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Redefines Traditional Techniques in Batik Industry: A SWOT Analysis Approach

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Abstract: This research investigates a contemporary strategy for revitalizing Malaysia's batik industry by introducing the Batik Pointillism Block, a modern substitute for the traditional copper batik blocks. Utilizing a focused qualitative case study alongside SWOT analysis, the study closely examines the strengths, weaknesses, opportunities, and threats related to this product innovation. The Batik Pointillism Block, manufactured with CNC technology and heat-resistant acrylic, directly addresses persistent challenges in the sector, including high production costs, limited skilled labor, and waning interest from younger generations. Findings indicate that this new approach can enhance productivity, reduce operational expenses, and expand design versatility, thereby making batik production more accessible, particularly for B40 communities and emerging young artisans. Nonetheless, limitations persist regarding distribution, market reach, and users' technical proficiency, which currently hinder broader adoption. The study further underscores the potential of social innovation and community-driven training initiatives in supporting both cultural preservation and economic development. From a managerial perspective, the findings suggest a clear need for structured training programs, diversified marketing strategies, sustained investment in research and development, and the formation of strategic partnerships to facilitate commercialization and scalability. Ultimately, the Batik Pointillism Block represents a sustainable and inclusive pathway for modernizing Malaysia's batik industry while safeguarding its cultural heritage.

Keywords: *SWOT Analysis; Block Batik Innovation; Batik; Sustainability*

1. Introduction and Background

Batik is crucial to the culture and economic growth in Malaysia. Batik art in Malaysia originated around 1921, greatly enhancing economic activities and entrepreneurial prospects in rural areas, especially in the East Coast Region, specifically Kelantan and Terengganu (Nugroho et al., 2022). The earliest batik techniques introduced in Malaysia involved using block prints (Rahayu & Peng, 2020). This traditional textile art form has had a significant impact on both the economy and culture (Poon, 2020). Recognizing batik as an intangible cultural heritage by UNESCO shows how vital the batik is, as the batik shows how communities express themselves artistically and culturally (Asmah et al., 2018; Nugroho et al., 2022). The preservation and promotion of batik are vital for safeguarding cultural heritage and ensuring the economic sustainability of local artisans and businesses.

Social innovation is therefore essential for maintaining and safeguarding the cultural heritage of batik by confronting challenges and capitalizing on opportunities. It is crucial to support initiatives that promote cultural identity and awareness. Social Innovation (SI) refers to the deployment of novel solutions targeting societal challenges, with the dual aim of generating economic value and strengthening social welfare and environmental sustainability (Aksoy et al., 2019; Gupta et al., 2020; Westley & Antadze, 2010). Social innovation efforts will help people recognize batik as an intangible cultural heritage that shows how people express themselves creatively and culturally, which will help preserve and promote it. Community empowerment initiatives are also significant. They help to protect batik by involving local artisans and communities, which keeps batik production economically viable while keeping traditional techniques and designs. To guarantee its sustained relevance, extensive educational initiatives aimed at imparting the complex knowledge and specialized skills intrinsic to batik production to subsequent generations are imperative (Poon, 2020). These efforts help keep traditional methods alive, promote cultural heritage, and help local economies grow (Nugroho et al., 2022).

Through analyzing a single case study, this study conducts a thorough SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis of the novel technique in batik block. This innovative technique replaces the traditional batik block made of copper. It evaluates the internal strengths and weaknesses of these novel methods, as well as the external opportunities and threats in the market. In conclusion, this study highlights the importance of adopting innovative methodologies in batik block processing, fostering a more competitive and sustainable Batik industry.

2. Literature Review

This section presents literature evaluations on the significance of production innovation for economic growth and government initiatives toward encouraging research on innovations.

The Roles of the textiles industry in economic growth

Globally, the textiles industry plays a crucial role in economic growth, innovation, and cultural development. This sector significantly contributes to global trade and employment, supporting millions of workers across a wide range of skill levels (Weerasinghe et al., 2023). However, it also encounters persistent challenges, including long production cycles, fragmented supply chains, delayed market responsiveness, and increased pressure from fast-changing fashion trends (Glogar et al., 2025). Moreover, concerns over its environmental footprint, particularly related to water usage, pollution, and waste, have prompted calls for sustainable transformation (Shofari et al., 2022).

In Malaysia, batik is a part of the textiles industry, representing a culturally rich and economically vital subsector (Wesnina et al., 2025). Batik is a traditional textile art that uses wax-resist dyeing techniques to create intricate patterns rooted in local culture. It is not only a symbol of national heritage but also a source of income for many communities (Nugroho et al., 2022). Since independence, the Malaysian government has actively promoted batik through cultural policies that encourage its use in formal attire and support for local artisans (Sulaiman et al., 2022). The global appeal of batik also contributes to Malaysia's tourism sector, with patterns often inspired by nature and cultural stories, reinforcing national identity.

