PATTERN DESIGN AND MOTIF PLACEMENT OF BATIK *SANGGIT* IN SHORT-SLEEVE SHIRT STYLE

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Abstract: *The current trend of Indonesian fashion mode indicates a massive process of batik industrialization that drives batik transformation to any modern outfit. Along with this process, the challenge had occurred regarding to how the batik is applied in any modern outfits without sacrificing its aesthetical motif. It means the modern batik outfit requires the harmonious motif junction in every linked bloc of outfit pattern, which is archetypally called as sanggit. This research proposed a model of pattern design and motif placement of batik sanggit in short-sleeve shirt mode. The authors outline the combination between pattern design and motif placement as the essential factor to generate batik sanggit in short-sleeve shirt mode. The key is to place the motif into the blocs of the pattern designs by precisely flipping and mirroring the motif until it reach the harmonious motif junction. The harmonious motif junction could be attained by extending the motif over the measurement of pattern design that provides a space to harmonizing the motif. Thus, the motif would match each other even it is located in different bloc of pattern.*

Keywords: *batik sanggit, short-sleeve shirt, pattern design, motif placement.*

1 INTRODUCTION

Traditionally, batik is produced in form of a long cloth corresponding with its function as the material for a long-dress outfit [1]. The regular measurement of a batik cloth is about 115 cm wide and 250 cm long [2, 3]. Batik cloth is decorated by motifs and ornaments, which those are mostly inspired from cosmological interpretation, such as *pagi-sore*, one-headed, two-headed, oblique, *ceplok*, upright symmetrical and random motif [4]. As a traditional handicraft, the beauty of batik depends on the tacit knowledge of craftsman [5]. Fundamentally, the craftsman must have three basic skills of batik production: dyeing, waxing and coloring [6].

Industrialization has driven batik transformation from traditional to modern outfits. Modern batik outfits require harmonious motif junction in every linked bloc of pattern, which is archetypally called *sanggit*. Consequently, it brought a fundamental change in the practice of batik production. The production of modern batik outfits employs the process of cutting and sewing. This process could cause several problems of motif harmonization [7], such as the fractals problem [8] or the Irregular Strip Packing Problem [9]. These problems become the main challenge for the batik craftsman, especially in the production of batik *sanggit*.

Following Haake's [10] and Lawrence's [11] argumentations, the authors argue that an efforts to generate appropriate formula of motif harmonization should be grounded by a conceptual foundation of pattern design and motif placement. Most of the researches take a computer vision technique to harmonize the batik motifs [12], such as the utilization of computational generative pattern [13], the Interactive Evolutionary Algorithm [14], the Scale Invariant Feature Transform [15], and the Dotted-Board Model and Extended Local Search [16]. Unfortunately, those researches are neglecting the importance of the theoretical and conceptual foundation in motif harmonization. It means the rapid technological utilizations are less followed by a fundamental research on pattern design and motif placement.

In order to filling this gap, this research aims to formulate a model of pattern design and strategy of motif placement as a conceptual foundation to produce batik *sanggit* in short-sleeves shirt style. The designed pattern and motif placement could become a ground for further development of batik production in modern outfits. Thus, this development would give benefits for batik craftsman, especially for small batik industries by giving empowerment to elevate the aesthetic dimension of modern batik as well as satisfying the demand of the consumer.

2 METHODS

Qualitative descriptive [17] and participatory action [18] were used as the research methods. As a research participants were: three motif designers, four batik makers, two batik dyers and one tailor. They work at Dewi Ratih batik industry, Jalidin batik industry and Royal Tailor, which are categorized as the small batik industry in Sragen and Sukoharjo, Central Java, Indonesia. Data resources were determined based on two sampling techniques: purposive and snowball. The data were collected through observation, interviews, focus group discussion and literature review. The flow model was used to analyze the data. Qualitative descriptive was employed to obtain the data about the existing pattern design and motif placement. The authors reviewed the literature and interviewed the batik craftsman regarding the practical aspect of batik production, including the design process, cutting pattern and blocs seaming. The participatory action was applied to develop the draft and acquire the standard measurement of pattern design and motif placement. The motifs were then placed on the designed pattern, screened into a piece of cloth and being processed in a short-sleeve shirt pattern in middle and extra-large size. The draft was analyzed, revised and retested to reach the harmonious motif junction. If the harmonious junction was attained, the draft was then standardized

3 ANALYSIS

3.1 The existing batik pattern and motif placement

From the observations, it could be concluded that the craftsman is using regular measurement of batik cloth and measurement for producing batik in short-sleeve shirt style [19]. The craftsman employs two sets of button pattern for short-sleeve shirt batik: the edge button and the middle button. The edge button provides a space to matching the motif on the edge of the cloth. Moreover, the woven yarn on the edge of the cloth is stronger than in the middle. This button pattern is easy to be applied in the batik writing production. However, the edge button pattern has a weakness if it is applied into screening process in the batik printing production. It is because the edge button pattern only employs 110-centimeter of wide from the batik regular measurement. Thus, 5 cm would be wasted and, consequently, the pattern will cut off in the same width on the left edge of cloth.

