

The Effect of Green Accounting and Environmental Awareness on Environmental Performance in Manufacturing Companies in Indonesia

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Article Info:

Article History:

Received: 2025-08-12

Revised: 2025-09-21

Accepted: 2025-10-08

Keyword:

Green Accounting,
Environmental Awareness,
Environmental
Performance,
Manufacturing Companies,
Sustainability

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Paper Type:

Research Paper



Abstract:

Purpose:

Increasing awareness of sustainability is driving manufacturing companies in Indonesia to be more responsible for their environmental impact. Green accounting is one of the modern accounting approaches that incorporates environmental costs into the company's reporting system, while environmental awareness reflects the awareness of management and employees in maintaining environmental sustainability.

Methodology:

This study uses a literature review method on various relevant national and international journals in order to analyze the relationship between the two variables and environmental performance.

Findings:

The results of the study show that manufacturing companies that actively implement green accounting tend to have more efficient waste management and energy consumption, and are more compliant with environmental regulations. On the other hand, environmental awareness has been shown to encourage more environmentally conscious managerial actions, as well as strengthen the effectiveness of the implementation of green accounting itself. The combination of a structured environmental reporting system and internal organizational awareness has been shown to improve environmental performance significantly.

Implication:

The implications of these findings emphasize the importance of integration between technical and value approaches in the sustainability management of the manufacturing industry.

INTRODUCTION

In recent decades, industrial activity has become a dominant factor in changing global environmental conditions. The growth of the manufacturing and extractive sectors, for example, has contributed to increased carbon emissions, environmental degradation, and massive exploitation of natural resources. These problems can no longer be ignored by business actors who previously only focused on efficiency and profitability. Now, companies are required to be responsible for the ecological impacts they cause by disclosing environmental information in financial reports. One of the emerging approaches is green accounting, an accounting system that integrates environmental data and costs into the company's reporting process (Rounaghi, 2019).

The implementation of green accounting provides an opportunity for companies to systematically record and report environmental costs such as waste management, emissions, rehabilitation, and energy use. More than just a recording tool, green accounting also allows companies to assess the efficiency of their activities in relation to environmental sustainability. In the Indonesian context, the implementation of green accounting has begun in several sectors such as the chemical and mining industries, although the level of implementation still varies (Wati

& Kusumawati, 2021). Research shows that companies that actively implement green accounting tend to experience increased financial performance and social reputation (Damayanti & Astuti, 2022).

However, the effectiveness of green accounting is highly dependent on internal organizational factors, especially the environmental awareness of decision makers. Without strong awareness and commitment from management, green accounting will only be an administrative formality with minimal impact. Environmental awareness includes an understanding of the importance of environmental conservation, compliance with regulations, and the courage to adopt pro-environmental policies amid economic pressures (Setianingrum & Sari, 2024). Therefore, environmental awareness needs to be seen as a foundation that supports the success of the green accounting system in improving environmental performance.

Many previous studies have highlighted the importance of both factors. In a study conducted by Dita and Ervina (2021), it was found that green accounting has a significant influence on a company's financial performance, which mostly comes from operational cost efficiency and environmental risk reduction. Meanwhile, research by Dewi and Muslim (2022) indicates that high environmental awareness can strengthen the influence of corporate social responsibility (CSR) and green accounting practices in creating long-term economic and social value. It shows that there is a close relationship between environmental awareness and the implementation of sustainable reporting strategies.

Environmental performance measurement is important in assessing the success of green accounting implementation and the level of environmental awareness of the company. Environmental performance includes waste management, energy efficiency, reduction of greenhouse gas emissions, and achievement of environmental certification such as ISO 14001. In a study by Melenia, Agustini, and Putra (2023), it was found that the implementation of green accounting in companies in the energy, cement, and mining sectors has a positive correlation with improving environmental performance. In other words, the higher the company's commitment to environmental reporting and management, the better the environmental performance produced.

However, most existing studies still focus on the relationship between green accounting and financial performance, with few explicitly linking it to environmental performance as the main outcome. In fact, environmental performance is a very relevant indicator for assessing a company's long-term sustainability. A study by Muzakki (2024) even suggests that the effect of green accounting on economic performance is mediated by environmental performance, thus reinforcing the urgency of placing environmental aspects as the main variable in sustainable accounting research. Kurnianingtyas and Trisnawati (2024) also emphasize that the success of sustainable development is highly dependent on the collaboration between the reporting system and the organization's environmental awareness.

