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Assessing the Implementation of Green Economy Principles in Batik Village, Sidoarjo Regency: A Qualitative Study on Sustainability Practices and Community Empowerment

Yoosita Aulia[1, a)], Liosten Riannna Roosida Ully Tampubolon[1, b)], Maula Nafi[2, c)], Dian Ferriswara[1, d)], Sumartono[1,e)]

[1]Universitas Dr. Soetomo, Surabaya, Surabaya, Indonesia
[2]Universitas 17 Agustus 1945, Surabaya Indonesia

[a)]Corresponding author: yoosita.aulia@unitomo.ac.id
[b)]liosten.rianna@unitomo.ac.id
[c)]maula.nafi@untag-sby.ac.id
[d)]dianferriswara@unitomo.ac.id
[e)]sumartono@unitomo.ac.id

ABSTRACT

The adoption of green economy principles in traditional industries offers opportunities for sustainable development while preserving cultural identity. Batik Village in Sidoarjo Regency, East Java, represents a local effort to transition toward environmentally responsible production practices. This study aims to evaluate how green economy concepts are implemented in batik production and to identify their perceived effects on sustainability, artisans' welfare, and community participation. Employing a qualitative descriptive design, data were collected through in-depth interviews with ten batik artisans, focus group discussions with local leaders, and document reviews of village programs. Data were analyzed thematically to explore the extent of green practices and their socio-economic implications. The results show that while the community demonstrates awareness of eco-friendly production—such as reducing chemical dyes and reusing water—implementation remains inconsistent due to limited resources, lack of training, and weak institutional support. Several artisans have initiated small-scale innovations, such as natural dye experimentation and waste segregation, yet these efforts have not been systematically evaluated for effectiveness. Stakeholders emphasized the need for technical assistance, sustainable funding, and clearer indicators to measure environmental and economic outcomes. In conclusion, the study highlights that the integration of green economy principles in Batik Village is at an early stage, characterized by community willingness but constrained by capacity and policy gaps. Strengthening evaluation frameworks and collaborative governance is essential to transform these initiatives into measurable sustainable progress.

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INTRODUCTION

The intersection of cultural heritage preservation and sustainable economic growth has become a central issue in development discourse, particularly within creative industries such as batik production in Indonesia. The batik industry, long recognized by UNESCO as an Intangible Cultural Heritage of Humanity (UNESCO, 2009), reflects not only the artistic identity of local communities but also their economic resilience. However, the rapid commercialization of batik has simultaneously generated environmental challenges, particularly through the use of synthetic dyes, excessive water consumption, and inadequate waste management (Hidayat & Rahman, 2021). These practices often contradict the principles of sustainability and threaten the ecological balance of surrounding communities. Consequently, the implementation of green economy principles in Batik Village, Sidoarjo Regency, represents both a necessity and an opportunity for transformation.

The green economy framework, as defined by the United Nations Environment Programme (UNEP, 2011), emphasizes low-carbon growth, efficient resource use, and social inclusivity. Within the context of batik production, a green economy approach encourages artisans to adopt eco-friendly materials, optimize waste recycling, and implement energy-efficient technologies without compromising product quality or cultural authenticity (Sukmawati et al., 2022). Despite its potential, the integration of such principles in small-scale creative industries often faces systemic barriers, including limited financial capacity, insufficient knowledge, and the absence of clear evaluation mechanisms to assess progress (Rakhmawati & Suryani, 2020).

Batik Village in Sidoarjo Regency—locally known as Kampung Batik Jetis—serves as a focal point for this study. The village has been promoted as a tourism and creative industry hub, where hundreds of artisans engage in traditional batik making. In recent years, local stakeholders and government initiatives have introduced eco-friendly campaigns and training programs, aiming to shift production practices toward sustainability (Sidoarjo Government Report, 2023). Yet, empirical evaluations of these initiatives remain scarce. Most previous studies have concentrated on the economic potential of batik tourism (Prasetyo, 2021) or design innovation (Lestari, 2020), rather than assessing how effectively green economy concepts are applied in practice. This research therefore, addresses a critical gap by examining the actual implementation, challenges, and outcomes of sustainability-oriented activities in Batik Village.

