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## The Effect of Circular Economy Practices on Financial Performance of Creative MSMEs in Surakarta

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## Abstract

Rising raw material costs and global sustainability demands compel MSMEs to shift from linear to circular economic models. However, the economic impact of this transition on small businesses remains debated. This study aims to investigate the effect of circular economy practices on the perceived financial performance of creative MSMEs in Surakarta. This research offers novelty by challenging the stigma that sustainability practices are merely cost burdens, highlighting their potential for efficiency instead. Employing a quantitative explanatory approach, data were collected through a survey of 73 MSME practitioners and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The results demonstrate that circular economy practices have a positive and significant effect on perceived financial performance at the 10% level, with a dominant path coefficient of 0.656. Empirically, the adoption of reduce, reuse, and recycle principles proves to be a resource efficiency mechanism capable of enhancing profitability. This study recommends that MSME owners integrate waste management and material efficiency as core business strategies for long-term business sustainability.

## Keywords

Circular Economy, Creative MSMEs, Financial Performance, Resource Efficiency.

## 1. Introduction

Micro, Small, and Medium Enterprises (MSMEs) play a pivotal role in Indonesia's economic structure, serving not only as significant contributors to the Gross Domestic Product (GDP) but also as a social safety net through extensive employment absorption. In Surakarta, the creative economy sector has experienced rapid growth, becoming a primary driver of regional economic dynamics (Prihatiningsih et al., 2020). However, amidst this growth, MSMEs face dual challenges: the volatility of raw material prices and escalating global pressure to transition toward sustainable business practices. The linear economy paradigm (take-make-dispose), which has long dominated MSME operations, is increasingly viewed as inefficient and vulnerable to resource scarcity (Geissdoerfer et al., 2017).

The Circular Economy (CE) concept provides a strategic, regenerative model based on the principles of reduce, reuse, and recycle. Unlike the conventional approach that treats waste as valueless residue, CE views waste as a resource that can be recovered and reintroduced into the production cycle (MacArthur, 2015). This shift supports the Sustainable Development Goals (SDGs), particularly Goal 12 on responsible consumption and production. Nevertheless, a major challenge for MSMEs is the perception that adopting eco-friendly practices entails high initial investment, potentially affecting short-term financial performance. Research by Prameswari et al. (2024) indicates that applying an EOQ model aligned with circular economy principles can optimize inventory management while enhancing both profitability and resource efficiency.

This research is grounded in the Resource-Based View (RBV) introduced by Barney (1991). RBV postulates that firms can achieve sustained competitive advantage if they manage resources that are valuable, rare, and imperfectly imitable. In this context, the ability of MSMEs to perform energy efficiency and transform waste into raw materials represents a unique strategic capability. Dewi and Purwantini (2023) reinforce this argument by stating that sustainability practices in MSMEs are not merely acts of regulatory compliance but constitute internal efficiency strategies that lower operational cost structures.

Previous empirical studies regarding the relationship between circular economy and financial performance have yielded mixed results. Sassanelli et al. (2019) and Julianelli et al. (2020) found that in large manufacturing firms, circularity correlates positively with profitability through material cost-saving mechanisms. Kuik et al. (2023), in a systematic literature review on the MSME sector, also indicated that circular business models potentially open access to new markets (green consumers), thereby enhancing perceived financial performance. Given the limitations of standardized financial reporting in the MSME sector, perceived financial performance is utilized as a valid proxy in this research (Rizal et al., 2025).

Beyond financial performance, the growing wave of digital transformation presents a significant opportunity to amplify the impact of circular economy adoption among MSMEs. Khan et al. (2022) and Audretsch et al. (2023) empirically demonstrated that technological innovation is positively associated with circular economy practices in MSMEs, and that this integration leads to both economic and environmental performance improvements. This relationship becomes increasingly strategic in the context of the creative economy sector, where digital platforms such as e-commerce marketplaces enable MSMEs to monetize by-products and repurposed materials, effectively closing the resource loop while simultaneously expanding revenue streams. Arroyabe et al. (2024) further confirmed that a high degree of digitalization within SMEs enhances the integration of circular economy orientation, suggesting that digital and circular strategies are not only compatible but mutually reinforcing in driving innovation.

