

Can batik craft products in the red-light area improve sustainable social and economic impact? A case study of the largest former prostitution area in Southeast Asia

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Received Jun. 15, 2024

Revised Oct. 3, 2024

Accepted Oct. 15, 2024

Abstract

The batik industry in the ex-Dolly area of Surabaya has undergone significant transformation from its history as a red-light district to a hub for creative batik production. This study aims to assess the environmental and social impacts of the development batik industry in the ex-Dolly area using the Environmental and Social Impact Assessment (ESIA) method. Through a qualitative case study approach, key stakeholders including batik artisans, local communities, and government agencies were engaged to evaluate the industry's sustainability and development. Baseline data collection and impact assessments revealed both positive and negative effects on the environment and social well-being of artisans. Mitigation measures were proposed to address issues such as water pollution, waste management, and working conditions. The results and discussions highlighted the importance of sustainable practices and community involvement in enhancing batik industry's overall impact. The study concludes that by implementing targeted strategies and monitoring mechanisms, the batik industry in the ex-Dolly area can achieve long-term sustainability and positive social outcomes. The implications of this research extend to policymakers, industry stakeholders, and local communities, emphasizing the need for responsible environmental and social practices in the development of creative industries.

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Published by ARDA.

Keywords: Batik craft, Cultural economy, Community empowerment, Women empowerment, Former prostitution area

1. Introduction

Urban community life is filled with various activities and social dynamics that differ from rural or remote areas. One characteristic of urban community life are dense population. One of the main characteristics of life in the city is the high population density. This is due to the fact or myth that cities usually have better infrastructure, more jobs, and better accessibility. This causes cities to become places of choice for people seeking employment, education, or other opportunities. Diverse people dominate life in the city regarding ethnicity, religion, and income level. This forms a heterogeneous and multicultural society [1].

2. Consumption pattern

Urban communities tend to consume more diverse and sophisticated goods and services, such as the latest technology, fashion, and entertainment, and tend to have higher mobility, both in terms of private transportation, public transportation, and online transportation. This is due to the greater distance between residence, workplace, and other essential places. A faster and more competitive rhythm characterizes life in the city. Life in a city is characterized by sophisticated infrastructure, such as faster internet, more regular public transportation, a more advanced education system, and a better health system. People in villages tend to desire to migrate to cities, assuming that it will give them a better life. Therefore, jobs in cities are usually more available and varied. Urban life is often used as a benchmark for success in work and career. As in the research development of ecological ethno-tourism in Bosnia and Herzegovina, it could potentially become one of the leading branches of rural tourism in the country [2].

Surabaya is one of the largest cities in Indonesia, located in the eastern part of the island of Java. It is the capital of the province of East Java, with a population of around 3 million, making it the second largest city in Indonesia after Jakarta. This makes Surabaya one of the largest economic centers in Indonesia, with many businesses and industries operating in the city. Surabaya has good infrastructure, including an international airport, seaport, and transportation network, making it a necessary logistics and transportation hub in Indonesia.

Surabaya has a unique village, namely Putatjaya Village, Sawahan District, which all villages know as Dolly. The village was once a popular prostitution site in Southeast Asia and absorbed many male and female workers. Because the most prominent localization in Asia has been closed since 2014, many people have lost their livelihoods due to the impact on sex that occurs in children [3]. For this reason, empowerment is still very much needed for the former Dolly community. They should try to change professions and start new businesses to support their families in a new way [4]. They need entrepreneurial activity provision of training, and understanding and changing the minds of society, where there is still a notion of how to get money instantly [5].

Gang Dolly is a prostitution complex in the Jarak area, Pasar Kembang, Surabaya City. The name 'Dolly' is the name of a Dutch woman, Dolly Van Der Mart, who founded the first prostitution shop in 1967. She provided several beautiful women to become sex workers to serve the Dutch army. In 1968-1969 more and more guest houses were established in the area, so the prostitution business grew. Over time, this place became widely known by the public. Finally, the visitors to the place were Dutch soldiers and merchants who traded in Surabaya and residents of Surabaya. Because the number of visitors is increasing, it automatically affects the addition of commercial sex workers. Finally, this place became a significant localization in the Surabaya area [6].

Gang Dolly is known as the most prominent prostitution in Indonesia and Southeast Asia, with several commercial sex workers 1449 and as many as 318 guesthouses, cafes, and massage parlors operating in the Gang Dolly area. The female commercial sex workers [7] here come from various backgrounds and come from all parts of Indonesia. The businesses in Dolly's Alley area are very well managed by pimps who are good at finding customers and managing the business. Many supporting businesses such as karaoke places, bars, cafes, salons, culinary entrepreneurs, hotels, public transportation, and drug stores offer services and goods related to prostitution. The economic turnover is considerable and is the primary source of income in the region.

After operating for 40 years, in 2014, the Surabaya city government officially closed the area under a female mayor named Risma Maharani. The closure of these prostitution places is part of the Indonesian government's program to eradicate prostitution and other illegal activities in Indonesia. This is also done in other nations. For example, research in Mexico found that the introduction of regulations in the region was caused by exogenous factors derived from international relations that had as their focus the attack on prostitution; stopping, what was then known, as venereal diseases in the assets of the U.S. Army, rather than complying with a public health concern on the part of local authorities —municipal and state [8]. There is much pressure from society and organizations concerned with sexual exploitation against the government [9]. In addition, the existence of Dolly's gang has also attracted international attention because it is the largest prostitution complex in Indonesia.

After the closure of the area, the economic cycle in the area changed drastically. Many supporting businesses were closed. Several businesses, such as hotels and restaurants, experienced a drastic decline in customers. According to Helderop's research, most commercial sex sellers in any domestic market are involved in sex trafficking. Therefore, a rise in prostitution might cause more people to become victims of this crime [10]. High-fidelity prediction models may be used to find chances for sex trafficking victims' intervention, given the distribution of prostitution operations in most localities. In their study, they build several machine learning models and feed them data from various known criminogenic characteristics to forecast areas with high prostitute rates. They exhibit these techniques in the Illinois metropolis of Chicago, for example. The findings of this exploratory investigation revealed many explanatory variables influencing prostitute activity across Chicago, and the top-performing model accurately predicted prostitution frequency with 94% precision. As a woman who is a former sex worker who has turned into a virtuous woman, she needs support from the government and the surrounding community [11]. It becomes an opportunity for the government to seriously improve society so that it becomes comprehensible, one of which is training and workshops for batik business with the characteristics of the ex-Dolly area.

