

INNOVATION IN PATCHWORK WASTE PROCESSING USING *FABRIC MANIPULATING TECHNIQUES AND DESIGN THINKING APPROACH*

**Wulan Madani Aisyiah¹, Didit Widiatmoko Soewardikoen², Hanif Azhar³,
Mahendra Nurhadiansyah⁴**

Master of Design, Faculty of Creative Industries, Telkom University

Email: wulanmadani@gmail.com¹ diditwidiatmoko@telkomuniversity.ac.id²

hanifazhar@telkomuniversity.ac.id³ mahendrainterior@telkomuniversity.ac.id⁴

Abstract

Fashion waste is a global concern due to its large production volume. Therefore, waste management is a major concern in the industry to reduce negative impacts on the environment. The case study in this study is on a garment factory on Jalan Tamim. The waste produced by this garment needs to be considered in environmental management on Jalan Tamim Bandung. It highlights the urgency of implementing more sustainable production practice innovations by utilizing fabric scraps. The design approach method is used to provide a deep understanding of the problem's urgency that can produce design solutions with the Design Thinking stages, namely, emphasizing, defining, ideating, prototyping, and testing. The design results are expected to be an alternative strategy for utilizing fabric scraps in the context of sustainable fashion using fabric manipulation techniques

Keywords: Patchwork waste; Patchwork; Sustainable fashion; Fabric manipulation techniques

Introduction

Indonesia's rapid growth can contribute to the main driver of the national and even global economy, especially in big cities such as Bandung (Rustiadi et al., 2021). As one of Indonesia's largest textile production centres, Bandung has many confectionery factories that produce garments for local and international markets. However, the rapid growth of the textile industry also has a significant negative impact, one of which is the problem of patchwork waste left over from confectionery production. The textile and garment confectionery industries are included in the manufacturing sector, which recorded the highest growth in the third quarter of 2019 of 15.8%. (Kemenprin, 2019)

Environmental data statistics show that *fashion* waste (patchwork and clothing) is the second largest waste after plastic, with more than 92 million tonnes of *fashion* waste ending up in landfills yearly. The problem is further complicated because fabric waste is difficult to decompose in landfills, causing severe environmental impacts (Siddiqua, Hahladakis, & Al-Attiya, 2022). With this problem, the *fashion industry* has begun to adopt the concept of *sustainable fashion*. to create environmentally friendly products. *Sustainable fashion* aims to change the paradigm of the *fashion* industry towards more

responsible and sustainable practices as a whole (Kulsum in Irmawati et al., 2021). Apart from the impact of the fashion industry, the implementation of *sustainable fashion* among the public still faces various challenges. Awareness of the importance of waste utilization is still low among the community, especially industry players. The lack of innovation on waste utilization is also an obstacle in driving change towards more sustainable practices in the fashion world (Todeschini, Cortimiglia, Callegaro-de-Menezes, & Ghezzi, 2017).

Today's *fashion* industry plays a key role in meeting people's needs for clothing, which is often influenced by ever-changing trends. Fierce competition and high market demand encourage industry players, including clothing confectionery, to continue producing without considering the environmental impact of the textile waste produced (Schmutz & Som, 2022). One of them is the confectionery industry on Jalan Tamim Bandung.

Along Jalan Tamim are many tailors or confectioners, including Taylor Jeans, Warung Jeans, Teddy Collection, and others. The confectionery offers clothing manufacturing services from various materials, including denim. One of the famous confectionery on Jalan Tamim is Taylor Jeans, which was established since 1998 and is known for its services for making jeans and other clothes and Warung Jeans is also famous for its confectionery of making pants and clothes with various types of fabrics. However, like many other confectionery, Taylor Jeans and Warung Jeans also face the problem of waste from leftover pieces of production fabric that are piling up every month. This waste creates a serious challenge in environmental management on Jalan Tamim Bandung and highlights the urgency to implement more sustainable production-practice innovations in the confectionery industry.

Confectionery on Jalan Tamim Bandung is an object for processing leftover fabric waste by implementing the SDGs approach number 8 emphasizing the importance of inclusive and sustainable economic growth and decent work for everyone. This innovation in the use of cerca fabric waste will use the concept of *upcycle*, and creativity is needed from actors, both designers and industries, to improve skills and sustainable innovation to produce products that have functional and aesthetic value by increasing the product value from waste

Research Methods

The research approach uses the design approach, which provides an in-depth understanding of the problem's urgency and can produce design solutions. This approach involves the visual aspects of the design work, the role of the creator of the work, and the influence the design user feels. This process aims to develop a comprehensive understanding of design as the right solution. In its stages, using (Soewardikoen, 2021) *design thinking* is the process of finding solutions collaboratively with a practical rather than theoretical nature. Definition of *design thinking*: "*Design thinking is a human-centred and collaborative approach to problem-solving that is creative, iterative and practical*". There are five key steps to forming a methodology (Brown, 2008) *Design Thinking: Empathize, Define, Ideation, Prototype and Test*.