Despite this synergistic potential, the adoption of digital technologies in MSMEs remains limited due to insufficient technological management capabilities and weak linkages with other enabling factors (Hughes et al., 2022; Jamwal et al., 2024). Digital readiness may function not merely as a complementary variable but as a structural precondition that determines the magnitude of circular economy's impact on financial performance a dimension that existing empirical studies on creative MSMEs in Indonesia have yet to fully interrogate. Based on this background, this study aims to fill the research gap by empirically investigating how circular economy practices influence the financial performance of creative MSMEs in Surakarta, offering a fresh perspective on the cost-benefit analysis of sustainability in small enterprises.

## **2. Literature Review and Hypothesis Development**

### **2.1. Circular Economy Practices**

Circular Economy (CE) practices are defined as a firm's operational efforts to minimize resource input, waste, and emissions by closing energy and material loops (Williams et al., 2024). In this study, CE is conceptualized through four multidimensional aspects: reduce, reuse, recycle, and sustainable sourcing. The first dimension, reduce, refers to upstream efficiency strategies aimed at minimizing raw material usage and waste generation at the source. Kirchherr et al. (2017) identify reduce as the highest hierarchy in the circular principle (R-framework), where waste prevention through design and production efficiency is prioritized over waste management.

The second dimension, reuse and extend, involves practices of utilizing materials or products for the same function and extending product lifespans through repair or maintenance to delay disposal. Bocken et al. (2016) explain that strategies to slow resource loops through durable product design are key to retaining economic value longer. The third dimension, recycle, refers to the processing of production waste into new materials or secondary inputs. Ghisellini et al. (2016) emphasize that recycling is a fundamental mechanism for transforming waste output into new input, thereby reducing dependency on virgin materials. Finally, sustainability sourcing involves selecting suppliers based on environmental criteria and engaging in green supply chains. Chin et al. (2015) define green sourcing as collaboration with suppliers to ensure purchased materials are eco-friendly and ethically produced, serving as a crucial initial step in circular supply chain management.

### **2.2. Perceived Financial Performance**

Given the characteristics of MSMEs, which often lack standardized financial reporting, financial performance in this study is measured using a perceived performance approach. This variable comprises three key dimensions: cost efficiency, profitability, and access to resources. Cost efficiency refers to a firm's ability to lower operational, material, and waste disposal costs as a direct result of circular practices. Rizos et al. (2016), in their study on European MSMEs, found that cost savings are the primary enabler and most tangible benefit of adopting circular business models. By improving cost efficiency, MSMEs can reinvest savings into innovation or expand production, enhancing their overall operational resilience. This is particularly important for small firms with limited capital, where even small reductions in costs can significantly impact sustainability and growth.

The second dimension, profitability, encompasses net profit achievement, sales growth, and Return on Investment (ROI) relative to competitors. Albertini (2013), through a meta-analysis, demonstrated that proactive environmental management correlates positively with firm profitability through product differentiation and process efficiency mechanisms. Firms that integrate circular practices not only reduce costs but can also offer unique products or services that attract

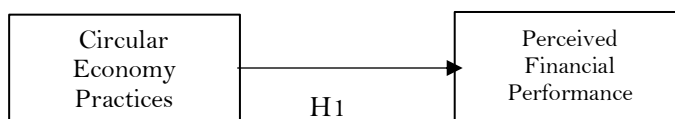
environmentally conscious customers, strengthening market position. Lastly, access to resources refers to the ease of obtaining external funding, government support, or strategic partnerships due to a positive environmental reputation (green image). Ghisetti et al. (2017) state that firms engaging in eco-innovation tend to access public funding more easily and attract investors concerned with sustainable finance. This improved access can further support long-term strategic investments, creating a cycle where sustainability initiatives reinforce financial and operational opportunities for MSMEs.

