

TEXTILE WASTE RECYCLE PROGRAM IN THE DEVELOPMENT OF SUSTAINABLE DESIGN BY THE COMMUNITY OF KARANGREJO VILLAGE ANDPT DAUR LANGKAH BERSAMA (PABLE)

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ABSTRACT

The fashion and textile industry contributes to high level of consumerism which has a major impact that leads to climate change. Facing this, PT. Daur Langkah Bersama (Pable) as a start-up company that manages textile waste offers a solution with a responsible textile waste management by empowering the people of Karangrejo Village. This research is focused on the recycle program which in the process minimizes the use of water and other resources to be more environmentally friendly. The aims of this research are (1) finding the results of the textile waste recycle program by Pable, and (2) examining Pable's form of sustainability in processing the textile waste. This study uses a case study research method on the circular economy concept. There are three main components to be analyzed; data reduction, data presentation, and verification, that involved in interrelated processes to determine the final result. The approach used in this research is a qualitative approach with case study methods. The data relating to the up-cycle process of textile waste by Pable studied qualitatively, where the conditions and situation in Karangrejo Village examined directly through interviews, observation, and documentation. Additionally, it aims to understand how sustainability has been implemented by both parties.

1. INTRODUCTION

1.1 Background

The fashion industry is one of the creative industry fields with a high level of consumerism, triggered by people's lifestyles towards a rapid change. Therefore, the term fast fashion existed, with the new designs appearing quickly in a short time. Manufacturers compete to respond to these changes quickly, which leads to a major impact on environmental damage, including water and soil pollution, as well as greenhouse gas emissions that can cause climate change.

The United Nations (UN) has announced in its climate change news that the fashion industry contributes 10% of global greenhouse gas emissions due to its long supply chain and highly energy-intensive production processes (*UN Helps Fashion Industry Shift to Low Carbon, United Nations Climate Change News, September 2018*). This process takes place continuously in order to pursue material profit, but it can threaten the survival of all creatures on earth due to the environmental degradation. Facing this, PT. Daur Langkah Bersama (Pable) as a start-up company in the field of sociopreneurs offers a solution, namely by managing textile waste responsibly.

Pable seeks to process the textile waste into new products, in order to increase its life cycle so it doesn't just go to waste by empowering the weaving community in Karangrejo Village, Pasuruan.

The empowerment of Pable to the weaving community in Karangrejo Village is an example of sustainable and eco-friendly business practices. By reusing the solid textile waste from factories outside Karangrejo Village area, they are able to reduce the amount of waste that ends up in landfills. The solid waste then processed into raw materials in the form of thread, which is used to create plain woven fabric and striped-motif products.

Pable implements sustainability in its business through collaboration with the weaving community in Karangrejo Village, providing business assistance and supplying capital in the form of raw materials and equipment needed in the production process. Additionally, Pable also supports the community by assisting in the development of necessary infrastructure for the village.

1.2 State of The Art

Textile recycling is a practical solution for reducing textile waste while minimizing the use of water and other raw natural resources (Sandvik, 2019). Unfortunately, not much academic literature has discussed this in depth. Previous research on a similar topic has been conducted by Sandvik and Stubbs (2019) which explored the drivers, restraints and supports in creating textile recycling systems in the Scandinavian fashion industry, as well as investigating the technologies, innovations and systemic changes needed to enable circular supply chains. So, the best solution the best solution of this problem is a circular production system, which places a lot of emphasis on the reuse of an item or recycling to avoid disposal.

In Indonesia, previous research has focused more on upcycling activities, such as recycling textiles to increase use-value from various scientific perspectives. Upcycle activities are often identified with post-consumer fashion waste which will then increase its use value to become better clothing items or products in terms of quality and appearance. Research on this matter was conducted by Aisyah and Hidayati (2020) on textile recycling that focus on sustainable business strategies, and no similar research has been found that discusses in-depth sustainability in Indonesian textile and fashion industry; thus, this research provides novelty in this regard. Furthermore, these writings will be used as a reference to strengthen the theory in this study.

The activity of recycling textile waste carried out by the weaving community in Karangrejo Village with Pable is an important focus of this research. This research is important to conduct because environmental pollution caused by the textile and fashion industry is a serious problem that requires effective management. The traditional linear production model of create, use, and throw away is being addressed through a circular economy production model, which utilizes wasted as raw material for creating new products. This research will examine the Pable's form of sustainability in processing the textile waste of Karangrejo Village's weaving community.