The research examines how Yokohama's creative city initiative revitalized urban areas before and during the 2008 financial crisis. They employed strategic informants, observations, and secondary data to investigate how creative city programs contributed to Yokohama's Kogane-cho neighborhood's transformation from a brothel area to an art district. They demonstrate how innovative city policies were influenced by the interactions of neighborhood groups, provincial police, and a national economic development policy encouraging quality-of-life measures, including crime control in entertainment districts [12]. National stimulus monies have maintained quality-of-life efforts, but the uniformity of the art district casts doubt on its standing as a creative environment [13]. A definition of sustainability is that it must take care of people's physical, emotional, and social requirements [14]. While some of the ideas stated are still highly relevant, the study claims that others may benefit from an update. They call attention to several linkages that may be made with the expanding literature on the geographies of sex itself and underline the need to focus on men in the sex industry as both customers and providers. Thus, although concerns of gender, embodiment, and sexual desire were mainly ignored, they concluded by acknowledging work as a crucial early intervention in debates on the links between sexuality and space [15].

The implications of the article on the ecological and environmental effects of urban transformation in Turkey can be applied to the sustainability of social, economic, and environmental aspects of batik craft products in the Red Light Area. Here are some potential implications [16]:

1. **Social Sustainability:** Urban transformation projects can lead to improved living conditions and social well-being in communities. Revitalizing urban areas, such as the Red Light Area, through sustainable practices, can create a more vibrant and inclusive social environment for residents and artisans involved in batik craft products;
2. **Economic Sustainability:** Urban transformation can stimulate economic growth by attracting investments, creating job opportunities, and enhancing the market for local products like batik crafts. Integrating sustainable practices in the production and marketing of batik crafts can contribute to the economic empowerment of artisans and entrepreneurs in the Red Light Area;
3. **Environmental Sustainability:** Implementing eco-friendly practices in the production of batik crafts can reduce environmental impact and promote sustainability. By adopting green technologies, recycling materials, and reducing waste, the batik crafts industry can contribute to environmental conservation in the Red Light Area;
4. **Cultural Sustainability:** Preserving cultural heritage and traditions, such as the art of batik crafts, is essential for maintaining the cultural identity of communities. Urban transformation projects that incorporate cultural

preservation can help sustain the unique heritage of the Red Light Area and promote the value of traditional crafts like batik;

5. **Community Engagement:** Involving local communities, artisans, and stakeholders in the urban transformation process can foster a sense of ownership and empowerment. Engaging with Batik craftsmen and women in the Red Light Area can ensure their voices are heard, their skills are valued, and their livelihoods are supported through sustainable practices. By drawing insights from the ecological and environmental effects of urban transformation in Turkey, stakeholders involved in the Batik Crafts Product in the Red Light Area can explore sustainable strategies to enhance social, economic, and environmental sustainability while preserving cultural heritage and promoting community well-being.

Establishing a batik center in Gunungkidul that is now being developed as a tourist village based on the economic empowerment of rural communities promotes the improvement of the welfare of the local village community. It makes the economy of the village community in Gunungkidul Regency more developed with the presence of a batik center [10]. The research above can reference developing areas based on local wisdom in the form of batik. Some SMEs in the batik industry in Indonesia have started using open innovation, which can help them perform better. However, the lack of expertise and the engagement of other stakeholders prevents small SMEs from using open innovation. In light of this, we propose that open innovation in the Indonesian batik sector be supported by the involvement of multiple stakeholders or that open innovation be paired with engagement theory [10]. If people hear the term Dolly, they will think not far from sex, so innovative development is needed to remember Dolly well, not in terms of sex. The research ingeniously creates a scale of agricultural heritage cultural memory, enriches the frontier of cultural memory theory research, broadens the scope of agricultural heritage research, and offers a helpful reference for the transmission of agricultural heritage and the enhancement of brand value [17].

From this study, there are two types of Semarang batik designs: traditional and contemporary. Several batik craft businesses in Semarang City already produce locally distinctive designs. The findings of this study also demonstrate that the batik industry in Semarang always organizes itself as a creative sector, namely as a small enterprise with a workforce of between 4 and 20 workers. The Semarang batik creative industries have persisted until now, never declining [10]. Research on the development of batik motifs conducted in the city of Semarang can be a reference in the development of batik in Dolly.

The batik design developed should describe the area so that it can be used as a promotion for the city. According to Chen's research, 197 nations from 1995 to 2019 were included in the study, along with China. It examines the impact of cultural communication on the development of the visitor economy by using trade in cultural products and inbound tourism as proxy variables. It discovers that cultural communication significantly encourages the development of the visitor economy [18]. So that the batik works produced are more developed, it is necessary to build a community that can supervise SMEs [19]. Following Leoti's research, creative culture and tourism follow the region's history [20]. For the sustainability of the program under study, strategic thinking is needed. The research example states that local governments play a crucial role in developing a well-structured and operationally successful plan for incorporating sustainable and cutting-edge intelligent features [21].

The primary purpose of the study is to assess the environmental and social impacts of the Batik industry in the ex-Dolly area of Surabaya, Indonesia, which has transitioned from a red-light district to a creative industry hub. The research aims to evaluate how this transformation contributes to sustainable development practices, enhances the socio-economic well-being of local artisans, and fosters community engagement. By employing the Environmental and Social Impact Assessment (ESIA) methodology, the study seeks to identify key stakeholders, assess critical environmental and social aspects, and provide actionable recommendations for improving sustainability within the batik industry. This understanding is crucial for informing policymakers, stakeholders, and the public about the potential benefits and challenges associated with the Batik industry's growth in this historically significant area.

3. Research method

This research was conducted in the ex-Dolly area. A qualitative case study approach was adopted in this study. It is essential to know the impact of the government's efforts to build a creative batik industry and the sustainability of the Social and Economic Impact of the batik industry in the region today. A purposive sampling approach was used to identify and recruit informed participants from batik artisans in the ex-Dolly area. The selected batik artisans have been in the industry for over five years and have participated in government programs ranging from batik-making training to business assistance, and exhibition activities. This method is cost and time-efficient and is the primary data source in this study.

The research method using the ESIA (Environmental and Social Impact Assessment) method, the study would need to focus on assessing the potential environmental and social impacts of the Batik industry in the ex-Dolly area. Here are some steps to adapt the research method to the ESIA approach:

1. Identify key stakeholders: Determine the key stakeholders involved in the Batik industry in the ex-Dolly area, including artisans, local communities, government agencies, and environmental organizations
2. Scoping: Define the boundaries of the study and the key environmental and social aspects to be assessed. This could include factors such as water usage, waste management, air quality, social well-being of artisans, and community relations
3. Baseline data collection: Gather baseline data on the current environmental and social conditions in the ex-Dolly area related to the Batik industry. This could involve conducting surveys, interviews, and field assessments
4. Impact assessment: Evaluate the potential environmental and social impacts of the Batik industry activities. This may include assessing factors like water pollution from dyeing processes, waste generation, working conditions of artisans, and community perceptions, making the research questions RQ1 – RQ18. Researchers visited the artisans, conducted in-depth interviews, and observed their workplaces in January 2023. Through business independence, entrepreneurial values positively and significantly impact business sustainability [10].

