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Assessing the Need for Environmental Cost Accounting in Plastic Recycling Small and Medium Enterprises: A Case Study of Manado Recycle Hub, Manado City

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A B S T R A C T

Plastic recycling Small and Medium Enterprises (SMEs) play a significant role in reducing environmental pollution by recovering and reprocessing plastic waste. However, most SMEs still lack an adequate system for recording environmental costs, limiting their ability to evaluate environmental expenditures and support informed decision-making. This study aims to assess the need for environmental cost accounting in plastic recycling SMEs through a case study of Manado Recycle Hub, Manado City, Indonesia. A descriptive qualitative approach with a case study design was employed. Data were collected through structured interviews consisting of 30 questions, direct field observations, and an analysis of business documents. The data were analyzed using gap analysis to compare existing accounting practices with Green Accounting principles. The findings reveal that environmental expenditures, including water and electricity consumption, waste management, personal protective equipment, and transportation costs, are incurred regularly but are recorded as general operating expenses without specific classification. Although the business owner demonstrates strong awareness of the importance of environmental cost accounting, its implementation is constrained by limited accounting knowledge and the absence of a simple recording system. The identified needs include a Microsoft Excel-based accounting system, separate classification of environmental costs, environmental cost reporting, and a user-friendly recording procedure. These findings provide a foundation for developing a simple and practical environmental cost accounting system tailored to the characteristics and operational needs of plastic recycling SMEs

INTRODUCTION

Plastic recycling Small and Medium Enterprises (SMEs) occupy a unique yet challenging position. On the one hand, they make a tangible contribution to environmental sustainability by collecting, sorting, washing, and processing plastic waste, thereby preventing it from ending up in landfills, rivers, and oceans. On the other hand, these environmentally beneficial activities are rarely reflected in their financial records. Expenditures related (Zahrah & Yu, 2024).
This issue extends beyond a mere accounting technicality. When environmental costs are not identified and recorded separately, SMEs lose critical information needed to make informed and responsible business decisions. Without clear records, business owners cannot accurately determine how much is spent on environmental management or evaluate whether those expenditures are being used efficiently. As a result, although plastic recycling SMEs are widely recognized for their positive contribution to environmental sustainability, this contribution cannot be adequately demonstrated through financial evidence. The absence of environmental cost information also limits the enterprise's ability to assess operational efficiency, measure environmental performance, and communicate its sustainability efforts to stakeholders. Therefore, establishing a systematic approach to recording environmental costs is essential not only for improving financial management but also for strengthening environmental accountability and supporting sustainable business practices.

Green Accounting has emerged as an effective approach to addressing these limitations by integrating environmental considerations into conventional accounting practices. Its fundamental principle is that costs arising from activities that affect the environment should be systematically identified, measured, and reported separately from general operating expenses (Endiana et al., 2020). By incorporating environmental cost information into financial reporting, organizations can generate more comprehensive and transparent accounting information that reflects not only their financial performance but also their commitment to environmental responsibility and sustainable business practices (Abdullah & Yuliana, 2018). Consequently, Green Accounting provides a valuable basis for improving managerial decision-making, strengthening environmental accountability, and demonstrating an organization's contribution to sustainable development.

Despite its potential benefits, the adoption of Green Accounting among Small and Medium Enterprises (SMEs) remains limited. This is not due to a lack of willingness on the part of business owners, but rather to the absence of practical and user-friendly guidelines that can be implemented without formal accounting expertise (Susanto, 2019). Against this background, the present study seeks to identify the actual needs of plastic recycling SMEs rather than proposing a new accounting model. Specifically, it aims to examine the current practices of environmental cost recording, identify the gaps between existing practices and Green Accounting principles, and explore the practical requirements of business owners for a simple and applicable environmental cost accounting system. Understanding these needs is essential for developing accounting practices that are both feasible for SMEs and supportive of sustainable business management.

