Green marketing strategies: environmentally friendly batik ecosystems in niche and mass market segments in Pekalongan

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Abstract

Consumer awareness of environmental issues has encouraged batik MSMEs in Pekalongan to adopt environmentally friendly production practices. This study examines how these businesses implement green marketing in two market segments, mass and niche, and how key actors contribute to business sustainability. A qualitative approach, including interviews, field observations, and Social Network Analysis (SNA), was used to identify central actors and coordination patterns. Results show that in the mass market, employees play a central role in production and communication, supported by government and digital platforms, while owners focus on strategic decisions. In the niche market, the business owner leads both production and marketing, with communities and media providing support. The findings suggest practical strategies, for mass markets, involve employees in communicating sustainability through digital channels, for niche markets, leverage owner-led storytelling and selective exhibitions to highlight authenticity, cultural value, and environmental responsibility.

Keywords: *environmentally friendly batik, mass market, niche market, green marketing, actor roles*

Introduction

The batik industry in Indonesia plays a strategic role as both a cultural heritage and an important economic sector with a complex production supply chain. However, conventional batik production generates significant environmental impacts due to the use of synthetic dyes that produce hazardous waste (Al-shami et al., 2024; Daud et al., 2022). In response to these challenges, producers have gradually adopted more environmentally responsible practices, including the use of natural dyes and improved waste management systems, in line with regulatory developments and increasing consumer awareness of environmentally responsible products (Pranta & Rahaman, 2024). In Pekalongan, one of Indonesia's major batik production centers, this shift is reflected in the interactions among producers, markets, and supporting institutions that collectively shape the development of environmentally responsible batik production and marketing practices (Huang et al., 2024; Santoso et al., 2025; Suzianti et al., 2023; Warasthe et al., 2022).

The development of environmentally friendly batik in Pekalongan can generally be observed through two market orientations, namely niche markets and mass markets. The niche market focuses on a smaller segment of consumers by offering exclusive products based on natural dyes, artisanal techniques, and limited production volumes, while the mass market targets a broader consumer base through larger scale production and wider distribution channels. These two orientations tend to complement each other, where the niche market supports innovation and artistic value, while the mass market expands

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production capacity and market diffusion (Afiatna et al., 2024; Martuti et al., 2020; Nikmah et al., 2023; Redaksi, 2024; Zhu et al., 2022). However, the sustainability of environmentally friendly batik micro, small, and medium enterprises remains challenged by high production costs, limited availability of raw materials, time intensive natural dyeing processes, low consumer awareness of environmentally friendly products, and weak inter actor connectivity within the batik ecosystem (Steelyana, 2025; Cahyani et al., 2023).

As the urgency of environmental sustainability issues and consumer awareness of green products continues to increase, green marketing has emerged as a strategic approach to enhancing business sustainability and competitiveness through product, process, and business practice innovations that are ecologically responsible (Dahri et al., 2025; Kumar & Harichandan, 2022). Green marketing is defined as a strategy for promoting and delivering environmentally safe products throughout their life cycle to reduce ecological impacts, while simultaneously strengthening relationships with environmentally conscious consumers and creating sustainable value for firms (Alzu'bi et al., 2025; G. Chen et al., 2024).

Within the context of sustainability marketing, green marketing contributes to improved firm performance through changes in consumer behavior, product innovation, and environmentally friendly production processes, which ultimately enhance brand image and customer loyalty (White et al., 2025). The effectiveness of these strategies is further reinforced by the adoption of green innovation and integration with Green Supply Chain Management, which expands market potential for environmentally friendly products in response to growing consumer preferences for sustainable lifestyles (Roh et al., 2022). In the Indonesian batik industry, the implementation of green industry standards through the use of natural dyes and environmentally friendly production techniques presents opportunities to enhance competitiveness. In the MSME context, green marketing encompasses product and process innovation, as well as sustainability education and communication, to build consumer trust and loyalty (F. Achmad & Wiratmadj, 2025; Ayu Kusumawardani et al., 2024; Xu & Xu, 2025).

Although numerous studies have examined environmentally friendly batik practices (Hermawan et al., 2025; Klaski Putri & Tjahjono, 2024; Ragil et al., 2023), green marketing (Ardianingsih et al., 2024; Ariyanti et al., 2025; Mekaniwati & Bon, 2024; Notoatmojo et al., 2025), and green production innovation (F. Achmad & Wiratmadja, 2025; Ayu Kusumawardani et al., 2024; Fawaid et al., 2026; Mekaniwati & Bon, 2025; Raya et al., 2021), limited research compares the development of batik across niche and mass markets, or examines how actors such as suppliers, artisans, communities, and institutions interact and contribute to business sustainability. Understanding these relationships is crucial, as success depends on both production innovation and coordination among actors amid changing markets and consumer preferences.