Sustainability has thus become a growing concern in batik production. Ensuring the industry's long-term viability requires adopting environmentally responsible practices together with innovations using technology advancement, integrating sustainability throughout the production chain, and promoting the use of eco-friendly materials (Shofari et al., 2022). The future of the batik industry hinges on its ability to embrace innovation while remaining rooted in the rich cultural tapestry of Malaysia. As batik continues to be celebrated as a vibrant expression of national identity, artisans and manufacturers need to adopt environmentally responsible practices that address the increasing concerns surrounding sustainability. By integrating advanced technologies and utilizing eco-friendly materials, the industry can thrive and ensure its long-term viability. Balancing tradition with modernity will ultimately allow batik to flourish in a way that respects both cultural heritage and the planet, paving the way for a sustainable future that honors the past.

National Initiatives to Promote Innovation Efforts

Governments worldwide have acknowledged the vital role of innovation in driving economic growth, enhancing standards of living, and addressing pressing challenges in society. One key aspect of government efforts to encourage innovation is the creation of an enabling regulatory framework. Policymakers must carefully navigate the balance between necessary oversight and control and allow for the flexibility and risk-taking that often characterize innovative activities (Bradley et al., 2021). As noted, the same regulations that may hinder innovation in one industry could potentially serve as a stimulus in another (Barr, 2018). Governments must therefore adopt a tailored approach, continuously evaluate the impact of their policies, and adjust accordingly.

In Malaysia, product innovation stands out as a significant catalyst for both economic and social transformation. The Twelfth Malaysia Plan (12MP), covering the years 2021 to 2025, emphasizes innovation as essential for the country's pursuit of high-income nation status. Central to this plan is the cultivation of an innovation-driven economy, which involves strengthening the national innovation ecosystem, boosting investment in research and development (R&D), and encouraging the adoption of advanced technologies across multiple sectors. The

plan also highlights the importance of robust collaboration between the public and private sectors to facilitate the commercialization of innovative products. Collectively, these measures are designed to accelerate Malaysia's growth while supporting broader sustainable development objectives.

Within this context, the Malaysian Innovation Foundation (Yayasan Inovasi Malaysia, YIM), established in 2008 under the Ministry of Science, Technology, and Innovation (MOSTI), plays a pivotal role in fostering a culture of creativity and technological innovation throughout Malaysian society. YIM's initiatives are notably inclusive, targeting a wide range of groups including students, youth, women, rural communities, persons with disabilities, and non-governmental organizations. To empower these communities, YIM provides both financial and technical grants that support the development and commercialization of technology-based projects. Moreover, YIM maintains strategic partnerships with government research institutes (GRIs) and higher education institutions (HEIs), ensuring that technical expertise and the latest technologies are effectively transferred and applied in ways that meet current societal needs. YIM also has three primary initiatives, including MySI Akar Umbi, MySI Perintis, and MySI Komuniti, which have been established to empower the communities.

Moreover, the Madani Economy framework, introduced in 2023, marks a significant shift in Malaysia's approach toward building a resilient and sustainable economic landscape. Rather than focusing solely on economic growth, the framework integrates economic prosperity, social equity, and environmental stewardship, positioning innovation at its core. The intention is clear: transform Malaysia into a knowledge-based, high-income nation through widespread digital adoption and the development of high-tech industries (Narayanan & Yew-Wah, 2018).

A notable aspect of this initiative is its emphasis on fostering collaboration between the public and private sectors. Public-private partnerships are regarded as crucial drivers of innovation, facilitating the commercialization of emerging technologies and encouraging entrepreneurial ventures. Additionally, the framework prioritizes social innovation as a mechanism to address inequality and poverty. By supporting social enterprises and community-driven efforts, the Madani Economy seeks to ensure that economic advancement is both inclusive and beneficial to all segments of society (Narayanan & Yew-Wah, 2018).

Continuous monitoring plays a vital role in ensuring the success and effectiveness of each project. It helps to ensure that all funded and ongoing initiatives are closely supervised and remain aligned with their original objectives. The selection and allocation of funding must be based on a thorough evaluation of project plans, taking into account both financial and non-financial impacts on businesses and local communities. Ongoing monitoring enables the tracking of project performance and supports continuous refinement. To support this process, Yayasan Inovasi Malaysia (YIM) has engaged a team of researchers from Universiti Teknologi MARA (UiTM) to carry out an impact assessment, focusing on the economic, social, and environmental outcomes of the supported projects. This agenda is underpinned by the aspiration to build a robust social innovation ecosystem, leveraging Science, Technology, and Innovation (STI) to promote long-term sustainable development.

