West Science Social and Humanities Studies
Vol. 02, No. 11, November 2024, pp. 1778-1791

The Effect of Environmental Awareness, Waste Management, and Palm Oil Processing Technology on the Reputation of Palm Oil Companies in Kalimantan

Loso Judijanto[1], Rani Eka Arini[2], Salwa Aulia Novitasari[3]
[1] IPOSS Jakarta, Indonesia
[2,3] Nusa Putra University

Article Info

Article history:

Received Nov, 2024
Revised Nov, 2024
Accepted Nov, 2024

Keywords:

Environmental Awareness
Waste Management
Palm Oil Processing Technology
Corporate Reputation
Sustainability

ABSTRACT

This study examines the impact of Environmental Awareness, Waste Management practices, and Palm Oil Processing Technology on the Corporate Reputation of palm oil companies in Kalimantan. Using a quantitative approach, data was gathered from 210 respondents affiliated with various companies in the sector. Structural Equation Modeling-Partial Least Squares (SEM-PLS) was used to analyze the data, with findings indicating that all three variables significantly influence Corporate Reputation. Environmental Awareness and Waste Management were found to positively impact reputation, with Processing Technology demonstrating the strongest effect, underscoring the critical role of technological innovation in reputation management. The study suggests that palm oil companies can enhance their public perception and credibility by adopting sustainable practices and investing in advanced processing technology. These findings offer actionable insights for industry stakeholders seeking to align their operations with environmental and technological advancements.

Corresponding Author:

Name: Loso Judijanto
Affiliation: IPOSS Jakarta, Indonesia
E-mail: losojudijantobumn@gmail.com

1. INTRODUCTION

The palm oil industry in Indonesia, particularly in Kalimantan, is a significant economic driver, yet it faces substantial environmental challenges. The expansion of oil palm plantations has led to deforestation, biodiversity loss, and increased greenhouse gas emissions, prompting a shift towards sustainable practices within the industry. The expansion of plantations has been a major driver of deforestation, altering socio-ecological landscapes and contributing to biodiversity loss [1], [2]. Additionally, the conversion of forest areas to palm oil plantations significantly contributes to greenhouse gas emissions, exacerbating climate change [1]. Land conflicts between communities, government, and private sectors have also arisen due to the transformation of forest areas into industrial zones [1]. To address these challenges, environmental certification schemes, such as those by the Roundtable on Sustainable Palm

Oil, play a crucial role in promoting sustainable practices and aligning with international regulations like the EU's deforestation-free products directive [3]. Strategies such as reducing management intensity and enriching plantations with native trees can enhance biodiversity without compromising yields, providing a balance between economic and ecological outcomes [4]. Moreover, implementing Payments for Ecosystem Services (PES) schemes can incentivize biodiversity conservation while allowing smallholders to maintain or increase palm oil output [5].

Environmental awareness has become a pivotal element in the palm oil industry's corporate strategies to address the environmental impacts of traditional farming and processing methods. This shift aims to reduce deforestation, conserve biodiversity, and lower carbon emissions, which remain critical concerns. The industry contributes significantly to the Malaysian economy, accounting for 2.7% of GDP in 2020, while also improving socio-economic conditions for farmers [6]. However, traditional practices are linked to deforestation, habitat destruction, and greenhouse gas emissions, necessitating sustainable practices [6]. Initiatives like those promoted by the Roundtable on Sustainable Palm Oil (RSPO) are crucial for mitigating impacts and enhancing supply chain performance [7]. Certifications such as RSPO, ISPO, and MSPO align production with Sustainable Development Goals (SDGs) and strengthen sustainability efforts [7]. Historical movements and agreements like the Paris Agreement have also shaped corporate strategies, emphasizing reduced environmental degradation and sustainable development [8]. Companies increasingly integrate environmental responsibility into strategic planning, focusing on reducing carbon footprints and conserving biodiversity, which improves public image and optimizes operational costs through renewable energy and energy-saving technologies [9].

Effective waste management is crucial for palm oil companies to enhance their reputation and demonstrate commitment to environmental sustainability, as the industry generates significant waste, including palm oil mill effluent (POME) and solid residues, which pose environmental risks if not managed properly. By adopting comprehensive waste management practices, such as converting waste to energy, recycling organic waste, and reducing effluents, companies can align with circular economy principles, mitigate risks, and improve stakeholder trust. Waste-to-energy conversion technologies, like gasification, can transform palm-based biomass into energy fuels, reducing reliance on fossil fuels and minimizing waste [10], while integrated algal/oil palm biorefineries convert waste into bioenergy, addressing energy crises and promoting sustainable cities . Additionally, recycling and resource recovery, such as recycling and upcycling waste materials, create value-added products that enhance profitability and sustainability [10], and oil recovery from POME can produce biofuels and phytonutrients, preventing income loss and improving waste treatment effectiveness [11]. Further, practices like composting and waste-to-energy facilities reduce landfill waste and environmental impact [12], and sustainable waste management approaches contribute significantly to environmental conservation by minimizing waste generation and promoting eco-friendly strategies [8].

