

Enhancing Sustainability of Batik MSMEs Through Product Innovation and E-Commerce: a Case Study of Seberang Jambi Indonesia

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Abstract

This study examines the implementation of product innovation and e-commerce strategies in managing batik SMEs using a sustainability industry approach in Seberang, Jambi City. The study aimed to analyze how product innovation and digital marketing can support them, to explore their understanding and implementation of product innovation and e-commerce, as well as the challenges and sustainability outcomes. Data were collected through the following triangulation methods: observations were carried out during visits to batik workshops and SME locations, literature and document reviews relevant, and semi-structured interviews with in-depth Interviews were conducted with selected owners and managers of batik SMEs in Seberang Kota Jambi. The results showed that innovation in batik design, the use of eco-friendly materials, and the development of Jambi-specific motifs increased the market value of batik, strengthened cultural identity, and appealed to environmentally conscious consumers. On the other hand, e-commerce helped SMEs expand their market reach nationally and internationally, allowing them to compete more effectively. However, several challenges remain, including limited capital for innovation, low digital literacy among business owners, and a lack of policy support from the government. These barriers hindered the full adoption of innovation and digital strategies. Theoretically, this research contributed by enriching the concept of product innovation with a cultural and sustainability-based perspective, expanding the application of e-commerce theory to traditional MSMEs, and reinforcing sustainability theory in the creative industries rooted in local heritage. Moreover, it introduced a new managerial model that integrated local cultural values with modern digital business strategies, offering a practical framework for sustainable development in traditional SME sectors.

Keywords:

Product Innovation
Strategy, E-Commerce,
Sustainability Industry,
Batik SMEs

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1. Introduction

The development of batik in Indonesia has made significant progress on the international stage. According to data obtained from the Ministry of Industry, the realization of batik and batik product exports from January to April 2023 reached 26.7 million USD, a realistic target after the Indonesian batik industry showed positive development last year. Batik exports are expected to grow by 30.1 percent annually in 2022. In addition to this optimism, the IMF also provided positive signals regarding the impact of the COVID-19 pandemic, projecting economic growth to increase from 2.8 percent to 3 percent in 2023. This opportunity must be embraced through collaboration among various parties, including associations, entrepreneurs, designers, academics, business practitioners, and influencers. This collaboration can serve as a platform for the batik industry in Indonesia to develop, introduce, and promote the rich potential of domestic batik.

The positive national development of batik is closely linked to the batik artisans in various regions of Indonesia, who have high productivity in producing quality batik product innovations. Product innovation refers to developing new or specific components, features, and technologies for new products (Dari & Isfianadewi, 2020). It will provide a competitive advantage for batik artisans in these regions. The increasingly fierce competition requires batik producers to improve product quality and make breakthroughs through product innovation to boost sales and ensure the success of their batik businesses (Muazza, Mayasari, & Syuhada, 2024).

Seberang Jambi City is one of the regions in Jambi Province that produces the distinctive batik of Malay Jambi. Given that the Malay Jambi batik is not as famous or renowned as the batik produced on the island of Java, such as Pekalongan batik, Solo batik, and Yogyakarta batik, the artisans of Malay Jambi batik must consider strategies that can elevate this batik to the same level of recognition as those from other regions. The development of batik in these areas is not only supported by artisan groups but also by the local government (Pemda), which plays a policy-making role by promoting trade organizations for batik artisans through Micro, Small, and Medium Enterprises (Muazza, Asra, Syuhada, & Mayasari, 2024).

Many issues are faced by the Batik SMEs in Seberang Jambi City and the artisans of Malay Jambi batik in gaining recognition similar to that of batik from other regions. This is due to several factors: 1) Batik SMEs in Seberang Jambi City may struggle to access broader markets, especially national and international markets through e-commerce platforms; 2) Batik artisans may need to improve product quality and design innovation to meet the standards of an increasingly competitive market; 3) Awareness of the importance of sustainable business practices remains low among batik SMEs, necessitating a more proactive approach to encourage sustainable practices; 4) Batik SMEs may still face limitations in using technology to support production and marketing processes, requiring efforts to introduce and enhance understanding of digital technology; 5) Artisans need to improve their knowledge and skills in business management, including production management, marketing, and finance; 6) Changes in consumer consumption patterns and preferences towards batik products can affect the product development and marketing strategies of batik SMEs; and policies and regulations that do not support the sustainable growth of batik SMEs can also be obstacles that need to be addressed.

Related to the issues outlined, this research can delineate the main challenges faced by batik SMEs in Seberang Jambi City and design appropriate innovation strategies to enhance the competitiveness and sustainability of the batik industry. Therefore, the objectives of the research include analyzing how product innovation strategies can be implemented with

consideration for the Sustainability Industry, analyzing how e-commerce strategies can help overcome market access limitations in the development of batik SMEs in Seberang Jambi City, and analyzing how the Sustainability Industry approach can be applied in the management of these batik SMEs.

Several batik SMEs have developed product innovations such as the use of eco-friendly materials, innovative dyeing techniques, and more modern designs to attract a broader market interest (Almira, Amelia & Sutanto, 2018; Chynthia & Hendra, 2014; Ernawati, 2019; Kanagal, 2015; Rasyid & Indah, 2018). Innovation is an essential tool companies can use to maintain their presence and give them a competitive advantage over their rivals. Innovation involves companies changing existing methods or creating new methods related to the provision of products and services (Thongsri & Chang, 2019). In implementing innovation, a company must develop a comprehensive innovation strategy. This strategy outlines the company's objectives for innovation by explaining what needs to be innovated and how to achieve it (Riyadi & Sumardi, 2017).