Manado Recycle Hub was selected as the case study because it represents a typical small-scale plastic recycling Small and Medium Enterprise (SME) that has been operating actively, maintains a measurable production capacity, yet still lacks a structured financial recording system. This characteristic makes the enterprise an appropriate setting for examining the current practices and needs related to environmental cost accounting. Data were collected through structured interviews using a questionnaire consisting of 30 questions covering five key dimensions: business profile, existing accounting information system practices, identification of environmental costs, understanding of Green Accounting, and the enterprise's requirements for an ideal environmental cost recording system. This comprehensive approach enabled the study to capture both the current accounting practices and the practical needs of the business owner, providing a solid basis for assessing gaps and identifying opportunities for improving environmental cost accounting in plastic recycling SMEs.

LITERATURE REVIEW

1. Green Accounting dan Klasifikasi Biaya Lingkungan

Green Accounting emerged from the recognition that conventional financial reporting often fails to capture the environmental costs associated with business activities. As a result, organizations may report strong financial performance while the environmental consequences of their operations are effectively shifted to external stakeholders, including local communities, ecosystems, and future generations. To address this limitation, Green Accounting broadens the scope of traditional accounting by incorporating environmental costs and impacts into financial reporting (Puspitasari et al., 2018). Through this approach, financial statements provide a more comprehensive representation of organizational performance by integrating both economic and environmental dimensions, thereby supporting greater transparency, accountability, and sustainability in business decision-making.

Within the Green Accounting framework, environmental costs are generally classified into four main categories (Abdullah & Yuliana, 2018): The first category, environmental prevention costs, includes expenditures incurred to prevent environmental impacts before they occur, such as the purchase of personal protective equipment (PPE) and the installation of wastewater treatment or filtration systems. The second category, environmental detection costs, refers to costs associated with monitoring, measuring, and evaluating environmental quality and performance. The third category, internal environmental failure costs, comprises costs arising from environmental incidents or inefficiencies that occur within the organization's operations before affecting external stakeholders. The fourth category, external environmental failure costs, includes costs resulting from environmental impacts that extend beyond the organization and affect surrounding communities, ecosystems, or other external parties. This classification provides a systematic framework for identifying, measuring, and reporting environmental expenditures, enabling organizations to improve environmental accountability and support more sustainable managerial decision-making.

For plastic recycling Small and Medium Enterprises (SMEs), these four categories of environmental costs are highly relevant and directly linked to daily business operations rather than being merely theoretical concepts. Expenditures such as energy consumption for recycling machinery, water used in the plastic washing process, the handling and disposal of non-recyclable plastic residues, and the provision of personal protective equipment (PPE) for employees can all be identified and classified within this framework. However, effective classification and reporting are only possible when an appropriate accounting system is in place to record environmental costs separately from general operating expenses (Ridwan et al., 2022). By systematically documenting these expenditures, plastic recycling SMEs can gain a clearer understanding of their environmental costs, improve cost control, strengthen environmental accountability, and support more sustainable business management.

2. Green Accounting in MSMEs and Its Limitations

Most Green Accounting studies have focused on large organizations that possess sufficient financial, technological, and human resources to implement comprehensive environmental accounting practices. In contrast, relatively little attention has been given to Small and Medium Enterprises (SMEs), despite their collective contribution to waste management and environmental sustainability. One of the few studies examining environmental management accounting in Indonesian SMEs found that business owners generally recognize the importance of environmental accounting. However, its implementation remains limited due to inadequate human resource capabilities and the lack of practical accounting tools and guidelines tailored to the needs of SMEs (Susanto, 2019). These findings suggest that the primary challenge lies not in the willingness of SMEs to adopt environmental accounting practices, but in the absence of simple, accessible, and context-appropriate systems that can support their implementation.

Suggesting that Green Accounting models should be specifically designed to meet the characteristics and operational capacities of organizations that lack professional accounting personnel (Astawa, 2018). Rather than representing a limitation, simplicity should be regarded as a fundamental requirement for successful implementation in SMEs. Furthermore, previous studies have emphasized that even simple digital accounting systems can significantly improve the systematic recording and reporting of environmental information within waste management organizations. Other studies have also confirmed that the adoption of Green Accounting contributes positively to financial performance, although most of this evidence has been derived from large-scale organizations. These findings highlight the need to develop practical and user-friendly environmental accounting systems that are better suited to the operational realities and resource constraints of SMEs.