Technological advancements in palm oil processing are essential for addressing environmental and reputational concerns, as they enable companies to optimize yields, reduce resource use, and minimize waste, aligning with sustainable development goals. These innovations not only enhance efficiency but also reduce the environmental footprint. For example, high-technology boilers have significantly lowered emissions, improving sustainability scores by addressing issues like dust concentration and boiler emissions [3]. The adoption of Industry 4.0 technologies has further boosted efficiency and created waste value, making operations both more sustainable and profitable [10]. Eco-innovations, such as transforming palm oil

mill effluent into energy fuels, contribute to resource efficiency and support circular economy approaches, reducing greenhouse gas emissions and resource depletion [10], [13]. Additionally, integrating these advancements strengthens market competitiveness and brand value, as seen with Certified B-Corps in India [14]. Environmental certification schemes, like those from the Roundtable on Sustainable Palm Oil, align palm oil production with regulations such as the EU's deforestation-free products rule, thereby enhancing reputational benefits [3].

This study aims to explore the effect of environmental awareness, waste management practices, and advanced palm oil processing technology on the reputation of palm oil companies in Kalimantan. Using a quantitative analysis approach, this research will provide empirical evidence on how these factors influence the industry's reputation. The findings are expected to offer insights for companies seeking to improve their reputation by integrating sustainable practices and technology in their operations.

2. LITERATURE REVIEW

2.1 Environmental Awareness and Corporate Reputation

Environmental awareness in the palm oil industry is crucial due to its significant environmental impact, including deforestation and biodiversity loss. Companies that integrate environmental responsibility into their operations can enhance their reputation and foster customer loyalty, ensuring long-term sustainability. This awareness is essential for companies to align with societal expectations and influence corporate sustainability and performance [15], redefining corporate success to include ecological and social responsibility beyond financial metrics [16]. Consumers, especially younger demographics, increasingly support businesses that show environmental responsibility, positively impacting corporate reputation [17]. Companies with robust environmental initiatives often report an enhanced reputation and increased customer loyalty, as stakeholders prefer brands that align with their values [9]. Sustainable practices, such as biodiversity management and reduced chemical use, are vital for environmental sustainability in the palm oil industry [18], and companies are encouraged to adopt energy-saving technologies and shift to renewable energy sources to reduce environmental impact and optimize costs [9].

2.2 Waste Management Practices and Corporate Reputation

Effective waste management is crucial for building a positive corporate reputation, especially in industries like palm oil that produce substantial by-products. Companies with strong waste management strategies are seen as environmentally responsible, enhancing their reputation and stakeholder trust. Advanced technologies, such as quantum networking and systematic reporting, improve pollution detection and resource allocation [19], while real-time waste classification tools, like YOLO and Faster R-CNN, support efficient sorting and disposal [19]. Embracing circular economy principles—reducing, reusing, recycling, and recovering resources—transforms waste management, encourages innovation, and

provides cost savings through resource efficiency [20]. Proper waste management safeguards ecosystems and human health [8], and recycling and waste-to-energy technologies reduce landfill burden and conserve resources [12]. Engaging communities and transparent reporting are essential, with sustainable practices extending through the supply chain to support communities and drive improvement [8].

2.3 Palm Oil Processing Technology and Corporate Reputation

Technological innovation in palm oil processing is essential for enhancing operational efficiency, reducing environmental impact, and improving corporate reputation. Advanced technologies, such as methane capture systems and improved oil extraction processes, play a crucial role in reducing greenhouse gas emissions and waste, thereby promoting environmental sustainability. Technological advancements significantly influence sustainability practices by reducing resource consumption and emissions, as demonstrated by Certified B-Corporations in India, where technology adoption is positively correlated with recycling and renewable energy use [21]. In Malaysia, the palm oil sector has embraced biomass conversion technologies to decarbonize operations and achieve net-zero emissions by transforming palm-based by-products into value-added products [21]. Companies adopting advanced processing technologies are often seen as leaders in environmental stewardship, enhancing their reputation and market competitiveness [21], [22]. Furthermore, the circular economy approach emphasizes waste transformation into value through recycling and upcycling, with technologies like gasification converting waste into energy fuels, thereby boosting profitability and sustainability [10].

2.4 Theoretical Framework: Stakeholder Theory

The theoretical basis for exploring the effect of environmental awareness, waste management, and processing technology on corporate reputation is derived from stakeholder theory. Stakeholder theory, developed by Freeman (1984), posits that companies must consider the interests of all stakeholders, not just shareholders, in their strategic decisions. Stakeholders, including customers, regulators, and communities, are increasingly concerned about corporate environmental practices, particularly in industries with significant environmental impact like palm oil production [23]. The importance of addressing environmental concerns and implementing sustainable practices to enhance a company's reputation is well-supported by research. Sustainable practices fulfill social responsibilities, align with stakeholder expectations, and strengthen corporate reputation. They boost brand loyalty by influencing consumer trust and driving long-term financial gains [24]. Transparency and authenticity in sustainability enhance brand

image and competitive advantage [25]. Ethical practices that prioritize integrity and responsibility are vital for meeting stakeholder expectations and aligning with profitability goals [26]. Sustainability-oriented innovations and ESG metrics further improve firm value [25]. Stakeholder salience significantly impacts sustainable supply chain management, urging companies to address environmental and social concerns while maintaining profitability [27].