Product innovation strategies offer a specific perspective on the level of change in products, which can include incremental improvements, additions to product families, next-generation products, and entirely new core products (Muigai & Gitau, 2018). Innovation strategies must be consistent with the company's mission, vision, goals, and overall strategy. Companies must be dedicated to investing in research and development, producing innovative products, and achieving substantial performance to remain competitive (Tugba, 2015). Most previous research on global innovation has focused on large or mature companies, even though SMEs or young businesses are often more flexible in innovation, especially in adapting to changing customer needs and environmental conditions (Thi, Van, Mahmud, & Thuy, 2023). Thus, it can be defined that a product innovation strategy is an approach taken by a company to create new products or enhance existing ones to achieve competitive advantage and meet the evolving market needs.

Some batik SMEs in Indonesia have utilized e-commerce to market their products, both through local and international e-commerce platforms, thereby increasing the accessibility of batik products to the global market (Wahyudi, 2022; Wibowo, Hidayat, & Rahmawati, 2020; Yang, Li, Wang, & Sherratt, 2020; Yu & Dong, 2013; Rachman, Beny, and Fernando, 2017; Jain, Malviya, & Arya, 2021).

The use of e-commerce is commonly employed in business development as it enables companies to efficiently reach global markets, reducing geographic barriers and enhancing consumer accessibility. The adoption of e-commerce by SMEs allows them to compete in international markets at relatively low costs compared to physical stores (Choshin & Ghaffari, 2017). By leveraging e-commerce, companies can lower operational costs such as rent, utilities, and labor. E-commerce platforms also enable companies to manage inventory and orders automatically, improving efficiency. This automation reduces human error in inventory management and increases productivity (Zhu & Kraemer, 2018).

Big data allows companies to analyze consumer behavior and provide relevant product recommendations. Personalization in e-commerce can enhance customer satisfaction and consumer retention, as customers feel acknowledged and better served (Choshin & Ghaffari, 2017). E-commerce provides flexibility in digital marketing through channels such as social media, email, and digital advertising, allowing for more targeted marketing strategies. Digital marketing on e-commerce platforms enables companies to monitor campaigns in real-time and adjust strategies based on consumer responses (Liguori & Winkler, 2020).

Some batik SMEs have developed sustainable business models by considering economic, social, and environmental aspects, such as through community development programs and the use of local raw materials (Indrayani, Triwiswara, & Evtriyandani, 2020; Nurbaiti, Harefa, Zaky, Pati, &

Nurhayati, 2021; Purwaningsih, Purwaningsih, & Susanto, 2016; Szalavetz, 2017; Li, Syah, Syukur, Limkanchanapa & Srisura, 2023; Al-Shaikha & Hanaysha, 2023; Rantala, Ukko, Saunila & Havukainen, 2018; Roxas, Ashill, & Chadee, 2017).

The concept of developing sustainable business models focuses on integrating sustainability into the values, processes, and outcomes of businesses. The goal is to ensure that companies not only prioritize profit but also consider the environmental and social impacts of their activities. The Triple Bottom Line (TBL): Profit, People, and Planet is a fundamental component of sustainable business, which combines three main aspects: economic profit, social welfare, and environmental sustainability. The TBL approach allows companies to assess their performance not only from a financial perspective but also from social and environmental impacts (Elkington, 2018).

Another component of developing sustainable business models is the circular economy, which aims to reduce waste by recycling and reusing raw materials. The circular economy decreases dependence on natural resources and creates value from waste, providing economic benefits while minimizing environmental impact (Geissdoerfer et al., 2020).

Sustainable innovation emphasizes the development of environmentally friendly products and processes, covering the entire product life cycle from raw materials to disposal. Sustainable innovation enhances business competitiveness by meeting the demands of more environmentally conscious consumers (Kiron et al., 2017). Sustainable supply chain management ensures that the entire production process, from raw material suppliers to product delivery to consumers, follows sustainability principles. Sustainable supply chain management helps reduce environmental risks and enhance the company's reputation (Pagell & Shevchenko, 2014). Value-Based Business Models focus on creating long-term value that encompasses economic, social, and environmental aspects. This approach enables companies to communicate the added value they create to consumers and partners while enhancing consumer loyalty toward sustainable brands, emphasizing the importance of value-based business models for companies that wish to remain relevant in an increasingly sustainability-conscious market (Boons & Lüdeke-Freund, 2013).

Some batik SMEs are also active in empowering local communities, especially women, by providing skills training and mentoring to enhance their capacity to manage batik businesses (Fathor, 2014; Malik & Widhanarto, 2019; Pratama, Mukmin & Fitriyanti, 2023; Mardiana & Sucahyo, 2020). Various approaches and practices of community empowerment, as well as how their implementation can contribute to sustainable development (Fauzi & Ahmad, 2023), need to be undertaken in running a business.

Economically empowered communities have better access to job opportunities, skills training, and resources needed to participate in sustainable industries. It can reduce poverty and improve quality of life. A framework is required to realize this. A framework for empowering communities to support the development of sustainable industries and create positive impacts on the environment (Hussain & Ali, 2023) is essential.