Different with the edge button, the middle button has an advantage if it is applied to the 115 cm screen. The cloth is applied based on the right edge line so that the left edge cut off 5 cm. Therefore, the motif could be matched in the middle of the front bloc. However, the middle button has a weakness if it is

applied on the dyed technique, particularly to make a straight-line motif.

The common technique to harmonizing motif junction is simply folding the cloth until the motif match precisely. The technique emphasizes the efficiency of cloth usage, but would be hard to be applied in others batik patterns, particularly in symmetrical and random patterns. If the symmetrically patterned clothes are made into blouses or shirts, then the motifs may never become fully *sanggit*. Meanwhile, in the cases of random motif, the motifs will cut off and cannot be *sanggit*.

In sum, the craftsman could only employ in limited motif to make batik in *sanggit* style. It is because the existing motif, which is the regular motif, is not designed in certain purposes of short-sleeve mode. Thus, the pattern design and special motif placement adjusted the short-sleeve pattern should be developed. The motifs should be placed in a particular pattern so that the aesthetic value of batik can be fully obtained.

3.2 The developed pattern design

Based on those existing pattern and motif, the authors then developed a pattern design of short-sleeve shirt in extra-large (XL) and middle (M) size. The developed pattern design consists of 7 blocs which covers the section of half rear body circumference, the length of the shirt, quarter front body circumference, arm circumference, short-sleeve length, collar and pocket. The calculation of the developed pattern design of short-sleeve shirt mode for extra-extra-large (XL) size is explained in the Table 1.

Table 1 The calculation of the developed pattern design in XL size

Blocs	Code-Pattern	Hem	XL Short-sleeve		
			Body	Total	Remains
1	*2*	*3*	*4*	*5=3+4*	*6=2-5*
Half rear body circumference	A-70	4	60	64	6
Length of shirt	A-90	6	82	88	2
Quarter front body circumference	BC-39	2	36	38	1
Arm circumference	DE-70	3	54	57	13
Short-sleeve length	DE-45	6	31	37	8
Collar	F-20x85	6	41	47	38
Pocket	H-20x30	2	12x14	14x16	6x14

The Table 1 shows that in the code-pattern A, the calculated size of half rear body circumference is 70 cm. Meanwhile, the tailor only needs 64 cm so it will remain 6 cm. The length of short-sleeve shirt on in the developed pattern is 90 cm. It is only needed 88 cm so it remains 2 cm. In the Code-Pattern B and C, the size of quarter front body is 39 cm; meanwhile it is only needed 38 cm. Thus, the pattern would remain 1 cm. In the Code-Pattern D and E, the size for arms is 70 cm and it is only need 57 cm for the shirt. Therefore, it will remain 13 cm. The length

of short-sleeves is 45 cm, whereas the tailor only needs 37 cm, so it will remain 8 cm. In the Code-Pattern F, the size of collar is 20 cm width and 85 cm long; meanwhile it is only need 47 cm. In the Code-Pattern G, the size of pocket is 20 cm width and 30 cm long; however, it is only needed 14 cm width and 16 cm long, so it will remain 6 cm and 14 cm. The rest of the cloth is used to place the pocket to become *sanggit* with the motifs.

The Figure 1 depicts the illustration of the developed pattern design of short-sleeves shirt mode.
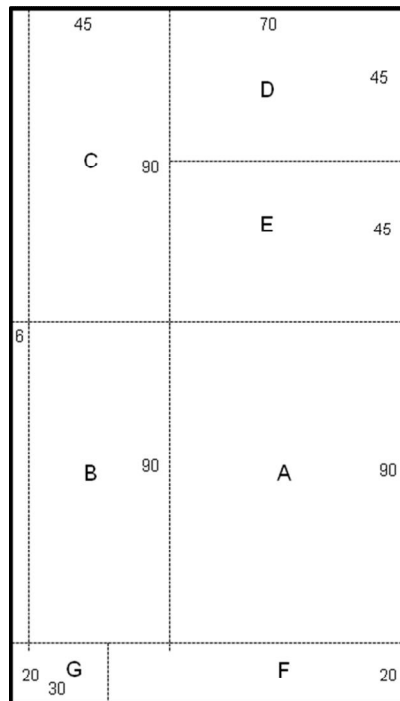
Figure 1 The illustration of developed pattern of short sleeve shirt

Meanwhile, the calculation of the developed pattern in middle (M) size, in some sections of the pattern, is different with the XXL size. The calculation could be seen on the Table 2.