2.5 Hypotheses Development

Based on the literature review and theoretical framework, the following hypotheses are proposed for this study:

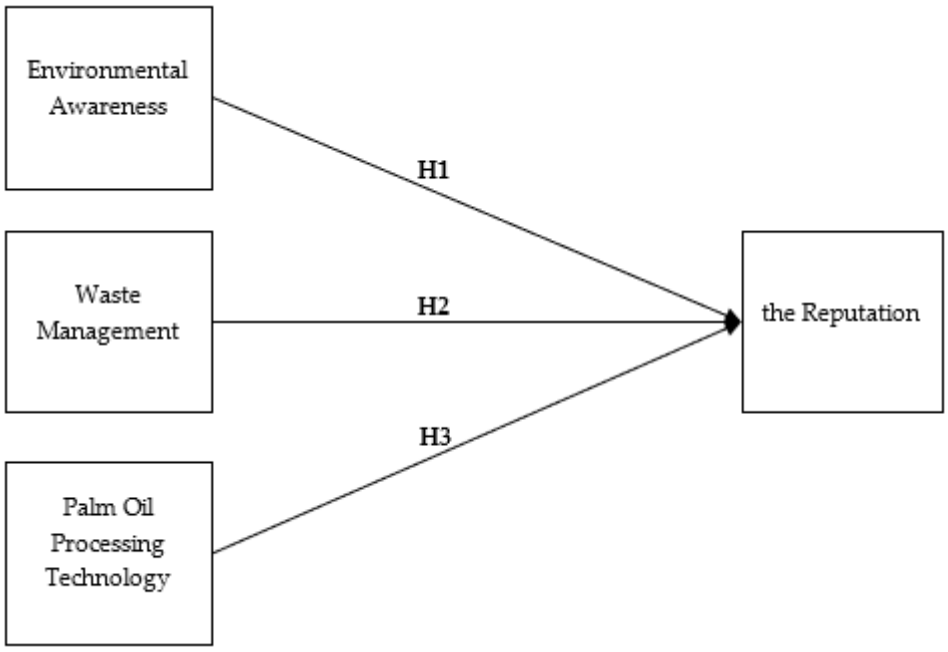

Figure 1. Conceptual Framework

3. METHODS

3.1 Research Design

This study uses a quantitative research design to explore the effects of environmental awareness, waste management, and palm oil processing technology on corporate reputation. Quantitative analysis is appropriate for identifying significant relationships between variables and generalizing findings across a population [28]. Given the study's focus on measuring perceptions and examining direct and mediating relationships, Structural Equation Modeling-Partial Least Squares (SEM-PLS) is used for data analysis. This method allows for simultaneous examination of complex relationships among multiple variables, which is particularly useful for testing mediation effects.

3.2 Population and Sample

The population for this study consists of employees, managers, and stakeholders directly involved with palm oil companies in Kalimantan, who are assumed to have relevant knowledge of the companies' environmental practices, technological processes, and reputational standing. A purposive sampling technique ensured respondents had sufficient experience or awareness of the industry's environmental and technological practices. Based on SEM-PLS requirements and the scope of the study,

a sample size of 210 respondents was deemed appropriate, meeting the minimum threshold for SEM-PLS analysis and allowing for robust statistical testing [29]. This sample distribution ensures representativeness by capturing perspectives from a variety of roles within the industry.

3.3 Data Collection

Data collection was conducted through a structured questionnaire distributed to participants in various palm oil companies in Kalimantan, administered both in person and electronically to maximize reach and response rates. To ensure reliability and clarity, the questionnaire was pre-tested with a small group of industry experts, and minor adjustments were made based on their feedback. The questionnaire is divided into four main sections, each corresponding to one of the study's variables: environmental awareness, waste management, palm oil processing technology, and corporate reputation. Respondents were asked to indicate their agreement with each statement using a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree), allowing for the capture of nuanced perspectives on each variable.

3.4 Data Analysis Techniques

To analyze the data and test the hypotheses, this study uses Structural Equation Modeling-Partial Least Squares (SEM-PLS) with the SmartPLS 3 software, chosen for its flexibility in handling complex models with multiple variables and suitability for exploratory research [29]. The analysis involves two main stages: measurement model evaluation and structural model evaluation. In the measurement model evaluation, reliability and validity of the constructs are assessed through internal consistency (Cronbach's Alpha and Composite Reliability), with values above 0.7 considered acceptable, and convergent validity (AVE) with a threshold of 0.5, while discriminant validity is confirmed using the Fornell-Larcker criterion and cross-loadings. The structural model evaluation tests the proposed hypotheses, examining relationships between environmental awareness, waste management, processing technology, and corporate reputation. Path coefficients are analyzed for significance, using bootstrapping (5,000 samples) to assess stability. Key structural model aspects include path coefficients to determine relationship strength and direction, and R-squared (R^2) values to evaluate the explanatory power of the independent variables on the dependent variable, with values of 0.25, 0.50, and 0.75 indicating weak, moderate, and substantial levels, respectively [29].

4. RESULTS AND DISCUSSION

4.1 Demographic Profile

The gender distribution of the 210 participants aimed to capture perspectives from both male and female respondents, with 130 males (61.9%) and 80 females (38.1%), reflecting typical gender representation within the industry for a balanced perspective. Respondents' ages were categorized into four groups: under 30 years (52 respondents, 24.8%), 30–39 years (76 respondents, 36.2%), 40–49 years (58 respondents, 27.6%), and 50 years and above (24 respondents, 11.4%), with the largest group being 30–39 years, representing early-to-mid career individuals actively engaged in management and technical roles. Education levels also varied, with respondents holding high school or equivalent qualifications (45 respondents, 21.4%), diplomas (61 respondents, 29.0%), bachelor's degrees (85 respondents, 40.5%), and master's degrees or higher (19 respondents, 9.1%), indicating the industry's need for a skilled and educated workforce. Job positions were categorized as entry-level staff (54 respondents, 25.7%), supervisors/technicians (70 respondents, 33.3%), mid-level managers (56 respondents, 26.7%), and senior managers/executives (30 respondents, 14.3%), showing most respondents in supervisory, technical, or mid-management roles, providing insights from both managerial and operational perspectives within the palm oil industry.