**2.3. The Effect of Circular Economy on Perceived Financial Performance**

Based on the Resource-Based View (RBV) theory, the implementation of circular economy practices can generate value for MSMEs through two main mechanisms: cost efficiency and product differentiation. By optimizing the use of resources and reducing waste, firms can lower operational costs and improve their cost structure, which enhances financial performance. At the same time, CE practices enable MSMEs to cultivate a reputable green image, attracting environmentally conscious customers, investors, and other market stakeholders. This combination of operational efficiency and market differentiation creates resource-based competitive advantages, which RBV theory suggests are critical for sustaining superior profitability and long-term business resilience (Barney, 1991; MacArthur, 2015).

Empirical evidence supports this hypothesis across various contexts. Agyapong et al. (2024) found that practices such as upcycling and waste recovery significantly enhance financial stability by reducing costs while attracting eco-conscious clients. Similarly, Esposito et al. (2024) demonstrated through multivariate regression on a global sample of agri-food firms that CE performance positively correlates with profitability, with stakeholder engagement acting as a significant moderator. Focusing on emerging markets, Ahmed et al. (2025) reported that financial investment and operational readiness are key drivers of CE adoption among 350 Malaysian SMEs, where absorptive capacity strengthens the link between resource deployment and circular practice implementation. Collectively, these studies reinforce the RBV perspective that consistent CE implementation provides strategic resources and capabilities, ultimately translating into improved perceived financial performance for MSMEs.

H1: Circular economy practices have a positive effect on the perceived financial performance.



**Figure 1.** Research Framework

The proposed link between circular economy practices and MSMEs’ perceived financial performance is shown in Figure 1. The figure illustrates how putting CE practices like reduce, reuse, and recycle into practice improves resource efficiency and product differentiation, both of which have a beneficial impact on financial performance. Additionally, the graphic emphasizes reputation/green image and cost effectiveness as mediating processes via which CE activities produce value.

**3. Methods**

This study looks at the causal linkages between the variables being studied using an explanatory research design and a quantitative technique. The main way of gathering data was a cross-sectional survey that recorded respondent perceptions at

a certain moment in time. This method was chosen because it is suitable for evaluating theories in a particular demographic environment (Sekaran & Bougie, 2020).

MSMEs in the Surakarta region that are involved in the creative economy sector make up the study's population. Purposive sampling, a non-probability sampling approach, was used. Respondents had to meet three requirements in order to be included MSMEs that had been in operation for at least a year, companies based in Surakarta, and companies that had adopted at least one circular economy practice (such as recycling, material reuse, or waste reduction).

A final sample of 73 respondents was collected after the questionnaire was distributed and the data was cleaned to eliminate invalid responses (outliers and straight-lining). The PLS-SEM analysis rule of thumb, which calls for at least ten times the number of structural routes or the greatest number of formative indicators, is satisfied by this sample size (Hair et al., 2017). The research instrument used a closed-ended questionnaire with a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The independent variable, circular economy practices, was measured using four dimensions: reduce, reuse & extend, recycle, and sustainable sourcing, adapted from Kirchherr et al. (2017). The dependent variable, perceived financial performance, was measured through cost efficiency, profitability, and access to resources, adapted from Rizal et al. (2025).

Data analysis was conducted using Variance-Based Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0, selected for its suitability for small samples, non-normal data, and exploratory research (Hair et al., 2017). The analysis consists of two stages: Measurement model (outer model) evaluation to assess validity and reliability, including convergent validity (loading factors  $> 0.50$ – $0.70$  and AVE  $> 0.50$ ), discriminant validity, and reliability using Cronbach's Alpha and Composite Reliability ( $> 0.60$ ), and structural model (inner model) evaluation to test hypotheses, including  $R^2$  assessment and path significance using bootstrapping with 5,000 subsamples at a 10% significance level ( $\alpha = 0.10$ ).

#### **4. Results**

Data collection was conducted among creative MSME practitioners in the Surakarta region. From the distributed questionnaires, a total of 73 respondents provided complete data that were deemed valid for analysis after the data cleaning process. The demographic profile is categorized based on gender, position in the business, business tenure, business type, and workforce size. This demographic analysis is crucial to ensure that the data were obtained from competent sources representing the studied MSME population.