The objective of this study was to analyze and compare the implementation of green marketing strategies within the ecosystem of environmentally friendly batik in the niche market and mass market segments in Pekalongan. The findings of this study are expected to contribute both theoretically and practically by providing empirical evidence and comparative insights, as well as serving as a basis for formulating more effective and sustainable strategies and policies for the development of the environmentally friendly batik industry.

Methods

This study employed a qualitative research design using a case study approach focusing on environmentally friendly batik SMEs representing the mass market and niche market segments in Pekalongan in 2025. The selection of Pekalongan was based on empirical evidence that the city is widely recognized as the Batik City, contributing approximately 70% of national batik production and reaching international markets (Pemerintah Kota, 2025). Therefore, it provides a relevant context for examining the dynamics of the environmentally friendly batik ecosystem. Primary data were obtained through in-depth interviews and direct observation, while secondary data were derived exclusively from relevant scientific literature.

The classification of marketing strategy orientation between the mass market and niche market segments in this study was determined based on several criteria, including target market, production volume, distribution channels, product positioning, and pricing strategy. Based on these criteria, differences in the orientation of marketing strategies in the two segments of environmentally friendly batik businesses can be identified, as presented in Table 1.

Table 1. Marketing Strategy Orientation for Mass Market and Niche Market

Criteria	Mass Market	Niche Market
Target Market	Middle-class consumers, functional and accessible batik	High-end consumers/collectors, exclusive and artistic batik
Production Volume	Relatively large, ±100 pieces per motif	Limited, 1 piece per motif
Distribution Channels	Local exhibitions, physical stores, marketplaces, social media	Personal relationships, local and international exhibitions
Product Positioning	Functional batik, wide market reach	Exclusive artwork, high artistic value
Pricing Strategy	Competitive, starting around IDR 400,000	Premium, starting around IDR 2,500,000

The research participants consist of environmentally friendly batik enterprises in Pekalongan selected through purposive sampling. The selection criteria included: (1) consistently implementing environmentally friendly production practices, such as the use of natural dyes and waste management; (2) having operated for a minimum of three years to demonstrate business stability; (3) possessing clear market orientation characteristics based on target market, production scale, pricing strategy, distribution, and marketing communication; and (4) being willing to provide access for in-depth interviews and field observations. These criteria were established to ensure that the selected cases were relevant and enabled in-depth comparative analysis. This study involves three environmentally friendly batik enterprises: Batik D as a representative of the niche market segment, and Batik PF and Batik W as representatives of the mass market segment.

Data collection was conducted through a literature review to obtain an in-depth understanding of green marketing practices and inter-actor interactions within environmentally friendly batik ecosystems, complemented by semi-structured interviews with key actors in environmentally friendly batik enterprises in Pekalongan and

surrounding areas, including business owners, worker representatives, consumers, and resellers (Table 2). The research questions in this study were designed implicitly to allow respondents to naturally describe their experiences and practices, particularly regarding environmentally friendly production processes, material selection, and green marketing strategies. This approach was employed to reduce social desirability bias, capture practices and values that are not always expressed explicitly, and obtain more in depth and contextual narratives concerning interactions among actors within the environmentally friendly batik ecosystem. Thus, implicit questions enable this research to produce data that is authentic and relevant to the real practices of business actors, without relying on formal or expected answers.

Table 2. List of Informants

Organization	Category	Interview Location	Role
Batik D	Owner	Production Site in Pekalongan	Batik Manufacturer
	Production Manager		Production Coordinator
Batik PF	Owner	PF Batik Shop in Pekalongan	Batik Manufacturer
	Production Manager		Production Coordinator
	Consumer		Regular Customer
	Reseller		Batik Seller
Batik W	Owner	W Batik Shop in Pekalongan	Batik Manufacturer
	Employee		

In addition, field visits (Table 3) and direct observations were conducted at batik production and marketing sites to examine the implementation of environmentally friendly practices and marketing strategies applied across different market segments (Nowell et al., 2017).

Table 3. List of Technical Visits

Organization	Category	Location
Wiradesa Batik Village	Community	Wiradesa, Pekalongan
Setono Pekalongan Batik Wholesale Market	Batik wholesale market	Pekalongan city
D Batik Shop	Batik production place	Production Site in Pekalongan
PF Batik Shop	Batik sales shop	PF Batik Shop in Pekalongan
W Batik Shop	Batik sales shop	W Batik Shop in Pekalongan

This study employed a qualitative approach combined with Social Network Analysis (SNA), operationalized based on a conceptual framework that positions value co-creation as the core of the ecosystem, surrounded by two main layers: the marketing pillar and the ecosystem pillar (Išoraite, 2021). The marketing pillar encompasses the extended marketing mix elements, including product, price, place, promotion, people, process, physical evidence, positioning, and segmentation, while the ecosystem pillar includes

external actors such as government, academia, communities, media, the public sector, and strategic alliances. This framework served as a guide for identifying actors and categorizing interactions within the ecosystem of environmentally friendly batik SMEs in Pekalongan.