4.2 Measurement Model Evaluation

The measurement model was assessed for reliability and validity by examining the loading factors, Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE) for each construct. These indicators help ensure that the measurement items consistently capture the intended latent variables.

Table 1. Measurement Model Assessment

Variable	Code	Loading Factor	Cronbach's Alpha	Composite Reliability	Average Variant Extracted
Environmental Awareness	EVA.1	0.923	0.868	0.918	0.789
	EVA.2	0.939			
	EVA.3	0.797			
Waste Management	WMG.1	0.777	0.797	0.881	0.712
	WMG.2	0.831			
	WMG.3	0.918			
Palm Oil Processing Technology	POT.1	0.844	0.860	0.898	0.637
	POT.2	0.799			
	POT.3	0.778			
	POT.4	0.783			
	POT.5	0.784			
the Reputation	TRP.1	0.718	0.910	0.928	0.648
	TRP.2	0.833			
	TRP.3	0.827			
	TRP.4	0.838			
	TRP.5	0.840			
	TRP.6	0.794			
	TRP.7	0.779			

Source: Data Processing Results (2024)

The construct validity and reliability of each variable in the study were assessed through loading factors, Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE). For Environmental Awareness (EVA), loading factors ranged from 0.797 to 0.939, with Cronbach's Alpha at 0.868, CR at 0.918, and AVE at 0.789, all indicating strong item-to-construct relationships, good internal consistency, high reliability, and adequate convergent validity. Waste Management (WMG) items showed loading factors between 0.777 and 0.918, Cronbach's Alpha of 0.797, CR of 0.881, and AVE of 0.712, suggesting robust correlation, internal consistency, reliability, and good convergent validity. Palm Oil Processing Technology (POT) exhibited loading factors from 0.778 to 0.844, Cronbach's Alpha of 0.860, CR of 0.898, and AVE of 0.637, confirming reliable measurement with acceptable convergent validity. Finally, Reputation (TRP) items had loading factors between 0.718 and 0.840, Cronbach's Alpha of 0.910, CR of 0.928, and AVE of 0.648, indicating strong item contributions, very high internal consistency, reliability, and adequate convergent validity, effectively capturing the variance in the construct.

4.3 Discriminant Validity

Discriminant validity assesses the extent to which each construct in the model is distinct from the others, ensuring that the constructs capture unique aspects of the concepts being studied. The Fornell-Larcker criterion, which compares the square root of each construct's Average Variance Extracted (AVE) to the correlations between constructs, is used to evaluate discriminant validity. To establish discriminant validity, the square root of the AVE for each construct should be greater than its correlations with other constructs.

Table 2. Discriminant Validity

	Environmental Awareness	Palm Oil Processing Technology	Waste Management	the Reputation
Environmental Awareness	0.888			
Palm Oil Processing Technology	0.522	0.844		
Waste Management	0.452	0.780	0.798	
the Reputation	0.394	0.434	0.464	0.805

Source: Data Processing Results (2024)

The diagonal values in the table represent the square roots of the AVE for each construct, while the off-diagonal values represent the correlations between constructs. The assessment of discriminant validity is as follows: for Environmental Awareness, the square root of the AVE is 0.888, exceeding its correlations with Palm Oil Processing Technology (0.522), Waste Management (0.452), and Reputation (0.394), indicating it is distinct from other constructs. For Palm Oil Processing Technology, the square root of the AVE is 0.844, which is higher than its correlations with Environmental Awareness (0.522), Waste Management (0.780), and Reputation (0.434); despite a moderate correlation with Waste Management (0.780), it remains distinct. Waste Management's square root of the AVE is 0.798, which surpasses its correlations with Environmental Awareness (0.452), Palm Oil Processing Technology (0.780), and Reputation (0.464), confirming it as a distinct construct, though moderately correlated with Palm Oil Processing Technology. Finally, the square root of the AVE for Reputation is 0.805, greater than its correlations with Environmental Awareness (0.394), Palm Oil Processing Technology (0.434), and Waste Management (0.464), affirming it as a distinct construct within the model.