Community empowerment enables them to engage in decision-making processes that affect the local environment and industry. This involvement is crucial to ensure that policies and practices of sustainable industries align with the needs and aspirations of the community. The importance of community empowerment in sustainable industrial practices and how it can enhance local participation is highlighted (Sari & Prasetyo, 2023).

Building community capacity through education and training relevant to sustainable industries can help them adapt to changes and innovations in industrial practices. This also creates awareness of the importance of sustainability. Community empowerment can contribute to the growth of sustainable industries and reduce negative environmental impacts (Pramudito & Wibowo, 2022).

Strong social capital within communities can foster collaboration among individuals, groups, and institutions in efforts to achieve sustainability goals. Social networks can help communities share

knowledge, resources, and experiences. This serves as a perspective within the community related to capacity building in the context of industrial sustainability and its benefits for local welfare (Nugroho, 2023).

Community empowerment can generate new ideas and innovations that support sustainable industrial practices. Community involvement in research and development can accelerate the transition to more environmentally friendly industries and innovative practices in community empowerment that support sustainable industries and their impacts on local communities (Kurniawan & Setyaningrum, 2023).

The concepts outlined form a theoretical and empirical framework in presenting the product innovation strategies needed in a company, as it can help the company identify competitive challenges against other businesses. Thus, if a company can innovate products and utilize a well-structured strategy, it can survive in its business competition. Companies must also leverage technological advancements through e-commerce platforms to facilitate the marketing of their products, along with the need for sustainable business development for entrepreneurs to achieve welfare. The following theoretical framework can be illustrated as follows:

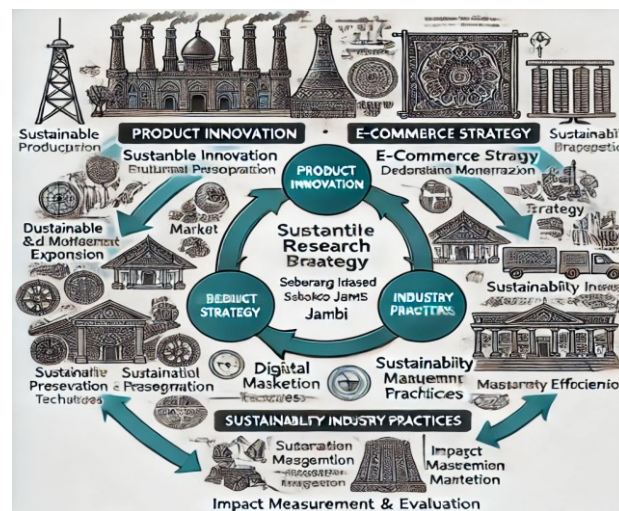


Figure 1. The conceptual research framework

This framework offers a cohesive structure for investigating effective, sustainable approaches to managing batik SMEs in Seberang Jambi City. This study examines the implementation of product innovation and e-commerce strategies in managing batik MSMEs based on a sustainable industry approach in Seberang, Jambi. The background lies in the need to transform traditional batik businesses to remain competitive in the digital era while preserving local cultural values. A gap in the literature is identified due to the limited number of studies that integrate product innovation, marketing digitalization, and sustainability within the context of culture-based MSMEs. The research aims to analyze the role of innovation and e-commerce in supporting the competitiveness and sustainability of batik MSMEs and to formulate a relevant managerial model. Its contributions include strengthening innovation theory with a cultural approach, expanding the application of e-commerce theory to traditional MSMEs, and integrating local values with digital strategies within the framework of a sustainable creative industry.

2. METHOD

The appropriate research design for product innovation strategies and e-commerce in managing batik SMEs based on the sustainability industry in Seberang Jambi City can utilize a mixed methods research approach. This method combines qualitative and quantitative

approaches to obtain a comprehensive understanding of the research problem (Cresswell, 2019). In several sub domains of social science, behavior, health, and humanities, research questions are increasingly being answered through mixed methods research, which combines qualitative and quantitative evidence as well as research elements (Heyvaert, Hannes, Maes, & Onghena, 2013) with a case study approach. The mixed methods case study design can focus on a single case or multiple cases for comparison, and this design can be used to investigate unique and interesting cases that may vary depending on the type of case studied (Creswell & Clark, 2018; Cresswell, 2019; Bungin, 2014). The research object in this study is batik SME craftsmen in the Seberang Jambi City area.

In qualitative data analysis, after conducting interviews and obtaining information and data from participants, researchers perform grouping and coding to facilitate the analysis of the data. Researchers use NVivo software to code the interview results. N-Vivo is a qualitative data analysis (QDA) application developed by QSR worldwide (Bandur, 2019). Meanwhile, in quantitative data analysis, researchers utilize SWOT analysis to assess the strengths of internal and external factors of the product innovation strategies and the utilization of e-commerce being studied. SWOT is a strategic analysis tool that is highly appropriate for use in the context of MSME development. With a systematic research structure—ranging from planning, data collection, and appropriate instrument use to in-depth analysis—SWOT-based studies can provide clear direction for policy-making and practical strategies to strengthen MSMEs. If needed, the results of the SWOT analysis can also be further developed into strategic formulations using other approaches such as the TOWS Matrix, Analytic Hierarchy Process (AHP), or the Business Model Canvas.

