

Implementation of Green Economy in Small and Medium Industries: Case Study of Batik Craftsmen in Pekalongan City

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ABSTRAK: *Pekalongan City is known as one of the centers of the batik industry in Indonesia which contributes directly to the economy and social culture. However, the batik production process still often uses synthetic materials which have the potential to damage the environment. The implementation of a green economy offers solutions by using natural batik dyes, better waste management and energy efficiency in the batik production process. This research explores how to implement a green economy in small and medium industries, especially batik craftsmen in Pekalongan City. The research method used is a qualitative approach with case studies identifying challenges and opportunities in implementing a green economy among batik craftsmen. The results of this research indicate an increase in the use of natural dyes and waste management in the batik production process. However, significant challenges remain, including limited access to environmentally friendly technology, high costs, and a lack of knowledge about green economy practices. This implementation can have an impact on increasing product competitiveness, reducing pollution, and increasing environmental awareness among craftsmen.*

Kata kunci: 3-5 kata kunci, kata kunci 1, kata kunci kata 2, dst.

ABSTRACT: City of Pekalongan known as one of the the center of the batik industry in Indonesia that contributes direct to economy and socio- culture . However , the batik production process is still often use material potential synthesis damage environment . The implementation of green economy offers solutions with use natural batik dyes , management more waste good , and efficiency energy in the batik production process . Research This explore How implementation of green economy in small and medium industries , especially batik craftsmen in Pekalongan City . Research methods used yes with through approach qualitative with studies case identifying challenges and opportunities in implementing green economy in batik craftsmen . Research results This show there is an increase in the use of natural dyes and waste management in the batik production process . However , there are still significant challenges, including limited access to environmentally friendly technology, high costs, and lack of knowledge about green economy practices . Implementation This can impact on increasing product competitiveness, reducing pollution, and increasing environmental awareness among craftsmen.

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1. INTRODUCTION

The increasingly pressing global issues today are climate change and environmental damage. This can certainly affect various sectors in life and the economy. Small and medium industries (SMEs) which are often the backbone of the local economy are also affected by climate change. In Indonesia, especially in Pekalongan City, the batik industry is one of the SME sectors that has an important role both in terms of economy and culture. However, the batik production process often uses dyes made from chemicals and energy that can have a negative impact on the environment.

The Pekalongan City Industry and Trade Service stated that Pekalongan City is known as one of the centers of the batik industry in Indonesia. This has led to the push to implement green economy principles as an effort to address the environmental impact of batik production. This implementation includes various initiatives, such as the use of natural dyes, better waste management, and energy efficiency in the production process. However, the implementation of green economy in the MSME sector, especially in the batik industry, still faces various challenges, such as limited access to environmentally friendly technology, high costs, and lack of knowledge about sustainable practices. In fact, by adopting environmentally friendly practices, batik craftsmen can develop more innovative products. For example, using natural dyes that are safer for the environment. This could be a special attraction for buyers who care about the environment.

Green economy offers an alternative approach to reducing the environmental impact of economic activities while supporting economic growth and social welfare. Green economy is a development approach that aims to improve human well-being and social equity, while significantly reducing environmental risks and ecological scarcity. This concept emphasizes the importance of transitioning to more sustainable and environmentally friendly economic practices, including efficient resource management, renewable energy use, and reduced pollutant emissions. Green economy emphasizes that economic development must be achieved by considering environmental and natural resource aspects.

The implementation of Green Economy in batik production practices can provide many benefits for craftsmen, workers, the environment, and even local governments. The implementation of green economy can be done by reducing the use of chemical batik dyes and switching to using natural batik dyes to minimize environmental pollution. Reducing waste will certainly improve the quality of life of the surrounding community. This shows that Green Economy offers great opportunities for SMEs of batik craftsmen in Pekalongan to increase competitiveness, preserve the environment, and improve community welfare. With support from various parties, SMEs of batik in Pekalongan can be an example for other creative industries in implementing sustainability principles.

This study aims to explore and analyze how green economy is implemented in the batik industry in Pekalongan City, as well as to evaluate the impact of the implementation. This study will provide insight into the successes, challenges, and opportunities faced by batik artisans in implementing green economy. The results of this study are expected to provide useful recommendations for batik artisans, policy makers, and other related parties to support the transition towards more sustainable industrial practices.

2. METHOD

This study uses a qualitative approach with a case study method to explore and analyze green economy policies as a solution to overcome the impacts of climate change in Pekalongan City. This method was chosen because it can provide an in-depth understanding of policies, implementation, challenges, and impacts of green economy policies in a local context. The approach used in this study is qualitative with a case study design. Case studies were chosen to allow for in-depth and detailed exploration of green economy policies in Pekalongan City, as well as to understand the dynamics and specific contexts of the implementation of these policies.

