
Academia Open



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Academia Open

Vol. 10 No. 2 (2025): December
DOI: 10.21070/acopen.10.2025.11071

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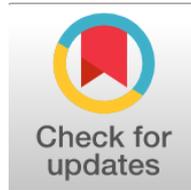
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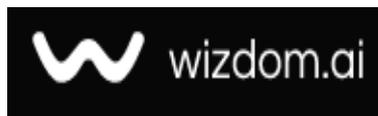
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DOI: 10.21070/acopen.10.2025.11071

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Green Accounting Practices in Opak Factory SMEs

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Abstract

General Background: Environmental sustainability has become an essential aspect of business operations, especially for small and medium enterprises (SMEs) in the food processing sector. **Specific Background:** The opak factory in Sidodadi Village, Indonesia, produces organic and inorganic waste, necessitating strategic environmental management. **Knowledge Gap:** While studies have shown benefits of green accounting, limited research explores its application and link to business sustainability within rural SMEs. **Aims:** This study aims to assess the implementation of green accounting and environmental performance in supporting business sustainability at the opak factory. **Results:** Using qualitative methods including interviews and field observations, findings reveal suboptimal integration of environmental costs into financial records and inadequate documentation of environmental initiatives. Although the factory engages in solid and liquid waste management—such as reusing cassava pulp as animal feed and building liquid waste tanks—these efforts are not systematically reported under green accounting frameworks. **Novelty:** The study offers empirical insight into green accounting within a rural food SME, highlighting distinct challenges and context-specific practices. **Implications:** Without structured financial tracking and better stakeholder awareness, potential long-term benefits such as increased competitiveness, regulatory compliance, and market access remain underutilized. Strengthening institutional understanding and environmental cost reporting is crucial for advancing sustainable business practices.

Highlights:

- Environmental costs are not systematically recorded in financial reports.
- Waste management practices exist but lack integration into sustainability reporting.
- Green accounting remains underutilized due to limited awareness and resources.

Keywords: green accounting, environmental performance, business sustainability, SMEs, waste management

Published date: 2025-06-17

Introduction

The Opak factory in Sidodadi Village, Biru-Biru Subdistrict, Deli Serdang Regency is one of the small and medium enterprises (SMEs) that plays an important role in the local economy. As a food-based business, opak production activities produce organic and inorganic waste that has the potential to pollute the environment. Therefore, the application of green accounting is a strategic step in managing the environmental impact caused [1]. In addition, the environmental performance of the factory also needs to be considered because good environmental performance is believed to improve business reputation, production efficiency, and business sustainability in the long term.

The application of Green Accounting and environmental performance to opak factory waste is the main focus of the discussion [2]. Factory waste is the remnants or waste generated from industrial production processes that no longer have economic value and require special management to avoid negative impacts on the environment. This waste can be in the form of liquid, solid, or gaseous waste, each of which requires appropriate handling methods to prevent pollution and damage to the surrounding ecosystem. Liquid waste is the remaining liquid generated from various human activities, including households, industry, and agriculture. According to Government Regulation of the Republic of Indonesia No. 82 of 2001, liquid waste is defined as the residue of a business that is liquid and can contain pollutants that are harmful to the environment and health [3].

Business sustainability has become a crucial issue in business management in the modern era, especially in the small and medium industry (SMI) sector. Along with the increasing awareness of the importance of environmental sustainability, the concept of green accounting has begun to be applied as an effort to integrate financial and environmental aspects in business decision making. Green accounting allows companies to measure, record and report the extent to which opak factories apply the principles of their operational activities, which in turn can encourage the creation of more socially and ecologically responsible business practices [4].

Previous research has examined the role of green accounting and environmental performance in promoting business sustainability. Study by Prabowo & Yulianti (2022) found that the implementation of green accounting in small and medium enterprises (SMEs) in the food industry sector is able to improve operational efficiency and reduce negative impacts on the environment [5]. This research shows that SMEs that apply green accounting are better prepared to deal with increasingly stringent environmental regulations, so they have a competitive advantage in the market.

Green accounting is a form of accounting that combines environmental aspects with a company's financial activities. The aim is to assist companies in managing the environmental impact of their business operations. Through this approach, companies can improve environmental performance, manage expenses more efficiently, invest in environmentally friendly technologies, and develop more sustainable products and production processes. Research from Irawan et al. (2019) revealed that the implementation of green accounting can effectively reduce production costs through waste management and more efficient energy use [6]. Several studies reveal that the implementation of green accounting can drive operational efficiency and improve corporate reputation. For example, a study conducted by Hidayat et al. (2023) found that the implementation of green accounting in manufacturing companies is able to reduce production costs through better waste management [7]. The study also noted that green accounting-related information published in sustainability reports can increase investor confidence.