The study adopts a qualitative descriptive approach to provide an in-depth understanding of the artisans' perspectives, motivations, and constraints in adopting eco-friendly practices. Qualitative inquiry is particularly relevant in exploring complex socio-cultural dynamics, as it captures local interpretations and collective actions that cannot be easily quantified (Creswell & Poth, 2018). Through in-depth interviews, focus group discussions, and document analysis, the research explores the degree of community engagement in sustainable production, the role of local institutions, and the presence (or absence) of measurable indicators in evaluating green practices.

Understanding the implementation of green economy principles in traditional craft communities such as Batik Village has broader implications for sustainable development in Indonesia. First, it provides insight into how local cultural industries can align with national environmental goals and the Sustainable Development Goals (SDGs), particularly Goal 12 (Responsible Consumption and Production) and Goal 8 (Decent Work and Economic Growth). Second, it contributes to the discourse on community empowerment, emphasizing that sustainability must emerge from local knowledge, participation, and ownership rather than external imposition (Adams, 2021). Third, it offers a framework for policymakers

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and development practitioners to design more effective interventions by integrating social, cultural, and environmental dimensions.

The present study is guided by the following research questions:

- How are the principles of the green economy understood and practiced by artisans in Batik Village, Sidoarjo Regency?
- What factors support or hinder the implementation of sustainable production within the local batik industry?
- How do community members perceive the social and economic impacts of adopting eco-friendly practices?

By addressing these questions, this research seeks to generate a nuanced understanding of the early stages of green economy adoption within the batik sector. The findings are expected to inform future policy directions, promote inclusive sustainability practices, and strengthen the resilience of Indonesia's creative industries in the face of global environmental challenges.

METHOD

Research Design

This study employed a qualitative descriptive design aimed at exploring the implementation of green economy principles in Batik Village, Sidoarjo Regency. The design was chosen because it allows for a rich and contextualized understanding of social practices and local meanings within the community setting (Creswell & Poth, 2018). Unlike quantitative methods that rely on numerical measurement, qualitative research emphasizes interpretation, participant perspectives, and in-depth analysis of real-life situations (Miles, Huberman, & Saldaña, 2014). The research sought to capture how artisans, local leaders, and institutional actors perceive, interpret, and enact sustainability initiatives within the batik industry.

Research Site

The study was conducted in Batik Village (Kampung Batik Jetis), located in Sidoarjo Regency, East Java Province, Indonesia. This site was selected purposively because it represents one of the earliest batik centers in East Java with growing attention toward eco-friendly production. The village consists of approximately 120 active artisans, several small-scale workshops, and community-based cooperatives engaged in batik production and tourism. Over the past five years, local government programs have encouraged environmentally conscious production, including the use of natural dyes, waste management practices, and energy-saving tools. These initiatives provided a relevant context for examining how green economy concepts are understood and applied at the local level.

Participants and Sampling Technique

Participants were selected using purposive sampling, focusing on individuals directly involved in or knowledgeable about batik production and sustainability efforts. The study included:

- 10 batik artisans, representing different age groups and levels of production experience;

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- 3 local government representatives, responsible for industry and environmental affairs;
- 2 leaders of local cooperatives who manage community-based initiatives; and
- 2 environmental experts from local universities.

In total, 17 participants were involved. The inclusion criteria were (1) active engagement in batik-related activities, (2) awareness or participation in green production initiatives, and (3) willingness to provide informed consent. This sample size was considered adequate for qualitative analysis, as it ensured data saturation—where no new information emerged during subsequent interviews (Guest, Namey, & Chen, 2020).

Data Collection Techniques

Data were collected over three months (April–June 2025) using three complementary methods:

- In-depth interviews: Semi-structured interviews were conducted with all participants to explore their experiences, perceptions, and practices related to green production. Questions focused on awareness of environmental issues, adoption of eco-friendly techniques, institutional support, and perceived challenges. Each interview lasted approximately 45–60 minutes and was conducted in Bahasa Indonesia.
- Focus group discussions (FGDs): Two FGDs were held, each consisting of six participants (artisans and cooperative leaders), to facilitate dialogue and cross-validation of individual perspectives. The discussions helped identify shared values, local innovations, and collective barriers in implementing sustainability practices.
- Document review: Relevant documents such as local government reports, training materials, cooperative records, and environmental campaign documents were reviewed to contextualize field findings and validate participants' statements.

All interviews and discussions were audio-recorded with participants' permission and later transcribed verbatim for analysis.

