companion: Business. Springer, Cham. https://doi.org/10.1007/978-3-030-80519-7_1
- 8) Hair, J.F., Risher, J.J., Sarstedt, M. and Ringle, C.M. (2014), "When to use and how to report the results of PLS-SEM", *European Business Review*, Vol. 31 No. 1, pp. 2-24. *Structural Equation Modeling (PLS-SEM)*, Sage, Thousand Oaks, CA.
- 9) Laszlo, C. and Zhexembayeva, N., 2017. *Embedded sustainability: The next big competitive advantage*. Routledge.
- 10) Nilsson, D., Bernesson, S. and Hansson, P.A., 2011. Pellet production from agricultural raw materials—A systems study. *Biomass and Bioenergy*, 35(1), pp.679-689.
- 11) Osorio, C.G., Abriningrum, D.E., Armas, E.B., Firdaus, M. and Osorio, C.G., 2011. Who is benefiting from fertilizer subsidies in Indonesia?. *World Bank*.
- 12) Purwandani, J. A., & Michaud, G. (2021). What are the drivers and barriers for green business practice adoption for SMEs?. *Environment systems and decisions*, 41(4), 577-593.
- 13) Qu, Y., Lyu, X., Peng, W. and Xin, Z., 2021. How to evaluate the green utilization efficiency of cultivated land in a farming household? A case study of shandong province, China. *Land*, 10(8), p.789.
- 14) Singh, A., Kumar, A., Jaswal, A., Singh, M. and Gaikwad, D.S., 2018. Nutrient use efficiency concept and interventions for improving nitrogen use efficiency. *Plant*

Corporate Sustainability Performance in the Indonesian Fertilizer Industry: A Strategic Approach with PT Pupuk Indonesia (Persero)

- 15) Wahyuningdyah, K.L., Soemaryani, I. and Komaladewi, R., 2021. Competitive Advantages Strategy Of Fertilizer Industry In Java, Indonesia. *Academy of Strategic Management Journal*. 20(3): 1-9.
- 16) Zeng, L., dan Jiang, X. (2023). ESG and Corporate Performance: Evidence from Agriculture and Forestry Listed Companies. *Sustainability*. 15(8): 6723.
- 17) Laporan Tahunan PT Pupuk Indonesia (Persero). 2022.



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