3. Sistem Informasi Akuntansi untuk UMKM

Accounting Information Systems (AIS) in Small and Medium Enterprises (SMEs) are generally far from optimal. Many SMEs still rely on handwritten records, unstructured spreadsheets, or, in some cases, do not maintain formal accounting records at all. Nevertheless, these limitations do not imply that effective accounting practices cannot be achieved. Previous research has demonstrated that financial reporting based on the Financial Accounting Standards for Micro, Small, and Medium Entities (SAK EMKM) can be successfully implemented using Microsoft Excel without requiring specialized accounting software. The study also confirmed that this approach is practical and can be effectively adopted by SMEs whose owners or managers have limited accounting knowledge and experience (R. Tuerah et al., 2024). These findings indicate that simple, low-cost, and user-friendly accounting systems can substantially improve the quality of financial information while remaining compatible with the operational characteristics and resource constraints of SMEs. Accounting Information System (AIS) designs can be effectively implemented in SMEs. These systems range from digital inventory recording to financial reporting developed using Microsoft Access, demonstrating that practical and affordable technologies are well accepted by small business owners. This approach has also been extended to the development of digital sales information systems for rural SMEs, whose underlying principles are equally applicable to environmental cost recording and reporting (H. Tuerah et al., 2025). In addition to technological solutions, strengthening human resource capacity remains a critical factor in the successful implementation of accounting systems. Therefore, improving accounting knowledge and technical skills among SME owners and employees should be considered an integral part of business development, particularly when introducing environmental cost accounting practices and promoting the adoption of Green Accounting (Pratiwi & Meutia, 2020).

METHODOLOGY

This study employed a descriptive qualitative approach using a single-case study design. A case study was considered the most appropriate research strategy because the primary objective was to obtain an in-depth understanding of the existing practices, challenges, and needs related to environmental cost accounting within a representative plastic recycling Small and Medium Enterprise (SME), rather than to produce statistically generalizable findings.

Data were collected through structured interviews with a single key informant, Mr. Stevi, the Director and Owner of Manado Recycle Hub. The informant was selected using purposive sampling, as he is the sole decision-maker responsible for managing both the financial and operational activities of the enterprise. The interview instrument consisted of 30 structured questions organized into five sections: (A) business profile, (B) existing Accounting Information System (AIS) practices, (C) identification of environmental costs, (D) understanding and implementation of Green Accounting, and (E) requirements for an ideal environmental cost recording system.

The questionnaire included multiple-choice questions, checklists, five-point Likert scale items, and open-ended questions to obtain both quantitative and qualitative data. The collected data were analyzed using gap analysis to compare the existing environmental cost recording practices with the principles of Green Accounting. To enhance the credibility of the findings, data triangulation was conducted by comparing the interview results with supporting business documents, including weighing records, purchase receipts, and estimates of monthly operational and environmental expenditures.

RESULTS

1. Business Profile

Manado Recycle Hub is a plastic recycling Small and Medium Enterprise (SME) that has been operating for approximately one to three years and currently employs between six and ten full-time workers. The enterprise processes four main types of plastic waste—polyethylene terephthalate (PET), high-density polyethylene (HDPE), low-density polyethylene (LDPE), and polypropylene (PP). On average, the company processes approximately 641.9 kg of raw plastic waste each month, producing around 552 kg of cleaned and recyclable plastic ready for sale. The purchase price of raw materials varies from IDR 0, when plastic waste is obtained free of charge, to IDR 1,500 per kilogram when purchased from small-scale collectors. After processing, the recycled plastic is sold for approximately IDR 5,000 per kilogram to large-scale buyers or export markets. A summary of the enterprise's business profile is presented in Table 1.