Based on these arguments, this study was conducted to empirically test the effect of green accounting and environmental awareness on environmental performance in manufacturing companies in Indonesia. By using a quantitative approach and relevant company samples, this study can provide theoretical contributions to the development of environmental accounting as well as practical contributions in formulating sustainability-based managerial strategies. In addition, the results of this study are expected to be a basis for consideration for regulators and policymakers in developing a legal framework and incentives that support the implementation of green accounting more widely and effectively (Dianty & Nurrahim, 2022; Ratmono et al., 2024).

Stakeholder Theory. This theory states that companies are not only responsible to shareholders, but also to all stakeholders such as society, government, the environment, and employees. In the context of green accounting and environmental awareness, this theory emphasizes that companies need to pay attention to their environmental impact because external demands for transparency and sustainability are increasing (Freeman, 1984). Green accounting is a means to demonstrate environmental accountability, while environmental awareness reflects the company's concern for stakeholder expectations regarding sustainability issues.

Legitimacy Theory (Legitimacy Theory). This theory explains that companies strive to gain, maintain, and strengthen social legitimacy from society and regulators. One way to gain this legitimacy is to show that the

company's activities are in line with social values, including environmental aspects. Therefore, the implementation of green accounting and strengthening environmental awareness are strategies to maintain the company's image as a socially and ecologically responsible entity (Suchman, 1995).

Green Accounting for Environmental Performance. Green accounting is an accounting recording system that includes environmental cost elements and ecological information in a company's financial statements. The main objective of this approach is to provide a more comprehensive picture of the impact of business activities on the environment. Through systematic recording of waste management costs, energy, emissions, and environmental rehabilitation, companies can exercise more effective control over their ecological impacts while increasing cost efficiency (Rounaghi, 2019).

In the context of implementing green accounting, companies are not only required to prepare financial reports that include environmental activities, but also need to ensure that these activities contribute directly to improving environmental performance. It includes achieving energy efficiency, reducing carbon emissions, improving the quality of managed waste, and complying with applicable environmental regulations and standards. Research by Damayanti and Astuti (2022) states that the implementation of green accounting has a positive impact on company performance indicators, including in environmental aspects. This practice allows companies to map out ecologically less efficient operational areas and make sustainable improvements.

Melenia, Agustini, and Putra (2023) in their research on companies in the energy and mining sectors in Indonesia showed that the implementation of green accounting significantly improves environmental performance. It is due to the increasing involvement of companies in the process of evaluating and reporting environmental impacts, so that the internal decision-making process becomes more ecologically responsible. Thus, green accounting can act as a measuring tool as well as a control instrument to improve the environmental quality of business activities.

Furthermore, research by Dianty and Nurrahim (2022) shows that companies that consistently implement green accounting tend to experience decreased pollution levels and increased energy efficiency. It explains that green accounting is not only related to reporting aspects, but also encourages the transformation of operational management towards a more environmentally friendly direction. In addition, a study by Muzakki (2024) also supports this finding by stating that environmental performance plays an important mediating variable in the relationship between green accounting and economic performance. It means that before providing a financial impact, green accounting first creates improvements in environmental management.

From these various studies, green accounting has a close relationship with increasing environmental performance. Success in its implementation has great potential to increase public trust, strengthen compliance with environmental regulations, and support the company's long-term sustainability agenda. In other words, green accounting is not just a reporting system, but an integral part of the company's environmental management strategy.

H1: Green accounting has a positive effect on environmental performance.

Environmental Awareness towards Environmental Performance. Environmental awareness is the level of understanding and concern of individuals and organizations towards environmental issues and the impact of human activities on ecosystems. In the context of a company, this awareness is not only limited to the aspect of perception, but is also reflected in the attitudes and real actions of management to reduce the negative impact of business operations on the environment. Environmental awareness is an important prerequisite in encouraging the creation of an organizational culture that supports sustainability (Setianingrum & Sari, 2024).

