Reused jeans for upholstery of Jepara chairs— A design thinking towards a sustainable creative industry

A A S Fajarwati¹, O S Caroline², M Rafli³ and N Auliawan⁴

Interior Design Department, School of Design, Bina Nusantara University, Jakarta, Indonesia 11480

E-mail: ¹ade@binus.ac.id, ²baby@binus.ac.id

Abstract. The chair is one type of furniture that well-known in Jepara. Jepara is famous for its chair industry internationally. In Jepara, chairs use hardwood, such as Teak and Mahony, for its material and combination with textile for its upholstery. The idea of this research is to up-cycle reused jeans as upholstery for Jepara chairs. Denim is a fabric used to make jeans. Denim is one type of fabric whose manufacturing process is woven and uses blue cotton fiber. The use of reused jeans as the Jepara chair material is to create a different approach to design, help reduce the waste of unused jeans, and create a sustainable creative industry. This research aims to open the possibilities of using reused jeans as upholstery for the Jepara chair. By using the design thinking method and qualitative methodology on collecting data, this research will give a creative approach of collaborating reused jeans and Jepara carving skills. The result is the type of chair that looks casual and unique. It will be developed as a proposition for the young generation to consider the Jepara chair as their preferences.

Keywords: reused jeans, denim, Jepara chair, Jepara carving skill, sustainable creative industry

1. Introduction

Denim is a popular type of fabric and is one of the oldest materials globally and is known by many people. Jeans are widely applied in the form of pants, jackets, and various fashion accessories. Consumption of denim material is in high demand because it is considered comfortable and robust, with worldwide sales levels covering North America as much as 39%, Western Europe 20%, Japan and Korea 10%, and the rest, including Indonesia 31% [1]. As a tropical country that tends to choose clothing from cotton, Indonesia is a denim product user and an exporter of denim products, especially jeans. Denim is the fabric used to make jeans [2]. The amount of jeans usage in Indonesia produces secondhand trashes not only pre-consumer waste and environmental pollution but also the problem of unsaleable stock. Both denim and jeans manufacturing processes raise environmental concerns, and some viable options include washing with reduced water techniques and recycling denim waste, and using effluent treatment [3].

As the center of wood carving production in Indonesia, Jepara has produced tons of wooden chairs using fine craftsmanship. The craftsmanship inherited from generation to generation has become part of
the Jepara people's lives. However, recently, this craftsmanship has slowly begun to fade [4]. Young people tend to buy simple looks that easy to find in big retail furniture stores.

The team in Ruma Japara has developed the idea to upcycle the reused jeans as the material for Jepara chair to create a different approach to design, help reduce the secondhand trash of unused jeans by extending the life cycle of the jeans, and create a sustainable creative industry. This study aims to open the possibilities of upcycled the reused jeans as upholstery for the Jepara chair for the young generation (people under 30 years old) by using the design thinking method and qualitative methodology on collecting data. This research will give a creative approach to collaborating reused jeans and Jepara carving skills.

2. Literature review

2.1. Jeans and denim

Denim is a solid cotton warp confronted material in which the weft goes under two or more warp strings and considered as a strong cotton twill material. Ordinarily, it is used to make jeans, overalls, and other clothes. It is shaded blue with indigo color to make blue 'jeans'. However, 'jean' means an alternate and lighter cotton material [2]. The name is originated from constriction or subordinate of the French expression ‘Serge de Nîmes’. Types of denim are broadly categorized as dry, selvage, stretch, poly, and ramie cotton. Sustainability has turned into a unique selling proposition or unique selling point for some denim jeans producers [2].

The denim industry is associated with certain problems: denim waste that is composed of pre-consumer waste (clean waste), and postconsumer waste (secondhand trash), unsalable stock, and environmental pollution. Another problem is the metal accessories such as rivets and zippers used in jeans. Those have to be appropriately recycled [5]. To develop enough cotton to make one pair of Levi's jeans, it takes around 1800 gallons of water, not even mentioning the water needed to wash them properly. Jeans, a worldwide fashion, consistently offers roughly 6 billion pairs far and wide [2]. The sustainability issues of the denim industry consist of raw material (cotton), water management, energy management, environmental pollution, and social sustainability [5].