Tabel 1. Business Profile of Manado Recycle Hub

Aspect	Description
Key Informant	Stevi
Position	Director / Owner
Years of Operation	1–3 years
Number of Employees	6–10 full-time employees
Types of Plastic Processed	PET, HDPE, LDPE, and PP (various types of recyclable plastics)
Monthly Plastic Processing Volume	< 1 metric ton (641.9 kg of raw plastic; 552 kg of cleaned recycled plastic)
Raw Material Purchase Price	IDR 0 (obtained free of charge) to IDR 1,000–1,500 per kg from small-scale collectors
Selling Price	Approximately IDR 5,000 per kg (sold to large-scale buyers and export markets)

Two observations from the business profile deserve particular attention. First, with a monthly production volume of less than one metric ton, Manado Recycle Hub can be classified as a micro-scale plastic recycling SME. This indicates that all aspects of business management, including financial administration and environmental compliance, are handled with highly limited organizational and financial resources. Second, there is a noticeable difference

between the volume of raw plastic received and the amount of recyclable plastic produced, representing a reduction of approximately 14%. This difference consists of plastic residues that cannot be recycled and must be treated as waste. From an environmental accounting perspective, these residual materials represent environmental management costs that should be identified and recorded separately as part of environmental cost accounting. However, the findings indicate that such costs are not explicitly documented, making it difficult for the enterprise to accurately measure the financial implications of waste management activities and evaluate their environmental performance.

2. Existing Accounting Information System

The findings indicate that the accounting information system currently implemented at Manado Recycle Hub remains highly basic and relies entirely on manual bookkeeping. Financial transactions are recorded in handwritten notebooks without the support of accounting software or structured spreadsheet applications, and financial statements are not prepared on a regular basis. The enterprise maintains only basic transaction documents, including purchase receipts and plastic weighing records, to support its daily operations. Financial management is handled exclusively by the business owner, who is solely responsible for recording and monitoring all financial activities. According to the interview results, the primary challenge faced by the enterprise is the owner's limited accounting knowledge, which restricts the adoption of more systematic accounting practices. Consequently, the existing recording system is unable to provide comprehensive financial information or adequately support business decision-making and environmental cost management. A summary of the current Accounting Information System (AIS) practices is presented in Table 2.

Table 2. Existing Accounting Information System Practices

Aspect	Current Practice
Recording Method (Q7)	Manual bookkeeping using handwritten notebooks; no accounting software is currently used
Reporting Frequency (Q8)	Financial reports are prepared irregularly and only when needed
Transaction Documents (Q9)	Purchase receipts and plastic weighing records (plastic tonnage)
Financial Management (Q10)	Managed directly by the owner/director; no dedicated accounting or finance staff
Main Challenge (Q11)	Limited accounting knowledge and expertise
Recording Process (Q12)	Plastic waste is collected, processed, and sold. Purchase price ranges from IDR 0 to IDR 1,500 per kg, while the selling price is approximately IDR 5,000 per kg

Table 3. Identified Environmental Costs at Manado Recycle Hub

Environmental Cost Category (Q13)	Description	Estimated Monthly Cost	Current Recording Status (Q14)
Wastewater Management	Wastewater generated from the plastic washing process is temporarily stored before being discharged.	IDR 200,000–500,000*	Recorded together with general operating expenses
Energy Consumption (Electricity and Fuel)	Electricity for recycling machinery and fuel for operational activities.	< IDR 500,000 (approximately IDR 100,000)	Recorded together with general operating expenses
Water Consumption	Water used for washing and cleaning plastic raw materials.	< IDR 500,000 (approximately IDR 100,000)*	Recorded together with general operating expenses
Waste and Residue Management	Sorting and disposal of non-recyclable plastic residues through authorized waste management services.	IDR 200,000–500,000*	Recorded together with general operating expenses
Personal Protective Equipment (PPE)	Purchase of personal protective equipment for operational employees.	Not recorded regularly	Recorded together with general operating expenses
Transportation Costs	Transportation of raw materials and delivery of recycled plastic products.	Not recorded regularly	Recorded together with general operating expenses

Source: Primary Data from Interviews (2026)

Several findings warrant further discussion. First, the reported expenditures for electricity and water were relatively low, amounting to less than **IDR 500,000** per month, with the business owner estimating average monthly costs of approximately **IDR 100,000** (Question 15). Since these expenses have never been recorded separately from general operating costs, the reported figures are likely based on rough estimates rather than accurate financial records. This illustrates one of the key consequences of the absence of a dedicated environmental cost accounting system: business owners are unable to determine

the actual costs associated with environmental management and can only provide approximate values.