The SWOT matrix consists of four fields or quadrants, as mentioned in the previous section. Each field or quadrant has its own business strategy. The complete format is as follows:

Table 1. SWOT Matrix

IFAS EFAS	STRENGTHS (S)	WEAKNESSES (W)
OPPORTUNITIES (O)	STRATEGI SO Create strategies that use strengths to take advantage of opportunities	STRATEGI WO Create strategies that minimize weaknesses to take advantage of opportunities.
THREATS (T)	STRATEGI ST Create strategies that use strengths to overcome threats.	STRATEGI WT Create strategies that minimize weaknesses and avoid threats.

Source: Rangkuti (2013)

3. RESULT AND DISCUSSION

The results of the study can be obtained by processing qualitative and quantitative data. For qualitative data results, the findings can be shown through data processing from interview results using the help of the NVivo program tool as follows:

1. Product innovation strategies can be implemented by taking into account the sustainability of the batik MSME industry in Seberang, Jambi City.

The results of the study show that the analysis related to product innovation strategies can

be applied by considering the Sustainability Industry in batik MSMEs Seberang Jambi City based on the Nvivo tool. The results can be seen in the following figure:

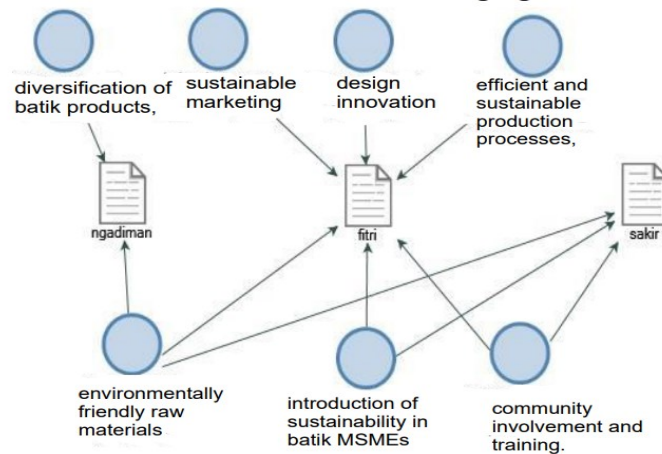


Figure 2. Product innovation strategy

From the figure, it can be explained that product innovation strategies can be implemented by considering the Sustainability Industry of batik MSMEs in Seberang Jambi City, including the introduction of sustainability in batik UMKM, use of environmentally friendly raw materials, efficient and sustainable production processes, design innovation, sustainable marketing, diversification of batik products, and community involvement and training.

Product innovation strategies that take into account the sustainability of the industry in batik MSMEs in Seberang Jambi City include the use of eco-friendly raw materials, efficient production processes, design innovation, community engagement, and sustainability-based marketing. Implementing these strategies will not only enhance the competitiveness of batik products but also contribute to the social and economic sustainability of the community.

Furthermore, the results using quantitative data through SWOT analysis, where the research findings related to product innovation strategies can be applied by considering the Sustainability Industry of batik MSMEs in Seberang Jambi City, can be seen in the following IFAS and EFAS tables:

Table 2. IFAS Innovation Strategy Weighting Product

IFAS	Weight	Rating	Weight Score	Information
Human Resources Capabilities and Technology Expertise	0.20	4	0.80	Skilled human resources facilitate the implementation of sustainable techniques and product innovation.
Quality and Availability of	0.15	3	0.45	Eco-friendly raw materials are hard to find, but their quality is essential for

Raw Materials				sustainable products.
Management Commitment to Sustainability	0.20	4	0.80	Highly committed leadership strongly supports the achievement of sustainability strategies.
Access to Innovation and Technology	0.15	3	0.45	Limited access to environmentally friendly technology can be an obstacle to implementing innovation.
Operational Efficiency in Waste Management	0.10	3	0.30	Efficiency in managing waste and resources supports sustainability but requires further improvement
Financial and Capital Management	0.10	3	0.30	A good financial management allows investment in environmentally friendly product innovation.
Total	1.00		0.310	IFAS: Internal strength is quite good, although there is still room for improvement, especially regarding materials and technology.

Source: Data Processing Results (2024)

The Total IFAS score is 3.10, indicating quite good internal strength. The main supporting factors are human resource capability and management commitment. However, weaknesses in technology access and availability of sustainable raw materials still need to be improved.

Table 3. EFAS Innovation Strategy Weighting Product

EFAS	Weight	Rating	Weight Score	Information
Government Support and Environmental Policy	0.20	4	0.80	Subsidy and incentive policies are very helpful in developing sustainable product innovation.
Market Trends for Eco-Friendly Products	0.15	4	0.60	Consumer demand for environmentally friendly products is increasing and represents a huge opportunity.
Digital Infrastructure Limitations	0.20	3	0.60	Limited digital infrastructure hampers online marketing and digital innovation.
Competition with Conventional Products	0.15	2	0.30	Higher prices of environmentally friendly products pose challenges in competing with conventional products.
Local Consumer Awareness of Sustainability	0.10	3	0.30	Despite rising global trends, local consumers may be less concerned about sustainability.
Availability of International Market Opportunities	0.20	4	0.80	The international market has a high interest in sustainable products, which is opening up the export potential.

Total	1.00	0.340	EFAS: memberikan banyak peluang, meski ada ancaman dari keterbatasan teknologi dan persaingan harga.bahan dan teknologi.
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Source: Data Processing Results (2024)

The total EFAS score is 3.40, indicating that external opportunities outweigh threats. The main external strengths are government support, market trends, and export opportunities. The primary threats are price competition with cheaper conventional products and limitations in digital infrastructure.