This paper focuses on the upcycle of textile and fashion waste by Pable through the concept of Return to the Village, which in the process helps empower rural communities who work as weavers. Pable comes with a story about how to overcome the problem of textile waste and provide additional value and innovation so that people no longer see it as waste, but as goods that can be used daily, along with real conditions upstream and downstream. Through the slogan "We Are Circular", Pable seeks to apply the concept of a circular economy which is designed to be restorative and regenerative. This research needs to be done to find out how far Pable's efforts are in overcoming pollution caused by textile waste through technology that is beneficial for the rural community. The involvement of the weavers in Karangrejo Village who live around the company and live as weaving craftsmen is urgently needed considering their existence requires a safe and healthy environment.

2. LITERATURE REVIEW

Up until now, sustainability does not have a certain definition and is still being debated by various parties, because its meaning varies between professionals from different fields. However, sustainability in the context of development has three important pillars that must

be fulfilled, namely economic, social, and environmental, as agreed at the 2005 World Summit (Purvis, 2019) which is described in the following chart,

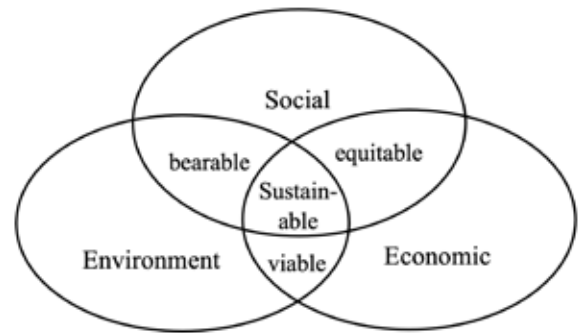


Figure 1 Three Pillars of Sustainable Development

Source: United Nation's 2005 World Summit

The three pillars are interrelated and are the driving pillars for sustainable development. Ideally, these three things can work together and become the driving focus in sustainable development (Mardikanto, 2013).

The concept of sustainable development is important to be applied to various industries, including the textile industry. The textile industry is one of the important industries that fulfill basic human needs. In recent years, sustainability has become a major topic that encourages stimulating reflection in the textile industry. However, sustainability in the textile industry is difficult to achieve due to the complexity of the textile supply chain, which is related to the production of material goods as well as non-material content and brand value, starting from fiber cultivation, weaving process, sewing, tailoring, and retail (Mora, 2014). Each stage has significant risks, from environmental aspects to worker health and welfare.

Over time, the long and complex production process of the textile and fashion industry has accelerated to catch up with trends, hence the term fast fashion appears. As an industry that affected by globalization and global economy growth, this internationalized supply chain is increasingly shifting growth in fiber, textile manufacturing and garment construction to areas with cheaper labor. Increased consumption stimulated the production of cheap clothes, and prices were kept down by outsourcing production to developing countries.

The context of sustainability in the textile industry is often closely associated with the fashion industry, considering that fashion is an expansion of textile that are most widely used by people around the world. According to Fletcher, sustainable fashion focuses on ecological integrity, social quality, and human development through products, actions, relationships, and usage practices (Mukendi, 2019). One approach that is in line and often used in sustainable fashion is the "circular economy". Popularized by the Ellen MacArthur Foundation (*Circular Economy Introduction*), the circular economy is defined as "restorative and regenerative by design, aims to keep products, components, and materials at the highest utility and value overtime". In a circular economy, waste is considered a resource

(*Circular Economy Introduction*, Ellen MacArthur Foundation). Using textile waste as a resource can be achieved through reversing the logistics and thereby redistributing textiles in the supply chain at different stages.

The current linear economy, which is based on the “take, make, use, and dispose” process, has created unsustainable pattern of production and consumption, resulting in waste at every stage. This has led to a transition towards a circular economy model that promotes various types of reuse materials, components, and used products to support sustainable production and consumption processes (Sung, 2021). Recycling offers a promising alternative to the linear, massive production and consumption by reducing or even stopping the cycle of materials that only focuses on the use of raw materials. It combines various concepts and practices in circular economy, including repair, refurbishment, upgrade, reuse, repurpose, and remanufacture, which all have certain values and contribute to reducing the negative impact of environmental pollution, as well as benefiting society in terms of social and economic aspects (Sung, 2021).

3. METHODS

This research was located in Karangrejo Village, Pasuruan Regency, East Java. Karangrejo Village is one of the largest weaving centers in East Java, with the number of weaving craftsmen reaching six hundred people. This study uses a qualitative approach, which examines data by investigating social phenomena and human problems. According to Moleong (2019), data relating to the upcycle process of textile waste by Pable will be studied qualitatively, where the conditions and situation in Karangrejo Village will be examined directly through interviews, observation, and documentation.

