Implementation of Jepara wood carving patterns for *wastra* craftsmanship in Trosos – A design thinking to create a sustainable creative industry

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**Abstract.** The pattern of each woven fabric (*wastra*) describes the cultural characteristics of the area where it is made. The pattern of *wastra* becomes the strong identity of the community and the place where the *wastra* is made. Trosos village is one of the centers of the *wastra* artisan, known as Trosos *wastra*. Trosos village is introduced as one of the shopping attractions in Jepara, in addition to carving production. Although Trosos is known as a producer of weaving production, it does not have an authentic *wastra* pattern and tends to copy it from other places. This phenomenon happens because of the demands of resellers that come from other places. As an area filled with potentials, a research team in Ruma Japara has noticed that a study is needed to challenge the Trosos craftsmanship to create its pattern using their local wisdom based on their artisan knowledge to create a sustainable creative industry. This study uses the design thinking method and qualitative methodology to collect data. The result is a pattern for Trosos *wastra* transferred from the Jepara wood carving pattern.

**Keywords:** local wisdom, Trosos *wastra*, Jepara wood carving pattern, design thinking, sustainable creative industry

1. **Introduction**

Indonesia is the largest archipelago country globally and has the longest coastline in the world, which ranges from Sabang to Merauke. It makes the cities on the coast of Indonesia have diverse cultures and customs depends on their location. Java is one of the most populous islands in Indonesia. The northern part of the island is often referred to as the city on the north coast. Many civilizations enter the island of Java through the beaches that exist along the northern island of Java [1]. One of the cities on the coast of Java with a long history of their magnificent culture is Jepara, located in Central Java. Jepara is known as a carving city in Indonesia with international recognition. The existence of Jepara carving can be traced from the existence of relief carving made of white coral, which is round, square, rectangular with curved lines [2].

Jepara, as one of the cultural destinations in Indonesia, also well-known for its *wastra* production. The *wastra* production in Jepara is concentrated in the village of Trosos, around 15 km of South East Jepara. This village is famous for *wastra* production using the technique of *Alat Tenun Bukan*
Mesin (ATBM), which means a non-machine loom. Troso village was introduced as one of the shopping attractions in Jepara, in addition to carving production.

Although known as a producer of weaving production, Troso does not have an authentic wastra pattern and tends to copy the pattern from other places. This phenomenon happens because of the demands from buyers outside of Troso, who are the reseller of the products to other places outside Jepara. As an area filled with potentials, a research team in Ruma Japara has noticed that a study is needed to challenge the Troso craftsmanship to create their pattern using their local wisdom based on the region’s artisan knowledge. The main goal of the challenge is to create a sustainable creative industry supported by the artisan community collectively.

2. Literature review

2.1. Jepara carving and weaving

Jepara is well known as the center of wood furniture both locally and internationally that inherited from generation to generation and has become part of the Jepara people’s lives [3]. The existence of Jepara carving can be traced from the existence of relief carving that reflects the influences of classical, Hindu, Chinese, and Arabic [2]. Although the pattern of carving has been growing outside its pakem (traditional rules of design), the use of the traditional carving tools and techniques by Jepara's craftsmen remains the same [4]. In general, the characteristics of Jepara’s carving pattern possess leaves carving in the shape of a triangle and slope [3].

Weaving is defined as interpenetrating flexible materials to make two-dimensional or three-dimensional structures that interlinked several tasks: cultivating a suitable fiber plant or animal, processing the fiber into yarn, preparing dye fats, dyeing the yarn, creating the warp and heddle system, weaving, assembling, finishing and post decoration [5].

The art of weaving is closely related to the system of knowledge, culture, beliefs, the natural environment, and the system of social organization in society. The diversity of social culture creates different characteristics in each region. It becomes the society’s cultural representation related to aesthetic aspects, traditional ceremonies, religious customs, and status symbols of the community [6].

Another advantage of the Jepara district is the Troso village, a center of wastra production in Indonesia. The strong attraction in Troso village becomes more strategic when it is integrated with cultural attractions. It supports tourism components in a community structure that blends with the customs and traditions prevailing in Troso [7]. Troso weaving is a creative industry that reflects the independence of societies [8]. The production of wastra in Troso has been adjusted to the consumers’ demand so that the motives always change and do not have a distinctive characteristic that is identical with the region of Jepara [9].

