



Transforming Fashion Waste Into Circular Interior Products: A Study on Upcycling Material Innovation

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Abstract. The fashion sector is a major contributor to textile waste worldwide. The volume of waste generated by this industry increases each year and, if not managed optimally, poses a risk of future environmental pollution. One solution that could help overcome this problem is to apply a fashion industry waste recycling technique that processes textile and fashion waste into new products with aesthetic, use, and economic value. The purpose of this study is to analyze the use of fashion and textile recycled waste as materials that have innovative value in producing interior goods. This study uses a descriptive qualitative methodology by collecting data on processing methods and the potential of interior goods that can be produced from the processing of textile and fashion recycled waste. The findings of this study show that textile materials such as polyester, denim, cotton, leather, and other supporting materials can be reprocessed into innovative interior elements by utilizing techniques such as weaving, patchwork, soumak, and other techniques. The resulting interior objects have aesthetic value and embody the principles of sustainability and environmental management that aim to minimize waste and improve the circular economy.

Keywords: interior design products, sustainable materials, sustainable design, upcycling fashion

1 Introduction

The fashion industry is one of the industries that contributes significantly to the increase in the amount of textile waste globally. In the absence of an effective waste management system, the industry is a major contributor to significant environmental pollution. cited in the Ministry of Finance of the Republic of Indonesia, 2023), global textile waste production amounts to around 92 million tons per year. Most of that waste is stored in landfills or incinerated, and this worsens environmental conditions over time. Textile and fashion waste is not only a local problem, but it is also becoming a problem experienced around the world, and this requires special attention from various parties, namely manufacturers, consumers, and the government.

Effective management of fashion and textile waste can improve environmental conservation and overcome the problems of production systems and excessive consumption. Fashion recycling methods have developed as an alternative and innovation to

create an item that has sustainable value. Recycling is the practice of reusing materials that become waste and then producing new items that have an even higher use value, aesthetic value, and economic value than the original item. Materials sourced from textile waste that have great potential for reuse are waste materials from the garment industry, including surplus materials, small fabric scraps, rejected textiles, or unsold fabrics. This waste can be turned into various types of interior items, including tablecloths, curtains, seat covers, and other interior elements. The rest of the fabric can serve as an alternative material in the manufacture of interior design products. This article seeks to thoroughly examine the possibilities that can be produced by recycling fashion waste materials as innovations in interior product design [1].

2 Literature Review

Recycling comes from the English term "up", which means improvement, and the word "recycling" refers to the process of reconstructing materials to increase added value, both aesthetically, use-value, and economic value. According to McDonough and , recycling is a process that involves reusing damaged and unused materials into new items without reducing their original value or quality, while retaining their basic characteristics [2].

emphasized that sustainability in product design can be achieved by considering several important factors, including the selection of environmentally friendly materials to reduce adverse impacts on the environment. Furthermore, the production process must be carried out properly and ethically, taking into account environmental and human factors. The optimal utilization of the product also considers the process of use and the maintenance process. In addition, the recycling process can extend the life of the product, and this is one of the techniques to reduce consumption and waste levels. Products that offer advantages in the economic and social spheres must consider not only environmental friendliness, but also sustainable design. Sustainable products have the goal of maintaining use value and relevance for future generations. This requires planning from the beginning to achieve the goal of reducing adverse impacts on society and the environment [3].

Recycling fashion and textile waste, such as excess fabrics from the sewing process, rejected materials, and misprinted textiles, can turn these materials into viable interior décor items to foster circular economy principles. Traditional techniques such as weaving and patchwork have shown success in turning fashion and textile waste into practical goods that have greater aesthetic and economic value than the original materials [4].

A study by D. Jin et al. The anticipated global increase in fashion industry waste will increase to 150 million tons by 2030. This causes the need for more sophisticated recycling technology than the current conventional techniques. One of them is a high-temperature thermal compression technique that can explore a variety of textile melting temperatures, so that it can turn textile waste into building construction materials that have strength and durability. In this study, it was found that the upcycling approach can have interior aesthetic value that includes the discovery of materials that improve the function of building materials [5].