Second, the enterprise has implemented responsible environmental management practices. Wastewater generated from the plastic washing process is temporarily stored before disposal, while non-recyclable plastic residues are separated and transferred to authorized waste management services. Although these practices demonstrate a commitment to environmental responsibility, the related expenditures—estimated at **IDR 200,000–500,000** per month—are still combined with general sanitation and operating expenses. As a result, these costs cannot be independently measured, monitored, or evaluated for efficiency.

Finally, the business owner reported that no complaints have ever been received from the surrounding community regarding the enterprise's environmental activities. This suggests that the external environmental impacts of the recycling process remain well managed. However, this conclusion is based solely on stakeholder perceptions, as no formal environmental monitoring or supporting documentation has been established to verify environmental performance objectively.

4. Gap Analysis: Existing Practices versus Green Accounting Principles

A systematic comparison between the enterprise's current accounting practices and the principles of Green Accounting revealed five interrelated gaps. These gaps highlight the differences between the existing environmental cost recording system and the accounting practices required to support effective environmental management and accountability. The analysis provides a clear understanding of the areas that require improvement in order to align the enterprise's accounting practices with Green Accounting principles. A detailed summary of the identified gaps is presented in Table 4.

Table 4. Gap Analysis of the Existing Accounting Information System (AIS) Against Green Accounting Principles

No.	Aspect	Current Practice	Expected Practice (Green Accounting)
1	Environmental Cost Recording	All environmental costs are combined with general operating expenses.	Environmental costs should be recorded separately and classified into at least four environmental cost categories.
2	Financial Reporting Frequency	Financial reports are prepared irregularly and only when needed.	Financial reports, including environmental cost reports, should be prepared on a regular and periodic basis.

3	Financial Management	Financial management is handled solely by the owner. No accounting staff are employed, and limited accounting knowledge is the primary constraint.	Standard operating procedures and practical recording guidelines should be available so that the system can be implemented without formal accounting expertise.
4	Environmental Performance Measurement	No formal measurement or documentation of environmental performance has been conducted.	Environmental performance should be systematically monitored, recorded, and reported on a regular basis.
5	Available Financial Reports	No formal financial statements are prepared; only purchase receipts and plastic weighing records are maintained.	At a minimum, the enterprise should prepare an income statement, environmental cost report, cash flow statement, inventory report, balance sheet, and business performance report.

Source: Primary Data from Interviews, Processed by the Authors (2026)

Among the five gaps identified, the first represents the most fundamental issue and serves as the root cause of the remaining deficiencies. As long as environmental costs are not distinguished from general operating expenses, financial statements—even when prepared regularly—cannot provide sufficient information to support environmental management or evaluate the environmental performance of the enterprise. Without separate environmental cost records, management lacks the financial information necessary to assess the efficiency and effectiveness of environmental initiatives.

The second and third gaps further reinforce this limitation. Irregular financial reporting, combined with financial management that relies entirely on a single individual without standardized accounting procedures, creates a situation in which essential financial information exists only in the business owner's personal knowledge. This dependence increases the risk of information loss, reduces transparency, and limits the reliability and verifiability of financial records.

The fourth gap, namely the absence of environmental performance measurement, is likely to be the most challenging to address in the short term. Beyond establishing an environmental cost recording system, it also requires the identification of appropriate environmental performance indicators and the capacity to monitor them consistently. Finally, the fifth gap highlights a practical limitation of the current accounting practices. Although purchase receipts and plastic weighing records are sufficient for documenting daily transactions, they are inadequate for providing a comprehensive overview of the enterprise's financial position, operational performance, and environmental accountability. Consequently, the development of a more structured accounting system is essential to support both sustainable business management and the implementation of Green Accounting principles.