Sustainable product innovation strategies have high potential if supported by the right internal and external factors. Batik SMEs in Seberang Jambi City can succeed by optimizing internal strengths and seizing external opportunities, particularly through government support and utilizing international markets.

2. E-commerce strategies can help overcome limited market access in the development of batik MSMEs Seberang Jambi City.

Before explaining the results of this study, first, an introduction to e-commerce in batik UMKM. E-commerce is a platform that allows UMKM to reach a broader market without geographical limitations. It is essential for batik UMKM in Seberang Jambi City, which often faces limited market access due to remote locations and inadequate infrastructure. The results of data processing related to e-commerce strategies based on the Nvivo tool can be seen in the following figure:

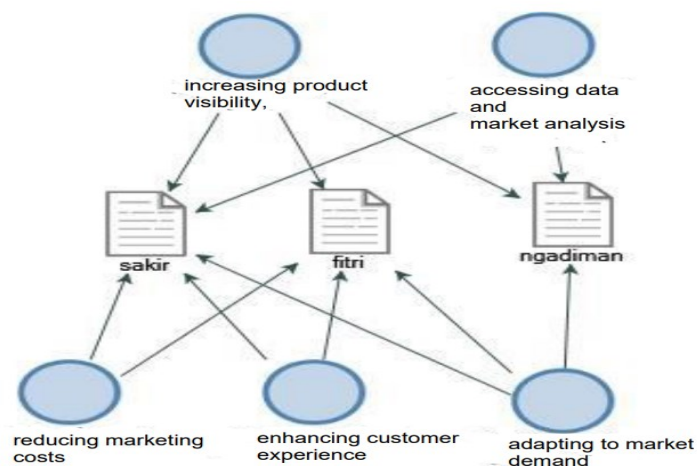


Figure 3. E-commerce strategy

The figure explains that the e-commerce strategy that can help address market access limitations in the development of MSMEs (Micro, Small, and Medium Enterprises) in Seberang Jambi City includes several factors that need attention, such as increasing product visibility, reducing marketing costs, accessing data and market analysis, enhancing customer

experience, and adapting to market demand.

E-commerce provides many benefits for batik MSMEs in Seberang Jambi City, especially in expanding market reach, improving marketing and distribution efficiency, and supporting innovation based on consumer feedback. MSMEs can also design more effective and measurable marketing strategies by utilizing consumer data. To support the success of e-commerce, MSMEs need assistance in training on using digital platforms and adequate internet access, as well as support from local government in providing sufficient digital infrastructure. This approach not only opens opportunities for MSMEs to grow but also creates chances to elevate local batik to broader and more diverse markets.

E-commerce has become one of the main strategies in the digital transformation of MSMEs, allowing local products to gain visibility and expand consumer networks in the digital era. E-commerce (electronic commerce) refers to trade activities conducted through electronic networks, primarily the internet, enabling consumers and businesses to buy, sell, or exchange goods and services online. In e-commerce, all transactions—from product offerings and payments to shipping—are carried out digitally, making the process faster, more efficient, and easily accessible.

Furthermore, the results using quantitative data through SWOT analysis, which shows that e-commerce can help overcome market limitations in the development of batik MSMEs in Seberang Jambi City, can be seen in the following IFAS and EFAS tables:

Table 4. IFAS Weighting of E-Commerce Strategy

IFAS	Weight	Rating	Weight Score	Information
HR Skills in E-commerce	0.20	4	0.80	Skills in operating e-commerce platforms support wider market access.
Availability of Capital for Digital Development	0.15	3	0.45	Sufficient capital is required for investment in infrastructure and digital marketing.
Available Technology Infrastructure	0.20	3	0.60	Lack of adequate technological infrastructure can hamper e-commerce operations.
Management Commitment to Digital Transformation	0.15	4	0.60	High commitment from MSME owners to implement e-commerce is significant for success.
Batik Product Quality and Visual Appeal	0.10	4	0.40	The visual appeal of batik is beneficial for marketing on digital platforms that prioritize visuals.
Network Suppliers and Logistics Couriers	0.10	3	0.30	Collaboration with logistics providers is essential to ensure fast and accurate distribution.
Total	1.00		0.315	IFAS: Internal strengths are pretty good, especially in HR skills and management commitment to digitalization.

Source: Data Processing Results (2024)

IFAS Total Score: 3.15 indicates quite strong internal strength. The main strengths are HR skills in e-commerce and management commitment to digital transformation. However, challenges arise from limited capital and technology infrastructure that must be addressed.

Table 5. EFAS Weighting of E-Commerce Strategy

EFAS	Weight	Rating	Weight Score	Information
The Increasing Trend of Online Shopping	0.20	4	0.80	The growing trend of online shopping provides opportunities for MSMEs to reach more consumers.
Government Policy Support for MSME Digitalization	0.15	4	0.60	Government policy support, such as e-commerce training, provides a significant boost to MSMEs.
Access to National and Global E-commerce Platforms	0.20	4	0.80	Access to large platforms, such as Tokopedia or Shopee, allows MSMEs to reach a broader market.
High Level of Competition in the Online Market	0.15	2	0.30	High competition can be challenging because batik products have to compete with various other products.
International Consumer Awareness of Jambi Batik	0.10	3	0.30	Increasing international consumer awareness of local products provides export opportunities.
Limited Internet Access in Certain Areas	0.20	3	0.60	Limited internet infrastructure in some areas hampers potential access to broader markets.
Total	1.00		3.40	EFAS: External opportunities are quite significant, especially the online shopping trend and government support for MSME digitalization.