Various questions were asked during the interviews to reveal the government's efforts to assist batik artisans in the ex-Dolly area to improve the surrounding community's economy. Questions cover the main aspects: training and facilities, production, and marketing assistance. Examples of questions include:

1. When and how long did you receive training in making batik? Where and who teaches? What facilities did you get when you first set up a batik business?
2. Where do you produce batik? How do you get materials for production? Is there production assistance? What motifs do you produce? Are there any problems in the production process? How do you deal with it?
3. Where do you sell your products? How much do you sell your batik? Is there a sales assistance program? Are you in the cast? Are your products selling well? Are there any problems with sales? Follow-up questions are asked, if necessary. The interview was audio recorded after we obtained permission from the interviewee. The research questions are shown in Table 1.

Table 1. Interview questions

No.	Research questions	Code
1	When and how long did you receive training in making batik?	R.Q. 1
2	Where and who teaches?	R.Q. 2
3	What facilities did you get from the government when you first set up a batik business?	R.Q. 3
4	Where do you produce batik?	R.Q. 4

No.	Research questions	Code
5	How do you get materials for production?	R.Q. 5
6	Is there production assistance?	R.Q. 6
7	What motifs do you produce?	R.Q. 7
8	Is there a special motive Dolly? Like what?	R.Q. 8
9	Is there a motive suggested by the municipal government?	R.Q. 9
10	Is the motive that you patented?	R.Q. 10
11	Are there any problems in the production process?	R.Q. 11
12	How do you deal with it?	R.Q. 12
13	Where do you sell your product?	R.Q. 13
14	How much do you sell your batik?	R.Q. 14
15	Is there a sales assistance program?	R.Q. 15
16	Are you in the cast?	R.Q. 16
17	Are your products selling well?	R.Q. 17
18	Are there any problems with sales?	R.Q. 18

5. Mitigation measures: Develop strategies to mitigate any identified negative impacts and enhance positive outcomes. This could involve implementing cleaner production techniques, promoting social welfare programs for artisans, and engaging with the community in decision-making processes,

6. Monitoring and evaluation: Establish a monitoring plan to track the effectiveness of mitigation measures and assess the ongoing environmental and social performance of the Batik industry. Regular evaluations can help ensure continuous improvement and sustainability,

7. Reporting and communication: Prepare a comprehensive ESIA report outlining the findings, conclusions, and recommendations of the assessment. In this step, qualitative data analysis was carried out in five stages. First, transcribe the raw data as recorded interviews or field notes into a written format in Indonesian and then voluntarily verify it with the informant. The second is identifying themes or patterns in the data by giving codes to identify specific parts, either the types raised or the reactions shown. Third, the data is categorized based on identified patterns or themes. Fourth, the researcher interprets the data after the data is categorized. This interpretation involves understanding the meaning and significance of the themes or patterns found in the data. Researchers also consider the analyzed data's social, cultural, or historical context. Fifth, researchers verify to ensure that raw data supports the resulting findings. In this verification process, the researcher ensures that the analysis results are clearly explained and consistent with the raw data.



Figure 1. Stages of qualitative data analysis

It is important to communicate the results to stakeholders, policymakers, and the public to promote transparency and accountability. By incorporating the ESIA method into the research approach, the study can provide valuable insights into the environmental and social implications of the batik industry in the ex-Dolly area and contribute to sustainable development practices.

4. Results and discussion

The first step in ESIA is to identify stakeholders. Dolly Alley is part of the history of the city of Surabaya. The prostitution area, established 40 years later, was officially closed by the Surabaya city government. For nearly ten years, the city government built the ex-Dolly area and tried to change the negative image as the largest prostitution area in Indonesia into a positive image as a creative industry area. The role of the city government is significant in empowering the community, and now the former red-light area has become a creative industry village. This study's answers to RQ1-RQ18 are described as follows according to the S.M.E.s studied:

4.1. Putat Jaya Batik Creative House as a batik training center

The batik creative house is located on Jl. Putat Jaya Barat VIII B No. 31, Putat Jaya, Kec. Sawahan, SBY City, East Java 60255. This place used to be a karaoke place since the localization closed. Dolly's karaoke house was bought by the Surabaya city government and used as a batik training ground for Putat Jaya residents affected by the brothel's closure. The Batik Creative Hous is open to all Surabaya residents who wish to learn batik skills.

The presence of S.M.E.s at the Batik Putat Jaya Creative House helps residents acquire skills as new entrepreneurial provisions. All batik makers in the ex-Dolly area learned batik here. Mrs. Fitri, the owner of Jarak Arum SMEs (43 years), explained: "I have been studying batik since 2015 at Rumah Batik, and Pak Pengki is the trainer. I was taught from designing motifs and editing to the coloring process. The tools and materials have been provided in full."

The average respondent attends training for one week to 1 month. Mrs. Siti, the owner of SMEs Sekar Dewa (55 years), said, "I learned to make batik with various dyes for one week, then started learning to make one sheet of batik cloth 2.5 meters long for one month. After one month, I dared to produce written batik at home." Mrs. Uka, the owner of Kriya Punden SMEs (50 years old), studied at the Batik Creative House for one month. After that, he made printed batik cloth in his own house, but still often consulted with the Rumah Creative Batik instructor, especially about making motifs and the coloring process for one year. So the Batik Creative House provides training from scratch, up to unlimited time. Residents studying again or wanting a consultation can just come to the Batik Creative House.

The Surabaya city government provides two instructors who stand by at the Batik Creative House. The Batik Creative House is equipped with batik-making tools, such as writing canting, copper stamps, dye baths, stoves, and stoves for heating wax, which batik artisans can use. The author made direct observations and saw that the room was quite spacious even though it was in a small alley. On the 1st floor, there is a showroom and a lobby, which is quite spacious for training. On the 2nd floor is a production area filled with tools for making and coloring batik. Mrs. Uka said, "My house is small, so it can only be used for knitting. I always come to the Batik Creative House to dye batik cloth because the equipment is complete and quite spacious." He also frequently consulted new designs with the Batik Creative House instructors. Pak Sutrisno, one of the instructors, said that he had been working at the Batik Creative House for a long time, he was paid a salary by the Surabaya city government cooperative service every month, and his job was to provide training for Surabaya residents who wanted to learn batik for free at the Batik Creative House. Even though ex-Dolly was closed for a long time, this Batik Creative House still exists today because residents use it for the batik production process, as shown in Figure 2.



