

# Revitalizing batik competitiveness through green branding, eco-innovation, and circularity

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## Abstract

Sustainable practices are increasingly recognised as important drivers of business performance in contemporary markets. This study examines the influence of green branding, eco-innovation, and the circular economy on the competitiveness of batik SMEs, a representative emerging economic context in Indonesia. The relationships between these constructs were analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM). The results indicate that green branding, eco-innovation, and the circular economy have a significant and positive influence on the competitiveness of batik SMEs. Batik SMEs that are more environmentally friendly, more innovative, and more circular will have a higher level of competitiveness than SMEs that do not implement these practices. These findings indicate that sustainability practices based on green branding, eco-innovation, and the circular economy not only provide environmental benefits but also serve as key drivers of increasing the competitiveness of batik SMEs. In other words, the higher the level of consistency in implementing environmentally friendly strategies, the greater the capacity of batik SMEs to compete in both local and global markets. This research reinforces the theory and practice that sustainability is one of the most strategic sources of competitiveness for batik SMEs. These findings provide direction for future batik business models and confirm that sustainability programmes not only impact the environment but also enhance local competitiveness.

## Keywords

Green branding, Eco-innovation, Circular economy, Competitiveness, Batik SMEs

## Introduction

Pekalongan is known as the “The World City of Batik” and produces batik, an internationally recognised art form [1]. Because of its fishing port, Pekalongan is also a major producer of sea fish and is developing into a centre for fruit production, which has eventually evolved into a culinary hub. As the phenomenon illustrates the trends in Pekalongan’s three mainstay sub-sectors, presented below, batik is a major draw for the city. It is now renowned as a major batik producer, not only on Java but throughout Indonesia. This product is a leading export commodity, reaching international markets.

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The data presented shows that over the past five years, Pekalongan's economic sub-sectors have remained highly discussed, with batik being the most prominent. Beyond its global fame, batik is also under pressure to move in a positive direction, ensuring its continued success and avoid being eroded by technological developments. Instead, it must be able to survive and sustainably adopt technology [2]. Exploration of search for Pekalongan's leading sectors shown in Figure 1.

This demand impacts the competitive advantage of batik SMEs, particularly in Pekalongan. They are vying to survive and compete amidst the onslaught of technologically advanced textile products, while batik must continue to thrive, despite its inherent handicrafts and traditional traditions [3]. Batik entrepreneurs are expected to be able to promote batik by showcasing its unique characteristics and the culture it preserves. Furthermore, how to package batik with environmental sustainability in mind is a major challenge for batik SMEs [4].

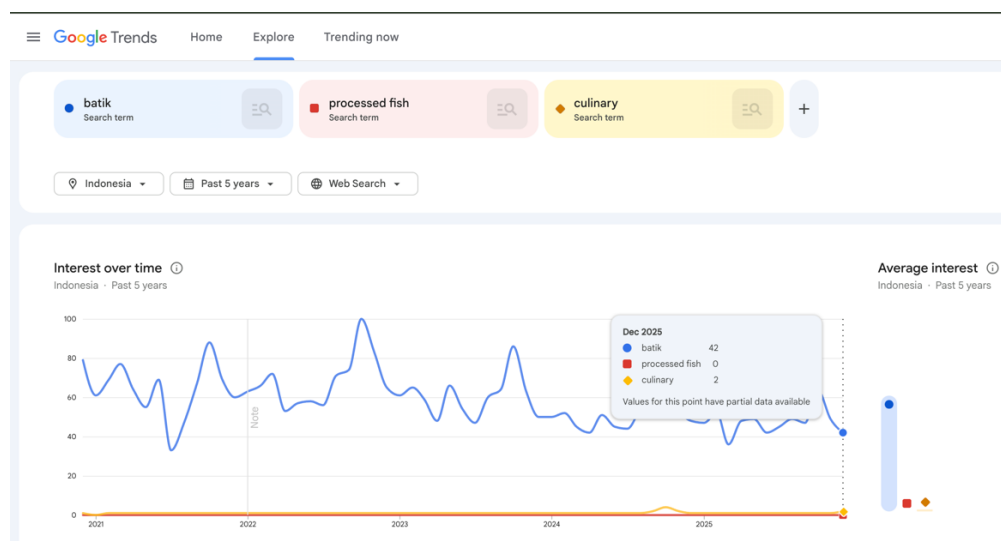


Figure 1. Exploration of search for Pekalongan's leading sectors

Source: Google Trends (accessed December 22, 2025)

Competitiveness has become a central concern for small and medium-sized enterprises (SMEs) operating in increasingly dynamic and sustainability-oriented markets [5]. For batik SMEs in Indonesia, competitiveness is not only determined by price and product uniqueness, but also by their ability to respond to environmental concerns, changing consumer preferences, and global sustainability standards. In many cases, batik SMEs face declining market reach, limited differentiation, and vulnerability to competition from mass-produced textile products [6].