Consumer creativity and concern for the public environment are motives that can encourage public interest in learning recycling procedures and also buying products derived from recycling. Recycling is one of the creative efforts that requires aesthetic and innovative thinking in transforming the value of materials that have no use value into products with premium value [6].

A study conducted shows that the innovative use of textile and fashion waste can function as one of the environmentally friendly interior design solutions to alleviate the accumulation of waste due to fast fashion consumption. The researchers used innovative and creative design methods to research the transformation of leftover fashion, fabrics, and used clothing into acoustic wall panels that can control and reduce noise levels. Modular acoustic panels derived from fashion recycling are made by the compression method with natural adhesives, resulting in materials that have aesthetic appeal and improve the standards of acoustic health and comfort [7].

3 Methodology

This study uses a descriptive qualitative methodology to investigate the possibility of fashion waste as a new raw material in interior design. The stages of the research are arranged as follows:

- a) A Subsection Sample Research Data Collection Techniques collected from three main sources, namely:
 - (i). The literature, which analyzes theories related to recycling techniques with textile and fashion waste materials, sustainable design, and its relation to the circular economy.
 - (ii). Interviews are conducted by involving industry professionals related to the fashion upcycling process, including the Creative Director of KasihiinBaju.id. This interview was conducted to obtain primary data on the origin of textile and fashion waste, sorting methods, and characteristics of the materials used.
 - (iii). Visual observation, which involves collecting visual data from various digital platforms, including Instagram (@setali.indonesia) and Pinterest, to obtain trends and various methods of utilizing recycled textile and fashion materials that produce interior decoration items.
- b) The research target examines the elements of interior decoration items that utilize basic materials derived from textile and fashion waste, including polyester, denim, cotton, and leather.
- c) Data Analysis Phase. The collected data is then examined through several stages:
 - (i). Identify materials, namely by categorizing textile waste according to its material

composition, texture, and origin.

- (ii). Analysis of production innovations, namely reviewing various methods in the textile and fashion upcycling process, such as weaving, patchwork, soumak, knot, and closed-loop weaving.
- (iii). Sustainability value analysis, which is to review the extent to which the application of materials that go through the fashion upcycling engineering process complies with sustainable design principles, extends the life cycle of products, and reduces environmental impact.

4 Results and Discussion

Jendra (Creative Director of KasihinBaju.id) stated that the main source of used fashion materials comes from surplus fabrics from tailors or community donations. This waste consists of various forms, including patchwork and used clothes, which are then sorted manually and categorized according to the type of material, size, color, and texture [8]. Jendra stated that among the 300 kilograms of fashion and textile waste collected from tailors, it was found that the dominant material was cotton fabric, which consisted of about 80% cotton fabric, and the rest consisted of synthetic materials, such as nylon, polyester, rayon, and wool [1]. This shows that most textile waste has a consistent material composition and is suitable for reprocessing in the interior design realm. According to Jendra, the garment industry produces textile waste that is suitable for reuse, even if the condition of the fabric does not meet QC, such as fabrics with damaged seams, mismatched fabrics, and visually damaged fabrics, such as those that are miscolored or perforated [9]. There are several stages in turning fashion waste or waste into elements and interior decoration items, including:

4.1 Technical Transformation of Change From Waste to Interior Products

Waste treatment procedures are currently more commonly done manually by sorting according to the type of material, size, color, and texture. The results of the sorting will then be processed according to the character of each textile material. There are several techniques for turning materials derived from fashion waste into interior objects, including:

- (i). The Patchwork technique, which is to arrange small segments of fabric with various motifs (size 10-15 cm) to create a repetitive design pattern, both vertically and horizontally. This method can be used to create interior elements that require a large surface area, such as tablecloths, bed linens, window blinds, footrests, armrests, and more.



Fig. 1. Patchwork technique.

- (ii). The Soumak technique, which is a traditional weaving method that is a flat weaving technique, but produces a thick and prominent texture. This technique results in a unique, strong, and tough texture that visually resembles embroidery (see Figure 2).