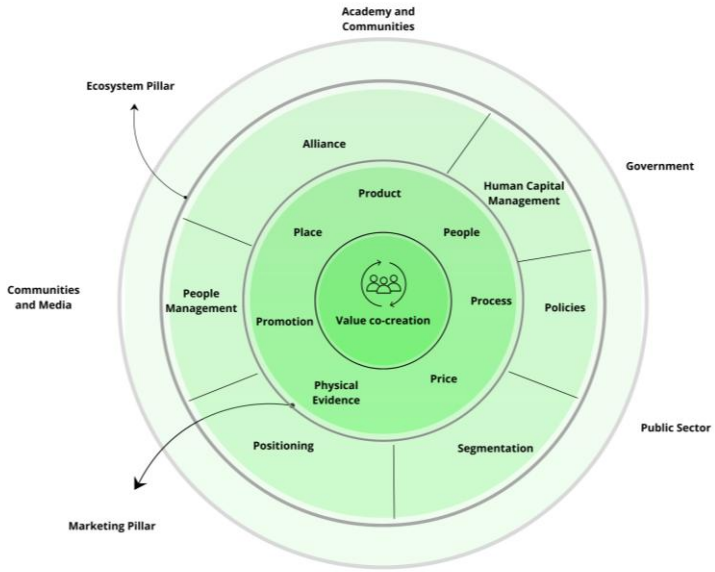

Figure 1. Conceptual Framework of Green Marketing Innovation

Relationships among actors (edges) were defined as forms of interaction that included information flows, training and mentoring, marketing collaboration, and regulatory support, which were identified through in-depth interviews, field observations, and relevant documents. The relational data were then converted into an adjacency matrix using the MAXQDA software by considering the role of each actor in constructing the network. Network visualization was subsequently conducted using Gephi, where line thickness represented the intensity of interactions, arrow directions indicated the flow of relationships, and node size reflected the level of actor centrality within the network. This visualization enabled clearer interpretation of relational patterns, interaction intensity, and the relative roles of each actor in the network.

The SNA was further conducted by calculating Degree Centrality to identify actors with the highest number of direct connections, Betweenness Centrality to determine actors that functioned as intermediaries between actors or groups within the network, Closeness Centrality to examine actors with the most efficient access to information within the network, and Modularity to map cluster structures and interaction patterns among actors in the niche market and mass market segments. The resulting network metrics were then interpreted alongside qualitative findings from interviews and observations, allowing the study to explain patterns of coordination, information flows, and collaboration among actors, while also identifying key actors and assessing the effectiveness of sustainable marketing strategies within the ecosystem of environmentally friendly batik SMEs.

Results and Discussion

Table 4. SNA Result of Environmentally Friendly Batik Ecosystem (Mass Market)

Actor	Modularity Class	Degree	Closeness Centrality	Betweenness Centrality
Owner	0	12	0.536	0.026
Employee	1	46	0.811	0.809
Local government	0	10	0.508	0.003
Community	2	16	0.536	0.135
Media	1	10	0.484	0.007
Marketplace	1	6	0.469	0.001
Academic	-	-	-	-

Within the mass market ecosystem, environmentally friendly batik practices in Pekalongan are carried out on a relatively large production scale, supported by extensive distribution networks and the involvement of various actors within the supply chain. The implementation of environmentally friendly principles is undertaken by business actors through an organized production structure, as illustrated by Batik PF and Batik W.