5. Understanding and Attitudes toward Green Accounting

The findings presented in this section reveal a striking contrast with the existing accounting practices discussed in the previous sections. Although the enterprise maintains only a basic accounting system and does not record environmental costs separately, the business owner demonstrated a strong awareness of and positive attitude toward the adoption of Green Accounting. A summary of these findings is presented in Table 5..

Table 5. Understanding and Attitudes toward Green Accounting

Aspect	Findings
Awareness of Green Accounting (Q19)	The respondent has heard of Green Accounting but does not yet fully understand how to implement it in practice.
Importance of Environmental Cost Reporting (Q20)	Rated 5/5 (Very Important).
Environmental Performance Measurement (Q21)	No formal measurement or documentation of environmental performance has been conducted.
Environmental Performance Reporting (Q22)	No dedicated environmental performance report is currently available, although the enterprise intends to develop one in the future.
Business Success Indicators (Q23)	Financial profitability, volume of recycled plastic produced, and positive environmental impact.
Community Complaints (Q17)	No complaints have been reported by the surrounding community.

Source: Primary Data From Interviews (2026)

The most notable finding is the respondent's highest possible rating (5 out of 5) regarding the importance of environmental cost reporting. This assessment reflects a genuine understanding rather than a superficial opinion. During the interview, the business owner explained that recording environmental costs separately would enable the enterprise to identify environmental expenditures more accurately, improve cost control, enhance operational efficiency, and demonstrate its environmental commitment to customers and business partners. These responses indicate that the respondent clearly recognizes the practical value of environmental cost accounting.

Another important finding is that, although the enterprise has not yet prepared a formal environmental performance report, there is a clear intention to develop one in the future. This suggests that the main barrier to implementation is not a lack of commitment but rather limited organizational capacity and technical expertise. Furthermore, the respondent identified business success not only in terms of financial profitability but also through the volume of plastic successfully recycled and the positive environmental impact generated by the enterprise. These indicators demonstrate an intuitive understanding of the triple bottom line concept, even though no formal accounting system currently exists to document and report these environmental and social contributions systematically.

6. Identified Needs For Environmental Cost Recording

The final section of the interview instrument focused on identifying the business owner's expectations and requirements for an ideal environmental cost recording system. These findings represent the core of the present needs assessment and provide valuable insights for the future development of an environmental cost accounting system tailored to the operational characteristics of plastic recycling SMEs. A summary of the identified needs is presented in Table 6..

Table 6. Identified Needs for Environmental Cost Recording

Dimension (Question Number)	Identified Needs
Preferred Platform (Q25)	Microsoft Excel or Google Sheets, as they are considered the most practical and user-friendly platforms.
Required Reports (Q26)	Income Statement, Environmental Cost Report, Cash Flow Statement, Raw Material and Inventory Report, Business Performance Report (recycling volume versus environmental costs), and Balance Sheet.
Willingness to Learn (Q27)	Rated 5/5 (Highly Willing).
Implementation Challenges (Q28)	Limited human resource capacity, particularly insufficient accounting knowledge.

Willingness to Participate in Pilot Testing (Q29)	Highly willing to participate in system testing and implementation.
Expectations for an Ideal Accounting Information System (Q30)	A simple and user-friendly system that requires no advanced accounting knowledge, records daily transactions efficiently, calculates revenue and operating expenses accurately, separately records environmental costs (electricity, water, transportation, and waste management), supports timely managerial decision-making, and contributes to long-term business sustainability.

Source: Primary data from interviews (2026)

The business owner identified Microsoft Excel and Google Sheets as the preferred platforms for implementing an environmental cost recording system. This preference is primarily based on practical considerations, as both applications are already familiar to users, require no additional licensing costs, and can be accessed across multiple devices. These characteristics make them suitable and realistic solutions for SMEs with limited financial and technological resources.

Another important finding concerns the scope of information expected from the accounting system. The respondent emphasized the need for a comprehensive set of financial reports, including an income statement, environmental cost report, cash flow statement, inventory report, balance sheet, and a business performance report that compares recycling output with environmental expenditures. This indicates that the enterprise requires not only information on profitability but also integrated financial and operational information to support inventory management, cash flow monitoring, asset control, and the evaluation of environmental performance.