From a strategic perspective, competitiveness reflects a firm's capacity to sustain market position, expand market share, and create superior value relative to competitors [7], [8]. However, many batik SMEs struggle to achieve sustainable competitiveness due to resource constraints, low innovation intensity, and limited strategic orientation toward sustainability. Environmental issues such as excessive water usage, chemical

waste, and inefficient production further weaken their competitive position, particularly in markets where environmentally responsible products are increasingly valued [9], [1].

Therefore, the key issue addressed in this study is how batik SMEs can enhance their competitiveness by transforming sustainability-oriented practices into strategic assets rather than operational burdens. This study positions competitiveness as a critical dependent variable that captures both market performance and strategic resilience in sustainability-driven competition.

Prior research has established that sustainability-oriented strategies positively influence firm performance. Studies on green branding highlight its role in enhancing corporate image, consumer trust, and market differentiation [10]. Eco-innovation literature emphasizes the importance of environmentally friendly product and process innovations in improving efficiency and competitiveness [11], [12], [13]. Meanwhile, circular economy research focuses on waste minimization, resource efficiency, and closed-loop production systems as mechanisms for sustainable value creation.

Although these streams of research provide valuable insights, they are often examined in isolation and predominantly within large firms or advanced economies. Empirical studies that integrate green branding, eco-innovation, and circular economy practices within SME contexts particularly in traditional and creative industries remain limited.

Although prior studies have separately examined green branding, eco-innovation, and circular economy practices, several critical gaps remain. First, most empirical research investigates these sustainability dimensions in isolation, providing limited understanding of their integrated effects on firm competitiveness [14], [15]. Second, existing studies predominantly focus on large firms or SMEs in developed economies, leaving culturally embedded and traditional SMEs such as batik enterprises in emerging economies largely underexplored [16], [17]. Third, sustainability practices are often positioned as compliance-oriented or environmental outcomes, rather than as strategic resources that directly enhance competitiveness [18], [19].

Consequently, there is insufficient empirical evidence explaining how integrated sustainability-oriented strategies function as a coherent competitive mechanism within traditional creative industries. This gap highlights the need for a comprehensive model that captures the strategic role of sustainability in enhancing SME competitiveness.

This study offers a clear and focused novelty by demonstrating that competitiveness in traditional SMEs can be systematically strengthened through an integrated sustainability strategy. Unlike prior studies that treat green branding, eco-innovation, and circular economy practices as isolated initiatives, this research empirically validates their simultaneous role as complementary strategic resources. Furthermore, by applying the Resource-Based View to batik SMEs, this study advances existing theory by showing how sustainability-driven intangible assets generate competitiveness within culturally embedded and resource-constrained enterprises in emerging economies.

Grounded in the Resource-Based View (RBV) [20] and Stakeholder Theory [21], this study conceptualizes sustainability-oriented practices as intangible strategic resources that enhance firm competitiveness. Green branding strengthens market perception and legitimacy, eco-innovation enhances innovation capability, and circular economy practices improve operational efficiency.

This study aims to empirically examine the influence of green branding, eco-innovation, and circular economy practices on the competitiveness of batik SMEs in Indonesia using an integrated sustainability perspective.

## Method

This study adopts a quantitative research design using a cross-sectional survey approach. The unit of analysis is batik SMEs operating in Indonesia. Data were collected from batik SME owners and managers using structured questionnaires. Respondents were selected through purposive sampling based on their involvement in strategic and operational decision-making. All constructs were measured using validated indicators (Table 1) adapted from prior empirical studies and adjusted to the batik SME context. Responses were assessed using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) [22].

Table 1. Measurement indicators

Variable	Indicators	Description
Green Branding [23]	GB1	Use of environmental claims in brand communication
	GB2	Perception of batik products as environmentally friendly
	GB3	Consistency of green values in branding strategy
Eco-Innovation [24]	EI1	Adoption of eco-friendly production processes
	EI2	Development of environmentally friendly batik products
	EI3	Continuous innovation to reduce environmental impact
Circular Economy [25]	CE1	Reduction of production waste
	CE2	Reuse and recycling of materials
	CE3	Efficient use of water and raw materials
Competitiveness [26]	COMP1	Ability to compete with similar batik products
	COMP2	Market expansion and customer growth
	COMP3	Perceived competitive advantage over rivals

Partial Least Squares Structural Equation Modelling (PLS-SEM) was employed to analyze the data. This method is appropriate for predictive research models and complex constructs with relatively small sample sizes [27].