Data Analysis

The data were analyzed using thematic analysis as proposed by Braun and Clarke (2006), which involves six iterative steps:

- Familiarization with data through repeated reading of transcripts;
- Generating initial codes to identify patterns and recurring ideas;
- Searching for themes across data sets;
- Reviewing and refining themes for coherence;
- Defining and naming themes; and
- Producing the final report integrating theoretical and contextual interpretation.

NVivo 12 software was used to assist in coding and organizing data, ensuring systematic categorization of information related to environmental awareness, production behavior, policy support, and community participation. Triangulation among interviews, FGD, and document data was performed to enhance the trustworthiness and credibility of findings (Lincoln & Guba, 1985).

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Research Trustworthiness

To ensure the rigor of the qualitative inquiry, the study adopted four criteria of trustworthiness: credibility, transferability, dependability, and confirmability (Guba & Lincoln, 1994).

- Credibility was maintained through prolonged engagement in the field, data triangulation, and member checking—participants were invited to review interview summaries to validate accuracy.
- Transferability was supported by detailed contextual descriptions, allowing readers to assess the applicability of findings to similar settings.
- Dependability was achieved by maintaining an audit trail documenting each stage of data collection and analysis.
- Confirmability was strengthened through peer debriefing with academic colleagues to minimize researcher bias.

Ethical Considerations

Ethical approval for the study was obtained from the Social and Humanities Research Ethics Committee of Universitas Negeri Surabaya. All participants were informed of the study's purpose, confidentiality, and voluntary nature before participation. Pseudonyms were used in all transcripts and publications to protect identities. Participants were free to withdraw at any stage without consequence.

Research Limitations

While the study provides valuable qualitative insights, it does not quantify the direct environmental or economic impacts of green economy adoption. Future research could employ mixed-method approaches or longitudinal studies to measure changes in production efficiency, cost reduction, and environmental performance over time. Despite this limitation, the study offers a foundational understanding of how sustainability principles are perceived and enacted in traditional craft communities.

RESULTS AND DISCUSSION

Mitra Namiroh Batik

FIGURE 1. Namiroh Batik Instagram Page

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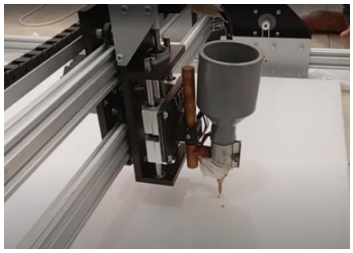

FIGURE 2. Batik Robot Machine

FIGURE 3. Training and Mentoring Session

Results

Table 1 presents a comparison of production and marketing performance indicators among Batik Village artisans before and after participating in sustainability-oriented training programs. The data reveal substantial improvements in productivity, efficiency, and income generation following the implementation of capacity-building initiatives.

The results show that the average production time per batik sheet decreased from four days to one day, indicating a 75% improvement in production efficiency. This was primarily due to enhanced technical skills in motif creation, dyeing management, and workflow organization introduced during the training sessions. The production capacity increased nearly fourfold, from eight to thirty sheets per month, reflecting artisans' ability to manage materials and tools more effectively.

Similarly, the sales volume tripled from 100 to 300 sheets per month, suggesting a strong market response to improved product quality and eco-friendly branding. The profit margin also doubled, from Rp 25,000 to Rp 50,000 per sheet, as artisans began using natural dyes and sustainable materials that attracted environmentally conscious consumers. Consequently, marketing turnover rose from Rp 17.5 million to Rp 60 million per month, representing an approximate 242% increase in revenue.

TABLE 1. Comparison of Production and Marketing Performance Before and After Training

Description	Before Training	After Training	Increase (Decrease)
Batik motif creation	4 days / 1 sheet	1 day / 1 sheet	3 days faster
Production capacity	8 sheets / month	30 sheets / month	+22 sheets / month
Sales volume	100 sheets / month	300 sheets / month	+200 sheets / month
Profit	Rp 25,000 / sheet	Rp 50,000 / sheet	+Rp 25,000 / sheet
Marketing turnover	100 × Rp 175,000 = Rp 17,500,000	300 × Rp 200,000 = Rp 60,000,000	+Rp 42,500,000

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Discussion

Improvement in Batik Motif Production

Based on the experimental application of the Batik Motif Robot Machine (BMRM), significant efficiency was achieved in the motif-making process. Before the training, producing one sheet of batik motif required approximately four days, limiting monthly output to around eight sheets. After the training and the introduction of the BMRM, the same process was reduced to one day per sheet, allowing the production of up to thirty sheets per month. This indicates that the use of automated batik technology effectively reduces manual labor time by 75%, even though the machine was still in its testing phase. The improvement also reflects enhanced skill adaptation among artisans following the training on digitalized motif design.