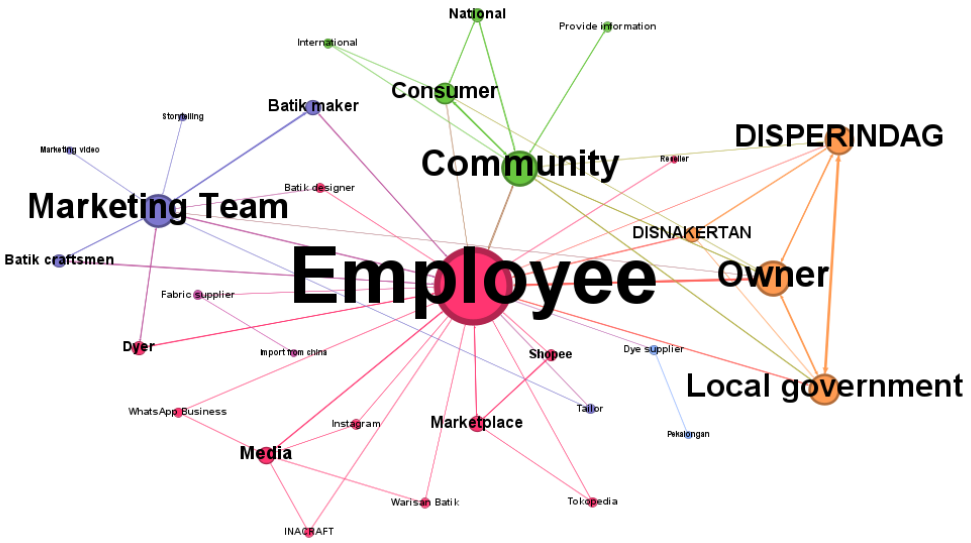

Figure 2. The Ecosystem of Environmentally Friendly Batik (Mass Market)

The network visualization in Figure 2 shows that employees occupied the most central position in the network structure. Based on table 4 the results of the Social Network Analysis, employees had the highest degree value of 46, a closeness centrality of 0.811, and a betweenness centrality of 0.809. These values indicate that employees had the largest number of direct connections with other actors in the network and simultaneously functioned as the main intermediaries in the flow of information and coordination among actors within the ecosystem. The high closeness centrality value also suggests that employees had faster access to other actors in the network, enabling more efficient coordination in both production and marketing activities. In practice, employees were not only involved in the production process but also in product promotion, coordination with

resellers, and the communication of sustainability values to consumers.

The next actor involved in the network was the business owner, who played a role in determining the direction of business development. Based on the network analysis results, the business owner had a degree value of 12, a closeness centrality of 0.536, and a betweenness centrality of 0.026. These values indicate that the business owner maintained direct connections with several actors within the network, particularly in relation to decision-making regarding business concepts, product differentiation, and marketing strategies. However, the relatively lower betweenness centrality value compared to employees suggests that the owner did not act as the main intermediary among actors in the network, as most operational coordination was handled by employees.

Production in the mass market segment required a relatively longer time due to the involvement of several technical stages in the batik-making process. The production output in one cycle could reach a minimum of 100 pieces or more, reflecting the larger production scale characteristic of the mass market segment. The motifs produced were varied and tended to follow market trends, making the designs more adaptive to the demands of a broader consumer market. Raw silk fabric was sourced from China, while dye materials were obtained from Solo and Pekalongan.

In addition to production actors and raw material suppliers, the network analysis also revealed the role of communities within the environmentally friendly batik ecosystem. Community actors had a degree value of 16, a closeness centrality of 0.536, and a betweenness centrality of 0.135. These values indicate that communities occupied a relatively important position in the network, particularly in facilitating the exchange of information among business actors. Through these interactions, communities supported the dissemination of information related to environmentally friendly production practices, access to raw materials, and marketing strategies.

Meanwhile, the involvement of local government actors showed a degree value of 10, a closeness centrality of 0.508, and a betweenness centrality of 0.003. These values indicate that government actors maintained a moderate level of connectivity within the network, although their intermediary role in connecting actors was relatively limited. Nevertheless, their involvement contributed to strengthening green marketing practices through institutional support such as improving business legality, enhancing product quality, and providing technical assistance. Through the Department of Industry and Trade, business actors obtained formal legal recognition such as the Business Identification Number (NIB), business permits, and trademark registration. In addition, the Center for Handicrafts and Batik in Yogyakarta provided technical guidance and verification of environmentally friendly production processes to ensure compliance with established standards, thereby strengthening the credibility of green claims and increasing consumer trust in environmentally friendly batik products.

In terms of marketing channels, media actors had a degree value of 10, a closeness centrality of 0.484, and a betweenness centrality of 0.007. These values indicate that media functioned primarily as communication channels supporting product promotion to consumers. Digital media platforms used by business actors included Instagram, Telegram, and WhatsApp Business. Meanwhile, marketplace platforms had a degree value of 6, a closeness centrality of 0.469, and a betweenness centrality of 0.001. These values indicate that marketplaces primarily functioned as distribution channels to reach broader markets

rather than acting as connectors among actors within the network. The marketplaces utilized included Shopee and Tokopedia, which enabled business actors to expand their marketing reach beyond local markets. In addition, some products were distributed internationally through export activities, particularly to Malaysia. However, the utilization of marketplaces for marketing environmentally friendly batik remains less than optimal due to intense price competition with conventional batik products that are often offered at lower prices. As a result, the environmental value embedded in eco-friendly batik has not yet become a primary consideration for consumers in marketplace transactions, creating challenges for business actors in highlighting sustainability-based product differentiation. Based on interview results and field findings, no involvement of academic actors was identified within the environmentally friendly batik mass market ecosystem. Production, marketing, and business development processes were carried out internally and through support from government institutions, communities, and existing distribution networks. Therefore, academics had not yet become part of the actors involved in the business network within this segment.