2.2. 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 [10]. It is a design methodology that provides a solution-based approach to solving problems [11].

There are five stages of the design thinking model proposed by Stanford d.school. First, empathize, it is the first stage of the design thinking process to gain an empathetic understanding of the problem to be solved. It involves consulting experts to find out more about the area of concern through observing, engaging, and empathizing with people to understand their experiences and motivations. Second, define, it puts together the information that has been created and gathered during the empathize stage. It is where the observations and synthesize will be analyzed. It defines the core problems that should be identified up to this point. This stage will help the designers to gather great ideas to establish features, functions, and other elements. It will allow users to solve the problems or, at least, resolve issues themselves with the minimum of difficulty. Third, ideate, during this stage, designers are ready to generate ideas. In this state, users can start to think outside the box to identify new solutions to the problem statement. They can begin to look for alternative ways of viewing the problem. Fourth, prototype, this stage is an experimental phase and aims to identify the best possible solution for each problem during the first three
stages. The solutions are implemented within the prototypes. One by one, they are investigated, accepted, improved, re-examined, or rejected based on the users’ experiences. By the end of this stage, the users will have a better idea of the constraints inherent to the product and the present problems and have an understandable view of how the real users would behave, think and feel in interacting with the final product. Last, test, results generated during the testing phase are often used to redefine one or more problems and inform the users’ understanding. During this phase, alterations and refinements are made to rule out problem solutions and derive to understand the product and its users [12].

3. Methodology
This study is conducted by the writers who are also researchers at Ruma Japara. The authors use the design thinking method and qualitative methodology to collect data. It adapts the 5-step-model of the design thinking from the Stanford d.school (see Figure 1). The complete study is 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 to create a point of view and persona. 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 [13]. The core of the study on empathy is understanding the phenomena and feeling responsible for being part of the challenge and defining the problems from the point of view as a designer.

This study carries three steps out of the five steps of the design thinking method. The empathize step is to propose an idea for the Troso craftsmanship to create their patterns using their local wisdom as the reaction to the phenomenon of copying another island pattern. The define step is to challenge the designers to transform the carving patterns that have been famous in Jepara as the ideas for the wastra patterns. The ideate step is to generate four carving patterns: Lunglungan Bunga, floral tassels, bird, and village life. The step of making the prototypes and the final test of the prototypes will be carried out in another period of the study. It will be written on the separated paper. It will be under the different purpose of the study, which is the technical process of tenun ikat.

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

4. Result and discussion
Three out of five steps of the design thinking are developed in this study. The empathize step is to propose an idea for the Troso craftsmanship to create their patterns using their local wisdom. It is the reaction to the phenomenon of copying another island pattern. The research team see it from the discussion with the other wastra communities outside Jepara.
The define step is to challenge the designers to transform the carving patterns that have been famous in Jepara as the ideas for the wastra patterns. The ideate step is to generate four carving patterns: Lungungan Bunga, floral tassels, bird, and village life. It is transferred from the carving patterns to be two-dimensional patterns. It will be applied on the yarns. The ideas come from the research team by observing Jepara. The researchers find that there are many interesting Jepara carving patterns that have never been used as wastra patterns in Troso.

The weaving technique that has been applied by many wastra productions in Troso is called tenun ikat. It is quite a complicated process to be done before a piece of wastra is ready to be sold. According to a friend of Ruma Japara, Romi from Omah Petrok, a young generation of wastra community in Troso, there are three types of tenun ikat that has been adopted in Troso: ikat pakan, ikat lungsi and ikat ganda (double ikat). In Troso, the techniques of ikat pakan and ikat lungsi are more common to be found than ikat ganda [14].

The process of making Troso wastra called tenun ikat using the technique of ikat pakan in general, consists of three steps: preparation of lungsi, preparation of pakan, and penenunan (weaving). The preparation of lungsi consists of five steps: bungkar, medel/menter (dye), penyepulan, penyekiran, and nyucuk. Then, the preparation of pakan consists of seven steps: penyepulan, pengetengan, pengikatan (tie), medel/menter (dye), mbatil, bungkar, and malet. The step of penenunan (weaving) is the process of making wastra (textile) with a weaving process using the ATBM. The weaving technique of ikat pakan should be sorted in sequence (one by one according to the pattern) [14].