Green accounting implementation can help companies formulate better strategies to reduce negative impacts on the environment. Companies that implement green accounting tend to have a positive image in the eyes of investors and consumers, who are increasingly paying attention to sustainability aspects in their decision-making. Thus, green accounting is not only beneficial for the environment, but also for the sustainability of the business itself [8]. Highlighting the importance of Green Accounting, which not only helps companies manage environmental costs but also improves reputation in the eyes of the public and investors. By using sustainable accounting methods, a company can demonstrate its commitment to social and environmental responsibility, which in turn can increase the profitability of its research [9].

Environmental performance reflects the efforts made by companies to create and maintain a healthy and sustainable environment. The management is required to carry out various activities that are considered important by stakeholders, then convey the results of these activities transparently [10]. This environmental performance management is a form of corporate responsibility and concern for the community and the surrounding environment. Sacrifice When companies allocate funds to protect the environment, this can be a preventive measure against potentially larger expenses in the future. For example, the cost of dealing with a lawsuit from the community due to environmental pollution, or the risk of shutting down business operations due to government sanctions. Therefore, environmental investment is not just an expense, but also a strategy to avoid bigger losses [11].

Environmental performance refers to the ability of an entity or company to manage the environmental impacts of its operational activities. According to Irawan et al. (2019), good environmental performance is reflected in waste management, energy use efficiency, and reduced greenhouse gas emissions [6]. Research by Anggraini et al. (2024) shows that companies with good environmental performance have higher competitiveness in the global market. This study also found that companies that are proactive in managing their environmental performance tend to be better prepared to face increasingly stringent environmental regulations [12]. This is in line with the findings of Sari et al. (2022) which reveals that good environmental management can enhance a company's reputation and strengthen its competitive position in the market [13].

Research from Atika et al. (2023) also emphasizes that good environmental performance can increase the competitiveness of

companies in the global market, especially in the face of consumer demands that are increasingly concerned about environmentally friendly products [14]. However, there are still limited studies that specifically review the impact of implementing green accounting and environmental performance on business sustainability in the SME sector, especially in the food processing industry such as opak factories. Good waste management and efficient energy use are two important things in improving environmental performance and maintaining the sustainability of company operations [15]. That companies that implement Green Accounting tend to have higher profitability levels due to operational efficiency and better waste management.

Green accounting is an approach that incorporates environment-related cost elements into the preparation of corporate financial statements, helping companies understand the impact of their operations on the environment. Research by Loen (2019) shows that the implementation of green accounting contributes to the advancement of sustainability and operational efficiency [16]. In addition, an integrated carbon report can reflect a company's commitment to climate change and improve reputation in the eyes of stakeholders. The purpose of green accounting is to recognize and calculate the environmental costs that arise from a company's operations. These costs can include waste management, repairing environmental damage, and preventing pollution. In addition, by adopting Green Accounting practices, companies can build a positive image that appeals to consumers who are increasingly concerned about environmental issues [17].

The importance of local wisdom-based small business sustainability also increases profitability. In this context, business sustainability is not only related to economic aspects, but also includes fundamental social and cultural values [18]. In this increasingly complex era, it is important for a company to evaluate its performance thoroughly, this method changes the way performance is measured by describing organizational education in the form of three dimensions that include five sides, namely stakeholder satisfaction, strategy, process, capability, and stakeholder contribution. With this approach, it shows that performance evaluation does not only focus on financial aspects, but also considers other elements that are important for long-term success [14].

The novelty of this research lies in its focus on the opak factory industry, which has different production and waste characteristics compared to other manufacturing industries. The scientific contribution of this research is to provide an empirical view of how green accounting and environmental performance can be effectively applied to local food-based businesses, as well as how it impacts on business sustainability. This is expected to provide strategic input for business managers, policy makers and other stakeholders in encouraging sustainability practices in the SME sector.

Method

This research uses a qualitative descriptive approach [19], which aims to describe and understand a phenomenon in depth through a case study approach. approach with the aim of providing an in-depth understanding of the processes, constraints, and factors that influence the application of green accounting and environmental performance in the context of business sustainability at the Opak Factory in Sidodadi Village, Biru-Biru District, Deli Serdang Regency.