Source: Data Processing Results (2024)

Total EFAS Score: 3.40, indicating that external opportunities are pretty large. Government policy support and increasing online shopping trends provide great opportunities for expansion. The biggest external challenges are the tight online market competition and limited internet infrastructure in certain regions.

The E-commerce strategy provides a great opportunity to overcome the limitations of market access for batik MSMEs in Seberang Jambi City. By utilizing internal strengths and existing external opportunities, MSMEs can increase product visibility and reach a wider market, both nationally and internationally.

3. The sustainability industry approach can be applied to the management of Jambi Batik MSMEs.

The Sustainability Industry approach in the management of Jambi batik MSMEs focuses on integrating environmentally friendly practices, sustainable economy, and social responsibility into all aspects of batik production and business. Applying this approach to Jambi batik MSMEs aims to preserve local culture, improve community welfare, and reduce the negative

environmental impacts of the batik industry. The following are the results of the analysis using NVivo related to this:

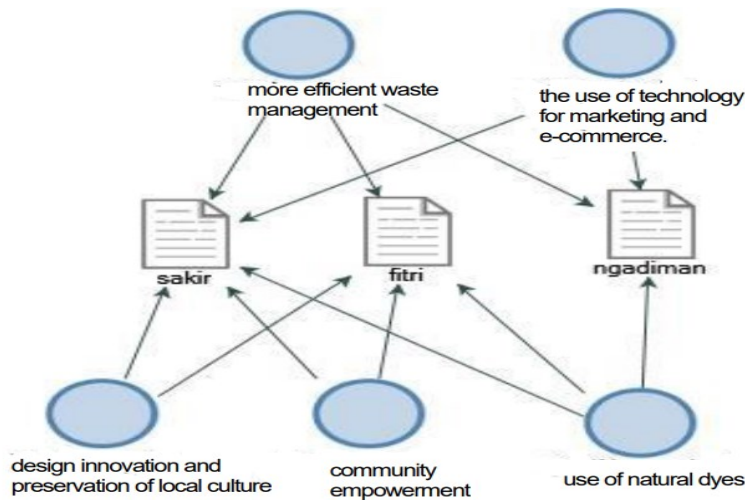


Figure 4. Sustainability Industry Approach

The figure above explains that to run batik MSMEs with a Sustainability Industry approach, several actions need to be taken, including using natural dyes, more efficient waste management, design innovation and preservation of local culture, community empowerment, and the use of technology for marketing and e-commerce.

The sustainability industry approach to managing batik MSMEs in Jambi has positive environmental, economic, and social impacts. By adopting eco-friendly practices such as natural dyeing and proper waste management, MSMEs can reduce their negative environmental impact. Empowering local communities and utilizing design innovations based on local culture can also enhance community welfare and preserve Jambi's cultural heritage. Adopting digital technology through e-commerce helps improve market access and expand the global reach of Jambi batik products. This approach provides a pathway for Jambi batik MSMEs to thrive while maintaining cultural values and sustainability.

Furthermore, the results using quantitative data through SWOT analysis, which show that the Sustainability Industry approach can be applied in managing batik MSMEs in Jambi, can be seen in the following IFAS and EFAS tables:

Table 6. IFAS Weighting of Sustainability Industry Approach

IFAS	Weight	Rating	Weight Score	Information
Uniqueness of Local Motifs	0.20	4	0.80	A local motif appeals to a market that values local culture and products.
Local Skills Support	0.15	3	0.45	have inherited batik skills, which are a strong asset in developing high-quality products more sustainably.
Awareness and Commitment to Sustainability	0.20	3	0.60	the use of natural dyes which are more environmentally friendly
Technology Limitations for Environmentally Friendly	0.15	4	0.60	requires investment to update tools and technology to be more environmentally friendly.

Production					
Limited Access to Capital and Financial Resources	0.10	4	0.40		MSMEs to implement sustainable technologies that require higher costs at the start, such as waste recycling machines.
Lack of Knowledge about Digital Marketing	0.10	3	0.30		Many Jambi batik MSMEs have not fully adopted digital technology or e-commerce for marketing.
Total	1.00		0.315		IFAS: Internal strength is quite good, especially in the uniqueness of local motifs

Source: Data Processing Results (2024)

Total IFAS Score: 3.15 indicates quite strong internal strength. Strength and opportunity factors indicate the potential that can be developed, especially in terms of the uniqueness of local products and government policy support. However, weaknesses and threats such as limited technology and competition with cheaper batik require a strong innovation strategy and support from the private sector and government to overcome these obstacles.

Table 7. EFAS Weighting of Sustainability Industry Approach

EFAS	Weight	Rating	Weight Score	Information
Government Policy Support for Sustainable Industry	0.20	4	0.80	The Indonesian government encourages the use of natural and environmentally friendly materials,
Increasing Consumer Awareness of Environmentally Friendly Products	0.15	3	0.45	Global consumer trend of increasing concern for sustainable products
Use of Digital Platforms and E-commerce for Market Access	0.20	4	0.80	expand the market at a relatively low cost
Competition with Cheaper Mass Batik Products	0.15	3	0.45	Machine-made batik products or those using synthetic dyes are generally cheaper
Fluctuations in Natural Raw Material Prices	0.10	3	0.30	Natural raw materials such as plant dyes can experience price and availability fluctuations, which can hamper production.
Changing Economic Conditions	0.10	3	0.30	Economic instability can affect people's purchasing power
Total	1.00		0.310	EFAS: External strength is quite good, although there is a threat from cheap product competition.