Companies with high levels of environmental awareness tend to be more active in implementing pro-environmental policies such as energy efficiency, reducing the use of hazardous materials, recycling waste, and reporting social responsibility. Research by Melenia, Agustini, and Putra (2023) shows that increasing environmental awareness among company management encourages the implementation of more environmentally

friendly business practices, including waste management and emission control. It has a direct impact on improving the company's environmental performance, both in terms of regulatory compliance and public recognition.

Setianingrum and Sari (2024) stated that environmental awareness has a strong correlation with sustainable consumption and production behavior. In the corporate scope, environmental awareness not only drives green policies at the strategic level but also influences daily operational decisions such as raw material selection, energy management, and waste management. Thus, high environmental awareness contributes to the birth of an internal control system that is oriented towards resource efficiency and environmental preservation.

In addition, environmental awareness also plays a role in increasing employee active participation in activities that support the company's sustainability. Research by Dita and Ervina (2021) states that companies that consistently provide environmental training and education to their employees show improvements in environmental performance indicators such as reducing greenhouse gas emissions and energy efficiency. A work environment with a high level of awareness also generates technical innovations to support cleaner production processes.

The positive impact of environmental awareness on environmental performance is also emphasized by Dewi and Muslim (2022), who found that companies with a high commitment to internal environmental education are able to achieve better environmental performance than companies that only focus on reporting obligations. It shows that environmental awareness is not only a supporting factor but is a core element in strategic environmental management. The higher the level of environmental awareness in the organization, the higher the likelihood that the company to set ambitious and sustainable environmental targets.

Based on the literature review, environmental awareness is an important factor in improving environmental performance. This awareness encourages organizations to make decisions that are not only financially profitable but also responsible for their ecological impacts. Therefore, this study proposes the following hypothesis:

H2: Environmental awareness has a positive effect on environmental performance.

Conceptual Framework. The relationship between variables in this study is described through the relationship between green accounting and environmental awareness as independent variables that influence environmental performance as the dependent variable. Green accounting functions as a tool to record and report the company's environmental costs and activities, which are expected to increase the effectiveness of environmental management. Meanwhile, environmental awareness reflects the level of concern and understanding of the company towards ecological issues that encourage pro-environmental organizational behavior. These two variables are assumed to have a partial or simultaneous influence on improving the company's environmental performance. The relationship between these variables is depicted in Figure 1 below.

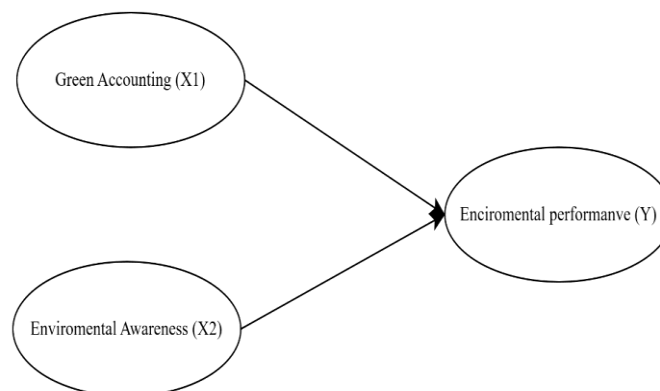


Figure 1. Conceptual Framework

METHODS

This study was conducted with a qualitative approach through a literature study method that aims to explore and analyze the relationship between green accounting, environmental awareness, and environmental performance in the context of manufacturing companies in Indonesia. Data were collected from various secondary sources in the form of scientific journal articles, proceedings, and relevant academic publications, especially those discussing environmental accounting practices, organizational environmental awareness, and environmental performance measurement in the industrial sector. The literature reviewed was selected based on thematic relevance, strong methodological background, and research context that is in line with the topic of this study. The analysis was conducted descriptively and comparatively, by mapping the findings from various studies to understand the pattern of relationships between variables, and to see the consistency or differences in results between studies. This process also includes a review of quantitative results such as the value of the influence coefficient or the significance of the relationship between variables, in order to strengthen the conceptual arguments built. With this approach, the study seeks to provide a comprehensive picture of how green accounting and environmental awareness play a role in shaping the environmental performance of manufacturing companies, while also offering a theoretical basis that can be used as a reference in implementing corporate sustainability policies.