This research was conducted through a case study method at an opak factory operating in Sidodadi Village. The selection of research subjects was carried out purposively by considering the criteria of factories that have implemented green accounting principles and have documentation related to environmental performance. The main data was obtained through in-depth interviews with owners and managers involved in environmental management [20].

Qualitative data collection was carried out through three main stages including observation, interviews and documentation. Qualitative data analysis was carried out in stages by referring to the interactive analysis process consisting of several stages, namely data filtering, data compilation, and conclusion drawing. In the screening stage, information that is considered important and relevant is selected from the results of interviews, observations, and documents obtained. After that, the data is organized and presented in the form of descriptive descriptions to make it easier to understand and analyze, which describes the main patterns and findings related to the application of green accounting and environmental performance. Final conclusions were drawn after a careful process of data verification and reflection on the results of the analysis [21].

Results and Discussion

From interviews with the factory owner and factory employees who have a broader knowledge of the opak factory, several key findings were found, which are explained in the following discussion.

1. Implementation of Green Accounting at Opak Factory

Green accounting, or environmental accounting, is an accounting approach that focuses on recording and reporting costs and benefits associated with the environmental impacts of business activities. The main objective of green accounting is to ensure that environmental impacts are taken into account in the financial statements, which in turn can help companies make more sustainable decisions.

Based on the results of research on the application of green accounting in the opak factory in Sidodadi Village, it is concluded that the application of green accounting there is not fully in accordance with the expected principles. There are four explanations of the principles of green accounting as well as an evaluation of their application at the opak factory according to Lako (2018) includes [22]:

a. Principles of Environmental Cost Recognition

One of the basic principles of green accounting is the recognition of costs related to the environment, such as waste management, pollution reduction, and sustainable use of natural resources. At the opak factory, environment-related costs such as waste management and investment in environmentally friendly technology are not systematically recorded in the financial statements. This shows that the principle of recognizing environmental costs has not been applied properly.

b. Integration of Environmental Accounting in Financial Statements

Green accounting also emphasizes the importance of integrating costs and revenues related to environmental aspects into the company's overall financial statements. In the opak factory, there is a lack of integration of recording environmental costs into their financial statements. Although there are some environmental management efforts, such as the management of production waste or solid waste, these measures are not systematically recorded in the existing accounting system.

c. Limited Resources and Understanding

One of the main challenges faced by opak factories in Sidodadi village is also the lack of adequate understanding from the company owners regarding the concept of comprehensive green accounting. Without sufficient understanding, the implementation of green accounting is hampered. In addition, limited resources, both financial and technical, are also an obstacle in the implementation of green accounting principles in this factory.

d. Investment in Environmentally Friendly Technology

Green accounting encourages companies to invest in more environmentally friendly technologies, which in the long run can reduce negative impacts on the environment. However, in the opak factory, this kind of investment has not been done optimally. This may be due to limited funds and understanding of the importance of green technology for the sustainability of the company and the environment.

The results showed that the application of green accounting in the opak factory in Sidodadi Village was not fully in accordance with the expected principles. This can be seen from the lack of integration of recording environment-related costs into the financial statements as a whole. In addition, environmental costs such as production waste management and investment in environmentally friendly technology have not been carried out or documented systematically. This is due to the owner's lack of understanding of the concept of comprehensive green accounting and the lack of experts in this field.

The implementation of green accounting in factories is also constrained by limited resources, both financial and technical. Although there are efforts to implement better environmental management, such as solid waste management, these measures are still irregular and not well integrated into the accounting system.

2. Environmental Performance

Environmental performance refers to the extent to which an entity, such as a company, organization, or individual, can manage its operational impacts on the environment in a responsible and sustainable manner. This performance focuses not only on reducing environmental damage, but also on achieving goals that support ecosystems, resource efficiency, and a better quality of life. In simple terms, environmental performance includes various efforts and actions taken to minimize negative impacts on the environment and optimize the use of resources. Environmental performance includes several key interconnected aspects, including natural resource management, waste management, pollutant emission reduction, and compliance with environmental policies and regulations.

Research Results The opak factory has shown some positive steps in its efforts to manage the environmental impacts resulting from its operations. One aspect of this is waste management, both solid and liquid. Solid waste management at the factory is quite innovative, as after the production process, employees sell the cassava pulp or skin as animal feed. This not only reduces the amount of waste wasted, but also creates an additional source of income for the company. This approach is an example of sustainable waste management, which not only reduces environmental impacts, but also provides economic benefits that can improve the company's operational efficiency. This is in line with the study Anggraini et al. (2024) found that disclosure of environmental performance through sustainability reports has a positive impact on investor confidence and increases firm value, with good environmental performance management will create strong market competition in international markets, especially in countries with strict environmental regulations [12].