2.2. Jepara chair

Jepara chair is made by the craftsman in Jepara, who includes local techniques and material combined with a foreign culture, religion, and designs. It is a combination of an international style with a touch of local wisdom and the designer's signature style [6]. It uses local woods and Jepara's traditional techniques and tools that are dasar (basic), terampil (intermediate), and mahir (advance) for classic Jepara wood carving [4].

2.3. Design thinking

Design thinking is a human-centered approach to innovation that draws from the designer's toolkit to integrate people's needs, the possibilities of technology, and the requirements for business success [7]. Design thinking is also a design methodology that provides a solution-based approach to solving problems [8].

There are five stages of the design thinking model proposed by Stanford d.school [9]. First, empathize, the first stage of the design thinking process is to gain an emphatic understanding of the problem trying to be solved. Second, define, it is done by putting together the information that has been created and gathered during the empathize stage. The observations and synthesis will be analyzed. Third, Ideate, during this third stage of the design thinking process, designers are ready to start generating ideas. In this state, users can start to think outside of the box to identify new solutions to the problem statement that already created. They can start to look for alternative ways of viewing the problem. Fourth, prototype, this fourth stage is an experimental phase. The aim is to identify the best possible solution for each of the problems identified during the first three stages. Last, test, the result generated during the testing phase are used to redefine one or more problems and inform the understanding of the
users. During this phase, alterations and refinements are made to rule out problem solutions and derive as deep to understand the product and its users as possible.

3. Methodology

This research, conducted by the writers who were also the researchers at Ruma Japara, used the design thinking methodology. This study adapted the 5-step-model of the design thinking from the Stanford d.school (see Figure 1). The complete study was divided into two periods of research. The first period in this research includes empathize, define, and ideate. The second period that will be conducted next year includes prototype and test. Empathize is the needs and insights collected from empathy for the user. Define is based on the point of view, and the ‘design challenge’ is defined. Ideate means brainstorming and generating ideas as possible solutions. The prototype is a simple model of the possible solution. Test means testing solutions with users by gathering new insights [10].

This study carried three steps out of the five steps of the design thinking method. The first step, the empathize was to open an idea for the Jepara chair industry to combine the classic techniques with a casual textile. The define step was to challenge the designers to find the type of casual textile that was a favorite choice for the young generation. The ideate step was to develop the idea to use the reused jeans by providing a three-dimensional drawing. It combined the chair with the Jepara classic techniques and Jeans for the upholstery (Figure 2 to Figure 5) and provided the design pattern for the seater using the reused jeans by keeping the three unique detail of the jeans (the rivet, the back pocket, and the double stitches) (Figure 6 and Figure 7). The fourth step (prototype) and the final step (test) will be carried out in another study period and will be written in the separated paper.

![Diagram of the 5-steps-model of design thinking](image)

**Figure 1.** The 5-Steps-Model of Design Thinking Used by Ruma Japara Adapted from Stanford School.

4. Result and discussion

Jepara is one of Indonesia’s cities, which is known as a center for the manufacture of wooden furniture and carved furniture, especially chairs [11]. The superiority of Jepara wood products lies in their carving and carpentry techniques [12]. The type of wood used to make furniture Jepara is teak that grows well in limestone mountains in Java. Teak wood (*Tectona grandis*) that is durable, strong, has a unique profile. The motifs mostly done in Jepara are chair designs that are carved with flora motifs, circular motifs, and woven motifs.

The development designs of classic chair production in Jepara depend on the craftsmanship of the local people crafted as mass products [13]. The trend factor is needed to commodify chair production through aspects of design thinking such as style, theme, shape, size, material, texture, color, and ornament. Jepara furniture craftsmanship retains a more traditional side by hand made up to 80% compared to 20% using the machine. Motifs contained in Jepara carving are a fusion of traditional motifs and originating from foreign influence since around the 7th century to the early spread of Islam in the Nusantara archipelago [14]. The influence of the various parts of the world that occurred in Jepara also
affected the furniture models starting from production models of classic design, traditional, to Scandinavian design.

The development of traditionally carved furniture produced by Jepara craftsmen currently experiences a stagnant situation for the utilization of wood-based materials that are increasingly difficult to obtain. Consumer interest in carving chair is also declining because that design has not changed much over time. In addition, the expertise of the craftsmen is not worth the wages they get. Most of those who work as sculptors are above 50 years old, and the younger generation is no longer interested in continuing this expertise [15]. Classic and traditional carving motifs are increasingly difficult to do. However, it still remains a characteristic of the production of chairs from Jepara. The styled chair is also available in Scandinavian design styles, which is currently in great demand.