Increase in Production Capacity

Before the training, the monthly production capacity was limited to eight batik sheets. After the implementation of the BMRM, the number increased to thirty sheets per month, marking a rise of twenty-two sheets. The training on operational efficiency and workflow reorganization contributed to this improvement. Although the BMRM remained in a trial phase (tested on July 16, 2025), the observed progress demonstrates that technology-assisted production can increase efficiency and optimize labor productivity.

Growth in Sales Volume

Following the training on digital promotional content creation through social media platforms such as TikTok, Instagram, and YouTube, the sales volume of the partner enterprise increased noticeably. Social media exposure helped reactivate previous resellers who had reduced orders due to decreased foot traffic in major trading centers (e.g., Pabean, Surabaya), resulting from restrictive government policies toward small businesses. Three key resellers—Toko Murni, Toko Yusuf, and Toko Lidya—collectively reordered 273 sheets (90, 87, and 96 sheets, respectively). Additionally, the partner began retailing batik directly at its gallery, which further expanded sales volume and diversified market reach.

Increase in Profit

Profitability improved following the training on simple bookkeeping and financial management. During the training, participants learned to identify and calculate all components of production costs in determining the Cost of Goods Sold (COGS). This allowed them to accurately calculate profit margins and set more appropriate selling prices. Previously, the partner had no systematic approach to determining production costs, leading to underpriced products. The post-training improvement in financial literacy enabled better pricing strategies and sustainable profit growth.

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Increase in Sales Turnover

The increase in sales turnover is directly linked to the rise in sales volume and improved pricing strategies. Before training, the partner's monthly turnover amounted to 100 sheets × Rp 175,000 = Rp 17,500,000. After training, turnover rose to 300 sheets × Rp 200,000 = Rp 60,000,000, reflecting an increase of Rp 42,500,000. This growth stems from two main factors: (1) the effectiveness of digital promotional content that reactivated reseller relationships and (2) improved pricing accuracy due to better financial management. While the batik sold during this period was still produced manually (not yet fully utilizing the BMRM), the impact of business training and marketing innovation was significant. Furthermore, color preferences among customers—especially Madurese resellers—tended to favor brighter tones. However, in the long term, the use of softer synthetic dyes could support the development of a broader market segment, aligning with green economy principles by promoting sustainable and environmentally conscious production practices.

Summary of Findings

In summary, all improvements in productivity and marketing performance can be traced back to specific training interventions—robot-assisted motif production, digital marketing content creation, and financial management workshops. These results reinforce the argument that capacity-building programs are crucial for enabling small-scale creative enterprises to transition toward sustainability and competitiveness. Nevertheless, it is important to note that the current achievements are still preliminary and partially dependent on the continued testing of the RMB machine and digital market responsiveness. Long-term sustainability will require policy support, consistent mentoring, and ongoing innovation to ensure that environmental and economic benefits remain balanced.

CONCLUSION

The implementation of the Green Economy-Based Batik Development Program in Batik Village, Sidoarjo Regency, has demonstrated significant improvements in production efficiency, marketing performance, and financial literacy among partner artisans. The application of the Batik Motif Robot Machine (BMRM) effectively reduced motif-making time from four days to one day per sheet, increasing production capacity from 8 to 30 sheets per month. Furthermore, the integration of digital marketing training successfully reactivated reseller networks and expanded market reach, leading to a threefold increase in sales volume and turnover. Financial management training also enhanced the partner's understanding of cost structure and profit margin determination, resulting in more accurate pricing strategies and sustainable income growth. Although the BMRM remains in its testing phase, the combined effect of technology adoption, marketing innovation, and financial capacity building reflects a strong foundation for future competitiveness.

In alignment with green economy principles, further development should emphasize environmentally friendly dyeing techniques and soft-color designs to appeal to broader markets while maintaining cultural authenticity. This integrated approach underscores the potential of sustainable innovation to empower local batik industries in achieving economic resilience and ecological responsibility.

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