Based on Table 1, most respondents are female (57.5%), indicating that the creative economy sector in Surakarta, particularly in fashion and crafts, is predominantly led by women entrepreneurs. In terms of position, the majority of respondents are business owners (80.8%), which strengthens the credibility of the data since owners possess a comprehensive understanding of operational strategies, including decisions related to resource efficiency and overall financial performance. Additionally, nearly half of the respondents (47.9%) have been operating their businesses for more than five years, while 39.7% have been in operation for two to five years. This suggests that the respondents represent relatively established enterprises that have successfully passed the early survival phase, allowing their perspectives on sustainability and financial performance to be grounded in substantial practical experience.

**Table 1.** Respondent Demographic Profile & Business Profile (Sector & Scale)

Description	Category	Frequency (N=73)	Percentage (%)
Gender	Male	31	42.5%
	Female	42	57.5%
Position in Business	Business Owner	59	80.8%
	Manager	6	8.2%
	Staff/Others	8	11.0%
Business Tenure	1 - 2 Years	9	12.3%
	2 - 5 Years	29	39.7%
	> 5 Years	35	47.9%
Creative Business Type	Fashion/Garment/Convection	32	43.8%
	Batik (Hand/Stamp/Combo)	16	21.9%
	Handicraft ( <i>Kriya</i> )	15	20.5%
	Others (Services, Printing, etc.)	10	13.8%
Workforce Size (Scale)	Micro (1 - 5 Employees)	29	39.7%
	Small (6 - 10 Employees)	26	35.6%
	Medium (> 10 Employees)	18	24.7%
Total		73	100%

The profile of business sectors and scales shows that the sample is dominated by the fashion/garment sector (43.8%), followed by batik and handicrafts. This composition reflects the characteristics of the creative industry in Surakarta, which is widely recognized as a center for textiles and cultural products. In terms of business scale, the distribution is relatively balanced among micro (39.7%), small (35.6%), and medium (24.7%) enterprises, indicating that the findings can represent various MSME scales in the region.

Average Variance Extracted (AVE) and outer loadings are used to evaluate convergent validity. To improve model quality, a number of initial indicators with low loadings (< 0.50) were eliminated based on the PLS algorithm findings. Table 2 displays the final measurement findings.

**Table 2.** Reliability and Convergent Validity Results

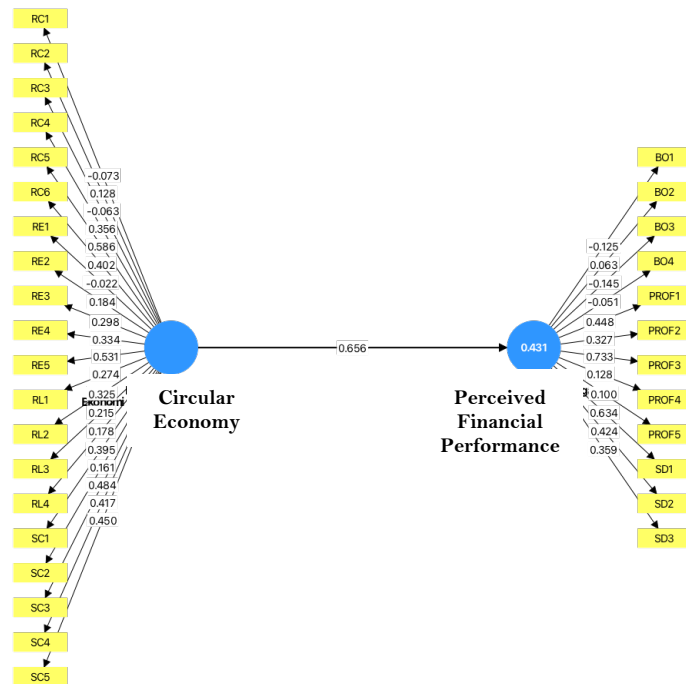
Variable	Cronbach's Alpha	Composite Reliability (rho_c)	AVE	Remark
Circular Economy Practices	0.555	0.635	0.111	Exploratory
Perceived Financial Performance	0.433	0.446	0.135	Exploratory