Emphasizing (empathy) is the most important stage in design thinking, observing and understanding directly to feel what consumers want. Phase *Define*, that is, analyze the data collected during the empathize stage to identify the problem. Phase *Ideation*: This is the stage of starting to explore solutions. The ideas in this stage will become *prototypes* that can be tested with targets. This stage uses creative thinking and out-of-the-box thinking to develop a creative solution. Phase *Prototype*: An idea was generated at a previous stage, and this prototype does not have to be a finished product. At this stage, it is intended to convey possible solutions, such as sketches, models, and digital. (Gupta, 2023)

Furthermore, conducting observations and interviews by *purposive sampling* is one of the techniques used in *Non-sampling* random. Namely, the researcher determines sampling by determining special characteristics according to the goals to be achieved based on the results of data collection that the population has obtained and the samples taken, namely confectionery on Jalan Tamim Bandung, one of which is Taylor Jeans and Warung Jeans confectionery (Soewardikoen, 2021).

Results and Discussion

Result

Emphasize

Jalan Tamim is a traditional market and denim fabric hub that offers more affordable prices than other places. In addition to denim, Jalan Tamim offers various other fabrics such as cotton, canvas, and satin. Along Tamim Street are many tailors or confectioners, including Taylor Jeans, Warung Jeans, Rere Teddy Collection, and others. The confectionery offers clothing manufacturing services from various materials, including denim.

Taylor Jeans Confectionery, one of the confectionery located on Jalan Tamim, was established in 1998, and started confectionery sewing services in 2001. The clothes sewn are jeans, chinos, shirts, jackets, and PDL. The price of unit sewing services starts from Rp. 130,000-190,000 and the price per dozen Rp. 100,000-150,000, with a turnover per month reaching Rp. 50,000,000-150,000,000. This confectionery produces waste left over from production that is not well considered. There are two types of waste, including patchwork waste, namely small pieces and large waste with dimensions of \pm 40-70 cm. The waste is usually just thrown into the landfill, and some are sold such as large waste sold per kg at a price tag of Rp. 13,000 to Rp. 15,000 depending on the type of material.



Figure 1. Taylor Jeans Confectionery Interview March 6, 2024

Teddy Collection Confectionery is a confectionery company located in Jalan Tamim, Bandung, which was established in 2000. Teddy Collection accepts sewing

services in jeans, chinos, shirts, jackets, PDL, and unit sewing service prices starting from Rp. 130,000-Rp. 190,000 and per dozen starting from Rp. 100,000-Rp. 150,000, with a monthly turnover of Rp. 75,000,000-Rp. 150,000,000. This confectionery produces waste that is piled up in large sacks and in one month can reach 16 sacks; in this confectionery, there is no special shelter for waste left over from production. The most waste here is denim fabric from leftover pieces of production.



Figure 2. Teddy Collection Confection Interview May 8, 2024

Define

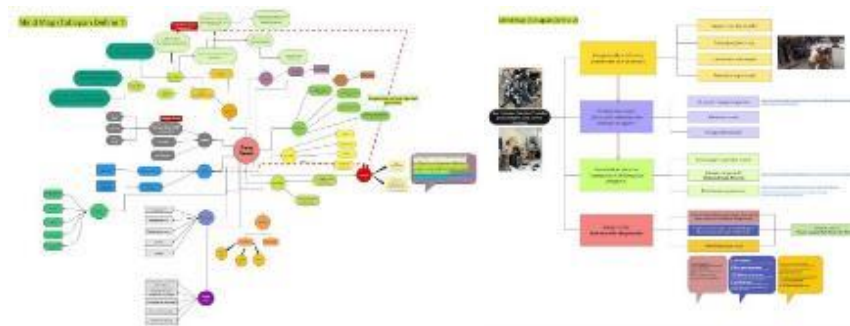


Figure 3. Data Mapping 360

In the process, *Brainstorming* By using the 360 data mapping method to answer 5W1H and *Product, Place, Promotion, and Price*, which includes history, facilities, policies, technology, competitors, intermediaries, environmental conditions, suppliers, financiers, strategic plans, work processes, human resources, and *End-user*. From this data, it can be concluded that Jalan Tamim is a very strategic fabric centre in the middle of Bandung and has been known as a fabric sales centre since 1960. So, there are many opportunities for shops in the street area to offer various types of fabrics, namely denim, cotton, corduroy, satin, and others. In addition to the fabric centre, Tamim Street also offers production services, namely confectionery. This confectionery is a home industry offering large quantities of clothing production services. The confectionery on Tamim Street plays an important role in the community's economic growth. Confectionery on Jalan Tamim includes Taylor Jeans, Teddy collection, Warung Jeans, and others.