The data used in this study include primary and secondary data. Primary data were obtained through in-depth interviews with key stakeholders, such as local government officials (e.g. from the Environmental Service and Regional Development Planning Service), academics, local NGOs, and residents involved or affected by green economy policies. Semi-structured interviews were used to collect detailed and flexible information, allowing researchers to dig deeper according to the informant's response. Obtained from policy documents, annual reports, regional development plans, scientific publications, journal articles, and reports from international institutions related to green economy and climate change. Secondary data sources help in understanding the policy context and provide an in-depth background on the implementation of green economy in Pekalongan City.

3. RESULT AND DISCUSSION

A. Implementation of Green Economy in Batik Craftsmen

In Tantina Haryati's research entitled "IMPLEMENTATION OF GREEN ECONOMY IN HOUSEHOLD WASTE MANAGEMENT" it is stated that the implementation of green economy can be applied with five principles, including being able to create welfare for the entire surrounding community; creating equality from one generation to the next; being able to maintain, restore, and invest in nature-based activities; supporting sustainable consumption and production levels, and with the support of strong, integrated and responsible institutions. The implementation of *green economy practices* in batik production is an important step to maintain environmental sustainability and develop a sustainable batik industry. Batik craftsmen are one of the parties who have an

important role in maintaining environmental sustainability. The implementation of green economy in batik craftsmen offers many benefits, including reducing environmental impacts, increasing competitiveness, and access to new markets. Steps that can be taken by craftsmen in implementing Green Economy practices include the use of natural batik dyes, waste management, energy efficiency, and participation in workshops and training related to the implementation of economy practices, as well as through the application of the 3R method (Reduce, Recycle, Reuse).

From the results of observations and interviews with batik craftsmen, it was found that the use of natural dyes is increasing. According to Mrs. Murni, one of the batik craftsmen who use natural batik dye *revealed "There are many plants around we who can made into natural batik dye actually , like Ketapang leaves , indigofera , even mangrove roots "*. Dyes such as indigo, leaves ketapang , and mangrove roots are starting to be used to replace synthetic dyes. The use of environmentally friendly raw materials will provide several benefits, including reducing negative impacts on the environment and increasing the appeal of batik products as sustainable products. Natural dyes provide added value through traditional stories and values that appeal to the environmentally conscious market. However, the main challenge is color consistency and the availability of natural raw materials, which are sometimes unstable and require more complex dyeing techniques. Mrs. Murni also added *" Natural batik dyes need more Lots dyeing to color his striking and dense . Sun drying it also needs longer time , because of the dipping process dry When coloring . Therefore that , the use of dye natural on batik more need time long processing time compared to with batik that uses dye synthesis "*. The length of time batik dyeing process experience make the craftsmen more choose use dye synthesis For savings time production and quantity production that can produced .

Waste management can also be a major focus in the adoption of green economy by batik craftsmen. The implementation of simple wastewater treatment installations (IPAL) applied by several craftsmen will reduce levels of hazardous chemicals in wastewater. In addition, efforts to recycle solid waste into value-added products such as bags, ornaments, and patchwork will reduce the amount of waste disposed of. Waste management through IPAL and recycling is a positive step in protecting the surrounding environment from pollution. However, batik craftsmen still facing challenges related to the high cost of installing and maintaining IPAL, as well as the need for training to ensure the waste processing system runs effectively. This was also conveyed by Mr. Bagus, one of batik craftsmen from Tirto, Pekalongan City *" The installation of IPAL requires quite a fee , especially For batik maker small like me , so more good money used as capital compared to For installation of IPAL "*. In addition, awareness and commitment to consistently run the recycling system need to be increased so that the environmental impact is more significant.

Efficiency in batik production practices is one of the steps that can be taken to implement green economy practices. This is also as done by Mr Bagus, one of the batik craftsmen who said *"I have been using it for a long time gas stove inside batik production , besides easy got than wood burn , use of gas in batik production is also more fast and not cause pollution the air around place batik production "*. Batik

craftsmen who have started switching to gas stoves have shown better energy efficiency compared to conventional methods. Energy efficiency contributes directly to reducing production costs and reducing carbon emissions, one of which is by using solar panels. Although it requires a large initial investment, the use of solar panels can provide long-term benefits for batik craftsmen. However, the adoption of this technology is still limited, even not yet found in craftsmen around Pekalongan City. This is because of capital outlay quite large, so that incentive support or subsidies from the government are needed to expand its application among small craftsmen.