3. Research Methodology

Case Study: A Single Qualitative Case Study of the Batik Pointillism Block

This study employed a single qualitative case study approach to gain a deeper understanding of the phenomenon under investigation (Yin, 2009). This method was selected for its strength in providing rich, detailed insights and a holistic perspective of the specific case, the Batik Pointillism Block innovation. By focusing on a single case, the researchers were able to explore the complexity and distinctive characteristics of the innovation in depth.

The case study allowed for a thorough examination of the strategies, challenges, and achievements of the key innovator, Mr. Z, thereby offering meaningful lessons and implications for similar initiatives. Moreover, this approach facilitated close observation of team dynamics and interactions throughout the development process, highlighting the significance of collaboration and mentorship in driving innovation. Overall, the single-case study method provided a contextualized and nuanced understanding of the various factors that contributed to

the development and potential societal impact of the batik block.

Participant Selection and Profile

Mr. Z, a designer affiliated with a public university located on the east coast of Peninsular Malaysia, was purposively selected as the sole participant for this case study in recognition of his pivotal role in the development of the batik block innovation. To preserve confidentiality, the pseudonym "Mr. Z" is used throughout this study.

Mr. Z is in his mid-40s and holds a master's degree in industrial design, with a specialization in product design and development. He is currently doing his PhD in Industrial Design at one of the local universities in Malaysia. He has over 10 years of experience spanning both academia and industry, particularly in the field of product innovation. Renowned for his collaborative and practice-oriented approach, Mr. Z has consistently engaged in hands-on innovation activities, often working closely with students under his colleagues' supervision to co-create solutions addressing real-world challenges. He is actively engaged in innovation and invention competitions and has received numerous awards at both national and international levels.

Interview Procedure

A semi-structured interview was conducted with Mr. Z at his university office. The session lasted approximately two hours. Before the interview, the participant was briefed on the study's purpose and provided informed consent. The semi-structured format allowed for a flexible yet focused exploration of Mr. Z's experiences and reflections on the invention process.

During the interview, Mr. Z offered comprehensive narratives of his creative journey, including the obstacles encountered and the strategies employed to overcome them. He also elaborated on the collaborative processes with students and how these interactions influenced the conceptualization and refinement of the innovative tool. This interview approach enabled a nuanced understanding of both the technical elements and the personal experiences that contributed to the innovation's development and eventual success.

Ethical Considerations

To ensure the ethical conduct of this research, the participants' confidentiality and anonymity were maintained throughout the study. The interview data was securely stored, and any identifying information was removed from the transcripts. The participant was informed of their right to withdraw from the study at any time without consequence.

Data Analysis

The interview data were analyzed using narrative analysis to explore the underlying processes and experiences contributing to the successful development of the Batik Pointillism Block innovation. This method was chosen for its capacity to interpret the personal stories shared by the participant, uncovering key themes and meanings related to Mr. Z's creative process, collaboration with students, and innovation journey.

Narrative analysis, a well-established qualitative research approach, emphasizes the value of personal narratives in understanding complex human experiences. Through this lens, the data derived from in-depth interviews were examined to highlight how Mr. Z constructed and made sense of his experiences, including his motivations, challenges, and strategies. The stories revealed insights into the innovation process that might not be captured through more traditional analytical techniques.

In addition to narrative analysis, a SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats) was employed to further assess the viability and market potential of the innovative tool. Originally developed for strategic planning in business contexts, SWOT analysis was deemed appropriate for its systematic and practical approach in identifying both internal and external factors influencing innovation. This complementary analytical framework enabled a structured evaluation of the tool's technical capabilities, user-friendliness, scalability, and sustainability, while also considering potential challenges and opportunities within the broader ecosystem. Together, narrative and SWOT analyses provided a comprehensive understanding of innovation's development and its potential contributions to social, cultural, and economic impact.

Data Analysis Approach and Procedure

For this study, data gathered from a semi-structured interview with the primary informant, Mr. Z, underwent two qualitative analytical frameworks: narrative analysis and SWOT analysis. Narrative analysis was utilized to examine the participants' personal accounts and reflections throughout the innovation process. This enabled the identification of key themes such as the challenges encountered, strategies adopted, and the collaborative interactions that influenced the development of the batik pointillism block. The narrative approach also facilitated deeper insight into the creative and social facets underpinning the innovation journey, capturing nuances that might otherwise remain obscured with more rigid analytical techniques.

To augment the narrative findings, a SWOT analysis was subsequently implemented. Through this framework, strengths, weaknesses, opportunities, and threats were systematically delineated based on both the participant's contributions and contextual observations. Employing both methods allowed for a comprehensive understanding of the innovation's potential impact, integrating both the individual and strategic dimensions.