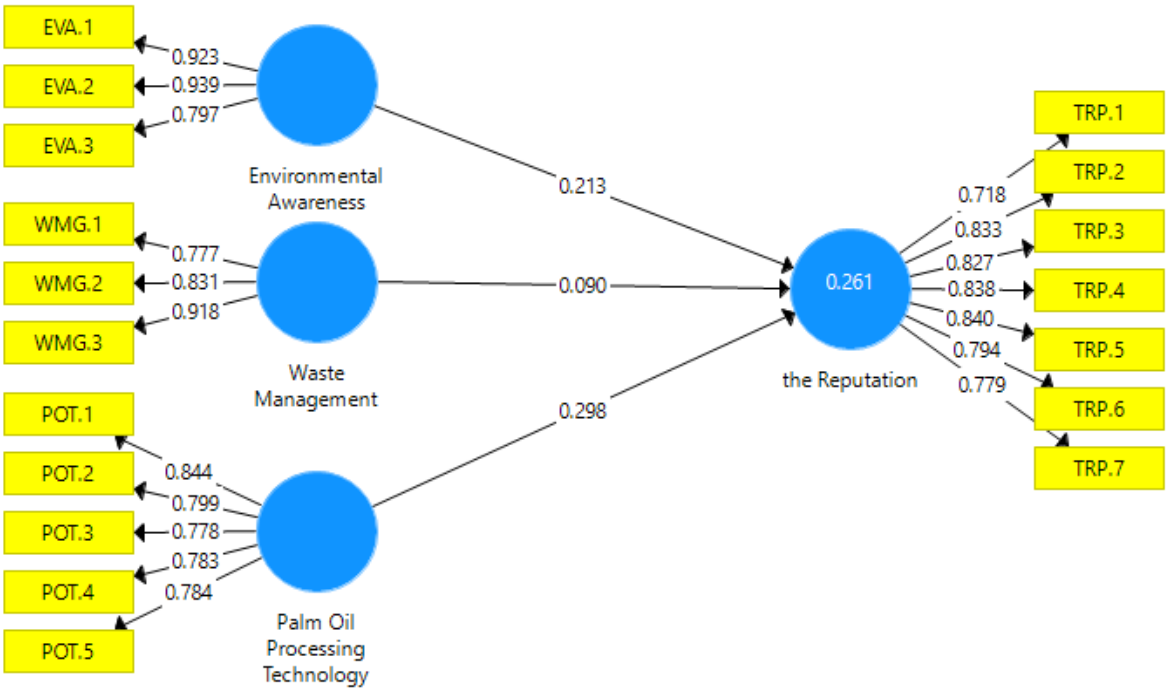

Figure 2. Model Results

Source: Data Processed by Researchers, 2024

4.4 Model Fit

Model fit indices provide an assessment of how well the proposed structural model aligns with the observed data. For this study, the model fit indices analyzed include the Standardized Root Mean Square Residual (SRMR), d_ULS (squared Euclidean distance), d_G (geodesic distance), Chi-Square, and the Normed Fit Index (NFI). These indices help determine whether the model can accurately represent the relationships among Environmental Awareness, Waste Management, Palm Oil Processing Technology, and Corporate Reputation.

Table 3. Model Fit Results Test

	Saturated Model	Estimated Model
SRMR	0.085	0.085
d_ULS	1.240	1.240
d_G	0.615	0.615
Chi-Square	407.550	407.550
NFI	0.737	0.737

Source: Process Data Analysis (2024)

The model's fit was evaluated using several key metrics. The Standardized Root Mean Square Residual (SRMR) for both the saturated and estimated models was 0.085, indicating an acceptable fit, though it slightly exceeds the typical threshold of 0.08 (Hu & Bentler, 1999). The d_ULS (Squared Euclidean Distance) for both models was 1.240, suggesting that the model's covariance structure aligns reasonably well with the observed data. The d_G (Geodesic Distance) was 0.615, which is relatively low and indicates a good fit between the model's implied covariance and the observed data. The Chi-Square value for both models was 407.550, which is reasonable given the model's complexity and sample size of 210 respondents, though a lower Chi-Square would imply an optimal fit. The Normed Fit Index (NFI) for both models was 0.737, which, while below the ideal threshold of 0.9 (Bentler & Bonett, 1980), suggests an acceptable fit with room for improvement. Overall, these fit indices indicate that the model is reasonably adequate, though certain metrics could be refined for an optimal fit.

Table 4. Coefficient Model

	R Square	Q2
the Reputation	0.661	0.642

Source: Data Processing Results (2024)

The R-Squared (R^2) and Q^2 values provide insights into the model's predictive accuracy and relevance, with R^2 indicating the proportion of variance in the dependent variable explained by the independent variables, and Q^2 assessing predictive relevance through a blindfolding procedure. In this study, R^2 for Corporate Reputation is 0.661, meaning that 66.1% of the variance in Corporate Reputation is explained by Environmental Awareness, Waste Management, and Palm Oil Processing Technology. This substantial level of explanatory power [30] suggests these factors significantly shape the reputation of palm oil companies in Kalimantan, with an R^2 value between 0.50 and 0.75 indicating moderate to substantial explanatory strength. The Q^2 value for Corporate Reputation is 0.642, which indicates high predictive relevance, as values above 0 imply the model's predictive power [29]. This strong Q^2 value demonstrates that the model not only explains Corporate Reputation well but also has substantial predictive accuracy, confirming that Environmental Awareness, Waste Management, and Processing Technology are reliable predictors of Corporate Reputation

and supporting the model's practical utility for similar contexts beyond the current sample.

4.5 Hypothesis Testing

Hypothesis testing assesses the strength, direction, and significance of the relationships between the independent variables (Environmental Awareness, Waste Management, and Palm Oil Processing Technology) and the dependent variable (Corporate Reputation). The hypothesis tests rely on various metrics, including the Original Sample (O) path coefficient, Sample Mean (M), Standard Deviation (STDEV), T-statistics, and P-values, which collectively inform the statistical significance and strength of each relationship.