Overall, the results of the network analysis indicate that the environmentally friendly batik ecosystem in the mass market segment involved various actors, including employees, business owners, communities, local government, media, and marketplaces. The network structure shows that employees occupied the most central position in the ecosystem, while other actors played supporting roles in sustaining the production, distribution, and marketing of environmentally friendly batik at a wider market scale.

Table 5. SNA Result of Environmentally Friendly Batik Ecosystem (Niche Market)

Actor	Modularity Class	Degree	Closeness Centrality	Betweenness Centrality
Owner	1	40	0.717	0.784
Employee	0.399	14	0.458	0.014
Local government	-	-	-	-
Community	0.465	18	0.508	0.166
Media	0.509	20	0.516	0.274
Marketplace	-	-	-	-
Academic	-	-	-	-

In the niche market ecosystem, environmentally friendly batik practices were conducted on a relatively limited production scale, supported by narrower distribution networks and targeting specialized markets with the involvement of a few actors in the supply chain. The results of the Social Network Analysis (SNA) indicated that the structure of the environmentally friendly batik ecosystem in the niche market segment exhibited a network pattern that was relatively centralized around a primary actor, namely the business owner, as represented by Batik D. The business owner held a central role in determining raw material selection, production processes, motif design, and marketing approaches, with support from production assistants and artisans who served as technical implementers..

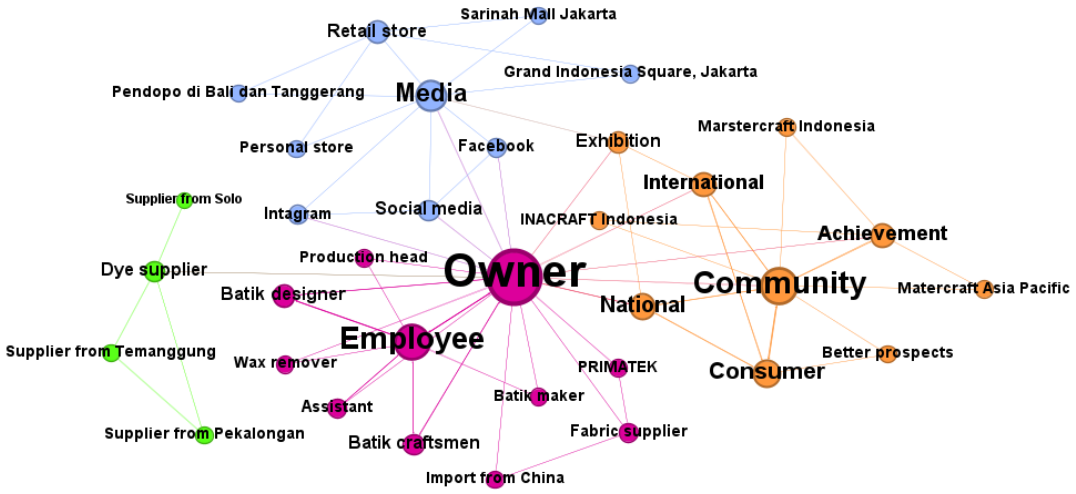

Figure 3. The Ecosystem of Environmentally Friendly Batik (Niche Market)

The network visualization in Figure 3 shows that the business owner occupied the most central position within the network structure, based on the data in Table 5 with a degree of 40, a closeness centrality of 0.717, and betweenness centrality of 0.784. These values indicate that the business owner had the highest number of direct connections with other actors and simultaneously functioned as the primary connector in the flow of information and coordination among actors within the network. The high closeness centrality also suggests that the business owner had the fastest access to other actors in the network, enabling more efficient decision-making in the management of environmentally friendly batik operations.

The next actors involved in the network were employees, including batik artisans, production heads, production assistants, and workers engaged in technical processes such as wax removal. According to the network analysis, employee actors had a degree of 14, a closeness centrality of 0.458, and a betweenness centrality of 0.014. These values indicate that employees maintained moderate connections with other actors in the network, primarily in the context of production activities. However, the low betweenness centrality suggests that employees did not function as primary connectors among actors in the network, but rather served as operational implementers supporting the environmentally friendly batik production process.