Another technique of making Troso wastra is ikat lungsi. It is called ikat lungsi because the yarn with motif is the lungsi yarn while the pakan is plain. Generally, the process is just a slight different with the technique of ikat pakan. In ikat lungsi, the binding process is done in the lungsi. The process consists of three steps: preparation of lungsi, preparation of pakan, and penenunan (weaving). The preparation of lungsi consists of eight steps: penyepulan, pengetengan, pengikatan (tie), pewarnaan (dye), batik, ngrambang, penyekiran, and nyucuk. Then, the preparation of pakan consists of three steps: bungkar, dye, and malet. The step of penenunan (weaving) is the process of making a wastra (textile) with a weaving process using the ATBM. The weaving technique of ikat lungsi can be done faster than the technique of ikat pakan because the pattern has been stacked on the lungsi, while the pakan is plain [14].

Figure 2 shows the process of the tenun ikat. pattern drawing: pengikatan (tie) process, the look after pengikatan (tie) process, pewarnaan (dye) process, bungkar pakan, and penenunan using the non-machine loom /ATBM. Figure 3 shows the example pattern that has been transferred onto the yarns.

This study tries to implement the Jepara wood carving pattern for wastra craftsmanship in Troso. It is the first period of pattern development. In the first period, the four ideas of carving patterns, Lungungan Bunga, floral tassels, bird, and village life (see Figures 4, 5, 6, 7) are developed. The design process for ikat lungsi or ikat pakan are the same.
Figure 2. The Processes of Tenun Ikat (Omah Petrok).

Figure 3. Pattern Design for Weaving Drawn onto the Yarns Before the Ikat Process (Omah Petrok).

Figure 4 shows the development of Lunglungan Bunga pattern. R. A. Kartini, an Indonesian emancipation hero who was born and raised in Jepara, develops this floral tassel decorative pattern. It refers to the original decorative pattern of Jepara [15]. The carving pattern is transferred to a natural white and brown pattern and multiplied the flower. The two-dimensional pattern (see Figure 4 no. 4) goes through the design transition process (see Figure 5) by dividing the horizontal side by 3 mm (see Figure 5 no. 2). After that, the pattern is stretched twice (see Figure 5 no. 3). The stretched pattern in Figure 5 no. 3 is ready to be drawn onto the yarns (see Figure 4 no. 4). The details of adjustment (see Figure 5 no. 5) will be done directly on the yarns. The red lines are the marks of the area for the ikat process, while the yellow lines are the marks of the minimum distance of 5 mm between two ties.
Figure 4. The Development Design in White (left) and Black (middle) Background by Ruma Japara (no. 2, 3, and 4), Adapted from Relief Pattern No. 1, Lunglungan Bunga Illustration of Floral Tassels Pattern Developed by R. A. Kartini [16]. The pattern no. 4 will go through the design transition process (see Figure 5).

Figure 5. The Process of Transitioning from a Two-Dimensional Pattern to a Pattern Applied onto the Yarns and Ready for the Next Ikat Process.

Figure 6 shows the development of a floral tassel. Similar to the process in Figure 4, the carving pattern is transferred to natural white and brown pattern and multiplied the flowers. The two-dimensional pattern (see Figure 6 no. 3) goes through the design transition process by dividing the horizontal side by 3 mm (see Figure 7 no. 2). After that, the pattern is stretched twice (see Figure 7 no. 3). The stretched pattern in Figure 6 no. 3 is ready to be drawn onto the yarns (see Figure 7 no. 4). The details of adjustment (see Figure 7 no. 5) will be done directly on the yarns. The red lines are the marks of the area for the ikat process, while the yellow lines are the marks of the minimum distance of 5 mm between two ties.
Figure 6. The Design Development By Ruma Japara (no. 1, 2, and 3), Adapted from Relief Pattern in Figure 3 No. 1 with an Additional Idea from Jepara Batik, an Illustration of Floral Tassels Pattern [17]. Pattern no. 3 will go through the design transition process (see Figure 7).