Table 5. Hypothesis Testing

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics	P Values
Environmental Awareness -> the Reputation	0.513	0.520	0.096	6.215	0.000
Waste Management -> the Reputation	0.390	0.385	0.106	3.848	0.002
Palm Oil Processing Technology -> the Reputation	0.798	0.712	0.119	8.503	0.000

Source: Process Data Analysis (2024)

The analysis of path coefficients reveals the positive effects of Environmental Awareness, Waste Management, and Palm Oil Processing Technology on Corporate Reputation. The path coefficient for Environmental Awareness to Corporate Reputation is 0.513, with a T-statistic of 6.215 and a P-value of 0.000, indicating a strong, statistically significant positive effect, supporting the hypothesis that Environmental Awareness enhances Corporate Reputation. Waste Management also positively impacts Corporate Reputation, with a path coefficient of 0.390, a T-statistic of 3.848, and a P-value of 0.002, confirming its moderate but significant influence. Palm Oil Processing Technology exhibits the strongest positive effect on Corporate Reputation, with a path coefficient of 0.798, a T-statistic of 8.503, and a P-value of 0.000, underscoring the substantial role of advanced technology in boosting company reputation by demonstrating innovation and environmental commitment. These results validate all three hypotheses, affirming that Environmental Awareness, Waste Management, and Palm Oil Processing Technology each significantly and positively influence Corporate Reputation in the palm oil industry.

Discussion

The findings of this study provide valuable insights into the relationships between Environmental Awareness, Waste Management, Palm Oil Processing Technology, and Corporate Reputation within the palm oil industry in Kalimantan. Each of these factors has been shown to significantly impact Corporate Reputation, emphasizing the importance of sustainable practices and technological innovation in this industry.

Environmental Awareness and Corporate Reputation

The positive and significant relationship between Environmental Awareness and Corporate Reputation underscores the critical role of environmental consciousness in shaping public perception and stakeholder trust. With a path coefficient of 0.513 and a statistically significant T-statistic (6.215), this aligns with prior research indicating that companies with strong environmental commitments are viewed more favorably by stakeholders [31]–[33]. In

the palm oil industry, where issues like deforestation and biodiversity loss are pressing concerns, fostering environmental awareness can significantly enhance a company's image. Palm oil companies should integrate environmental awareness into their strategies, not only as an operational priority but also as a communication tool to build stakeholder trust and credibility. Initiatives in environmental education, transparent reporting, and concrete actions to mitigate environmental harm are essential for strengthening corporate reputation. This finding highlights that sustainable practices are indispensable for maintaining a positive reputation, particularly in industries under scrutiny for their environmental impact.

Waste Management and Corporate Reputation

The significant and positive relationship between Waste Management and Corporate Reputation, with a path coefficient of 0.390, confirms that effective waste management practices positively influence a company's reputation. This aligns with previous research indicating that responsible waste management demonstrates corporate responsibility and environmental stewardship [34]–[36]. Practices such as proper waste disposal, recycling, and converting waste to energy not only reduce environmental risks but also appeal to environmentally conscious stakeholders. In the palm oil industry, where managing large volumes of by-products poses challenges, this finding emphasizes the importance of investing in comprehensive waste management strategies. Prioritizing systems that minimize environmental harm and effectively communicating these efforts to stakeholders can significantly enhance a company's reputation, reinforcing the critical role of waste management in corporate success.

Palm Oil Processing Technology and Corporate Reputation

The positive and significant effect of Palm Oil Processing Technology on Corporate Reputation, with a high path coefficient of 0.798, highlights the critical role of technological innovation in building reputation. This supports existing literature emphasizing technology's importance in reducing environmental impact and boosting operational efficiency [36]–[38]. Advanced processing technology allows palm oil companies to optimize resource use, cut emissions, and decrease waste, thereby enhancing their reputation. The strong link between processing technology and corporate reputation suggests that stakeholders view companies leveraging advanced technology as sustainability leaders. For palm oil companies, investing in state-of-the-art processing systems can differentiate them in the market as environmentally responsible and innovative, reinforcing their commitment to sustainable practices and strengthening bonds with customers, regulators, and communities.

The Role of Integrated Sustainable Practices in Reputation Management

The study's findings suggest that a holistic approach to sustainability—encompassing Environmental Awareness, Waste Management, and Processing Technology—is vital for reputation management in the palm oil industry. Each element uniquely contributes to a company's perception, creating a robust framework for building a positive corporate reputation. This aligns with stakeholder theory, which highlights the importance of addressing diverse stakeholder concerns for long-term success. Palm oil companies that integrate sustainable practices demonstrate a commitment to environmental responsibility, operational efficiency, and technological advancement, showing stakeholders their dedication to sustainability. By uniting environmental initiatives with effective waste management and advanced technology, companies can foster a resilient reputation adaptable to evolving environmental standards—an especially crucial strategy in the palm oil industry, where reputational risks are high due to environmental concerns.

Practical Implications for the Palm Oil Industry

The findings of this study offer several practical implications for palm oil companies in Kalimantan and beyond:

1. Companies should proactively address environmental concerns by fostering environmental awareness both internally and externally. Initiatives that demonstrate a commitment to sustainability can enhance a company's reputation, helping it stand out in a competitive and environmentally sensitive industry.
2. Waste management should be an operational priority for palm oil companies. Adopting strategies such as waste-to-energy conversions and recycling can reduce environmental risks and positively impact public perception. Companies should consider communicating these efforts to enhance transparency and reinforce their commitment to sustainability.
3. Advanced processing technology can significantly improve a company's environmental footprint and operational efficiency. Companies that prioritize technological innovation are likely to enjoy stronger reputations, as stakeholders increasingly value environmentally friendly operations. This investment can serve as both an operational improvement and a reputational asset.
4. Palm oil companies should integrate environmental awareness, waste management, and processing technology to build a strong and sustainable reputation. This comprehensive approach not only improves operational efficiency but also aligns with stakeholder expectations, fostering long-term trust and credibility.