Saturation Point

Although this was a single-case qualitative study with one key informant, the analysis reached thematic saturation due to the richness and depth of the collected data. The two-hour interview yielded detailed narrative accounts that spanned the entire innovation lifecycle from conception and development to implementation and user interaction. These findings were further substantiated by contextual observations and reference to relevant literature, ensuring adequate depth and breadth of discussion. The point of saturation was identified when no novel themes or significant insights emerged during the analytical process.

4. Results

This section presents the development of the innovative product of the batik block. Further, the analysis of SWOT will be discussed.

Development of the Innovative Product

The batik block represents a contemporary innovation designed to be an alternative tool to the traditional copper batik block. Traditional block production involves high costs, extended production time, and requires a high level of craftsmanship. In contrast, the batik pointillism block integrates the fundamental batik concept of "point" with a flexible arrangement of nails to create motifs for block printing. This innovative product offers several advantages: it is lightweight, cost-effective, reusable, and user-friendly. Currently, the innovation is in the process of obtaining a patent.

Observations indicate that the batik pointillism block addresses several persistent challenges faced by the traditional batik industry. One of the key issues is the time-consuming process of producing conventional batik blocks. Conventionally, these blocks are crafted from copper sheets by skilled metal artisans. On average, creating a single block takes approximately two to three days, depending on the complexity and size of the design. Consequently, the lengthy production time hampers mass production efforts.

Additionally, the limited availability of skilled artisans contributes to the challenges in traditional block production. The number of artisans with expertise in traditional batik block-making has been steadily declining. Most contemporary batik practitioners focus primarily on designing patterns rather than crafting the blocks themselves. Moreover, the high cost of producing batik blocks negatively affects profit margins, especially when the design and block size vary according to customer demands.

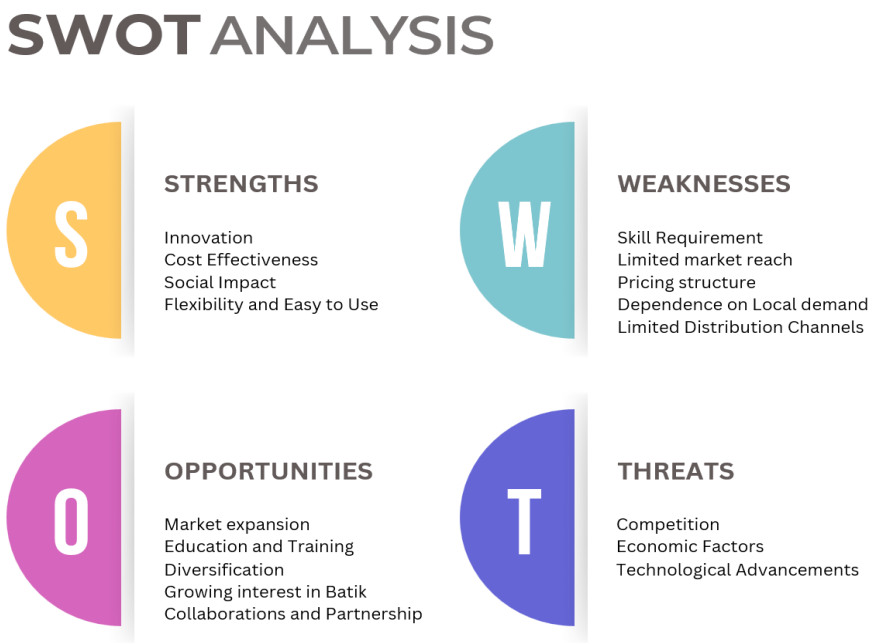
Another concern pertains to the declining appeal of traditional batik patterns among the younger generation. Traditional batik block designs are often perceived as less attractive to young people, who increasingly prefer more modern and innovative patterns. This shift in aesthetic preference, coupled with waning interest in learning the traditional techniques, further jeopardizes the sustainability of this cultural heritage.

In response to these issues, the development of the batik pointillism block offers a promising solution by introducing a faster, more efficient, and visually appealing method for creating batik patterns. It also aims to reignite interest among the younger generation, encouraging their participation in preserving and revitalizing

this important cultural tradition.

Analysis of SWOT

SWOT analysis, an acronym for Strengths, Weaknesses, Opportunities, and Threats, serves as a foundational strategic planning tool, providing a structured framework for evaluating the internal and external factors that influence the success of a project. SWOT analysis is employed to explain the batik pointillism block innovation project.