RESULTS AND DISCUSSION

The Influence of Green Accounting on Environmental Performance in Manufacturing Companies in Indonesia. The results of a review of various studies show that green accounting has a significant influence on environmental performance, especially in the manufacturing sector, which is synonymous with high energy consumption, large-scale production processes, and the potential for hazardous waste. Various empirical studies conducted on manufacturing companies in Indonesia show that green accounting practices not only strengthen the transparency of environmental reporting but also have a real impact on achieving resource efficiency and reducing pollution loads.

Research by Dita and Ervina (2021) shows that green accounting has a significant effect on environmental performance, with a regression coefficient value of 0.473, which means that the higher the implementation of green accounting, the higher the company's environmental performance. This study was conducted on consumer goods manufacturing companies listed on the IDX, and the results showed that companies that consistently record and disclose environmental costs are better able to reduce energy use and improve waste management systems. Meanwhile, Wati and Kusumawati (2021) who studied manufacturing companies in the chemical industry sub-sector, found that the implementation of green accounting contributed to profitability and environmental efficiency, where its effect on return on assets (ROA) was recorded at 36.2%, with an increase in liquid waste efficiency reported in the company's sustainability report.

Another study by Melenia, Agustini, and Putra (2023) focusing on manufacturing companies in the energy and mining sectors also supports similar findings. They noted that companies that actively implement green accounting have 15–20% higher environmental performance scores than similar companies that do not formally report environmental activities. In this context, environmental performance scores include emission reductions, waste management systems that meet ISO 14001 standards, and achievement of energy efficiency targets. These findings indicate that green accounting is not only an administrative tool, but also creates internal incentives to implement clean production policies.

However, these results also show that the success of green accounting is highly dependent on the commitment of company management. A study by Dianty and Nurrahim (2022) stated that in several manufacturing companies, green accounting is only implemented as a formality to meet sustainability reporting requirements, without being followed by real policy or operational changes. The regression results in the study showed that the effect of green accounting on environmental performance was only significant if accompanied by the support of an internal audit system and ongoing environmental awareness training.

In general, this discussion shows that green accounting has a strong influence on improving environmental performance in manufacturing companies in Indonesia, both through operational efficiency and pollution control. Quantitative values from various studies confirm that green accounting is not just a concept, but is able to provide real contributions to corporate sustainability efforts. In the context of a manufacturing industry that is at high risk of environmental damage, green accounting practices can be an important strategy to ensure that business processes not only generate profits but also consider long-term ecological sustainability.

The Influence of Environmental Awareness on Environmental Performance in Manufacturing Companies in Indonesia. Environmental awareness is an important factor that encourages companies to act more proactively in maintaining environmental sustainability. In the manufacturing sector in Indonesia, environmental awareness is considered the initial foundation that determines whether a company will truly commit to serious environmental management or only fulfill administrative obligations. This awareness is reflected in the attitude of company leaders, internal policies, and employee education efforts regarding environmental issues. The results of the study show that manufacturing companies that have a high level of environmental awareness tend to be more prepared to integrate sustainability principles into their business operations, which ultimately has a positive impact on environmental performance.

Research by Setianingrum and Sari (2024) found that environmental awareness has a significant influence on sustainable consumption behavior and managerial decisions in implementing environmentally friendly policies. In the context of manufacturing companies, the results of research by Dewi and Muslim (2022) showed that environmental awareness contributes to improving environmental performance with a regression coefficient of 0.423, which means that the higher the environmental awareness in the company, the better the environmental performance achieved. These results indicate that management awareness of the importance of environmental sustainability influences investment decisions in green technology, waste management systems, and energy efficiency programs.

Furthermore, Muzakki (2024) in his research on mining and manufacturing companies in Indonesia stated that companies with a strong environmental culture showed an average environmental performance score of 18% higher than companies with low awareness. It is obtained from indicators such as compliance with environmental regulations, frequency of emission reporting, and regular training for employees on energy conservation and waste management. Environmental awareness in organizations drives collective attitude changes that result in real decisions and actions in order to reduce negative impacts on the environment.