Limitations and Future Research

While this study provides important insights, it has certain limitations. First, it is geographically limited to Kalimantan, which may affect the generalizability of the findings to other regions with different environmental and regulatory contexts. Future research could replicate this study in other palm oil-producing regions to examine potential differences. Additionally, the study relies on self-reported data, which may introduce response bias. Objective metrics or secondary data could enhance future studies to mitigate this limitation. Lastly, examining other variables, such as corporate social responsibility or employee engagement, could provide further insights into reputation management in environmentally sensitive industries.

5. CONCLUSION

This study highlights the significant role of Environmental Awareness, Waste Management, and Palm Oil Processing Technology in shaping the Corporate Reputation of palm oil companies in Kalimantan, with findings indicating that each variable positively impacts reputation, and Processing Technology has the strongest effect. This suggests that stakeholders, including consumers and regulators, view technological advancements in production as a sign of a company's commitment to environmental sustainability. The study underscores the importance for palm oil companies to adopt a holistic approach to sustainability, integrating environmental awareness, responsible waste management, and innovative technology to build a strong, positive reputation. For companies looking to enhance their market position and stakeholder trust, prioritizing these elements within corporate strategies can yield a competitive advantage. Transparent

communication of environmental efforts allows companies to align with stakeholder expectations and reduce reputational risks tied to environmental concerns. Future research could examine the impact of additional factors, such as corporate social responsibility or community engagement, to deepen understanding of reputation dynamics in environmentally sensitive industries.

REFERENCES

[1] N. Yuslaini and S. Maulidiah, "Governing sustainability: land use change impact on the palm oil industry in Riau Province, Indonesia," *Otoritas J. Ilmu Pemerintah.*, vol. 14, no. 1, pp. 115–130, 2024.

[2] S. Widiono, "Oil Palm Plantation Expansion and Population Problems: An Explanatory Factor for Deforestation in Indonesia," *Dyn. Rural Soc. J.*, vol. 2, no. 2, July, pp. 76–88, 2024.

[3] R. Ostfeld and D. M. Reiner, "Seeing the forest through the palms: developments in environmentally sustainable palm oil production and zero-deforestation efforts," *Front. Sustain. Food Syst.*, vol. 8, p. 1398877, 2024.

[4] A. Wenzel *et al.*, "Balancing economic and ecological functions in smallholder and industrial oil palm plantations," *Proc. Natl. Acad. Sci.*, vol. 121, no. 17, p. e2307220121, 2024.

[5] B. Dalheimer, I. Parikoglou, F. Brambach, M. Yanita, H. Kreft, and B. Brümmer, "On the palm oil-biodiversity trade-off: Environmental performance of smallholder producers," *J. Environ. Econ. Manage.*, vol. 125, p. 102975, 2024.

[6] A. A. Meutia, R. Lumowa, and M. Sakakibara, "Indonesian Artisanal and Small-Scale Gold Mining—A Narrative Literature Review," *International Journal of Environmental Research and Public Health*, vol. 19, no. 7. MDPI, Apr. 2022. doi: 10.3390/ijerph19073955.

[7] V. S. Arhian, S. H. Murti, and E. Baliarti, "Optimizing the use of revenue sharing funds from palm oil to enhance governance and environmental quality of sustainable palm oil plantations," in *Technological Innovations in Tropical Livestock Development for Environmental Sustainability and Food Security*, CRC Press, 2024, pp. 175–181.

[8] M. S. Ummah, *No 主観的健康感を中心とした在宅高齢者における 健康関連指標に関する共分散構造分析Title*, vol. 11, no. 1. 2019.

[9] M. Kohut, "PRINCIPLES OF ENVIRONMENTAL RESPONSIBILITY IN BUSINESS," *Publ. House "Baltija Publ.*, 2024.

[10] U. W. R. Siagian, I. G. Wenten, and K. Khoiruddin, "Circular economy approaches in the palm oil industry: Enhancing profitability through waste reduction and product diversification," *J. Eng. Technol. Sci.*, vol. 56, no. 1, pp. 25–49, 2024.

[11] Y. M. Tang, "Enhanced oil recovery from palm oil mill effluent using ultrasonication technique for biodiesel production with two-step esterification and transesterification process." UTAR, 2023.

[12] P. C. Lukito and R. M. Oktaviani, "Pengaruh Fixed Asset Intensity, Karakter Eksekutif, dan Leverage terhadap Penghindaran Pajak," *Owner*, vol. 6, no. 1, pp. 202–211, 2022, doi: 10.33395/owner.v6i1.532.

[13] S. El Samad, "'Eco-Innovation': Transforming into a Sustainable Future," in *Proceedings*, MDPI, 2024, p. 14.

[14] . M. H. I., . H. J., and . H. S., "Investigating the moderating role of knowledge: The relationship between auditor's experience and ethical judgment," *Adv. Soc. Sci. Res. J.*, vol. 6, no. 2, Feb. 2019, doi: 10.14738/assrj.62.6193.

[15] K. P. Sabirali, "Environmental Social Governance (ESG) Practices: A Systematic Literature Review," *South Asian J. Soc. Stud. Econ*, vol. 21, pp. 224–240, 2024.

[16] K. O. Deyganto, "The effect of tax incentives practices on the sustainability of micro, small and medium enterprises in Ethiopia during the outbreak of corona virus pandemic," *J. Innov. Entrep.*, vol. 11, no. 1, Dec. 2022, doi: 10.1186/s13731-022-00194-8.