Table 2 demonstrates that the composite reliability for the circular economy practices variable reached 0.635, indicating an acceptable level of internal consistency, even though the Cronbach's Alpha and AVE values fall below more conservative thresholds. According to Hair et al. (2017), reliability values in the range of 0.60 to 0.70 are still considered adequate for exploratory research. This implies that the measurement instrument is sufficiently reliable in capturing the underlying construct, particularly within the context of early-stage or exploratory studies. Therefore, despite some limitations in certain validity indicators, the instrument can still be regarded as capable of measuring circular economy practices with a reasonable degree of consistency.

**Table 3.** Discriminant Validity Results (HTMT)

Variable Relationship	Value
Perceived Fin. Performance <-> Circular Economy	-
HTMT Value	0.876
Critical Threshold	< 0.90
Remark	Valid / Established

The HTMT value between financial performance and circular economy is 0.876, according to Table 3. The two constructs show sufficient discriminant validity because this value is less than the suggested cutoff of 0.90 (Henseler et al., 2015). To put it another way, every variable in the model measures a separate idea and is empirically unique. Additionally, this finding implies that there are no significant multicollinearity problems among the variables, guaranteeing that the structural model may be evaluated accurately and without bias brought on by overlapping constructs.



**Figure 2.** Structural Model

The outer loading values in Figure 2 reveal that a number of indicators have moderate to high loadings (usually above 0.50), indicating that they accurately reflect their corresponding constructs. Some indicators, however, have low loading values (less than 0.50), which suggests that these items do not accurately reflect the underlying variables and indicate lesser contributions to the construct.

**Table 4.** R-Square Values

Parameter	Value
Dependent Variable	Perceived Financial Performance
R-Square	0.431
R-Square Adjusted	0.424
Interpretation	Moderate (43.1%)

Table 4 shows an R<sup>2</sup> value of 0.431, indicating that circular economy practices explain 43.1% of the variance in the perceived financial performance of MSMEs. This suggests that the independent variable has a meaningful contribution in explaining

changes in the dependent variable within the research model. Meanwhile, the remaining 56.9% of the variance is influenced by other factors not included in this study, such as managerial capability, market conditions, or external environmental factors. In the context of behavioral research in the MSME sector, this value is considered moderate, indicating that the model has acceptable explanatory power while still allowing room for further improvement through the inclusion of additional relevant variables.

Hypothesis testing was conducted using a bootstrapping procedure with 5,000 subsamples. Considering the limited sample size and the exploratory nature of the study, a significance level of 10% ( $\alpha = 0.10$ ) was applied to assess the statistical significance of the results.

**Table 5.** Summary of Hypothesis Testing (Path Coefficients)

Item	Value
Hypothesis Relationship	Circular Economy → Perceived Financial Performance
Original Sample (O)	0.656
t-statistics	1.665
p values	0.096
Decision	Significant

\*Note: Significant at the 10% level (one-tailed  $t > 1.28$  or two-tailed  $p < 0.10$ )

The results presented in Table 5 show that the path coefficient is positive at 0.656, indicating a positive relationship between circular economy practices and perceived financial performance. The t-statistic value of 1.665 exceeds the critical value of 1.645, and the p-value of 0.096 is below the significance threshold of 0.10. These results confirm that the effect is statistically significant at the 10% level. Therefore, the first hypothesis (H1), which proposes that the implementation of circular economy practices positively influences perceived financial performance, is accepted. This finding suggests that greater adoption of circular economy practices tends to enhance the financial performance perceived by MSMEs.

## 5. Discussion

The hypothesis testing results demonstrate that the implementation of circular economy practices has a positive and significant effect (at the 10% level) on the perceived financial performance of MSMEs. These findings imply that the more intensively MSME practitioners implement strategies for waste reduction (reduce), reuse (reuse), and recycling (recycle), the better their perception of achieving cost efficiency and business profitability.