However, there are still challenges in realizing environmental awareness that is evenly distributed across all manufacturing companies in Indonesia. Most awareness is still centered on top-level management, without being accompanied by internalization of environmental culture down to the operational level. Kurnianingtyas and Trisnawati (2024) noted that environmental awareness is only effective if followed by an integrated environmental management system, such as the ISO 14001 standard or GRI (Global Reporting Initiative) reporting. Without such structural support, awareness tends to be normative and does not produce significant changes in environmental performance.

From this discussion, environmental awareness plays an important role in driving environmental performance in manufacturing companies in Indonesia. This awareness serves as a motivational basis that drives companies to act beyond just fulfilling legal obligations, but also actively seek solutions and innovations to reduce their ecological footprint. The higher the level of environmental awareness of a company, the more likely it is to invest in green technology, implement clean production systems, and build an organizational culture that supports sustainability.

Results of Inter-Variable Study. Based on the results of the analysis of various literature that have been discussed in the previous sub-chapter, both green accounting and environmental awareness have complementary roles in improving environmental performance, especially in the Indonesian manufacturing sector. Manufacturing companies have characteristics that are energy-intensive, process-intensive, and high risk of pollution, so the

implementation of structured environmental practices and awareness of their impacts is very crucial. The findings of previous studies indicate that these two variables not only have an individual effect but can also form a stronger synergy when applied simultaneously in the company's strategy.

The implementation of green accounting provides a systematic basis for recording environmental costs, transparency of reporting, and internal control over production activities that impact the ecosystem. However, the success of its implementation is greatly influenced by the level of environmental awareness of the company's management and employees. Without adequate environmental awareness, green accounting will only be an administrative document without being followed by concrete changes in behavior or policies. It is in line with the findings of Muzakki (2024) and Dewi & Muslim (2022), which show that the influence of green accounting on environmental performance is stronger when companies also demonstrate internal awareness of environmental issues. This awareness includes an understanding of the urgency of sustainability, corporate social responsibility, and intrinsic motivation to maintain environmental quality.

The relationship between the two is also seen in the implementation of operational policies. Environmentally conscious companies tend to be more proactive in using information from green accounting as a basis for decision making, such as adjusting production processes to be more efficient, using environmentally friendly technology, and implementing stricter waste management. In addition, environmental awareness also increases the acceptability of open environmental reporting to the public and stakeholders. Thus, green accounting functions as a tool, while environmental awareness is the driver. Both support each other in forming an effective environmental management system (Saputra & Laksmi, 2024b, 2024a).

In the context of manufacturing companies in Indonesia, the integration of green accounting and environmental awareness is becoming increasingly important amidst increasing environmental regulations and pressure from global investors on sustainability issues. Many manufacturing companies are now starting to switch to environmental-based management systems, such as ISO 14001, and publish sustainability reports as a form of commitment. It is an indicator that both have begun to become strategic priorities, not just additional obligations. However, the results of the discussion also emphasize that strong implementation requires comprehensive support from all levels of the organization, from top management to operational staff. Without internalizing sustainability values, green accounting and awareness will not provide maximum contribution to environmental performance (Laksmi & Saputra, 2024a).

Thus, it can be understood that achieving optimal environmental performance is not enough with a technical approach in the form of environmental accounting and reporting, but also requires a cultural and value approach, namely, environmental awareness. Therefore, manufacturing companies in Indonesia need to make these two variables part of a sustainable strategic management system, to not only improve environmental performance, but also the company's reputation and long-term competitiveness (Laksmi & Saputra, 2024b).

CONCLUSION

Based on the results of the literature review and discussion that have been conducted, green accounting and environmental awareness have a significant and complementary influence on improving environmental performance in manufacturing companies in Indonesia. The implementation of green accounting helps companies to systematically record, measure, and report the costs and environmental impacts of their production activities, which ultimately encourages energy efficiency, better waste management, and compliance with environmental regulations. Meanwhile, environmental awareness becomes a cultural foundation that drives the company's internal commitment to sustainability and environmental preservation. Empirical studies analyzed in this study show that manufacturing companies that have a high level of environmental awareness are more proactive in integrating green accounting into operational strategies and managerial policies, which has an impact on improving overall environmental performance. Therefore, improving environmental performance requires not only a good reporting

system but also a deep awareness of all elements of the organization regarding the importance of preserving the environment as part of social responsibility and long-term business strategy.

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