Strengths:

The first strength of this product is innovation. The batik pointillism block innovation introduces a new method utilizing acrylic and heat-resistant materials, making it lighter, more economical, reusable, and easier to handle compared to traditional copper blocks. Next is cost-effectiveness. With a selling price of RM120 per unit and an original cost of RM60 for the prototype, the product offers a cost-effective solution for batik makers, especially those from the B40 category. Indeed, this produced a more affordable option compared to traditional methods. Third is social impact. The product targets young batik makers and the B40 group, providing them with a modern and affordable tool for batik production, thereby contributing to the local economy and job creation. The final strength of this product is its flexibility and ease of use. The pointillism technique allows for flexible arrangements of the batik design, enabling the creation of various patterns and styles. Moreover, the tool is designed to be user-friendly, allowing even those without extensive experience in batik-making to create intricate designs.

Weaknesses:

The first weakness is a skill requirement. While the batik pointillism block innovation offers a modern solution, it may still require a certain level of skill and precision to operate effectively, potentially limiting its accessibility to less experienced batik makers. Next is limited market reach. The current sales strategy relies on orders and targets mainly batik makers from the local community, which may limit its market expansion potential. The third weakness is the pricing structure. The selling price varies depending on the size and pattern of the block, which could be perceived as a barrier to adoption for some potential buyers. Another weakness is dependence on international customers. In addition to that, the degree of acceptance by conventional batik manufacturers becomes the product's weakness. This hesitation can deter acceptance of the product within the industry, thus affecting the overall sales performance. Finally, the weakness of this product is its limited distribution channels. The product is sold through pre-orders, which may not be as effective in reaching a wider audience compared to established distribution channels.

Opportunities:
The first opportunity is market expansion. There is an opportunity to expand the market reach beyond the local community by exploring online sales channels and partnerships with retailers or distributors. By targeting a broader demographic and establishing a stronger online presence, the product can expand its market reach beyond the initial target audience. Second is education and training. Offering training programs or workshops on how to use the Blok Batik Innovation could enhance its value proposition and attract more customers, including those from outside the traditional batik-making community. The third opportunity is diversification. Exploring the development of additional accessories or complementary products for batik-making could diversify the product line and attract new customers. The fourth opportunity is the growing interest in batik. The increasing popularity of batik as a traditional craft and art form presents opportunities for the product to tap into this growing interest. Finally, the last opportunity is collaboration and partnerships. Partnering with local Batik artists, designers, or organizations can help increase the product's visibility and credibility within the Batik community.

Threats:
The first threat is competition. There may be existing or potential competitors offering similar innovative solutions or traditional batik-making methods, posing a threat to market share and differentiation. Additionally, competition from traditional methods may also occur due to the traditional methods of batik-making may still be preferred by some, posing a threat to the adoption of innovative technology. The second threat is economic factors. Economic downturns or fluctuations in raw material prices could impact production costs and pricing, affecting the product's affordability and profitability. Therefore, the economic fluctuations could impact the demand for the product, affecting its sales and profitability. Next are technological advancements. Rapid technological advancements in batik-making tools and techniques could render the Blok Batik Innovation obsolete if not continuously improved or updated.

Discussion
The Batik block technique clearly marks a notable advancement within the traditional batik-making industry. This discussion brings together various internal and external factors found throughout existing literature. Notably, the technique has the potential to improve accessibility and support the preservation of cultural heritage, all while offering new avenues for sustainable entrepreneurship. It is important to acknowledge that certain limitations persist, and the technique is not without its challenges. Overall, the evidence suggests that, with proper implementation, the Blok Batik technique may positively impact the future of the batik industry.
The internal strengths of the Batik block technique are prominently attributed to its design innovation and cost-effectiveness. By replacing conventional copper blocks with lighter, heat-resistant acrylic materials, the tool significantly reduces production costs while enhancing usability (Handayani et al., 2012; Hardjati et al., 2020) et al., 2020). This shift not only democratizes batik production by lowering the barrier of entry for novice artisans but also promotes wider participation among marginalized groups, particularly those from the B40 income segment (Sebayang et al., 2019). The flexibility afforded by the Blok Batik technique allows for a broad spectrum of creative patterns, enabling individual artistic expression and catering to evolving aesthetic preferences. The innovation is in line with current batik block method trends, where artists may improve perceptual flexibility (Setyaningrum & Nuraini, 2020). Furthermore, batik with bright colors and patterns will result in aesthetic flexibility of the products (Adikuncoro, 2021).

Moreover, this paper also highlights that Mr. Z used the user-friendly tool's design to simplify the batik-making process, thus attracting younger generations and educational institutions interested in preserving and modernizing cultural practices. The user-friendly tool's design and traditional batik-making, which is well-known for its emphasis on updating and protecting cultural heritage, are similar. Both contain cultural wisdom (Wesnina et al., 2025). Its affordability is evidenced by a significant cost margin between production and retail pricing, which makes it a viable alternative for small-scale batik entrepreneurs competing in cost-sensitive markets.