Source: Data Processing Results (2024)

The Total EFAS score is 3.10, indicating a reasonably good external strength. The main supporting factor is government support through sustainable industrial policies. However, weaknesses and threats such as technological limitations and competition with cheaper batik require a strong innovation strategy and support from the private sector and government to overcome these obstacles.

Discussion

The purpose of this study is to analyze product innovation strategy analysis that can be implemented by considering the sustainability of the MSMEs batik industry seberang jambi city; e-commerce strategy analysis can help overcome market access limitations in the development of batik MSMEs seberang jambi city, and the sustainability industry approach can be applied in the management of jambi batik MSMEs.

1. Product innovation strategy analysis can be implemented by considering the sustainability of the MSMEs Batik Industry Seberang Jambi City.

The analysis of the first product innovation strategy is the introduction of sustainability in batik MSMEs. Batik MSMEs in Seberang Jambi City play a crucial role in the local economy and have significant potential to implement sustainable practices. Sustainability encompasses not only environmental aspects but also social and economic factors, which must be considered in product innovation strategies.

The second product innovation strategy involves the use of environmentally friendly raw materials, such as natural dyes and organic fabrics. This can enhance the competitiveness of batik products and meet the growing market demand for sustainability (Badan Pusat Statistik (BPS) Jambi, 2022). Thirdly, there is a focus on efficient and sustainable production processes. MSMEs can adopt more efficient technologies and production methods to reduce waste and energy consumption. For example, implementing batik-making techniques that minimize water and energy usage can optimize the production process and utilize eco-friendly production techniques in Jambi (Adiwijaya & Riyanto, 2020).

Design innovation is the fourth strategy in this research, which combines traditional elements with modern styles. Innovations in batik design are not limited to traditional motifs but also include the application of contemporary designs. For instance, research shows that combining classic motifs with modern elements can attract young consumers looking for unique and appealing products (Pramono & Daryanto, 2021). Design innovations with features such as motifs, colors, and production techniques are fundamental in creating product innovations. Understanding these elements is essential to produce attractive products that resonate with the market.

The fifth product innovation strategy is product diversification. Expanding into batik accessories, interior products, and crafts can open new markets. This strategy allows producers to attract various consumer segments and reduce business risks (Nugroho, A., & Sulaiman, F. (2022). Diversifying products, which produce accessories or ready-to-wear clothing, can help batik MSMEs reach a broader market and increase revenue.

Finally, the sixth product innovation strategy involves community engagement and training. Involving the community in the innovation process and providing training on techniques and marketing can enhance the capacity of MSMEs. Training programs focused on sustainability will help batik artisans understand best practices in production and

marketing (Prabowo & Setiawan, 2022). Sustainable-based marketing is also part of the product innovation strategy highlighted in this research. Marketing batik products by emphasizing sustainability and unique designs is crucial for attracting consumers. Utilizing social media to promote sustainability values can increase product visibility (Rahman & Aminah, 2021).

This study acknowledges several limitations. First, the research was conducted within a limited geographic area—Seberang, Jambi City—so the findings may not be fully generalizable to batik MSMEs in other regions with different cultural, economic, or market conditions. Second, the study primarily used qualitative methods, which, while rich in context, may not capture broader statistical trends or allow for strong generalizations. Third, the scope of analysis focused mainly on product innovation strategies, without an in-depth exploration of other important factors such as supply chain dynamics, financial sustainability, or long-term environmental impacts.

Given these limitations, future research should adopt a broader scope by comparing sustainability-based product innovation strategies across different batik-producing regions in Indonesia. Quantitative or mixed-method approaches can also be employed to measure sustainability-driven innovation strategies' long-term effectiveness and economic impact. Additionally, future studies could integrate other strategic perspectives—such as green supply chain management, circular economy practices, or digital ecosystem development—to further strengthen the sustainability framework of traditional MSMEs in the creative industry.

2. E-commerce strategy analysis can help overcome market access limitations in the development of batik MSMEs Seberang Jambi City.

Product visibility refers to the extent to which a product can be seen and accessed by consumers, both physically in stores and online on digital platforms. This visibility is crucial in marketing as it affects how many people are aware of the product's existence, which in turn can influence sales. By leveraging e-commerce platforms, batik MSMEs can enhance their product visibility. E-commerce allows them to present their products more attractively and reach consumers beyond Jambi, even extending to international markets (Kusuma & Utami, 2021).

The second e-commerce strategy is cost reduction in marketing. E-commerce can help batik MSMEs lower traditional marketing expenses. With digital marketing, such as social media and email campaigns, MSMEs can reach a larger audience at a lower cost compared to conventional marketing. Thus, e-commerce can reduce marketing costs for batik MSMEs (Mardiana & Purnama, 2020). The third strategy involves access to data and market analysis. E-commerce platforms often provide analytical tools that can help MSMEs understand consumer behavior and market trends. With this information, batik MSMEs can adjust their products and marketing strategies to better meet consumer needs (Rizky & Hartono, 2022).