These findings align with Akinwale (2024), who found that the adoption of circular economy principles significantly impacts MSME business performance in developing countries, primarily driven by resource efficiency motivations. This is corroborated by Latif et al. (2025) in their study on MSMEs in Southeast Europe, proving that long-term resource optimization correlates positively with increased profits and competitive market positioning. Specifically, the cost efficiency dimension in this study mirrors the findings of Rizos et al. (2016), who identified “cost savings” as the most tangible benefit perceived by MSMEs when shifting to circular models. By reducing new raw material purchases and minimizing waste disposal costs, MSMEs automatically improve their profit margin structures. Furthermore, Prieto-Sandoval et al. (2018) emphasize that the “make” and “use” phases in the circular cycle are crucial for MSMEs to create value added that directly impacts economic performance, not just environmental performance.

Although the positive relationship direction is confirmed, the moderate significance level (10%) reflects barriers also found in other literature. These findings differ slightly from those of Demirel and Danisman (2019), who, in some cases, found

short-term negative impacts of environmental investments on Return on Assets (ROA) for small firms due to the trade-off between initial investment costs and future gains. This phenomenon is explained by Ormazabal et al. (2018), who found that financial and technical barriers often hinder MSMEs from enjoying instant circular economy benefits. In the context of Surakarta MSMEs, this indicates that while businesses are beginning to feel efficiency, the magnitude of the financial impact may not be fully optimal due to transition burdens or lack of supply chain ecosystem support, as highlighted by Lusiantoro et al. (2025) regarding the importance of business survivability.

From the Resource-Based View (RBV) perspective, these findings strengthen the argument that the ability to manage waste is a strategic intangible asset. As explained by Dewi and Purwantini (2023), when MSMEs successfully internalize environmental practices, making them a work culture rather than mere regulatory compliance, the resulting efficiency becomes an imperfectly imitable competitive advantage, ultimately leading to superior financial performance. This research contributes to the literature by validating that, despite financial barriers, the transition to circularity remains a profitable strategy for MSMEs in emerging markets.

## **6. Conclusion**

This research concludes that the implementation of circular economy practices serves as a significant determinant of perceived financial performance among creative MSMEs in Surakarta. Empirically, the findings challenge the view that sustainability adoption merely imposes additional costs; instead, the integration of reduce, reuse, and recycle principles acts as a strategic mechanism for improving resource efficiency and supporting profitability. The ability of MSMEs to transform waste into value aligns with the Resource-Based View (RBV), highlighting that environmental capabilities can become valuable and distinctive resources that enhance competitiveness. Although the statistical significance is observed at a marginal level due to early-stage transition barriers, the positive relationship indicates that adopting a circular model has promising long-term benefits for MSME sustainability.

However, this study has several limitations. The relatively small sample size and focus on a specific sector and geographic area may limit the generalizability of the findings. In addition, the use of perceived financial performance introduces subjectivity, which may not fully capture the actual financial condition of MSMEs. Furthermore, the exploratory nature of the study and the use of a higher significance level may affect the strength of statistical conclusions.

Based on these findings and limitations, several recommendations are proposed. For MSME owners, conducting waste audits is recommended to identify production residues that can be converted into secondary inputs, thereby reducing the Cost of Goods Sold (COGS). Integrating sustainability narratives into marketing strategies is also suggested to enhance product differentiation and customer loyalty. For future research, it is recommended to expand the sample size, conduct cross-industry comparisons, and utilize more robust significance levels. Future studies are also encouraged to incorporate objective financial data or mixed-method approaches, as well as include mediating variables such as green innovation or government support to provide a more comprehensive understanding of the relationship between circular economy practices and financial performance.

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The authors declare that there is no conflict of interest.

### ***Ethical Approval and Originality Statement***

Ethical approval was obtained for this study. The manuscript represents original work and has not been previously published, nor is it under consideration by another journal.

### ***Data Disclosure Statement***

The data that support the findings of this study are available from the corresponding author upon reasonable request.



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