Nonetheless, the system presents several internal weaknesses that may inhibit its widespread adoption. Despite its simplified mechanism, effective use of the tool still requires a certain degree of artistic precision and manual dexterity, which may discourage less experienced users (Adhanita, 2013). This partly contradicts the tool's inclusive aspirations. Furthermore, the reliance on direct pre-orders and community-based marketing

strategies limits broader market reach, thereby constraining scalability at both national and international levels (Razali et al., 2021). The pricing structure, which fluctuates based on block size and design complexity, may also be perceived as unpredictable, reducing appeal among price-sensitive consumers. Finally, the absence of structured distribution and retail channels curtails accessibility and limits the product's exposure to spontaneous or broader consumer segments.

Based on the findings, the batik block innovation technique distinguishes itself primarily through its innovative approach to design and heightened cost efficiency. By substituting traditional copper blocks with lightweight, heat-resistant acrylic, the technique not only significantly reduces manufacturing expenses but also improves operational ease (Handayani et al., 2012; Hardjati et al., 2020). This advancement effectively democratizes access to batik production, lowering entry barriers for novice artisans and fostering broader participation, notably among marginalized communities such as those within the B40 income segment (Sebayang et al., 2019). The inherent flexibility of the pointillism method supports a diverse array of creative patterns, enabling individual artistic expression and accommodating evolving aesthetic sensibilities. (Adikuncoro, 2021).

Additionally, the ergonomic and user-friendly design of the tool streamlines the batik-making process, thereby attracting interest from younger generations and educational institutions invested in the preservation and modernization of cultural heritage. Its affordability, demonstrated by a considerable margin between production costs and retail pricing, positions it as a competitive option for small-scale batik entrepreneurs operating within cost-sensitive markets.

Nevertheless, several internal limitations may impede the widespread adoption of this system. Despite its simplified mechanism, effective utilization still demands a degree of artistic precision and manual skill, which may deter less experienced users. (Adhanita, 2013). This reality partially contradicts the tool's inclusive objectives. Furthermore, the current reliance on direct pre-orders and community-centered marketing restricts broader market penetration and scalability at both national and international levels. (Razali et al., 2021). The pricing model, which fluctuates according to block size and design complexity, may also be perceived as inconsistent, potentially diminishing its appeal among price-sensitive consumers. Finally, the absence of established distribution and retail networks limits accessibility, curtailing the product's visibility among wider consumer segments.

Externally, the batik pointillism block technique is positioned to benefit from several significant trends. There is currently a notable global resurgence in the appreciation of traditional crafts and heritage products, providing a supportive environment for innovations rooted in cultural practices such as batik (Wesnina et al., 2025). Simultaneously, heightened consumer awareness regarding environmental sustainability has opened new opportunities for the integration of eco-friendly materials and processes. This includes the adoption of natural dyeing techniques and the use of raw organic materials, both of which align with shifting market preferences (Martuti et al., 2020; Nurcahyanti et al., 2025). Furthermore, leveraging digital marketing strategies and e-commerce platforms can greatly enhance the visibility and accessibility of batik pointillism block products across a range of demographic and geographic markets (Hartomo & Bakal, 2021). Educational initiatives, such as workshops and instructional content, present further avenues for expanding consumer engagement, particularly within schools and cultural institutions. Additionally, diversifying the product line through the introduction of complementary tools, design templates, or ready-to-use kits can broaden market reach and reinforce brand identity within the batik sector.

Nonetheless, several external challenges persist. The technique faces competition from established methods, such as traditional copper blocks, which possess significant symbolic and functional importance. It must also contend with ongoing innovations in textile design that continuously redefine the boundaries of traditional craft. There is an innovation using cheaper tools, such as cardboard, to produce the traditional motifs of batik. Thus, to maintain a competitive advantage, the Blok Batik technique requires ongoing refinement and differentiation. Moreover, external market factors, including economic instability and fluctuating costs of materials, may threaten production viability and pricing strategies. Weaknesses in supply chain infrastructure can further heighten these risks. Finally, the rapid pace of technological change within the creative and craft industries necessitates continual adaptation to ensure the technique's long-term relevance and to avoid obsolescence.

5. Managerial Implications and Recommendations

This study found several management implications within the batik sector. To begin with, the adoption of the batik block integrating CNC technology has demonstrably enhanced both productivity and operational efficiency. This innovation addresses declining skilled labor pools by enabling scalable and rapid production cycles. For small and medium-sized enterprises, strategic investment in such technological tools and automation is strongly recommended to streamline workflows, reduce labor dependency, and foster greater operational scalability.