Enhancing customer experience is the fourth e-commerce strategy. E-commerce allows MSMEs to improve customer experience through interactive features such as product reviews, search functionalities, and product recommendations. A better shopping experience can increase customer loyalty (Setiawan & Puspitasari, 2021). The final e-commerce strategy is market demand adjustment. E-commerce provides flexibility for MSMEs to quickly adjust their products based on market demand. With an online-based business model, MSMEs can respond to changing trends faster than traditional marketing

methods, allowing them to adapt quickly to the e-commerce environment (Wang & Zhang, 2020).

The analysis of e-commerce strategies was limited to the current level of digital adoption among batik MSMEs in Seberang, Jambi City, without exploring more advanced or emerging digital technologies. Second, the study primarily focused on market access and did not thoroughly examine other relevant dimensions such as logistics, payment systems, digital marketing capabilities, or cyber security risks. Third, the rapidly evolving nature of e-commerce platforms and consumer behaviour may limit the long-term relevance of the findings.

For future research, longitudinal studies should be conducted to assess the long-term impact of e-commerce implementation on the performance and resilience of batik MSMEs. Comparative studies between urban and rural MSMEs or among different cultural regions could provide a more comprehensive understanding of context-specific challenges and opportunities. Moreover, integrating e-commerce strategies with digital literacy training, supply chain optimization, and financial inclusion initiatives would offer a more holistic approach to strengthening MSMEs in the digital era.

3. The Sustainability Industry approach can be applied in the management of Jambi batik MSMEs

The research results indicate that the Sustainability Industry approach in managing batik MSMEs in Jambi can help enhance the competitiveness of local products in the global market, maintain environmental sustainability, and improve the welfare of the local community. The sustainable industry approach in the batik sector includes the use of eco-friendly raw materials, reduction of production waste, and recycling of materials. Research by Supriyadi et al. (2021) highlights the importance of using natural dyes in the batik industry in Jambi to reduce water pollution caused by harmful chemicals. Additionally, this initiative can decrease dependence on imported raw materials and add value to batik products through eco-friendly claims.

The sustainability approach also focuses on empowering the local community. Batik MSMEs in Jambi have the potential to create jobs and preserve local wisdom through traditional batik designs. Prasetyo & Hasanah (2020) demonstrate that the application of sustainability principles in the batik industry encourages community involvement in skills training, fosters a sense of ownership over local products, and enhances the welfare of local communities.

By adhering to sustainable industry principles, batik MSMEs in Jambi can capitalize on broader market opportunities, such as the demand for eco-friendly products. A study by Sari & Nugroho (2022) shows that global consumers are increasingly concerned about sustainably produced goods, providing a significant market potential for environmentally friendly batik. Furthermore, selling batik products through digital channels (e-commerce) can expand market access, helping MSMEs reach a wider consumer base beyond local markets.

The Sustainability Industry approach has great potential to improve the competitiveness of batik MSMEs in Jambi by focusing on environmental, social, and economic sustainability. By adopting eco-friendly practices, empowering local communities, and leveraging digital technology, batik MSMEs in Jambi can face the challenges of globalization and attract a wider market. However, the success of this implementation

heavily relies on government support, training institutions, and partnerships with the private sector to ensure that MSMEs have adequate resources and knowledge to apply sustainability principles.

The application of the sustainability industry approach was primarily examined from a conceptual and managerial perspective without conducting a comprehensive environmental or economic impact assessment. Second, the research was limited to the batik MSME context in Jambi, which may not fully reflect the diverse sustainability challenges faced by similar industries in other regions. Third, due to limited time and resources, stakeholder perspectives such as suppliers, consumers, and policymakers were not deeply explored.

Future research is recommended to adopt a more multidisciplinary approach by incorporating environmental impact analysis, lifecycle assessment, or social return on investment (SROI) to evaluate the effectiveness of sustainability practices. Comparative studies involving other cultural industries or batik centres across Indonesia could enhance the generalizability of the findings. Additionally, future studies could focus on the development of measurable sustainability indicators tailored to traditional MSMEs, as well as explore the role of policy, education, and partnerships in supporting long-term sustainable industry transformation.

4. CONCLUSION

Reflecting on the research into product innovation strategies and e-commerce in managing batik MSMEs based on the Sustainability Industry approach in Seberang Jambi City, it becomes clear that integrating sustainable product innovation with digital marketing is not only relevant today but also essential for shaping the future of local creative industries. The findings suggest that embracing sustainability—through eco-conscious design, the use of environmentally friendly materials, and the preservation of traditional Jambi motifs—offers a pathway for batik MSMEs to strengthen cultural identity while tapping into the growing global demand for ethical and green products.

Looking ahead, e-commerce emerges as a powerful enabler for market expansion, allowing batik MSMEs to reach beyond local boundaries and position themselves on national and international platforms. The digital shift enhances visibility, optimizes operational efficiency, and opens direct lines of communication with consumers, making MSMEs more agile in responding to evolving market trends.

However, the transition toward sustainable and digital practices also reveals structural challenges, such as limited technological literacy, funding constraints, and the absence of consistent policy support. Addressing these issues requires a forward-looking collaboration between government bodies, academic institutions, private sectors, and MSME actors themselves. Future efforts must focus on capacity building, inclusive digital infrastructure, and strategic investments that align with sustainability goals.

Ultimately, this research invites a shift in mindset—from short-term survival to long-term sustainability. By continuously innovating with purpose and embedding sustainability in both product and process, batik MSMEs in Seberang Jambi City can not only preserve cultural heritage but also lead as future-ready, competitive players in the global creative economy.

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