On the other hand, the opak factory has also made efforts to manage liquid waste, by allocating a budget for the construction of liquid waste storage tanks. This step aims to reduce negative impacts on the environment, especially related to pollution that can be caused by liquid waste that is not managed properly. However, despite the good efforts in the construction of this facility, the recording of expenses related to the construction of the catch basin has not been done specifically in accordance with green accounting principles. The construction costs are still recorded as general expenses without a more detailed classification, which should reflect the contribution to environmental management. This shows that the application of green accounting, essential for maintaining and transmitting environmental impacts in a more measurable manner, has not been fully implemented.

From the field observations, it appears that the opak factory has quite good measures in place for solid and liquid waste management. The sale of solid waste as animal feed shows that it can be put to productive use, supporting the factory to

reduce waste and even creating additional income. However, if this solid waste management is properly recorded and made part of the sustainability report, it can add significant value to the factory, both in terms of operational transparency and social responsibility.

Liquid waste management through the construction of liquid waste catchment basins is a positive first step, but still needs improvement, especially in terms of financial recording and budget allocation. Recording expenses in more detail and in accordance with the principles of green accounting will allow the company to be more efficient in maintaining waste management and its impact on the environment. This will also make it easier for the opak factory to conduct sustainability evaluations of its efforts and ensure that it can continue to reduce negative environmental impacts while improving its operational effectiveness.

Overall, although the opak factories have demonstrated a good commitment to environmental management, there is still room for improvement, especially in terms of more precise financial recording and budget allocation. A more systematic and in-depth application of green accounting principles will greatly help businesses monitor the efficiency of expenditures and their impact on the environment.

3. Business Sustainability

The suboptimal application of green accounting and challenges in environmental performance have an impact on the sustainability of opak factories. The implementation of green accounting and environmental performance have different impacts on the sustainability of the opak factories in Sidodadi Village, both in the short and long term. In the short term, green accounting has the potential to increase the transparency of environmental cost management, such as recording expenditures for the construction of liquid waste storage tanks. This transparency makes it easier for businesses to identify the efficiency of budget allocations. In addition, environmental performance in managing solid waste by selling cassava pulp or peels for animal feed provides direct economic benefits through additional income. These measures, although still limited, show an initial positive impact on business sustainability by reducing waste and improving operational efficiency.

However, the suboptimal implementation of green accounting has a negative impact in the short term because environmental cost recording is still done in general without specific classification. This makes evaluating the effectiveness of environmental management less accurate. On the other hand, constraints in adequate budget allocation for liquid waste management limit the positive impact that could have been achieved sooner.

In the long run, effective green accounting and environmental performance can significantly support business sustainability. With structured and environmentally-based financial records, businesses can monitor the cost efficiency and environmental impact of their operations, contributing to better strategic planning. Sustainable waste management can also strengthen a company's reputation in a market that is increasingly concerned about environmentally friendly practices. However, if green accounting implementation remains minimal and environmental performance is not improved, negative impacts include lost opportunities to improve competitiveness, limited access to broader markets, and the risk of sanctions from stricter environmental regulations in the future.

Conclusion

Based on the results of the study, the application of green accounting in the opak factory in Sidodadi Village is not in accordance with the principles of Green Accounting. Although the opak factory has taken positive steps in waste management. However, the financial recording of these expenses is not yet in accordance with the principles of green accounting, so it does not provide a clear picture of the contribution to business sustainability. Therefore, further commitment is needed, both in terms of structuring the environmental recording system, budget allocation, and human resource capacity building, so that business continuity can be truly realized as a whole and sustainable. A more structured and systematic application of green accounting is needed so that businesses can understand the impact of environmental management on their cost efficiency, competitiveness and business sustainability. Environmental performance still needs to be improved in order to support business sustainability more significantly. The factory needs a more strategic approach to environmental management, including an increased understanding of green accounting, adequate budget allocation, and strengthened management commitment. So that the sustainability of the opak factory can be achieved and provide long-term benefits for the environment and the surrounding community. This study recommends that factory management is advised to improve understanding and application of green accounting through training and consultation with experts, as well as allocating a special budget for environmental sustainability programs. In addition, collaboration with the government and related parties can help in obtaining clearer regulatory guidance and technical support to improve environmental performance.

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