The respondent's 5 out of 5 rating for willingness to adopt a new accounting system demonstrates a strong readiness to improve existing accounting practices. Consistent with previous findings, the main implementation challenge is not resistance to change but limited accounting knowledge and human resource capacity. Furthermore, the respondent expressed a strong willingness to participate in pilot testing, suggesting that opportunities exist for future implementation and validation of the proposed system. Overall, the expected accounting information system should be simple, practical, and easy to use while providing accurate environmental cost information that supports managerial decision-making, improves environmental accountability, and enhances the long-term sustainability of plastic recycling SMEs.

CONCLUSIONS AND RECOMMENDATIONS

This study provides a comprehensive overview of the current practices of environmental cost recording at Manado Recycle Hub and identifies the gaps between existing accounting practices and the principles of Green Accounting. Several important conclusions can be drawn from the findings.

First, the enterprise incurs six categories of environmental costs in its daily operations, namely wastewater management, energy consumption (electricity and fuel), water consumption, waste residue management, personal protective equipment (PPE), and transportation. However, all of these expenditures are combined with general operating expenses and are neither separately identified nor accurately measured. Consequently, the actual environmental costs incurred by the enterprise remain largely unknown, limiting its ability to evaluate environmental expenditures and improve cost efficiency.

Second, the principal obstacle to implementing environmental cost accounting is not the lack of time, financial resources, or the complexity of accounting tools. Instead, the findings indicate that limited accounting knowledge among the business owner represents the most significant barrier. This finding challenges the common assumption that SMEs are reluctant to maintain accounting records. In this case, the business owner demonstrated a strong willingness to improve accounting practices but lacked the technical knowledge and practical guidance necessary for implementation.

Third, a substantial gap exists between environmental awareness and accounting practice. Although the respondent rated the importance of environmental cost reporting at the highest possible level (5 out of 5), recognized its managerial benefits, and evaluated business success using both financial and environmental indicators, no formal environmental performance measurement or reporting has been implemented. Financial records remain manual, irregular, and unable to support environmental accountability. This disparity between awareness and organizational capacity represents the central issue identified in the study.

Finally, the needs assessment revealed several specific requirements for an appropriate environmental cost accounting system. These include a spreadsheet-based platform, a comprehensive set of financial and environmental reports, practical recording guidelines that can be implemented without formal accounting expertise, and initial technical assistance during system adoption. These requirements are practical, achievable, and well suited to the operational characteristics of plastic recycling SMEs.

This study contributes to the literature by providing detailed empirical evidence on the environmental cost accounting needs of plastic recycling SMEs, a sector that plays an important role in environmental sustainability but has received limited attention in accounting research. Future studies should focus on designing, implementing, and empirically evaluating environmental cost accounting systems based on the needs identified in this research across a broader range of SMEs.

FURTHER STUDY

This study was limited to a single-case analysis of a plastic recycling SME, which restricts the generalizability of the findings to other business contexts. In addition, the research focused primarily on identifying the needs for environmental cost accounting rather than designing, implementing, or evaluating an operational accounting system. Therefore, the findings should be interpreted as an initial assessment of environmental cost accounting requirements within the context of plastic recycling SMEs.

Future research should extend this study by developing and validating a practical environmental cost accounting system based on the needs identified in the present research. Such a system may be implemented using accessible platforms such as Microsoft Excel, Google Sheets, or web-based applications specifically designed for SMEs. Subsequent studies should also evaluate the effectiveness of the proposed system in improving environmental cost recording, financial reporting quality, managerial decision-making, and environmental accountability through pilot implementation involving multiple SMEs.

Furthermore, future investigations are encouraged to include a larger number of plastic recycling SMEs from different regions and operational scales to improve the external validity of the findings. Comparative studies across various waste management sectors, such as paper, metal, or electronic waste recycling, would provide a broader understanding of environmental cost accounting practices. Quantitative research examining the relationship between environmental cost accounting implementation, financial performance, environmental performance, and business sustainability would also enrich the existing literature and provide stronger empirical evidence regarding the benefits of Green Accounting for SMEs.

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