Figure 2. The front of the batik creative house

4.2. The Surabaya City small and medium enterprises cooperative and trade cooperative service facilitates marketing

The small and medium business and trade cooperative office is located at Jalan Tunjungan No.1-3, 3rd floor, Genteng, Surabaya City. Through this service, the city government manages SMEs in Surabaya, including in terms of marketing. Batik SMEs in the ex-Dolly area are greatly assisted in the marketing process of their batik products which the city government facilitates. Mrs. Uka says: "We got marketing facilities from the agency by placing our products in the city government's 'Craft Gallery' showroom located on the Siola floor of the building and on Jalan Merr Surabaya. Each sub-district has a companion who will contact each SMES to deposit products and collect products if stocks start to run low. I was also recently asked to deposit batik, but I am currently out of stock. The sub-district assistants also contact us if exhibitions are being held in Surabaya or other cities."

Mrs. Fitri said that she often participates in exhibitions at Grand City, a large mall usually used as a venue for trade shows. The East Java batik and embroidery exhibition is the most significant event in Surabaya, where many batik products are sold. Apart from Surabaya, Fitri has also been invited to cast to Jakarta (the capital city of Indonesia) and the furthest to N.T.T., an island in Eastern Indonesia. Nevertheless, not every exhibition is invited because there are many batik SMEs in Surabaya, so they must take turns. Mrs. Uka said she was often invited to exhibitions on cruise ships anchored in Surabaya. He also recently joined the Incraft exhibition, the largest craft exhibition in Indonesia. To participate in this exhibition, the artisans are free of charge.

Mrs. Siti also explained that the agency also has e-commerce (<https://peken.surabaya.go.id/>). Mrs. Siti and other SMEs can market their products here. However, selling through e-commerce is still not optimal. Its products can sell a lot precisely through showrooms and exhibitions. Mrs. Siti said she had problems mastering IT for online marketing and payment processes. Even though the agency also often holds digital marketing training, he can no longer sell himself online. Mrs. Uka said that she was often contacted by customers because she registered her business through Gmap.

Furthermore, he often gets orders directly through. The turnover he gets can be up to 10 million per month. He sells prices for written batik starting at IDR 500,000-3 million, while for stamped batik, around IDR 300,000.

4.3. Jarak and butterflies are the typical motifs of Putat Jaya Village

Batik artisans in the Putat Jaya sub-district have unique motifs for batik. Jatropha leaves, and butterflies are often used as typical batik motifs in Putat Jaya. Castor is a kind of flowering plant (*Ricinus communis*). Jatropha leaves are usually large and wide, circular like an ear. These leaves have a dark green color, a rough texture, and a sharp or pointed tip. Jatropha leaves are used as a typical batik motif for the Putat Jaya sub-district. This area, known as Jalan Jajar, is the main road and center of economic activity for Putat Jaya residents.

Meanwhile, butterflies (Figure 5) describes the history of Putat Jaya village as the most prominent former prostitution in Indonesia. In Indonesia, the proverb 'night butterfly' means women are commercial sex workers.

Night butterflies also refer to people who often go out at night, especially for entertainment purposes or to make acquaintances with the opposite sex. From these two histories, many artisans use castor leaf and butterfly motifs on a beautiful piece of batik cloth, which reminds us of the history of the Putat Jaya village (Figure 3).

Mrs. Fitri said she used to make castor leaf and butterfly motifs in the past, but now she has developed Surabaya-specific motifs according to market demand. Often people visit Surabaya and want to buy souvenirs typical of Surabaya batik. So, the batik artisans made Sura and Baya motifs that symbolize the city of Surabaya. The Sura and Baya motifs are often combined with other motifs. Sura means shark, and baya means crocodile, as shown in Figure 4.



Figure 3. Castor leaf and butterfly motifs made by the Jajar Arum SMEs



Figure 4. The motif of Jarak and Butterfly combined with Sura and Baya by the Jarak Arum SMEs



Figure 5. The night butterfly motif by Sekar Dewa SMEs

4.4. Six motifs have been patented by the municipal government of Surabaya

Since 2022 the Surabaya city government has patented six typical Surabaya motifs, namely:

1. Sparkling motif, which means shining or sparkling like the shining of the metropolitan city of Surabaya
2. Kintir-kintiran motif, which depicts the city of Surabaya surrounded by a river, symbolizes that the Suroboyo arek-arek is like the flow of water that can follow the progress of the times
3. Abhi boyo motif, which depicts the symbol of the city of Surabaya as Figure 6
4. Gembili Wonokromo motif, is a picture of a village in the middle of an urban area with various local wisdom values of money
5. Flower motifs, flowers from pink shrubs that cluster beautifully when in bloom, which grow a lot in Surabaya
6. Remo Surabaya motif depicts the typical Surabaya dance art

Mrs. Uka said: "The municipal government of Surabaya patents six motifs; all batik SMEs, including in the Putat Jaya sub-district, must make them, they may be modified according to the uniqueness of each SME." Mrs. Uka made batik with the abhi boyo motif combined with the clover motif, a typical Surabaya plant, and floral motifs. Mrs. Fitri said the city government requires all batik SMEs in Surabaya to make unique, patented motifs. The government wants to promote these six motifs so that they are widely known by the public, both nationally and internationally, so that the movement to make typical Surabaya motifs is encouraged through batik artisans.



Figure 6. Abhi Boyo motif by Kriya Punden SMEs combined with clover and flowers

The 2nd step is the Scoping step of the Environmental and Social Impact Assessment (ESIA) process for the Batik industry in the ex-Dolly area, the boundaries of the study are defined, and key environmental and social aspects to be assessed are identified. This step sets the framework for the assessment by outlining the scope of the study and determining the focus areas for evaluating potential impacts. Here is a brief explanation of the Scoping step:

1. The boundaries of the study establish the geographical, temporal, and sector-specific limits within which the ESIA will be conducted.
 - a. Example: The study may focus on batik production units in the ex-Dolly area of Surabaya City, East Java, and consider a specific timeframe for assessing environmental and social impacts
 - b. Purpose: Defining the study boundaries helps ensure that the assessment is targeted, relevant, and manageable within a defined scope.
2. Key environmental and social aspects to be assessed: The key environmental and social aspects to be assessed are the critical factors that will be evaluated to understand the potential impacts of Batik industry activities on the environment and society
 - a. Examples:
 - Water usage: Assessing the water consumption patterns of batik production processes and evaluating the impact on water resources and quality,
 - Waste management: Examining the types of waste generated by batik artisans, assessing waste disposal practices, and identifying opportunities for waste reduction and recycling,
 - Air quality: Investigating potential air emissions from batik production activities and their impact on air quality in the surrounding area,
 - Social well-being of artisans: Evaluating the working conditions, health and safety measures, and socio-economic well-being of batik artisans in the ex-Dolly area,
 - Community relations: Assessing the relationship between the batik industry and the local community, including community perceptions, engagement practices, and social impacts.