The participation of batik artisans in training programs and workshops related to green economy practices can also be one of the initial steps in implementing the Green Economy. Increasing environmental knowledge and awareness among batik artisans will greatly support them in implementing Green Economy practices. One of the workshops and trainings related to the green economy is carried out by the Partnership Partnership. This activity is usually attended by batik artisans and small and medium industry owners in Pekalongan City. According to Halim, one of the Participants in the Natural Dye Batik Workshop and Training organized by Partnership Partnership explained that " *This workshop activity give Lots related knowledge and insight with method making dye natural, how compilation report finance business, until with How marketing dye batik natural* ". Craftsmen who take part in the training will more understand and learn about How method For making dye batik natural and start apply it to the batik business owned. Education and increasing environmental awareness are fundamental steps in ensuring the sustainability of green economy adoption. Through training, craftsmen gain the knowledge and skills needed to manage waste and reduce chemical consumption. However, a more intensive and sustainable approach is still needed so that this training can truly change production behavior in the long term.

The application of the 3R principle by batik artisans has also succeeded in reducing waste volume by up to 40% in several study cases. Reusing dyeing and washing water and recycling leftover fabric into other creative products have shown positive results in reducing environmental burdens. The 3R principle plays an important role in waste reduction and more efficient resource utilization. Batik artisans who apply this principle not only contribute to environmental conservation but also create new economic opportunities through product diversification. Challenges faced include the need to create an efficient waste management system and market development for recycled products.

B. The Impact of Green Economy Implementation on Batik Craftsmen

The implementation of green economy in batik industry practices can provide several impacts for batik craftsmen, including helping craftsmen reduce operational costs through energy efficiency and more efficient raw material management. Environmentally friendly batik products also have a higher appeal in the market, especially in the rapidly growing green market segment, thus opening up opportunities for access to new and premium markets. The implementation of green economy has succeeded in reducing chemical waste and greenhouse gas emissions from the batik production process. The use of

environmentally friendly raw materials and an effective waste management system have reduced water and soil pollution around the production area. The implementation of environmentally friendly practices has increased craftsmen's awareness of the importance of preserving the environment. In addition, this approach also has a positive impact on the welfare of craftsmen by increasing their income and product reputation.

The implementation of the Green Economy can also have negative impacts on batik craftsmen, both in terms of economy, social, and environment, including the initial costs of switching to environmentally friendly practices, such as investment in wastewater treatment plants which are still quite high, which can be a burden for small-scale craftsmen. In addition, natural dyes often require a longer and more expensive process compared to synthetic dyes. This is also in line with as conveyed by Mrs. Murni " *Natural batik dyes need more Lots dyeing to color his striking and dense . Sun drying it also needs longer time , because of the dipping process dry at the time coloring . Therefore that , the use of dye natural on batik more need time long processing time compared to with batik that uses dye synthesis* ". However, challenges remain in ensuring the availability of consistent and quality natural raw materials. In addition, some waste management technologies are still not fully optimized, which sometimes reduces the effectiveness of pollution reduction. This change also faces resistance from some craftsmen who do not understand the long-term benefits of green economy practices, as well as limited access to relevant training for craftsmen in remote areas.

C. Challenges for Batik Craftsmen in Implementing Green Economy

1. Limited funds

Limited funds are one of the main obstacles in implementing green economy practices among batik artisans in Pekalongan City. Based on interviews and surveys conducted, most batik artisans in Pekalongan have difficulty in gaining access to the financing needed to adopt environmentally friendly technologies. Traditional batik artisans generally have limited capital, making it difficult for them to invest in more environmentally friendly technologies and materials, which often have higher initial costs.

Lack of funding can hinder the ability of artisans to make significant changes in their production processes. Despite government support and some funding programs, access to these resources is often limited due to complex and uneven requirements. This is as conveyed by Mr. Bagus " *The management and installation of wastewater treatment plants can just done by batik makers small like I , as long as There is cash injection or subsidy from government* ". Therefore, there needs to be a more inclusive policy and easier accessibility of funding for MSMEs.

2. Lack of knowledge about green economy practices

Knowledge about green economy practices and their benefits is still lacking among batik artisans. Many artisans do not yet understand the environmental impacts of conventional batik production processes and the long-term benefits of adopting more environmentally friendly practices. This lack of knowledge about green economy practices is a significant barrier. Many batik artisans in Pekalongan City still do not

fully understand what green economy is and how to implement it in the batik production process. This limited knowledge includes a lack of understanding about environmentally friendly raw materials, more efficient production techniques, and the long-term benefits of green economy practices.

Lack of socialization and training on green economy practices is a major barrier. Craftsmen need more intensive and sustainable education and training on environmentally friendly techniques and waste management. This requires collaboration between government, academics, and NGOs to provide relevant and accessible education.