Fig. 2. Soumak technique.

- (iii). The Knot technique, which is a technique that uses small pieces of fabric (0.5–4 inches) tied sequentially to nylon ropes, is different from patchwork. (see Figure 3).



Fig. 3. Knot technique

- (iv). Closed-loop weaving: Used exclusively on denim fabrics that have undergone recycling to produce sustainable carpet products.

4.2 Fabric and Fashion Waste Application for Interior Product Elements

The utilization of recycled materials in interior design can include several aspects of the space, including ceilings, floors, walls, and furniture. The materials used come from fashion waste that has been cleaned and sorted, then reprocessed into new products that can realize the spirit of sustainability and environmental awareness. Recycled materials for fabrics and fashion have a use value and aesthetic value that can be used on various elements of the space. The resulting products not only go through a creative design process but also apply the principles of sustainable design and the circular economy. The following are examples of interior products produced through the fashion upcycling method.



Fig . 4. Upcycling carpet with denim material

Fig. 4 is the result of the application of fashion upcycling derived from denim material. This work belongs to Setali Indonesia, a non-profit organization dedicated to addressing waste problems. Setali Indonesia's works are quite diverse. The works are made from discarded fashion remnants, then recreated into new items using various merging and creation techniques. The work in Figure 4 is the carpet used, which is made of denim and uses closed-loop weaving technology. Denim is known as a material with a thick structure that has exceptional durability. In denim recycling, the strong fabric structure is reused through weaving and rearrangement procedures, resulting in a carpet creation. The density of denim fibers causes this material to have thermal and acoustic insulation that is beneficial for indoor use.



Fig. 5. Elements of interior decoration wall hanging.

This wall hanger is made using the soumak technique. Soumak is a traditional weaving process prevalent in carpet and textile production, originating from the cultures of the Caucasus, Turkey, Iran, and Central Asia. The technique produces a strong and unique feel. The result of this technique: the fabric is processed so that it produces graphics similar to embroidery or decorative stitching. This technique prioritizes surface engineering, so the resulting texture creates the illusion of space. The results of this work show that the material has the ability to be a decoration with high durability and modern aesthetic appeal. (Figure 2)

Suteja (2023) provides various recommendations for repurposing used clothes into new materials or products for interior spaces. One of them is the manufacture of material surfaces that utilize woven denim as the main material. This weaving technique has potential for other interior products, such as those woven from denim cuts, as illustrated in Figure 6. Recycled denim fabrics that utilize weaving techniques have the properties and aesthetics necessary to replace conventional upholstery materials in furniture, due to their durable and strong properties [10].



Fig. 6. Example of a woven chair with denim recycled material.

The leather base material can also be modified as needed, for example, making a chair seat using an unused belt and utilizing weaving techniques, as illustrated in Figure 7 below. The method of weaving leather from reused belts can result in a distinctive tactile experience for the user.



Fig. 7. Recycling leather as a seat holder.

Fashion upcycling can also be applied to lampshade products, one of which is by using woven fabric ribbons. The design of this lampshade is an example of the idea of a circular economy, where the life of unused materials is extended through innovative methods (see Figure 8).



Fig. 8. Recycling fabric Tape Into a lampshade with weaving technique.

Other products that can be produced by fashion and textile upcycling include window blinds, footrests, armrests, table mats, and doormats. The method that can be used is the patchwork technique, which involves combining small pieces of fabric that are arranged and sewn together so that they become a large surface, so that they will be usable.