From a market perspective, the flexibility inherent to the Pointillism technique facilitates the creation of contemporary batik designs, broadening appeal to younger demographic groups. Managers are advised to align product development and branding efforts with evolving consumer trends, thereby capturing youth segments domestically and internationally. Additionally, the accessibility and user-friendliness of this innovation provide notable potential for community-based skill development and economic empowerment. Targeted programs for low-income groups, Indigenous communities, and incarcerated individuals could leverage this technology for skill-building and income generation, with managerial and policy support through inclusive training and entrepreneurship initiatives.

Indeed, sustained innovation is essential to ensure the long-term relevance and competitiveness of the batik pointillism block. It is recommended that continuous investment be made in research and development to explore new features, materials, and techniques. Such efforts will support product diversification, such as the creation of modular kits and design templates, and allow for iterative improvements based on user feedback and evolving market demands.

Educational and cultural institutions play a critical role in long-term sustainability. Integrating this technique into educational curricula and heritage conservation programs is advisable for facilitating intergenerational knowledge transfer and enhancing public appreciation for batik as a living tradition. Strategic partnerships with batik practitioners, vocational centers, and social innovation agencies could further embed this technology within broader socio-economic frameworks.

Moreover, securing funding through public innovation grants, corporate social responsibility initiatives, and impact investment schemes is essential for scaling these efforts. Furthermore, robust digital marketing strategies, including social media outreach, influencer collaborations, and narrative-driven branding, are recommended to strengthen visibility and position the product as both culturally significant and commercially viable. Finally, establishing a certification or quality assurance framework will likely enhance market differentiation, foster consumer trust, and reinforce the status of batik pointillism block as a high-value innovation in both cultural and economic contexts.

Conclusion

The development of the batik block innovation has significantly enhanced the batik industry in Malaysia by providing a more cost-effective, efficient, and user-friendly method for creating batik block patterns. This tool reduces dependency on manual labor while streamlining production processes, ultimately benefiting both artisans and entrepreneurs. By introducing a modern, exclusive, and versatile technique, this innovation appeals especially to the younger generation, empowering them to produce unique and visually striking batik designs. In doing so, it not only nurtures creativity but also plays a vital role in preserving and enriching Malaysia's cultural batik heritage. Ultimately, this innovative tool represents a sustainable advancement in reinforcing the national identity through batik.

References

Adhanita, S. (2013). Pengembangan batik Jambi motif Sungai Penuh sebagai bentuk kontribusi pada pembangunan. Jurnal Pembangunan Wilayah & Kota, 9(4), 381–392.

Adikuncoro, A. R. (2021). Merdeka Cultural Center final architecture design studio: Adaptable cultural center for cultural development with open building and adaptive reuse approach (Undergraduate thesis, Universitas Katolik Parahyangan).

Aksoy, L., Alkire, L., Choi, S., Kim, P. B., & Zhang, L. (2019). Social innovation in service: A conceptual framework and research agenda. Journal of Service Management, 30(3), 429–448. https://doi.org/10.1108/JOSM-11-2018-0366

Asmah, A. E., Okpattah, V., & Frimpong, C. (2018). A combined material substitution and process change approach to sustainable batik production. IOP Conference Series: Materials Science and Engineering, 365(1), 012029. https://doi.org/10.1088/1757-899X/365/1/012029

Barr, M. S. (2018). Innovation & regulation: Some preliminary observations. In R. Lastra & H. H. Lee (Eds.), Achieving financial stability: Challenges to prudential regulation (pp. 239–248). World Scientific. https://doi.org/10.1142/9789813238550_0014

Bradley, S. W., Kim, P. H., Klein, P. G., McMullen, J. S., & Wennberg, K. (2021). Policy for innovative entrepreneurship: Institutions, interventions, and societal challenges. Strategic Entrepreneurship Journal, 15(2), 167–184. https://doi.org/10.1002/sej.1390

Glogar, M., Petrak, S., & Mahnić Naglić, M. (2025). Digital technologies in the sustainable design and development of textiles and clothing—A literature review. Sustainability, 17(4), 1371. https://doi.org/10.3390/su17041371

Gupta, S., Kumar, V., & Karam, E. (2020). New-age technologies-driven social innovation: What, how, where, and why? Industrial Marketing Management, 89, 499–516. https://doi.org/10.1016/j.indmarman.2020.03.026

Handayani, K. N., Sakai, T., Deguchi, A., & Prasanna, D. (2012). Changes and issues of development and management of the batik industry in Java: A case study of Surakarta and Yogyakarta. Journal of Architecture and Urban Design, 22, 1–10.

