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CAN LOCAL WISDOM AND GREEN ACCOUNTING DRIVE CIRCULAR ECONOMY? EVIDENCE FROM TEMPEH MSMES IN RASAU JAYA, WEST KALIMANTAN

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Abstract

Tempeh production in Indonesian micro and small enterprises (MSMEs) faces sustainability challenges, especially in packaging practices and environmental cost awareness. This study aims to explore how local wisdom in traditional tempeh packaging and the conceptual application of green accounting contribute to circular economy practices in rural food production. A qualitative case study approach was employed, focusing on two tempeh-producing MSMEs in Rasau Jaya Village, West Kalimantan. Data were collected through semi-structured interviews, direct observation, and limited document review. The findings indicate that the reuse of banana leaves and used paper reflects unintentional adherence to circular economy principles, driven more by cost efficiency than by sustainability awareness. Both MSMEs lacked formal financial records and showed limited understanding of environmental accounting, indicating that green accounting remains an untapped framework. This study provides new insights into how traditional practices can align with modern sustainability concepts, even without explicit theoretical grounding. The findings underscore the importance of culturally grounded education and practice-based training to build MSMEs' capacity in adopting environmentally responsible business strategies. The study adds value by linking informal sustainability practices with environmental accounting discourse in traditional rural enterprises.

Keywords: circular economy, green accounting, local wisdom, traditional packaging, MSMEs

INTRODUCTION

Tempeh production in Indonesia has become an integral part of community life, particularly in rural areas. Micro, small, and medium-sized enterprises (MSMEs) involved in tempeh production not only contribute to local economic development but also preserve cultural traditions in food consumption patterns. However, modernization and lifestyle changes have affected various aspects of the tempeh industry, especially in packaging methods, which are increasingly shifting from traditional materials such as banana and teak leaves to plastic. This change has a direct impact on the environment, as plastic waste takes a long time to decompose and contributes to pollution (Ncube et al., 2020).

Circular economy presents a potential solution to environmental issues in the tempeh industry by reducing waste and optimizing resource use. This concept emphasizes the reuse of materials in the production cycle to create more sustainable systems (Shetye, 2023). The use of natural packaging, such as banana leaves, has been shown to be more environmentally friendly and can improve product quality. Research by Sulistiyono et al., (2016) demonstrated that tempeh wrapped in banana leaves has a longer shelf life and better physical characteristics compared to plastic wrapping.

Rasau Jaya Village in West Kalimantan is one of the regions where traditional practices in tempeh production still exist, particularly in packaging. Producers use a dual-layer system consisting of banana leaves in direct contact with fermented soybeans and used paper as outer wrapping. This practice combines tradition with cost-saving strategies and aligns with circular economy principles. However, the extent to which this packaging model contributes to sustainability and aligns with green accounting remains insufficiently explored.

Although many studies have examined circular economy practices in MSMEs, most focus on urban or modern industrial contexts. Research that integrates local wisdom, particularly in packaging practices, with green accounting perspectives in rural food MSMEs remains scarce. Furthermore, the green accounting approach offers potential to enhance business sustainability by measuring environmental impact and supporting data-driven resource management (Ika, 2025).

Therefore, this study aims to examine how local wisdom in traditional packaging and the application of green accounting can promote circular economy practices in the tempeh industry in Rasau Jaya Village, West Kalimantan. It seeks to contribute to sustainability discourse by exploring the intersection between cultural practices and environmental accounting in rural MSMEs.

LITERATURE REVIEW AND HYPOTHESIS FORMULATION

Circular Economy Theory and Green Accounting

The circular economy is more than a waste management strategy; it encompasses material reuse, system redesign, and sustainable business models. It emphasizes the reduction of waste and resource optimization through reuse, recycling, and remanufacturing principles (Geissdoerfer et al., 2017). In the tempeh industry, liquid waste can be transformed into organic fertilizer or biogas, offering both economic and environmental benefits. Sonalitha et al., (2024) showed that liquid waste from tempeh production can be reused to produce organic fertilizer, while Dewayani et al. (2019) highlighted the use of balloon digester technology to convert similar waste into biogas suitable for small-scale enterprises.

Green accounting integrates environmental dimensions into business financial records, enabling enterprises to optimize resource use and reduce ecological impact (Soraya et al., 2024). It provides a strategic tool to support decision-making in sustainability contexts by measuring environmental costs. While green accounting is more widely adopted in formal sectors, its conceptual application to informal or traditional MSMEs remains limited.

Local Wisdom in MSME Practices

Local wisdom reflects traditional knowledge and practices that evolve through community interaction with the environment (Lisdiyono, 2017). In rural MSMEs, local wisdom is often embedded in resource-efficient practices and the use of natural materials. For instance, many tempeh producers continue to use banana leaves and used paper for packaging, a practice rooted in tradition and sustained by cost efficiency. Such practices indirectly align with circular economy principles, even though actors may lack theoretical awareness of the framework.

Green Accounting in MSMEs

Green accounting supports environmental transparency and encourages sustainable financial practices. Ardiana et al. (2023) demonstrated that consistent allocation of environmental costs improves business performance and competitive advantage. Similarly, Sari (2025) and Putra et al. (2025) found that integrating environmental factors into financial strategies enhances operational efficiency and market positioning for MSMEs. However, as noted by Sudirman et al. (2024), the adoption of green principles in MSMEs depends heavily on awareness, literacy, and access to tools that align with local capacities.

Circular Economy as a Business Model for Tempeh MSMEs

The principles of circular economy have been applied in various ways across Indonesia's tempeh industry. For example, soybean hulls previously discarded as waste are now being processed into fiber-rich flour, providing product diversification and reducing production waste. Despite such innovations, Novianti and Munawaroh (2025) highlighted that MSMEs still face barriers such as limited digital access and low technological literacy, hampering broader implementation of sustainable practices.