From this 360 mapping, the researcher found a problem that occurred in the confection of Jalan Tamim Bandung, namely in the rest of the fabric produced by making clothes. Fabric waste produced at the confectionery on Jalan Tamim Bandung is an urgent problem because there is no place to distribute or dispose of fabric waste. Waste patchwork leftover production is disposed of along with cigarette, beverage and plastic waste collected in large plastic bags or sacks.

Ideate

An innovative strategy for waste utilization that can produce sustainable products from leftover textile waste using the upcycle concept of processing.

The waste treatment process requires several *fabric manipulation techniques* to support *upcycling* from waste left over from confectionery production on Jalan Tamim, Bandung. Covering Techniques:

1. **Fabric Slashing Technique:**

Technique *fabric slashing* is a method of manipulating fabric by concentrating several pieces of fabric to produce a desired shape or pattern according to its design. This technique cuts the surface of the fabric according to the line or pattern to produce a texture on the surface of the fabric.(Harianti & Damayanti, 2022)

2. **Patchwork Techniques**

Technique *Patchwork* is a method of combining several patchwork fabrics so as to produce a new shape by hand or machine sewn. *Patchwork* can be combined with matte lace and quilt application techniques. (Juliana, 2022)

3. **Quilting Technique:**

Technique *Quilting* It is a craft art that combines small patchwork sewn together. Quilting is also a piercing sewing technique that can perfect the fabric. The process can follow the sewing flow made in the *Patchwork*, And this technique can use dakron foam on the fabric sheets, making the fabric more voluminous and warm. (Juliana, 2022)

Of the three techniques, namely *fabric slashing technique*, patchwork technique, and *quilting technique*, the three techniques are considered to have the potential to be used in the waste processing process of production waste at Taylor Jeans and Warung Jeans confectionery. The confectionery produces two wastes that are quite varied, including small waste that is included in patchwork waste, leftover small pieces, and large waste that has pieces with dimensions of approximately 50 cm x 70 cm. This stage of waste treatment includes:

- a. Merger of small and large waste materials
- b. Classification of waste materials by distribution: size, types and thickness
- c. Product design concepts based on trends and fashion models that are in high demand, timeless, and unique from the perspective of *upcycle*, using fabric manipulation techniques.

Prototype

1. **Exploration:**

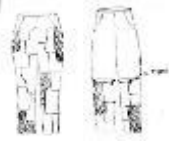



Table 1. Exploration Results

No.	Fabric Manipulation Techniques	Waste used	Result
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1	Fabric Slashing <i>Technique</i>	Patchwork waste and large-dimensional waste	
2	Patchwork Techniques	Large-dimensional waste	
3	Quilting Techniques	Patchwork waste, large-dimensional waste, and tulle	
4	Quilting Techniques	Patchwork waste, large-dimensional waste, and tulle	

Sketch

Table 2. *Sketch*

No.	Fabric Manipulation <i>Techniques</i>	<i>Sketch</i>
1	Patchwork <i>Technique</i> , Fabric Slashing <i>Technique</i>	
2	Patchwork <i>Technique</i> , Fabric Slashing <i>Technique</i>	
3	Quilting <i>Techniques</i>	
4	Patchwork <i>Techniques</i> , <i>Quilting</i>	

<i>Techniques</i>	
5	Patchwork Techniques, Quilting Techniques, and Fabric Slashing Techniques
6	Fabric Slashing Technique

Testing

At this stage, Textile Waste Treatment Innovation is a waste treatment design from a creative idea and a *prototype* stage that seeks to improve sustainable skills so as to produce products that have functional and aesthetic value by increasing the value of waste. Utilizing leftover textile waste from production also contributes to the dominance of textile waste from leftover production. Although the confectionery testing stage has not yet been completed, it is important to plan this process together to ensure the purpose of this research.

The *testing* stage can be carried out by collecting several data such as surveys of the community and confectioners, in-depth interviews, observations, and documentation. This was carried out to find out the skills and views on innovation strategies for waste treatment of production waste in the context of *sustainable fashion*

Conclusion

Based on the results of this study, it contains a process of designing innovations in the utilization of waste from production in the Jalan Tamin confectionery. This process uses the *stages of design thinking* so that the design process to answer an urgent problem is carried out in a structured manner.

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