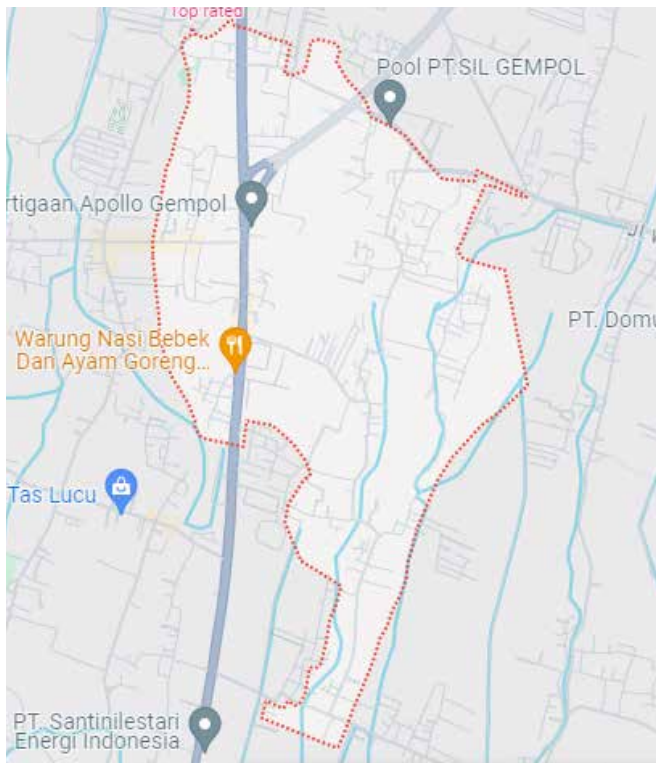


Figure 2 Karangrejo Village Map
(Source: Google Maps)

This research uses the case study research method, which is a method for studying, explaining, or interpreting a case in its natural context without any intervention from outside parties (Sutopo, 2006). The use of how and why questions is more emphasized in this method because both are considered appropriate to gain in-depth knowledge of the phenomena being studied, so that the question of how Pable’s sustainability in textile waste management can be answered. In addition, the form of this question will determine the strategy used to obtain data.

The case study method used is an explanatory case study, which is done when researchers are trying to answer a question that wants to explain alleged causal relationships in real-life interventions that are too complex (Nurahma and Hendriani, 2021). Explanatory case study can examine objects related to reasons regarding social, environmental and economic relations carried out by Pable, so as to achieve sustainability in its business model. Through this method, in-depth studies on the textile waste recycling program in Karangrejo Village with Pable will be conducted by examining the history, background, and production processed that the community continues to carry out. Case studies allow for the comprehensive analysis of real-life events, including organizational and managerial process, and help to retain their holistic and meaningful characteristics.

Meanwhile, to answer the question of how Pable’s sustainability in processing textile waste is studied with the theory of community empowerment. In the principle of social welfare development, there are 3 main points, including economic growth (financial and industrial), community care (education), and community concern (health, social welfare) (Suharto, 2009). All three will be the benchmark in this study.

The data that will be used in this research are primary and secondary. Each data will be obtained through the following data collection methods:

1. Interview, conducted by interviewing Ahmad Fauzi, the Head of Karangrejo Village and Aryenda Atma, the founder of Pable as the main informants, also Husni Mubarak as one of the textile business owner and Totok as one of the weavers in Karangrejo Village as the supporting informants. In order to explore the subjects’ perspectives on various useful aspects as the basis for data presentation and analysis, the interviews in this research are conducted openly and in-depth, both formally and informally, through meeting them in person and online through social media.
2. Observation, conducted by visiting the weavers in Karangrejo Village, Pasuruan. This is done by observing the daily activities of the craftsmen in Karangrejo Village, starting from the recycling thread spinning process and weaving process to the final finishing process of the products. The researcher only acts as an ‘observer’ by observing the entire production process and the impact of recycling in the community being studied, without being involved in the events.
3. Documentation is carried out using data from archives in the form of recorded images and writings, which are recorded, documented, and used to complete the data. Document recording is done through photo and video recordings so that the

researchers can review the information repeatedly after leaving the research location. Additionally, documentation can be used as evidence for research and material for producing outcomes.