Scandinavian style has taken its popularity in the world since the past five years and influenced the Jepara furniture industries. This style is marked by the simple and functional furnishing that has a clean line and uses mostly natural material [16]. This design style is originated from the Nordic country (Denmark, Finland, Sweden, Norway, and Iceland), which comes in two ways: the promotional media and academic influence of their product design concept acquired by Indonesian studies in Scandinavian countries[17].

To develop a design chair in Jepara, we analyze the utilization of waste materials in the form of jeans design ideas that can solve sustainability problems. Denim has a character that can be explored in the design of chairs combined with Jepara wood carving materials [18]. There is a relationship between affective and cognitive processes in the form of visual input and touch. It affects the evaluative process of denim material by consumers. Denim material users evaluate the correlation between the sense of touch as a measure of thermo-physiological comfort, material durability, and psychological comfort. In contrast, visual input relates to the value of denim material, which is related to the color lightness. Denim material is divided into several types: dry denim (hard and stiff texture), washed denim (brighter and more flexible texture), pre-washed denim (similar to washed denim but emphasizing on the brightness at certain points), stretch denim (the texture is more elastic and bending), poly denim (lighter mixed polyester), ramie denim (mixed with ramie plant fiber), and selvedge denim (located on the side woven fabric) [19]. We can choose a suitable material that matches the chair design.

Figure 2 shows the chair designs produced in Jepara to use reused jeans as its seaters. There are three types of Jepara chairs that have been developed for the study. First, it is a retro chair made from local teakwood for its frame and rattan for its backrest. Second, it is Scandinavian chairs from local teak wood. Third, it is a classical rocking chair from local teak wood with a Garuda (the symbol of Indonesia) three-dimensional pattern carving for its top of the backrest.
Figure 2. The Typical Jepara Chair Design That has been Produced: 1. Retro Chair [20], 2. Scandinavian Chair [21], 3. Classical Rocking Chair [22].

Figures 4, 6, and 8 show the design developments by Ruma Japara adapted from design chair in Figure 2 and reused jeans as the upholstery. Each development keeps the jeans details (the rivet, the back pocket, and the double stitches) for the details pattern (see Figure 3). Figures 5, 7, and 9 show the details of the upholstery that uniquely refer to the jeans characters. The upholstery pattern is made from one pair of jeans that is cut into pieces. The pieces that have rivet, back pocket and double stitches elements will be used and double stitched as a patchwork.

Figure 3. The Details of the Jeans: (1) The Rivet, (2) The Back Pocket, and (3) The Double Stitches That are Kept as the Upholstery Patterns.
Figure 4. The design development by Ruma Japara, adapted from the first chair design in figure 2 and reused jeans as the upholstery.

Figure 5. The First Upholstery Pattern Chair (figure 4) by Keeping the Jeans Details (The Rivet, the Back Pocket, and the Double Stitches) for the Detail Patchwork.

Figure 6. The Design Development by Ruma Japara Adapted from the Second Chair Design in Figure 2 and Reused Jeans as the Upholstery.
Figure 7. The Second Upholstery Pattern Chair (Figure 4) by Keeping the Jeans Details (The Rivet, The Back Pocket, and The Double Stitches) for the Detail Patchwork.

Figure 8. The Design Development by Ruma Japara Adapted from the Third Chair Design in Figure 2 and Reused Jeans as the Upholstery.

Figure 9. The Third Upholstery Pattern Chair (Figure 4) by Keeping the Jeans Details (The Rivet, The Back Pocket, and The Double Stitches) for the Detail Patchwork.
5. Conclusion and suggestion

Jeans waste is a big problem that needs to be solved from various views to create a sustainable industry. The concept of reuse and upcycle becomes one of the views that can be developed from the designer's view to create a sustainable creative industry. Development of ideas through design thinking that is applied to Jepara furniture by utilizing reused jeans as its upholstery is one way that can be done as an alternative to penetrating the current furniture market competition. The design of the Jepara chair for the young generation and the effort to solve the secondhand trash using the design thinking methodology produces a unique creative design. The result is the type of chair that looks casual and unique. It will be developed as a proposition for the young generation to consider the Jepara chair as their preferences. For future research, it is necessary to research the processing technique using reused jeans for the upholstery. Another suggestion is to get more details of style that refer to the target market of the young generations (people who are under 30 years old).

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