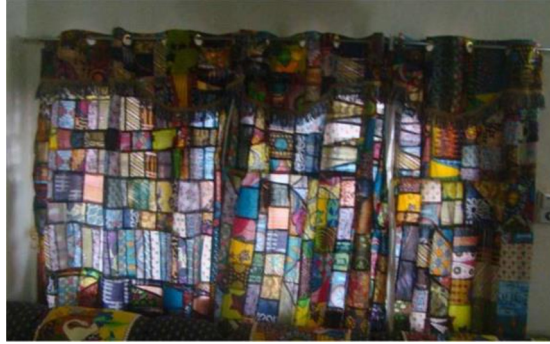


Fig. 9. Recycled window blinds

Sources: (Sai & Acquaye, 2022)

The production process of interior goods using the patchwork method for joining begins with arranging small pieces of fabric measuring 4-6 inches, which are then sewn together to produce a horizontal rhythmic pattern (Figure 9). Incorporation of many threads and fabrics (including motif, plain, and satin fabrics). The Patchwork technique can also be applied to other interior decoration products such as footrests, table mats, and sitting cushions (figures 10, 11, 12)



Fig. 10. Upcycling textiles with patchwork technique for footrest

Source : (Sai & Acquaye, 2022)



Fig. 11. Upcycling textiles with patchwork technique for tablecloths

Source : (Sai & Acquaye, 2022)



Fig. 12. Upcycling textiles with patchwork technique for sitting pillows

Sources: (Sai & Acquaye, 2022)

The mat in Figure 13 uses a knot technique that requires pieces of fabric to be segmented, then joined together by sewing technique with nylon thread, and finally connected each piece sequentially in a row-by-row arrangement to produce a surface that has a unique texture.



Fig. 13. Recycling doormats [1].

4.3 Value-Added Analysis and Sustainable Design

Design not only results in aesthetic added value but also realizes circular economy ideas. These innovations can extend the life cycle of clothing, so it can be one way to prevent the disposal of textile waste in landfills. This can reduce the environmental impact of the disposal of nearly 92 million tons of textile waste worldwide each year. The use of this textile waste material results in a distinctive and unique product (limited edition), so it has greater economic value than the original material. These creative innovations in utilizing fashion waste meet sustainability criteria by reducing the consumption of new resources. Fabric waste should be considered not only as waste, but also as a rich resource capable of driving economic development, promoting environmental sustainability, and inspiring aesthetic innovation efforts [11].

According to a study conducted, it was found that the reuse of unused materials is the most effective method to extend the life cycle of products while minimizing operational costs and energy use. Upcycling can address environmental issues while also serving as an artistic medium that encourages innovation and unique aesthetic expression. Many challenges are faced in the formation of a recycling culture, including inadequate public awareness, price increases for certain processes, a lack of specialized technical expertise, and challenges in obtaining good-quality recycled materials [12].

5 Conclusion and Recommendation

Waste from the fashion industry presents something that significantly affects the use of recycled resources in interior design. The technology used in the upcycling production process can turn textile materials such as denim, cotton, polyester, and second-hand clothing into high-value interior products, such as lampshades, curtains, carpets, upholstery for chairs, and other interior decoration products. The resulting products are not only functionally and visually appealing, but can also promote the principles of sustainable design and the circular economy. Waste materials can be transformed into uniquely designed items through processes such as patchwork, soumak, and knot. As a result, fashion recycling is an important advancement in ethical and sustainable home design, as well as in textile waste management.

The use of fashion waste as a recycling resource in interior product design presents significant potential as an innovative and ecological solution. This method allows the conversion of diverse waste materials, including denim, cotton, polyester, and old clothing, into interior items that have a use, aesthetic appeal, and economic value that is even superior compared to the original item before. In fact, when these materials are in the hands of designers with their ability to innovate and creativity, they can produce items with high novelty value and are economically valued as limited edition items. Research shows that fashion waste materials can be used effectively in a variety of interior components, including carpets, upholstery, curtains, and wall decorations. The transformation of waste materials into new goods is facilitated by the application of certain manual engineering processing procedures. The utilization of fashion recycling in interior design not only serves to produce visually distinctive items but also as a

strategic innovation that promotes sustainable design practices and facilitates the circular economy. By extending the life cycle of textile waste, the interior design sector can significantly reduce the effects of global environmental pollution. Recycling shows that textile waste is not only a by-product of production, but a valuable resource that is able to drive economic growth while protecting the environment.

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