By defining the boundaries of the study and identifying key environmental and social aspects to be assessed, the scoping step lays the foundation for a comprehensive ESIA that will guide the evaluation of potential impacts, the development of mitigation measures, and the enhancement of sustainability practices within the batik industry in the ex-Dolly area.

In Table 1 of the provided document, the research questions are outlined, focusing on key aspects related to the development and sustainability of the batik industry in the ex-Dolly area. These questions serve as a guide for the study, helping researchers gather relevant information from batik artisans through interviews and observations. The 3rd step is baseline data collection, which could involve conducting surveys, interviews, and field assessments. The first research question (R.Q. 1) inquires about the training received by artisans in making batik, highlighting the importance of skills development in the industry. Understanding the training background of artisans can provide insights into their expertise and knowledge base. R.Q. 2 explores the sources of teaching for batik making, shedding light on the educational pathways and knowledge transfer within the industry. This question delves into the learning environment and mentorship relationships that contribute to skill acquisition.

R.Q. 3 focuses on the facilities provided by the government to support the establishment of batik businesses. This aspect addresses the role of governmental assistance in fostering entrepreneurship and sustainable business practices among artisans.

R.Q. 4: "Where do you produce batik?" - This question seeks to identify the locations where artisans carry out their batik production, providing insights into the working environments and facilities available to them.

R.Q. 5: "How do you get materials for production?" - By asking this question, researchers aim to understand the sources and procurement methods of materials used in batik production, highlighting the supply chain aspects of the industry.

R.Q. 6: "Is there production assistance?" - This question focuses on determining if artisans receive any support or assistance in their production processes, such as training, equipment provision, or technical guidance.

R.Q. 7: "What motifs do you produce?" - Researchers inquire about the specific design motifs created by artisans, showcasing the artistic diversity and cultural richness of batik products in the ex-Dolly area.

R.Q. 8: "Is there a special motive Dolly? Like what?" - This question explores if there are unique or special motifs inspired by the Dolly area, reflecting the local heritage and history in batik designs.

R.Q. 9: "Is there a motive suggested by the municipal government?" - By asking this question, researchers aim to understand if the government plays a role in recommending or promoting specific motifs for batik production, indicating potential collaborations between artisans and local authorities.

R.Q. 10: "Is the motive that you patented?" - This question delves into intellectual property aspects, inquiring if artisans have patented or protected their batik motifs, highlighting issues of design ownership and innovation protection.

R.Q. 11: "Are there any problems in the production process?" - This question aims to uncover challenges or obstacles faced by artisans during the batik production process, such as technical difficulties, material shortages, or quality control issues.

R.Q. 12: "How do you deal with it?" - Following up on the previous question, this inquiry seeks to understand the strategies and solutions employed by artisans to address the problems encountered in the production process, showcasing their problem-solving skills and resilience.

R.Q. 13: "Where do you sell your product?" - By asking this question, researchers aim to identify the sales channels and markets utilized by artisans to distribute their batik products, providing insights into the distribution networks and market reach of the industry.

R.Q. 14: "How much do you sell your batik?" - This question delves into the pricing strategies and market positioning of batik products, shedding light on the economic aspects of the industry and the value proposition offered by artisans.

R.Q. 15: "Is there a sales assistance program?" - Researchers inquire about the existence of any programs or initiatives that support artisans in their sales efforts, such as marketing assistance, promotional campaigns, or sales training, highlighting the role of support mechanisms in enhancing market access.

R.Q. 16: "Are your products selling well?" - This question focuses on evaluating the market performance and consumer reception of batik products, indicating the demand for artisanal creations and the competitive positioning of the industry in the market.

R.Q. 17: "Are there any problems with sales?" - By inquiring about sales-related challenges, researchers aim to identify issues affecting the commercial success of batik products, such as market saturation, competition, or distribution constraints, highlighting areas for improvement and intervention.

R.Q. 18 focuses on exploring any problems related to sales within the batik industry in the ex-Dolly area. By addressing this question, researchers aim to uncover specific challenges or obstacles that artisans face in selling their batik products and engaging with the market effectively. Understanding the issues surrounding sales is crucial for identifying areas of improvement and implementing targeted strategies to enhance the commercial success of artisans.

Potential aspects that R.Q. 18 may cover include:

1. Market demand: Assessing whether there is sufficient demand for batik products and whether artisans are able to meet consumer preferences effectively
2. Competition: Examining the competitive landscape within the batik industry, including the presence of rival products or alternative textile offerings that may impact sales
3. Pricing strategies: Investigating whether pricing structures align with market expectations and whether there are challenges in setting competitive prices for batik products

4. Distribution channels: Exploring the efficiency of distribution channels utilized by artisans and identifying any bottlenecks or limitations in reaching target markets
5. Marketing effectiveness: Evaluating the effectiveness of marketing efforts in promoting batik products and attracting customers, including branding, advertising, and promotional activities
6. Sales performance metrics: Analyzing sales data and performance indicators to assess the overall success of artisans in generating revenue and sustaining their businesses.

By addressing these research questions and delving into the details of training, teaching sources, and government support, the study can gain a comprehensive understanding of the factors influencing the development and sustainability of the batik industry in the ex-Dolly area. The insights gathered from these questions can inform recommendations for enhancing training programs, strengthening educational resources, and improving government initiatives to support the growth of the batik sector in a socially and environmentally responsible manner.

5. Challenges and enhancement strategies

Based on step ESIA, the 4th step in the Environmental and Social Impact Assessment (ESIA) method, the "Impact Assessment" step involves evaluating the potential environmental and social impacts of the batik industry activities in the ex-Dolly area. This assessment aims to identify and analyze factors such as water pollution from dyeing processes, waste generation, working conditions of artisans, and community perceptions to understand the industry's overall sustainability and social responsibility. This step also has challenges and strategies for how to solve the problem.