Production in the niche market segment emphasized the use of natural dyes and involved longer processes due to greater attention to detail and selective methods. In a single production cycle, the output could be very limited, sometimes only a single motif or piece, in order to maintain exclusivity and artistic value. Cotton fabric was sourced from the Primatek factory, silk threads were imported from China and locally woven in Pekalongan, and dye materials were obtained from Solo, Temanggung, and Pekalongan.

In addition to production actors and raw material suppliers, the network analysis also highlighted the role of communities within the environmentally friendly batik ecosystem. Community actors had a degree of 18, a closeness centrality of 0.508, and a betweenness centrality of 0.166. These values indicate that communities occupied a relatively important position in the network, particularly in facilitating social interactions, information exchange, and the expansion of relational networks among craft industry actors.

In the niche market segment, there was no involvement from the local government, with business development relying primarily on the initiatives of the owner. Product quality recognition in this segment was obtained through participation in curation processes and craft competitions, such as Mastercraft Indonesia and Mastercraft Asia Pacific under the World Craft Council – Asia Pacific Region (WCC-APR). These awards served as symbols of credibility, quality, and product excellence.

Marketing in the niche market segment was conducted through personal networks, selective retail stores, national and international exhibitions, and social media platforms such as Instagram and Facebook, without the use of marketplaces, in order to maintain product exclusivity. Through this strategy, business actors also reached international markets, exporting to Singapore, Thailand, Malaysia, Myanmar, and Japan. Within the network structure, media actors supported business visibility with a degree of 20, a closeness centrality of 0.516, and a betweenness centrality of 0.274, indicating that media functioned as a relatively strategic communication channel connecting business actors with broader markets and the public. Findings from the niche market segment also indicated that academic actors were not involved in business development.

Overall, the network analysis results indicate that the environmentally friendly batik ecosystem in the niche market segment exhibited a network structure that was relatively centralized around the business owner, supported by other actors such as employees, raw material suppliers, communities, and media. This centralized network structure reflects the characteristics of artisanal batik enterprises with limited production scale, a focus on product quality and exclusivity, and marketing strategies that rely more on social relationships and reputation rather than mass market distribution.

Table 6. Comparative Characteristics of Mass Market and Niche Market Ecosystems

Actor	Mass Market	Niche Market
Owner	Acts mainly as a strategic decision-maker.	Becomes the central actor controlling production and marketing decisions.
Employee	Main operational coordinator connecting actors and managing production and promotion.	Functions mainly as a technical production worker.
Local Government	Provides legality support, training, and technical assistance.	Not involved in the business network.
Community	Facilitates information exchange on production and marketing.	Supports networking and knowledge sharing among artisans.
Media	Used mainly for product promotion.	Plays a role in strengthening brand visibility and reputation.
Marketplace	Used as a distribution channel to reach wider markets.	Not used to maintain product exclusivity.
Academic	Not involved.	Not involved.

The research findings indicate that workers occupy the most central position within the environmentally friendly batik ecosystem in the mass market segment in Pekalongan. This condition suggests that production activities and business coordination are largely carried out by workers through their direct involvement in various stages of production, ranging from raw material processing to product completion. Interactions between workers, business owners, raw material suppliers, and distribution actors demonstrate that workers play an important role in maintaining the continuity of production flows and communication among actors within the business network. This role is also associated with green marketing practices, as in certain situations workers participate in conveying information to consumers or distribution partners regarding the materials used and environmentally friendly production processes. This indicates that sustainability values are not only determined at the strategic level of the business but are also internalized through the daily operational activities carried out by workers. These findings are consistent with the literature suggesting that employee involvement and the implementation of green human resource management contribute to improved environmental performance and the competitiveness of sustainable businesses in the manufacturing and MSME sectors (Alrifae, 2026; Munawar et al., 2022; Ogiemwonyi et al., 2023).

Within this ecosystem, the role of business owners in the environmentally friendly batik ecosystem in the mass market segment is more dominant in strategic decision-making rather than serving as the primary connector in operational activities. Business owners are responsible for determining the direction of the business, including business concepts, motif selection, market segmentation, and promotional policies. In this context, the concept of environmentally friendly batik production also forms part of strategic decision-making, not only related to production processes but also as a value offered to the market through green marketing approaches. This condition indicates that the involvement of owners is more prominent in strategic relationships with external actors, while daily operational coordination is carried out by actors directly involved in production. These findings are consistent with studies indicating that MSME owners generally function as strategic decision-makers who determine business direction and establish external relationships with various stakeholders (Kraus et al., 2022).