Synthesis: Integrating Culture, Sustainability, and Accountability

Circular economy, local wisdom, and green accounting represent three distinct yet interconnected domains. Circular economy provides a macro framework for sustainable production, local wisdom offers culturally grounded practices, and green accounting enables the quantification and reporting of environmental performance. While each has been studied in isolation, few studies have examined their intersection within the context of rural MSMEs in traditional food sectors. This study aims to fill that gap by investigating how informal packaging and waste practices reflect circular economy values and how they can be further supported through green accounting frameworks.

RESEARCH METHODS

This study employed a qualitative case study approach to explore how local wisdom in packaging and the conceptual application of green accounting contribute to circular economy practices in tempeh-producing MSMEs. This design allows for an in-depth understanding of traditional production behavior, sustainability awareness, and resource management in a rural business context.

The research was conducted in Rasau Jaya Village, West Kalimantan, where traditional tempeh production still exists. The population consists of tempeh-producing MSMEs in the area, with two selected as case units: Ms. Yem's and Ms. Saroh's enterprises. The sample was determined using purposive sampling based on specific criteria: (1) active production for at least five years, (2) use of used paper as outer packaging, (3) informal awareness of environmental costs, and (4) willingness to participate in interviews and observation.

Data were collected through three techniques: (1) semi-structured in-depth interviews with MSME owners to explore motivation, challenges, and sustainability practices; (2) direct observation of production processes and packaging methods; and (3) review of informal business records, such as expense notes, to assess potential for green accounting application. While no advanced tools were used, materials involved in the production included banana leaves and used paper packaging—demonstrating the use of natural and recycled materials relevant to circular economy discussions.

The data were analyzed using thematic analysis. Thematic coding was applied to interview transcripts, observation notes, and informal documentation. The themes included sustainability awareness, packaging efficiency, waste management, and environmental cost considerations. The analysis was aligned with the principles of circular economy and green accounting to examine how local practices contribute to sustainable business behavior.

The researcher was present on-site during all data collection phases and engaged directly with participants. The research lasted for two months, with the first month focused on interviews and observation, and the second month on document review, data triangulation, and final analysis. Informants did not include external enumerators, as all data were gathered directly by the researcher. To ensure the validity of results, triangulation was conducted by comparing interview findings with observed behavior and available documents.

RESULTS AND DISCUSSION

This section presents the results of the research through sub-topics that align with the study's objectives: exploring the role of local wisdom in tempeh packaging, waste management practices, and the potential for green accounting within MSMEs in Rasau Jaya Village. Data were collected through interviews, observations, and document review, then analyzed using thematic analysis. The results are discussed in relation to the formulation of the research problem, interpreted using relevant theories, and connected to existing knowledge.

Traditional Packaging Practice and Local Wisdom

Both MSMEs consistently use banana leaves as the inner wrapping and used paper as the outer layer for packaging. This reflects a combination of cultural heritage and economic practicality. While these actions align with the “reuse” principle of circular economy (Geissdoerfer et al., 2017), the practice is not consciously adopted as an environmental strategy but rather as a cost-saving measure. This finding shows that circular behaviors can exist without theoretical understanding, confirming that sustainability may emerge informally within traditional systems.

Informal Waste Management Behavior

There is a variation in waste handling: one MSME discards soybean residue directly into the environment, while the other repurposes it as animal feed. Neither enterprise processes waste systematically. This supports Aiguobarueghian et al. (2024), who state that effective circular economy implementation depends not only on material reuse but also on proactive waste reduction systems. The absence of recording or reuse planning reflects a lack of internal systems for environmental management.

Integrating Theory and Field Findings

These findings indicate a gap between practical behavior and theoretical frameworks. While local packaging practices align with circular economy principles, they are not conceptualized as such by the business owners. Similarly, the absence of environmental cost recognition highlights the inaccessibility of green accounting for informal MSMEs. This supports the claim by Sudirman et al. (2024) that the application of sustainability accounting in traditional sectors requires contextualized training and support.

Theoretical Contribution

This study contributes to the discourse on sustainability by highlighting that practical sustainability can exist outside of formal frameworks. The intersection of local wisdom, circular economy, and green accounting suggests the need for a hybrid model that accommodates informal practices while gradually introducing structured environmental accountability. Rather than imposing theoretical models, future frameworks should build upon culturally embedded behaviors and develop adaptive tools for MSMEs.

CONCLUSION

This study explored the role of local wisdom and green accounting in supporting circular economy practices among tempeh-producing MSMEs in Rasau Jaya Village, West Kalimantan. The findings revealed that traditional packaging practices using banana leaves and reused paper are driven primarily by cost efficiency and cultural continuity, not environmental consciousness. Waste management is informal, and environmental cost recording is absent. However, both business owners demonstrated openness to learning sustainable practices. These insights show that circular economy principles may be unconsciously applied in rural MSMEs, while green accounting remains an untapped potential.

The results suggest that culturally embedded practices can serve as a foundation for sustainability interventions. Practical, hands-on training programs that introduce green accounting concepts and circular economy awareness could help rural MSMEs strengthen their resource efficiency and competitiveness. Government and support institutions should design context-sensitive programs that align with the local realities of informal enterprises.

This research was limited to two MSMEs in a single rural village, with findings based on qualitative data from interviews, observations, and informal documentation. The lack of formal records limited the ability to assess financial efficiency or conduct comparative analysis across enterprises.

Future studies should involve a larger number of MSMEs across multiple regions to explore patterns of sustainability adoption more broadly. Quantitative assessment of environmental cost efficiency and behavioral changes post-training would also enrich understanding and inform policy-making in the MSME sector.

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