## Results and discussion

The measurement model demonstrates adequate convergent and discriminant validity. All constructs achieved acceptable levels of composite reliability and average variance extracted, indicating robust measurement quality.

## Results

The following presents the measurement data for the structural model based on the PLS-SEM results presents in Table 2.

Table 2. Structural model results

Hypothesis	Relationship	Path Coefficient ( $\beta$ )	t-value	p-value	Decision
H1	Green Branding → Competitiveness	0.28	3.45	< 0.01	Supported
H2	Eco-Innovation → Competitiveness	0.34	4.12	< 0.001	Supported
H3	Circular Economy → Competitiveness	0.22	2.87	< 0.01	Supported

Source: Data processed by researchers, 2025

Green branding exerts a positive and significant influence on competitiveness ( $\beta = 0.28$ ;  $t = 3.45$ ;  $p < 0.01$ ). This finding suggests that environmentally oriented brand positioning enhances market legitimacy and differentiation, particularly in niche markets that value cultural authenticity combined with sustainability credentials [29], [30].

Eco-innovation shows the strongest effect on competitiveness ( $\beta = 0.34$ ;  $t = 4.12$ ;  $p < 0.001$ ), highlighting its central role in strengthening competitive advantage. This result confirms that innovation in environmentally friendly products and production processes enables batik SMEs to improve efficiency, reduce environmental impact, and respond to evolving market demands [31], [32], [3].

Circular economy practices also significantly influence competitiveness ( $\beta = 0.22$ ;  $t = 2.87$ ;  $p < 0.01$ ). Although its effect size is relatively smaller, this result underscores the importance of resource efficiency, waste reduction, and material reuse in traditional batik production, where environmental costs are often embedded in daily operations [33], [34].

Collectively, the model explains a substantial proportion of variance in competitiveness ( $R^2 = 0.56$ ), indicating that sustainability-oriented practices are strong predictors of competitive performance among batik SMEs. The structural model demonstrates substantial explanatory power, with sustainability-oriented practices accounting for 56% of the variance in batik SME competitiveness [35], [36]. This indicates that green branding, eco-innovation, and circular economy practices jointly represent strong predictors of competitive performance in traditional manufacturing SMEs.

## Discussion

The findings of this study directly address the research objectives outlined in the introduction. The significant relationships confirm that sustainability-oriented strategies are not merely ethical choices but also strategic economic assets. Alternative interpretations suggest that sustainability practices also enhance intangible assets, such as reputation and legitimacy, which are increasingly valued in global markets.

The results support the initial hypothesis that green branding, eco-innovation, and circular economy practices enhance competitiveness. These findings are consistent with previous studies emphasizing sustainability as a driver of competitive advantage, while extending existing literature to the batik SME context.

The findings confirm that sustainability-oriented strategies function as strategic resources that enhance competitiveness. Consistent with RBV, green branding strengthens intangible market-based assets, eco-innovation enhances innovation capability, and circular economy practices improve efficiency and cost control.

Unexpectedly, the strength of the circular economy's impact highlights that resource efficiency plays a critical role in traditional industries where production costs and waste management are major concerns. This finding underscores both the strength of the study contextual relevance and its limitations, as results may vary across sectors.

The results align with previous studies while extending their applicability to culturally embedded SMEs. Notably, the strong effect of circular economy practices underscores the importance of resource efficiency in traditional manufacturing sectors. This study also highlights that integrated sustainability implementation yields greater competitive benefits than isolated practices.

## Conclusion

This manuscript is structured and positioned to emphasize the strategic role of sustainability practices in enhancing the competitiveness of SMEs, particularly in developing countries and cultural industries. This study demonstrates that green branding, eco-innovation, and circular economy practices significantly enhance the competitiveness of batik SMEs. The findings confirm that sustainability-oriented strategies are not merely ethical imperatives but constitute strategic sources of competitive advantage.

By integrating multiple sustainability dimensions, this research advances current knowledge on SME competitiveness and provides practical insights for policymakers and practitioners. The study contributes to the sustainability and SME literature by illustrating how traditional industries can progress toward resilient and competitive business models.

The main contribution of this research lies in positioning sustainability as a strategic source of competitiveness, rather than a regulatory burden. By integrating multiple sustainability dimensions, this study advances current knowledge and provides practical direction for batik SMEs seeking to compete in local and global markets.

Overall, this research contributes to the broader field of sustainability and SME competitiveness by demonstrating how traditional industries can progress toward sustainable and competitive business models. Despite its contributions, this study is limited by its cross-sectional design and sector-specific focus. Future research may

adopt longitudinal approaches, incorporate mediating variables such as brand trust, and explore comparative analyses across creative industries.

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