In this context, structural institutional support becomes an important actor within the environmentally friendly batik ecosystem in the mass market segment. Local governments encourage environmentally friendly production and marketing practices through regulations, training programs, the provision of business legality, and technical assistance, including process verification by the Center for Handicrafts and Batik. Such support not only strengthens legitimacy but also helps business actors enhance production capacity and maintain quality standards at a larger scale. This indicates that the sustainability of the mass market does not develop spontaneously but is shaped through policy interventions and institutional collaboration. These findings align with literature emphasizing that regulatory and institutional support accelerates the adoption of environmentally friendly practices in large-scale production and facilitates business transitions toward sustainability (G. N. Achmad et al., 2023; Hu et al., 2022; Li et al., 2024).

The research findings also show that the utilization of digital platforms such as Instagram, WhatsApp Business, and online marketplaces contributes to expanding the market reach of environmentally friendly batik products in the mass market segment.

However, their effectiveness remains limited due to intense price competition with conventional batik products, which are often offered at lower prices. This condition indicates that the environmental value of products has not yet fully become a primary consideration in consumer purchasing decisions. This finding is supported by the results of the Social Network Analysis which can be seen in table 4. Therefore, the main challenge in marketing environmentally friendly batik lies not only in the use of digital technology but also in the ability of business actors to clearly communicate sustainability values so that consumers can understand the differences between environmentally friendly and conventional products. These findings are consistent with green marketing literature emphasizing that value-based environmental differentiation and effective communication are critical factors in improving consumer perceptions and purchase intentions toward environmentally friendly products (L. Chen et al., 2024; Dangelico & Vocalelli, 2017; Yadav et al., 2024).

Furthermore, the study indicates that the involvement of academic institutions within the green marketing ecosystem in the mass market segment remains relatively limited, despite the existence of collaborative networks involving communities, resellers, and digital media such as Instagram and WhatsApp Business. This condition suggests that the role of academic institutions as sources of knowledge and innovation has not been optimally utilized to support the strengthening of business actors' capacities, particularly in the development of sustainable marketing strategies, enhancement of digital literacy, and innovation in business models. The limited involvement of academic institutions indicates that knowledge transfer and research-based assistance have not yet been strongly integrated into business practices. Consequently, the implementation of green marketing is still largely based on the practical experiences of business actors rather than on structured and knowledge-based approaches. These findings are consistent with previous studies emphasizing that academic institutions play a strategic role in enhancing MSME capabilities through knowledge transfer, research, and mentoring in the implementation of green marketing practices (Audretsch et al., 2023; Bichinho et al., 2026; Putri et al., 2025).

The findings indicate that business owners occupy the most central position in the environmentally friendly batik ecosystem within the niche market segment because most strategic and operational decisions remain directly controlled by the owners. The results show that interactions among actors in the network, including the selection of raw materials, supervision of the production process, determination of motif designs, and marketing strategies, largely occur through the role of the business owner. This condition reflects the characteristics of the niche market, which emphasize product quality, artistic value, and exclusivity. As a result, the owner acts as the main controller in maintaining the concept and quality of the batik produced. These findings indicate that sustainability practices in the niche market batik ecosystem are strongly influenced by the commitment and vision of business owners in determining the direction of production and marketing. This finding is consistent with previous studies indicating that in creative and craft industries, sustainability orientation and business development direction are often centrally controlled by owners because they play a dominant role in maintaining the identity, quality, and value of the products offered to the market (Fawaid et al., 2026; Khan et al., 2025; Rahman et al., 2023; Tan et al., 2025).

The results also show that workers maintain connections with several actors within the

network but do not function as the main intermediaries among actors because their role is primarily focused on implementing the production process. This condition indicates that in batik businesses operating in the niche market segment, workers mainly perform operational functions related to production activities, while coordination among actors remains under the control of the business owner. Consequently, the contribution of workers to business sustainability is more visible in the implementation of environmentally friendly production practices rather than in strategic decision making within the business network. In other words, the successful implementation of sustainable production practices depends greatly on the ability of workers to carry out production procedures established by the business owner. This finding is consistent with previous studies showing that workers' behavior and competencies play an important role in supporting the implementation of sustainability practices at the operational level of production, particularly through work behavior that supports resource efficiency and reduces environmental impacts (Ali et al., 2021; Enyoghasi and Badurdeen, 2021).

In addition, communities play an important role in the network of the environmentally friendly batik ecosystem in the niche market segment. Communities function as spaces where business actors can share experiences, obtain information about exhibition opportunities, and expand professional networks. In the context of environmentally friendly batik, communities also assist business actors in exchanging information about more environmentally friendly production methods and promoting products that emphasize sustainability values. This indicates that communities do not only serve as spaces for social interaction but also function as informal channels that accelerate the dissemination of information, build consumer trust, and increase consumer interest in purchasing environmentally friendly batik products. This finding is consistent with previous studies showing that communities in creative and sustainable markets can strengthen product reputation, support promotion, and improve relationships between business actors and consumers through consistent social interaction (Jung et al., 2020; Peters & Bodkin, 2018; Santos et al., 2022; Shen et al., 2023; Truc, 2024).