Here is an explanation with supporting evidence:

1. Water Pollution from Dyeing Processes: The dyeing processes in the batik industry can lead to water pollution through the discharge of chemical dyes and wastewater into water bodies.
 - a. Proof: Studies have shown that textile dyeing and finishing processes contribute significantly to water pollution, with chemicals and dyes contaminating water sources.
 - b. Assessment: Conduct water quality tests in the vicinity of batik production units to measure the impact of dyeing processes on water bodies and assess compliance with environmental regulations.
2. Waste Generation: Batik production activities may generate solid waste, chemical waste, and other byproducts that can have environmental implications if not managed properly.
 - a. Proof: Research indicates that textile industries, including batik production, generate substantial amounts of waste, posing challenges for waste management and disposal.
 - b. Assessment: Evaluate the types and quantities of waste generated by batik artisans, assess waste management practices, and recommend strategies for waste reduction, recycling, and proper disposal.
3. Working Conditions of Artisans: Assessing the working conditions of artisans is crucial to ensure occupational health and safety standards are met, fair labor practices are upheld, and workers' well-being is safeguarded.
 - a. Proof: Studies have highlighted the importance of improving working conditions in the textile industry to protect the rights and welfare of workers.
 - b. Assessment: Conduct interviews and surveys with artisans to gather insights into their working conditions, including factors such as safety measures, working hours, wages, and access to healthcare and social benefits.
4. Community Perceptions: Understanding community perceptions towards the batik industry activities can provide valuable insights into social acceptance, cultural impacts, and community engagement.
 - a. Proof: Community perceptions play a significant role in shaping the social license to operate for industries, influencing relationships with local residents and stakeholders.

- b. Assessment: Engage with community members through consultations, focus group discussions, and surveys to gauge their perceptions of the batik industry, identify concerns, and address any social issues or conflicts.

By conducting a comprehensive impact assessment that considers environmental and social factors such as water pollution, waste generation, working conditions, and community perceptions, stakeholders can develop targeted mitigation measures, sustainability initiatives, and stakeholder engagement strategies to enhance the overall sustainability and social responsibility of the batik industry in the ex-Dolly area.

6. Sustainability

Furthermore, the fifth step in the Environmental and Social Impact Assessment (ESIA) process, the step of Mitigation Measures involves developing strategies to mitigate any identified negative impacts of the batik industry activities and enhance positive outcomes. This step aims to address environmental and social concerns by implementing measures that reduce adverse effects, promote sustainability, and improve the well-being of stakeholders. The following explains the components further.

6.1. Cleaner production techniques

Implementing cleaner production techniques involves adopting practices that minimize environmental impact, such as reducing water and energy consumption, optimizing resource use, and minimizing waste generation. For example: Introducing water recycling systems in batik production units to reduce water consumption and minimize wastewater discharge, thereby mitigating water pollution; Benefit: Cleaner production techniques reduce not only environmental harm but also enhance operational efficiency, cost-effectiveness, and compliance with environmental regulations.

The above statement aligns with the study offering a ten-year retrospective analysis of the implementation of clean production. This environmental strategy aims to improve efficiency and reduce risks to people and the environment. The study highlights the significant benefits of clean production, including improved process efficiency, reduction of pollution and waste, and improved organizational image and relationships with stakeholders. However, the study also identified various difficulties in its implementation, such as the lack of clear sustainability guidelines and limited resources. Using a systematic literature review, this document presents a comprehensive overview of the benefits and challenges faced in implementing clean production, as well as providing insights for academics and organizational managers to devise more effective strategies for achieving their sustainability goals [22].

6.2. Social welfare programs for artisans

Promoting social welfare programs for artisans focuses on improving working conditions, enhancing livelihoods, and supporting the well-being of workers in the batik industry. For example: Providing training programs on occupational health and safety, offering fair wages, access to healthcare, and social security benefits for artisans in the ex-Dolly area; Benefit: Enhancing social welfare programs can boost artisan morale, productivity, and retention, contributing to a more sustainable and socially responsible industry.

6.3. Community engagement in decision-making processes

Engaging with the community in decision-making processes involves involving residents, stakeholders, and community members in discussions, consultations, and collaborative initiatives related to Batik industry activities. Example: Organizing community forums, participatory workshops, and stakeholder dialogues to gather feedback, address concerns, and involve the community in shaping industry practices and policies. Benefit: Community engagement fosters transparency, trust, and mutual understanding between industry stakeholders and the local community, leading to more inclusive and sustainable decision-making processes.

By developing and implementing mitigation measures such as cleaner production techniques, social welfare programs for artisans, and community engagement initiatives, the batik industry in the ex-Dolly area can

effectively address environmental and social challenges, enhance positive outcomes, and promote sustainable development. These strategies not only help mitigate negative impacts but also contribute to building a more resilient, responsible, and socially inclusive batik industry that benefits both the environment and the community.

In the sixth step, the Monitoring and Evaluation step of the Environmental and Social Impact Assessment (ESIA) process for the batik industry in the ex-Dolly area, a monitoring plan is established to track the effectiveness of mitigation measures and assess the ongoing environmental and social performance of the industry. Regular evaluations are conducted to ensure continuous improvement, compliance with regulations, and the promotion of sustainability practices. Here is a brief explanation of the Monitoring and Evaluation step:

1. **Establishing a Monitoring Plan:** A monitoring plan outlines the parameters, indicators, and methods for tracking the implementation and outcomes of mitigation measures put in place to address environmental and social impacts.
 - a. **Example:** Setting up monitoring protocols to measure water usage, waste generation, air emissions, and social welfare indicators among batik artisans in the ex-Dolly area.
 - b. **Purpose:** The monitoring plan helps ensure that mitigation measures are effectively implemented, identifies any emerging issues, and provides data for performance evaluation.
2. **Tracking the Effectiveness of Mitigation Measures:** Monitoring involves regularly collecting data on key performance indicators related to environmental and social aspects to assess the impact of mitigation measures.
 - a. **Example:** Monitoring water consumption reduction targets, waste recycling rates, air quality improvements, and changes in social well-being indicators among batik artisans.
 - b. **Benefit:** Tracking the effectiveness of mitigation measures helps identify successes, challenges, and areas for improvement, guiding decision-making and adaptive management practices.
3. **Assessing Ongoing Environmental and Social Performance:** Evaluation involves analyzing monitoring data to assess the industry's environmental and social performance over time, comparing actual outcomes with predicted impacts and targets.
 - a. **Example:** Conducting periodic assessments of environmental compliance, social welfare improvements, community relations, and overall sustainability performance.
 - b. **Importance:** Ongoing evaluation helps stakeholders understand the progress made, identify trends, address gaps, and make informed decisions to enhance the industry's sustainability and positive impact.

By establishing a monitoring plan, tracking the effectiveness of mitigation measures, and assessing ongoing environmental and social performance, the batik industry in the ex-Dolly area can ensure transparency, accountability, and continuous improvement toward sustainable practices. Regular monitoring and evaluation activities enable stakeholders to adapt strategies, address challenges, and promote long-term environmental and social sustainability within the industry.