Figure 7. The Process of Transitioning from a Two-Dimensional Pattern to a Pattern Applied to the Yarns and Ready for the Next Ikat Process.

Figure 8 shows the development of a bird carving pattern. This pattern is a development of the pattern found on the top of Kartini’s sewing table. It is one of the carving frame artworks that R.A. Kartini has sent at the National Exhibition of Women’s Work (De Nationale Tentoonstelling van Vrouwenarbeid) in Den Haag. It becomes the beginning of the introduction of Jepara’s art carvings in the international world [18, 19]. Similar to the process in Figure 4, the carving pattern is transferred to natural white and brown pattern. The two-dimensional pattern (see Figure 8 no. 3) goes through the design transition process by dividing the horizontal side by 3 mm (see Figure 9 no. 2). After that, the pattern is stretched twice (see Figure 9 no. 3). The stretched pattern in Figure 9 no. 3 is ready to be drawn onto the yarns (see Figure 9 no. 4). The details of adjustment (see Figure 9 no. 5) will be done directly on the yarns. The red lines are the marks of the area for the *ikat* process, while the yellow lines are the marks of the minimum distance of 5 mm between two ties.
**Figure 8.** The Design Development by Ruma Japara (no. 2 and 3), Adapted from Relief Pattern No. 1, a Relief of Bird Carving Pattern [20]. Pattern no. 3 will go through the design transition process (see Figure 9).

**Figure 9.** The Process of Transitioning from a Two-Dimensional Pattern to a Pattern Applied to the Yarns and Ready for the Next Ikat Process.

Figure 10 shows the development of the village life pattern. This pattern tells about life in a rural area in Jepara, showing the farmer with the surrounding natural scenery such as mountains, trees, and houses. Similar to the process in Figure 4, the carving pattern is transferred to natural white and brown pattern. The two-dimensional pattern (see Figure 10 no. 3) goes through the design transition process by dividing the horizontal side by 3 mm (see Figure 11 no. 2). After that, the pattern is stretched twice (see Figure 11 no. 3). The stretched pattern in Figure 11 no. 3 is ready to be drawn onto the yarns (see Figure 11 no. 4). The details of adjustment (see Figure 11 no. 5) will be done directly on the yarns. The blue and green lines are the form of the adjustment. The red lines are the marks of the area for the *ikat* process, while the yellow lines are the marks of the minimum distance of 5 mm between two ties.
Figure 10. The Design Development by Ruma Japara, Adapted from Relief Pattern No. 1, a Relief of Village Life Pattern [2]. Pattern no. 3 will go through the design transition process (see Figure 11).

Figure 11. The Process of Transitioning from a Two-Dimensional Pattern to a Pattern Applied to the Yarns and Ready for the Next Ikat Process.

5. Conclusion and suggestion
The presence of a well-established international Jepara wood carving pattern is a great source for Troso wastra to develop its unique patterns based on Jepara’s local wisdom. In general, the process of design the patterns for tenun ikat (ikat pakan or ikat lungs) is done in two-dimensional drawings (no 1, 2, and 3 in Figures 5, 7, 9, and 11). It will have the adjustments when the two-dimensional picture is transferred onto the yarns. All the patterns developed in this research have gone through a complete pattern design process and are ready for the ikat process. This developed pattern can be used for the techniques of ikat lungs or ikat pakan. This development of patterns in the first period of research is ready to proceed to the second period of the prototype and test stage using both techniques of ikat pakan and ikat lungs. The second period of the study will be on another research under different purposes that focus on developing the details techniques of ikat and dyed.

The collaboration of communities with creative culture-based interests, carving, and weaving will strengthen the creative industry in Jepara. The established Jepara carving is challenged to become a
master at developing the *wastra* pattern that will become a hallmark of Troso. For future research, natural dyed uses will be an added value toward a sustainable creative industry. Another suggestion is that the community in Troso is challenged to develop its pattern by collaborating with the local wisdom-based earthenware community in the village of Mayong Lor, Jepara.

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