Furthermore, the findings indicate that social media platforms such as Instagram and Facebook are primarily used as promotional channels to display batik products and provide basic product information rather than to communicate comprehensive narratives about environmentally friendly production processes. This suggests that the potential of social media as a strategic communication tool within the green marketing ecosystem of environmentally friendly batik has not yet been fully optimized. Therefore, the adoption of visual storytelling can be considered a strategic recommendation to strengthen digital marketing practices. By presenting visual narratives about production processes, artisans, and the cultural meaning of batik motifs, business actors may communicate sustainability values more effectively, improve perceptions of authenticity, and foster stronger emotional engagement with consumers. Such an approach can also help differentiate environmentally friendly batik products from conventional alternatives and potentially increase consumer purchase intentions through more authentic and meaningful communication (Cai et al., 2025; Nekmahmud et al., 2022; Sun et al., 2022; Zafar et al., 2021).

Although there is no involvement from academic institutions, government actors, or the use of online marketplaces, the business continues to operate. This condition indicates that business sustainability is largely driven by the creativity, practical experience, and social

networks of the owner, as well as appropriate marketing strategies implemented through personal networks, craft communities, and selective exhibitions. These channels are effective in building brand image and close relationships with consumers while maintaining the quality, authenticity, and sustainability values of the products. This pattern is consistent with literature indicating that innovation in creative and craft industries is typically internal and informal, emerging through the creativity, experience, and social networks of business actors themselves. Therefore, the presence of academic institutions, government actors, or marketplaces is not necessarily a primary factor for the continuity and development of such businesses (Aritenang et al., 2025; Babakhani et al., 2026).

Overall, the findings indicate that the network structure within the environmentally friendly batik ecosystem in the niche market segment tends to be centralized around the business owner because most decisions related to production, design, and marketing remain under the owner's control. Other actors such as workers, raw material suppliers, communities, and media play supporting roles in facilitating production activities, providing materials, exchanging information, and communicating products to the market. This centralized network structure reflects the characteristics of batik craft enterprises that emphasize product quality, exclusivity, and sustainability values, which later become important components of the marketing strategy for environmentally friendly batik products.

Based on the research findings, green marketing strategies in the environmentally friendly batik industry in Pekalongan need to be clearly differentiated between the niche market and mass market segments. In the mass market segment, business actors need to actively involve employees as part of green marketing communication strategies, for example by presenting environmentally friendly production processes through digital content, live production, or consumer education on social media and online marketplaces. This is important because employees occupy a relatively central position in the production network, supporting production capacity while also conveying information about environmentally friendly practices. In addition, the use of digital platforms should focus on delivering simple and easily understandable information for a broad audience, such as eco friendly product labels, information about natural dyes, and transparency in the production process.

In contrast, within the niche market segment, green marketing strategies should focus on strengthening the role of the business owner as the central actor in the network and as a representative of sustainability values. This can be implemented through the personal branding of the business owner, storytelling about the production process, the philosophy of batik motifs, and the use of natural dyes in each product. Promotional activities are also more effective when conducted through selective channels such as exhibitions, creative communities, collaborations with designers or art curators, and media that target consumers who value sustainable products with strong cultural significance. Thus, green marketing strategies in both segments need to be designed differently according to the structure of actor networks that emerge within each market ecosystem.

Conclusions

This study shows that the green marketing ecosystem of environmentally friendly batik in Pekalongan differs between mass and niche market segments. In the mass market,

employees play a central role in coordinating production and communication, while owners focus on strategic decisions. Government support and digital platforms help expand reach, though price competition limits consumer recognition of environmental value. In the niche market, the business owner is the central actor controlling production, design, and marketing, while employees, communities, and media provide support. Green marketing strategies should therefore be tailored mass markets require employee involvement and clear digital communication of sustainability, whereas niche markets benefit from owner-led storytelling and selective channels that highlight authenticity, cultural value, and environmental responsibility.

The limitations of this study include its primary focus on the perspectives of business actors and supporting stakeholders, meaning that consumer viewpoints and the roles of academic institutions and research organizations have not yet been empirically explored. Future research could further investigate ecosystem governance dynamics, the role of public policy, and the evolution of inter-actor collaboration in response to market changes and increasing consumer awareness of sustainability issues at both national and international levels.

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