Hardjati, S., Prathama, A., & Wahyudi, K. E. (2020). Mapping the internal and external environments in empowering Semanggi batik craftsmen in Surabaya. JKMP (Jurnal Kebijakan dan Manajemen Publik), 8(1), 16–22. https://doi.org/10.21070/jkmp.v8i1.367

Hartomo, S., & Bakal, T. (2021). Analysis of usability and user experience on Batik's website design. IOP Conference Series: Materials Science and Engineering, 1115(1), 012027. https://doi.org/10.1088/1757-899X/1115/1/012027

Martuti, N. K. T., Hidayah, I., Margunani, M., & Alafima, R. B. (2020). Organic material for clean production in the batik industry: A case study of natural batik, Semarang, Indonesia. Recycling, 5(4), 28. https://doi.org/10.3390/recycling5040028

Narayanan, H., & Yew-Wah, L. (2018). Innovation policy in Malaysia. In M. Kean & R. Sanderson (Eds.), Innovation policy in ASEAN (pp. 128–162). Routledge.

Nugroho, P., Damayanti, M., Artiningsih, A., Lestari, D., & Putri, N. R. (2022). Missing policy for supporting cultural heritage preservation of batik industry clusters in Barlingmascakeb Region, Indonesia. IOP Conference Series: Earth and Environmental Science, 1097(1), 012046. https://doi.org/10.1088/1755-1315/1097/1/012046

Nurcahyanti, D., Kristiandi, K., Sari, A. D., Nurkasanah, A. A., Rochimah, E. A., Prayitno, F. A. H., & Grahan, T. K. (2025). Pelatihan pembuatan batik kombinasi cap dan kuas untuk pengembangan produk home decor pada Paguyuban Batik Giriarum. Mestaka: Jurnal Pengabdian Kepada Masyarakat, 4(1), 11–17. https://doi.org/10.55312/mestaka.v4i1.215

Poon, S. (2020). Symbolic resistance: Tradition in batik transitions sustains beauty, cultural heritage, and status in the era of modernity. World Journal of Social Science, 7(2), 10–21. https://doi.org/10.5430/wjss.v7n2p10

Rahayu, I. A. T., & Peng, L. H. (2020). Sustainable batik production: Review and research framework. In International Conference on Research and Academic Community Services (ICRACOS 2019) (pp. 113–118). Atlantis Press. https://doi.org/10.2991/assehr.k.200323.052

Razali, H., Ibrahim, M., Omar, M., & Hashim, S. (2021). Current challenges of the batik industry in Malaysia and proposed solutions. AIP Conference Proceedings, 2347, 020225. https://doi.org/10.1063/5.0051635

Sebayang, L. K. B., Utami, S., & Suseno, D. A. (2019). Will natural-dyeing batik SMEs compete in the Asian Economic Community? The Journal of Social Sciences Research, 5(2), 343–347. https://doi.org/10.32861/jssr.52.343.347

Setyaningrum, F., & Nuraini, F. (2020). Visual perception of elementary school teacher education students on "Batik Cap" aesthetic. In International Conference on Progressive Education (ICOPE 2019) (pp. 353–358). Atlantis Press. https://doi.org/10.2991/assehr.k.200323.137

Shofari, F., Kurniawati, D., & Paramawardhani, H. (2022). Green productivity approach in the batik industry. IOP Conference Series: Earth and Environmental Science, 1097(1), 012041. https://doi.org/10.1088/1755-1315/1097/1/012041

Sulaiman, A. I., Sugito, T., Prastyanti, S., Windiasih, R., & Prasetiyo, P. (2022). Student community services in batik education for the young generation. International Journal of Community Service, 2(3), 306–314. https://doi.org/10.55522/ijocs.v2i3.148

Weerasinghe, N., Weerasinghe, A., Perera, Y., Tennakoon, S., Rathnayake, N., & Jayasinghe, P. (2023). Sustainability practices and organizational performance during the COVID-19 pandemic and economic crisis: A case of the apparel and textile industry in Sri Lanka. PLOS ONE, 18(7), e0288179. https://doi.org/10.1371/journal.pone.0288179

Wesnina, W., Prabawati, M., & Noerharyono, M. (2025). Integrating traditional and contemporary in digital techniques: The analysis of Indonesian batik motifs' evolution. Cogent Arts & Humanities, 12(1), 2474845. https://doi.org/10.1080/23311983.2023.2474845

Westley, F., & Antadze, N. (2010). Making a difference: Strategies for scaling social innovation for greater impact. The Innovation Journal: The Public Sector Innovation Journal, 15(2), 2–19.

Yin, R. K. (2009). Case study research: Design and methods (5th ed., Vol. 5). SAGE Publications.