4. RESULTS AND DISCUSSION

Karangrejo Village is located in Pasuruan Regency, East Java, where most of the residents work as weavers specializing in cloth napkins and doormats. Weavers in Karangrejo Village use both non-machine looms and machine looms for production, which depends on the product types. According to the interview with the Head of Karangrejo Village, Ahmad Fauzi, weaving has been a tradition that has been passed down through generations since the 1960s. Initially, it was done as a side job alongside farming, while waiting for the harvest time. However, over time, weaving has become the primary profession for most people in Karangrejo Village.



Figure 3 Karangrejo Village
(Source: Personal Documentation)

Originally, these weavers worked on weaving sarongs for Kamajaya Tex Factory. Over time, the community began to adopt machine looms that were typically used to produce sarong, resulting in a wider variety of woven products such as gauze, patchwork fabrics, tablecloths, and the consistent ones up until now are cloth napkins and doormats. However, the exploration of new products is done by the community themselves without any official assistance from the government or private sector collectively. Until now, each weaver has been working individually with the factory and private parties, which often leads to issues when a craftsman passes away. It becomes difficult to continue their business or even stops due to the lack of legally binding agreements. Moreover, the range of products produced is limited to doormats and napkins, which have relatively low selling prices.

In response to this, Pable as a start-up in the sociopreneur field began to enter Karangrejo Village in 2020. Pable has a circular economy business concept that is able to create job opportunities from sustainable community empowerment projects in Karangrejo Village, with the hope of creating an eco-friendly textile products environment that could help to improve the economy of the weaving community in Karangrejo Village through the circular economy business concept. Pable provides opportunities and insights for the people of Karangrejo Village in the form of product diversification to create innovative products. There are many chances and possibilities to create products with higher value from textile waste through the upcycle process.

The circular economy business concept implemented by Pable can create job opportunities from sustainable community empowerment projects in Karangrejo Village, Pasuruan. The implementation of a circular economy in Indonesia that is detailed from upstream to downstream is still very rare, because integrating stakeholders, government, media, academics, and other parties requires time and a complicated process. This form of circular economy changes the process of ‘take, make, then throw away’ from the linear economy by recycling waste or waste to extend the use value of products (*Pable’s Company Profile*).

Based on data obtained through interviews with Aryenda Atma as the founder of Pable, the application of the circular economy implemented by Pable stems from the utilization of solid textile waste which is used as the staple material for fabric products. This is in line with what was stated by the Ellen MacArthur Foundation, where ‘waste’ is positioned as the ‘raw’ material for production, in order to minimize the possibility of waste ending up in landfills. More than that, the decision to make ‘waste’ products the ‘raw’ material for production makes this form of economy much more careful in the use of natural resources, which is then expected to reduce the existing damage to the earth, especially those that caused by the textile and fashion industries.

The research and development process carried out by Pable related to the circular economy has been going on for 5 years even before Pable was officially founded, and its implementation begins with awareness about utilizing goods until they reach their maximum value. When an item’s usable level is almost used up, it can be recycled. In this context, Pable focuses on processing pre-consumer textile waste, which is technically easier to process because the material tends to be homogeneous, which makes it easier to decompose the material.

Based on the waste treatment process, Pable applies a method called a closed-loop system, which is a recycling method, where the material that is recycled is the same material that was produced, in other words a product enters the same production chain again after being used. The closed-loop system seeks to have products and their components designed, produced, used and handled well so that they can circulate in society for as long as possible. There are two main objectives in this system, namely to produce as little waste as possible, and to produce products that can be used by society optimally.

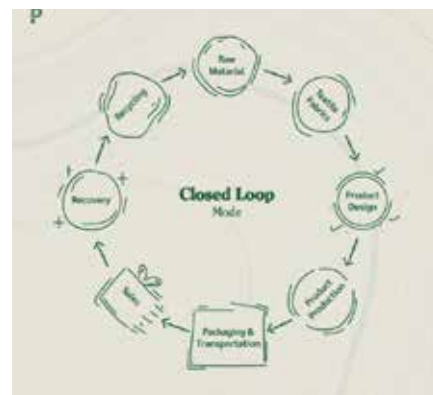


Figure 4 Pable waste treatment process through a closed loop system
(Source: Pable Company Profile)

Through the closed loop system method as shown in Figure 2, Pable's processing of textile waste begins by collecting solid textile wastes obtained through the drop box. These textile wastes are obtained from various textile factories in Surabaya and other cities in Indonesia. The solid textile waste that collected through this drop box will be sorted first based on the material and the color. In its textile recycling process, there is no color dyeing process, so the fabric colors are produced by sorting the waste based on its color. Furthermore, additional materials that cannot be recycled such as buttons, zippers, labels, and other non-fabric materials will be separated. Then, the solid textile waste which has been separated based on the material and color will be cut into a certain size and processed into fiber so that it returns to raw materials.