3. Resistance to change

Resistance to change is also a barrier, especially among artisans who have long operated with traditional methods. Adoption of new practices is often seen as a disruption to the production process they have mastered. Resistance to change is a psychological barrier that was also found in this study. Many batik artisans feel comfortable with traditional methods and are reluctant to change their production methods, even though new methods are more environmentally friendly. Mr. Bagus as one of the batik artisans in the Pekalongan area said *"I've already usually use dye synthesis and methods batik that I do use , if change with method new I'm afraid batik results are not The same like usually and make customer No satisfied , later rather We loss "*. In addition, the main reason for this resistance is the fear of financial risk and the uncertainty of the results of the change. Craftsmen who have been running their businesses with conventional methods for years are often not interested in trying something new because they are afraid of losing customers or facing unexpected costs.

4. Supporting infrastructure

The availability of supporting infrastructure, such as integrated waste processing facilities, marketing of environmentally friendly products, and access to environmentally friendly raw materials, is still limited in Pekalongan. The lack of support from the local government in the form of incentives or policies that encourage the adoption of the green economy is also an obstacle in the implementation of Green Economy practices. Without adequate infrastructure, batik craftsmen will have difficulty in implementing green economy practices optimally.

Inadequate infrastructure will slow down the efforts of craftsmen to implement the green economy effectively. For example, although there is a desire to use natural dyes, the limited supply and distribution of raw materials is an obstacle. The government needs to play an active role in providing adequate infrastructure, including by strengthening the supply chain of environmentally friendly raw materials and building waste processing facilities that are affordable for craftsmen.

D. Green Economy Implementation Opportunities

Home Batik industry in general has run its business by leading to the implementation of green economy. Although still in the development stage, the efforts that have been made by the home Batik industry show that there has been a movement from business owners to minimize the negative impacts of batik production. Simply

put, the implementation of green economy in the home Batik industry has been applied in at least four of the five elements of green economy. The four elements are: first, energy efficiency; second, waste minimization and management; third, preservation and utilization of sustainable natural resources; fourth, creation of green jobs.

The application of green economy in the batik home industry that can be done includes the use of natural dyes in the batik production process; minimizing wastewater, by providing a mini wastewater treatment plant (IPAL); and a comfortable and safe working environment. The use of natural dyes is said to be in accordance with the needs, if there is an order for environmentally friendly batik. This means that not every day the Batik home industry produces environmentally friendly batik.

The implementation of green economy in the Batik home industry is realized in two activities, including the use of natural dyes in the batik production process; and waste disposal in the area itself, meaning it does not pollute the surrounding home environment. The Batik home industry managed by Mr. Aldo produces natural colored batik if there are orders. If there are no orders, production will be more focused on making chemical or synthetic dyed batik cloth. Mr. Aldo's Batik home industry has only partially implemented environmentally friendly batik. As expressed by Mr. Aldo *"Not one hundred percent yet, only a part. Yes, it means that I used to produce natural dye batik, then because this is still trending now, I finally started to produce natural dye batik again, because this is also to neutralize environmental damage . "*

In addition, batik production waste management is important, including wastewater treatment so as not to pollute the environment through filtration technology or biological treatment. Energy efficiency also needs to be considered by reducing energy use through energy-saving technology or the use of renewable energy sources, such as solar power in the production process. Efficient use of water, such as recycling water or implementing water-saving dyeing techniques, is also part of the green economy. Education and increasing environmental awareness among craftsmen and consumers about the importance of the green economy are essential to support the sustainability of the batik industry. Finally, the adoption of environmental certification, such as eco-labels, is one way to show that batik products are produced with environmentally friendly practices, thus supporting the goals of the green economy and preserving cultural heritage in a more sustainable way.

4. CONCLUSION

The implementation of the Green Economy concept in small and medium industries (IKM), especially for batik craftsmen in Pekalongan City, has a positive impact on the environment, economy, and socially . Batik craftsmen who adopt environmentally friendly practices such as the use of natural dyes, good waste management, and energy efficiency, have succeeded in reducing negative impacts on the environment and improving the image of their products in the market. However , the implementation of green economy among Batik craftsmen still face challenges, such as limited funds because higher production costs, resistance to change , lack of awareness and training for craftsmen , and lack of adequate infrastructure . Implementation of green economy among batik craftsmen have great potential to increase the competitiveness and sustainability of the batik industry in Pekalongan . Therefore, further support is needed from the government and related parties in terms of providing incentives, technology

access, and educational programs to encourage wider implementation of the green economy among batik craftsmen .

5. REFERENCES

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