The final step in analyzing using the ESIA method is the Reporting and Communication step of the Environmental and Social Impact Assessment (ESIA) process for the batik industry in the ex-Dolly area, a comprehensive ESIA report is prepared to outline the findings, conclusions, and recommendations of the assessment. The results are communicated to stakeholders, policymakers, and the public to promote transparency, accountability, and informed decision-making. Here is a brief explanation of the Reporting and Communication steps:

1. **Preparation of a Comprehensive ESIA Report:** The ESIA report summarizes the methodology, data collected, analysis conducted, findings, conclusions, and recommendations related to the environmental and social impacts of the batik industry in the ex-Dolly area.

- a. Example: The report may include information on water usage, waste management practices, air quality impacts, social well-being of artisans, community relations, and the effectiveness of mitigation measures.
 - b. Purpose: The ESIA report serves as a documented record of the assessment process, outcomes, and proposed actions to address identified impacts and improve sustainability practices.
2. Outlining Findings, Conclusions, and Recommendations: The report presents key findings from the assessment, conclusions drawn from the data analysis, and recommendations for mitigating negative impacts, enhancing positive outcomes, and promoting sustainability within the batik industry.
 - a. Example: Findings may include trends in water consumption, waste generation rates, air pollutant levels, and social welfare indicators, while recommendations could focus on improving resource efficiency, implementing cleaner production practices, and enhancing community engagement.
 - b. Benefit: Clear and actionable findings, conclusions, and recommendations help guide decision-making, prioritize actions, and drive continuous improvement in environmental and social performance.
3. Communication to Stakeholders, Policymakers, and the Public: The ESIA report is shared with relevant stakeholders, policymakers, government agencies, industry associations, local communities, and the public through various communication channels to ensure transparency and accountability.
 - a. Example: Presenting the report findings at stakeholder meetings, sharing summaries with policymakers, publishing key insights on public platforms, and engaging in dialogue to address concerns and solicit feedback.
 - b. Importance: Effective communication of ESIA results fosters dialogue, builds trust, encourages collaboration, and empowers stakeholders to participate in decision-making processes that promote sustainable development and responsible business practices.

By preparing a comprehensive ESIA report, outlining key findings, conclusions, and recommendations, and effectively communicating the results to stakeholders, policymakers, and the public, the batik industry in the ex-Dolly area can demonstrate its commitment to sustainability, engage in dialogue with relevant parties, and drive positive change towards a more environmentally and socially responsible industry.

The description above can be explained more easily in understanding by looking at Figure 7 below.

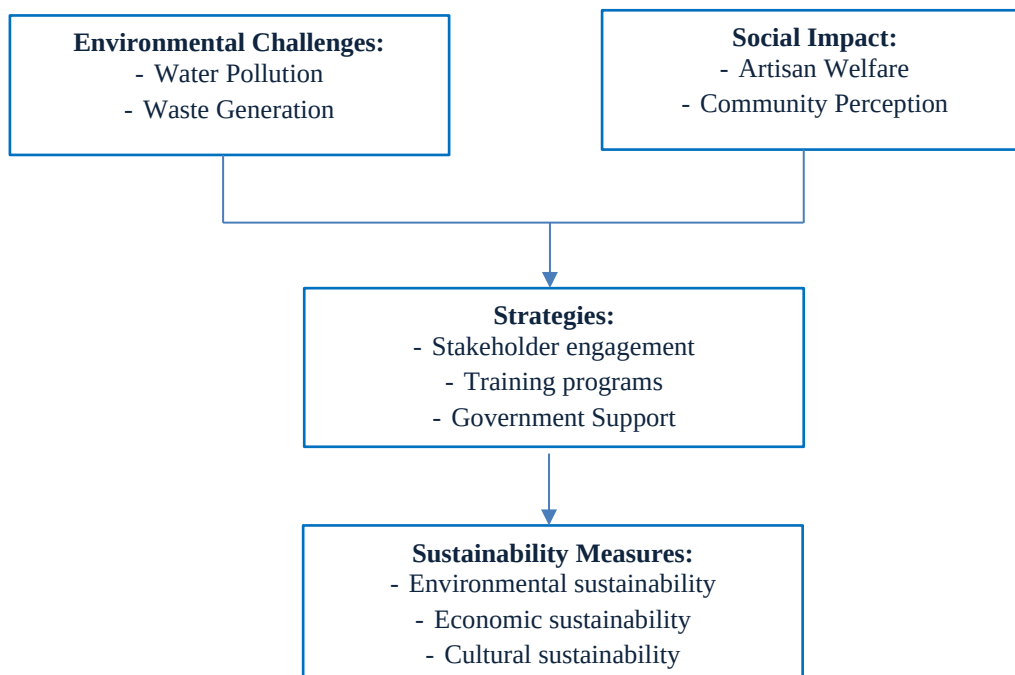


Figure 7. The research findings on the batik industry in the ex-Dolly area

Here are the practical applications of the research findings on the batik industry in the ex-Dolly area, along with specific recommendations for artisans, policymakers, and stakeholders:

1. For artisans

Skill development programs:

- Recommendation: Artisans should participate in ongoing training workshops that focus on advanced batik-making techniques, sustainable practices, and business management skills.
- Actionable Step: Collaborate with local educational institutions to create tailored training modules that address both artistic and entrepreneurial skills.

Sustainable practices:

- Recommendation: Adopt eco-friendly dyeing methods and waste management practices to minimize environmental impact.
- Actionable Step: Implement a waste reduction strategy by recycling materials and using natural dyes, which can also be marketed as a unique selling point.

Community collaboration:

- Recommendation: Form cooperatives or associations to share resources, knowledge, and market access.
- Actionable Step: Organize regular meetings to discuss challenges, share best practices, and explore joint marketing opportunities.

2. For policymakers

Supportive Policies:

- Recommendation: Develop policies that provide financial incentives for sustainable practices within the batik industry.
- Actionable Step: Introduce grants or subsidies for artisans who implement environmentally friendly production methods.

Infrastructure development:

- Recommendation: Invest in infrastructure that supports the batik industry, such as community centers for training and production.
- Actionable step: Allocate funds for the establishment of shared facilities equipped with modern tools and resources for artisans.

Promotion of batik culture:

- Recommendation: Launch campaigns to promote batik as a cultural heritage and a sustainable craft.
- Actionable Step: Organize cultural festivals and exhibitions that showcase Batik products, attracting tourists and enhancing community pride.

3. For stakeholders

Engagement and collaboration:

- Recommendation: Foster partnerships between artisans, local businesses, and government agencies to create a supportive ecosystem for the batik industry.
- Actionable step: Establish a stakeholder forum that meets regularly to discuss industry challenges and opportunities for collaboration.

Market access and promotion:

- Recommendation: Develop marketing strategies that highlight the unique aspects of Batik products, such as their cultural significance and sustainable production methods.
- Actionable step: Utilize digital platforms and social media to reach broader markets, including international buyers interested in ethical and sustainable products.