[17] A. M. Solina and L. V. G. Ocampo, "Driving Sustainable Change: Behavior and Environmental Awareness in the Case of the Philippines," 2024.

[18] Y. Kamakaula, "Sustainable Agriculture Practices: Economic, Ecological, and Social Approaches to Enhance Farmer Welfare and Environmental Sustainability," *West Sci. Nat. Technol.*, vol. 2, no. 02, pp. 47–54, 2024.

[19] V. Anupriya, S. Divesh, G. K. Hariprassath, and E. N. Kumar, "Waste Management Optimizing Using Quantum Networking-Integrated Systematic Reporting and Pollution Detection for Sustainable Disposal," in *Quantum Networks and Their Applications in AI*, IGI Global, 2024, pp. 337–354.

[20] I. Aiguobarueghian, U. M. Adanma, E. O. Ogunbiyi, and N. O. Solomon, "Waste management and circular economy: A review of sustainable practices and economic benefits," *World J. Adv. Res. Rev.*, vol. 22, no. 2, pp. 1708–1719, 2024.

[21] T. Tambunan, "Recent evidence of the development of micro, small and medium enterprises in Indonesia," *J. Glob. Entrep. Res.*, vol. 9, no. 1, Dec. 2019, doi: 10.1186/s40497-018-0140-4.

[22] N. F. Jamaludin, Z. Ab Muis, H. Hashim, O. Y. Mohamed, and L. L. Keng, "A holistic mitigation model for net zero emissions in the palm oil industry," *Heliyon*, vol. 10, no. 6, 2024.

[23] U. K. Kommuri and T. Arumugam, "Greenwashing Unveiled: How it Impacts Stakeholder Perception as Well as Sustainability Realities," *Pres. Coll.*, p. 96, 2024.

[24] E. E. Agu, T. V. Iyelolu, C. Idemudia, and T. I. Ijomah, "Exploring the relationship between sustainable business practices and increased brand loyalty," *Int. J. Manag. Entrep. Res.*, vol. 6, no. 8, pp. 2463–2475, 2024.

[25] F. Martielli, A. Salvi, and E. Doronzo, "Corporate social responsibility practices and value creation through open innovation approach: Evidence from the STOXX Europe 600 Index," *Corp. Soc. Responsib. Environ. Manag.*, 2024.

[26] E. M. N. Babu and G. Menon, "Investigating Employee Perceptions of Ethical Sustainability in Companies," *Sprin J.*

Arts, Humanit. Soc. Sci., vol. 3, no. 8, pp. 12–19, 2024.
[27] O. T. Ogoro and P. Hirschsohn, "Linking Stakeholder Salience to Sustainability Accountability in the Telecom Sector: The Case of Kenya's Safaricom," 2024.
[28] J. W. Creswell and V. L. P. Clark, *Designing and conducting mixed methods research*. Sage publications, 2017.
[29] J. F. Hair, W. C. Black, B. J. Babin, and R. E. Anderson, "Multivariate data analysis: Pearson College division," *Pers. London, UK*, 2010.
[30] W. W. Chin, "The partial least squares approach to structural equation modeling," *Mod. methods Bus. Res.*, vol. 295, no. 2, pp. 295–336, 1998.
[31] A. Sunani, U. P. W. Widodo, R. M. S. A. A. Wijaya, and N. W. I. Kirana, "Environmental disclosure analysis of manufacturing companies to realize sustainable green economy," *Intang. Cap.*, vol. 20, no. 2, pp. 321–342, 2024.
[32] R. Fahmi, H. Ramdhani, H. Latuconsina, and S. J. Lesmana, "Corporate Social Responsibility: Environmental Concern Through the Application of Communitarian Citizenship Thinking," in *Forum Ilmu Sosial*, 2024.
[33] J.-F. Henri and M. Journeault, "Eco-control: The influence of management control systems on environmental and economic performance," *Accounting, Organ. Soc.*, vol. 35, no. 1, pp. 63–80, 2010.
[34] U. W. Nuryanto, I. Quraysin, and I. Pratiwi, "Environmental management control system, blockchain adoption, cleaner production, and product efficiency on environmental reputation and performance: Empirical evidence from Indonesia," *Sustain. Futur.*, vol. 7, p. 100190, 2024.
[35] A. K. Almasyhari, W. S. Rachmadani, and Y. Priatnasari, "The Role of Environmental Accounting on Waste Management," *Shirkah J. Econ. Bus.*, vol. 9, no. 2, pp. 261–274, 2024.
[36] Nuraini, S. Arif, W. E. Sri, and B. D. Geoffrey, "Access Justice and Strengthening the Institutional Performance of Marine Ecotourism Management in Raja Ampat, Indonesia," *J. Sustain. Sci. Manag.*, vol. 16, no. 8, pp. 268–288, 2021, doi: 10.46754/jssm.2021.12.020.
[37] H. Xu, Y. Li, W. Lin, and H. Wang, "ESG and customer stability: a perspective based on external and internal supervision and reputation mechanisms," *Humanit. Soc. Sci. Commun.*, vol. 11, no. 1, pp. 1–14, 2024.
[38] S. Singh, R. Verma, A. Fatima, and M. Kumar, "Building Brand Reputation and Fostering Customer Loyalty Through ESG Practices: A Strategic Imperative for Competitive Advantage," in *ESG Frameworks for Sustainable Business Practices*, IGI Global, 2024, pp. 281–309.