This process utilizes mechanical recycling techniques, which involve cutting textile manually without any use of chemicals. One limitation of mechanical recycling is the shortening of fibers during the crushing process. As a result, the production of the new yarn often necessitates mixing recycled fibers with virgin fibers to achieve the required strength and quality for recycled textile materials, particularly those used as raw materials in clothing (Ribul, 2021). This mechanical recycling method has been implemented on an industrial scale for recycling cotton fiber waste (Ribul, 2021).

Entering the next stage, the raw fibre materials are then woven. This process does not involve color dyeing, as the colors are obtained from the solid waste that have been sorted according to each color. This not only benefits in terms of material effectiveness, time, and energy in production but is also environmentally friendly as it does not require water and dye substances that can cause pollution. This process still produces new waste in the final stage of the production, which then can be utilized by other craftsmen outside Karangrejo Village such as stuffing for dolls, thin mattresses, and others.

The fabric produced from this entire process are plain and striped woven fabrics with a width of 90 cm. In terms of product, Pable deliberately does not process the woven fabric into finished products in the hope that consumers can freely create these fabrics according to their individual needs and tastes. Thus, consumers can contribute more in utilizing these products to reach their maximum value.



Figure 6 Collection of recycled fabrics by Pable (Source: Pable Company Profile)



Figure 5: Recycled threads that have been set in a non-machine loom. (Source: Personal Documentation)

Pable applies structural design to their textile products, which means the designs are created directly on the woven construction itself using a weaving tool. The plain weave and striped weave designs focus on exploring the combination of colors between warp and weft, so even though the resulting designs tend to be simple, the colors produced are quite diverse.

The simple-looking designs of Pable's textiles generally take inspiration from Karangrejo Village's most popular products, such as patterned tablecloths and napkins. This inspiration gave birth to the Malet motif, which has developed into more valuable products. Pable does this to maintain the identity of the weaving community in Karangrejo Village who are widely known as weavers of tablecloths, napkins, doormats, and folding mats. Additionally, this also aims to show that a design like this can look good when it is applied to wearable products because this kind of design is timeless.





Figure 7 The catalogue of Pable's recycled textile
(Source: Website pable.id)

In their activities, Pable involves empowering the village community which is in line with the vision and mission they hold, including Profit, People, Planet, and Purpose. Profit refers to healthy profit margins, a sustainable business model, positive cash flow and good costs. People are related to human relations, from managing consumer expectations, treating everyone with respect and equality, and community to collaborating. Planet is related to the environment and waste management, which is realized by responsible waste management. Purpose emphasizes ways to achieve the objectives of the entire activity flow, namely by providing new materials, increasing waste collection, and increasing the volume of recycling.

5. CONCLUSION

Pable carries out textile waste processing by involving the community in Karangrejo Village who have been making a living as weavers of doormats and cloth napkins with educative, social, and economic approach through the circular economy business concept and closed loop recycling system. This concept and system mean making the most of goods, and when their use value is almost used up, these goods can be reused through the recycling process. Pable focuses on processing pre-consumer textile waste into recycled textile products, which are technically easier to process because the material tends to be homogeneous, which makes it easier to decompose. The result is plain and striped manual woven fabrics, which are deliberately not further processed into ready-to-wear products, with the aim that consumers can create these fabrics according to their needs and desires so that consumers can participate and contribute in utilizing these clothes to reach their maximum value. In addition, this woven fabric has a higher selling power than the cloth napkins and doormats which weavers of Karangrejo Village have been making for years, so it can increase their income.

This textile recycling process is not the answer to the journey cycle of the clothes we wear, but rather the last way to reuse the function of clothes when the value of their suitability has reached its minimum point. This is also a note for Pable to keep on researching and continue to innovate in order to have a better impact on the earth. The process of empowering the Karangrejo Village community through educational, social, and economic approaches needs to be further enhanced so that the community can be more independent and able to produce a more diverse range of textile products. In addition, it is

hoped that this activity can be better known in a wider scope so that it is more understood and understood by the general public.

On the other hand, from academics, there are not many studies that examine textile waste recycling programs and their relationship to the environment and community empowerment. Furthermore, it is hoped that there will be further research related to this topic with a more progressive discussion. Thus, it is hoped that this topic will be able to enrich the scientific knowledge in the field of Textile Crafts and its impact on fashion products, and can be applied in the textile and fashion industry in a real way to reduce the environmental and socio-economic impacts caused by this industry.

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