Research and development:

- Recommendation: Encourage research initiatives that explore innovative techniques and materials in Batik production.
- Actionable step: Partner with universities and research institutions to conduct studies that can lead to product innovation and improved sustainability practices.

By implementing these practical applications and recommendations, artisans, policymakers, and stakeholders can work collaboratively to enhance the sustainability and growth of the batik industry in the ex-Dolly area. This approach not only addresses the current challenges but also positions the industry for long-term success and cultural preservation.

The findings and discussion for the batik industry in the ex-Dolly area highlight several key points related to the environmental and social impacts, as well as the sustainability of the industry. Here is a summary of the findings and discussion based on the provided references:

1. **Environmental and Social Impact:** The batik industry in the ex-Dolly area has undergone a transformation from a former red-light district to a creative industry village, with the Surabaya city government playing a significant role in empowering the community
 - Artisans in the batik industry have received training in batik-making techniques, materials, and design, contributing to skill development and entrepreneurship opportunities, - The development of batik centers in different regions, such as Gunungkidul, has led to economic empowerment and improved welfare for local communities
 - Open innovation practices have been suggested to enhance the performance of small and medium-sized enterprises (SMEs) in the batik industry, promoting collaboration and knowledge sharing.
2. **Sustainability and Development:** The batik industry in Semarang has demonstrated resilience as a creative sector, with businesses producing distinctive designs and organizing themselves as SMEs with a workforce of 4 to 20 employees
 - Strategic thinking and government support are essential for the sustainability of programs aimed at developing creative industries, such as the batik industry in the ex-Dolly area
 - Monitoring and evaluation processes are crucial for tracking the effectiveness of mitigation measures, assessing ongoing performance, and ensuring continuous improvement and sustainability within the industry
 - The preparation of a comprehensive ESIA report, outlining findings, conclusions, and recommendations, is vital for promoting transparency, accountability, and informed decision-making among stakeholders, policymakers, and the public.

Overall, the findings and discussion emphasize the positive impact of training programs, government support, and community empowerment initiatives on the batik industry's sustainability and development in the ex-Dolly area. By implementing mitigation measures, monitoring performance, and fostering communication with stakeholders, the industry can continue to grow in a socially and environmentally responsible manner, contributing to economic development and cultural preservation.

7. Conclusions

Based on the ESIA assessment can be concluded that the Environmental and Social Impact Assessment (ESIA) of the batik industry in the ex-Dolly area of Surabaya has revealed both positive and negative effects on the environment and social well-being of artisans. Through mitigation measures such as cleaner production techniques, social welfare programs for artisans, and community engagement initiatives, the industry can effectively address environmental and social challenges. By implementing targeted strategies and monitoring mechanisms, the Batik industry in the ex-Dolly area can achieve long-term sustainability and positive social outcomes. The findings underscore the importance of sustainable practices and community involvement in

enhancing the industry's overall impact. The development of batik craft products in the ex-Dolly area has shown promising results in terms of economic empowerment, skill development, and entrepreneurship opportunities for artisans. Training programs, government support, and community engagement have played a crucial role in fostering the growth and sustainability of the batik industry. By focusing on creative design, innovation, and collaboration among small and medium-sized enterprises (SMEs), the industry has demonstrated resilience and potential for further development. Strategic thinking, government support, and continuous monitoring and evaluation processes are essential for ensuring the sustainability and success of programs aimed at enhancing the batik craft product in the ex-Dolly area.

Future research in the context of the batik industry, particularly in the ex-Dolly area, can focus on several key areas to further enhance understanding and support for this craft. Here are some suggested directions for future research:

1. **Impact of Technology on Batik Production**, objective: Investigate how modern technologies, such as digital printing and automated dyeing processes, can be integrated into traditional batik production; Focus: Assess the benefits and challenges of adopting technology, including cost implications, skill requirements, and potential impacts on traditional craftsmanship.
2. **Market Trends and Consumer Preferences**, objective: Conduct market research to understand current trends in consumer preferences for batik products, particularly in domestic and international markets; Focus: Analyze factors influencing purchasing decisions, such as sustainability, cultural significance, and design aesthetics, to inform marketing strategies.
3. **Longitudinal Studies on Artisan Welfare**, objective: Perform longitudinal studies to track the socio-economic impacts of batik industry initiatives on artisan communities over time; Focus: Evaluate changes in income levels, quality of life, and community engagement as a result of training programs and government support.
4. **Environmental Impact Assessments**, objective: Conduct comprehensive environmental impact assessments (EIAs) specific to batik production processes; Focus: Measure the ecological footprint of various dyeing methods and waste management practices, and explore ways to minimize negative environmental impacts.
5. **Cultural Heritage and Identity**, objective: Explore the role of batik in cultural identity and heritage preservation within the community; Focus: Investigate how batik practices can be sustained and promoted as a vital part of local culture, especially among younger generations.
6. **Policy Effectiveness and Recommendations**, objective: Assess the effectiveness of existing policies and programs aimed at supporting the batik industry; Focus: Identify gaps in policy implementation and propose evidence-based recommendations for enhancing support for artisans and sustainable practices.
7. **Comparative Studies with Other Regions**, objective: Conduct comparative studies of batik industries in different regions or countries to identify best practices and innovative approaches; Focus: Analyze how cultural, economic, and environmental factors influence the success and sustainability of batik production in various contexts.
8. **Consumer Education and Awareness**, objective: Research the effectiveness of consumer education initiatives aimed at promoting awareness of sustainable and ethical batik products; Focus: Evaluate how education impacts consumer behavior and preferences, and develop strategies to enhance awareness of the cultural significance of batik. Future research in these areas can provide valuable insights and data that will help stakeholders make informed decisions, enhance the sustainability of the batik industry, and promote its cultural significance. By addressing these research gaps, the industry can continue to evolve while preserving its rich heritage.

Declaration of competing interest

The authors declare that they have no known financial or non-financial competing interests in any material discussed in this paper.

Acknowledgments

We thank the rector of Surabaya State University for granting research funds. Based on funding DIPA Directorate of Research, Technology, Community Service, Directorate General of Vocational Education, Ministry of Education, Culture, Research, and Technology Number: SP DIPA-023.18.1.690524/2024 5th revision dated March 13, 2024 that Agreement / Contract Number: B/30342/UN38.III.1/LK.04.00/2024 dated March 25, 2024

Author contributions

Indarti has contributed to the study conception, interview, drat preparation, and final manuscript; Urip Wahyuningsih has contributed to the interview, and collected the data; Martadi has contributed to the data analysis, interpretation of results; Li Hsun Peng has contributed to the supervisor and final manuscript.

Informed consent

Informed consent for the publication of personal data in this article was obtained from the participant(s).

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