Table 2 The calculation of the developed pattern in M size

Sections	Code-Pattern	Hem	M Short-sleeve		
			Body	Total	Remains
1	*2*	*3*	*4*	*5=3+4*	*6=2-5*
Half rear body circumference	A-70	4	54	58	12
Length of shirt	A-90	6	77	83	7
Quarter front body circumference	BC-39	2	29	31	8
Arm circumference	DE-70	3	48	52	18
Short-sleeve length	DE-45	6	26	32	13
Collar	F-20x85	6	38	44	41
Pocket	H-20x30	2	12x14	14x16	6x14

Table 2 shows that in the Code-Pattern A, the measurement of half rear body circumference is 70 cm. To make a short-sleeve shirt, the tailor only needs 58 cm, so it will remain 12 cm. The length of short-sleeve shirt on the developed pattern is 90 cm; however, it is only needed 83 cm so it remains 7 cm. In the Code-Pattern B and C, the measurement of quarter front body is 39 cm. Meanwhile, it is only needed 31 cm; thus, the pattern would remain 8 cm. In the Code-Pattern D and E, the measurement for arms is 70 cm and it is only need 52 cm. Therefore, it remains 18 cm. The length of short-sleeves is 32 cm from 45 cm of developed pattern, so it remains 13 cm.

3.3 The developed motif placement

The motif is placed based on the developed pattern design by emphasizing on the harmonious motif junction in the blocs. The backside bloc in Code-Pattern A that is 70 cm and 90 cm is created as the main section of motif placements. The main motif is then divided into two equal sections: left side and right side. The life side section is extended 6 cm lengthen of the main motif. This section is then applied on the left chest bloc in the Code-Pattern B (see Figure 2c). The right side section is also extended 6 cm and then reversed and applied on the right chest bloc in Code-Pattern C (see Figure 2d). The short-sleeves bloc, with 70 cm wide and 45 cm long, is taken from a particular part of the main motif, such as from the below part. This section is applied on the right side of short-sleeve sections in Code-Pattern E. Meanwhile the left side section in Code-Pattern D is applied by the reflection on the right side (see Figure 2e). The motif of pocket in Code-Pattern G is taken from the motif of the left chest bloc, which is same with the pocket's positions. The motif of collar in Code-Pattern F is captured from the desired motif, such as from the above section of the main motif (see Figure 2f). The illustration of the developed motif placement can be seen in the Figure 2.

The developed motif placement could generate a batik *sanggit* in short-sleeves shirt mode in any regular size. The motifs in the junction parts, such as in the buttons, the left section, right section, pockets, and collar, can be fully harmonized with each other. The harmonious motif junction could be seen from any angle of the front side, the left side, the right side, and the pocket of the shirt. The motif of the front section can be made similarly or the reversely from the backside motif. If the motif of the backside is different from the front motif, then the motif can be posited upside down from the axis. Meanwhile, the motif in collar section can be made a differently with the main motifs. The result of the developed motif placement could be seen in the Figures 3-6:
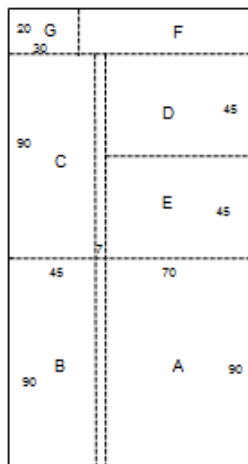
Figure 2a Short sleeve shirt pattern

Figure 2b Examples of batik motif (master) that will be developed in pattern (2a), motifs are placed in part A
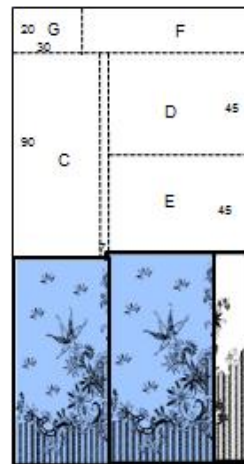

Figure 2c Half of the left master motif is applied on the left chest bloc in the Code-Pattern B

Figure 2d Half of the right master motif is applied on the right chest bloc in the Code-Pattern C
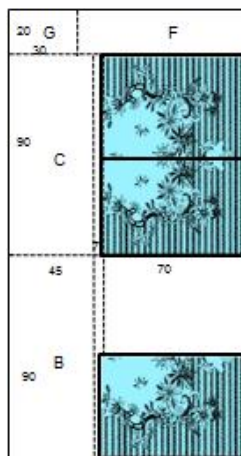

Figure 2e Half of the lower master motif is applied on the right side of short-sleeve sections in Code-Pattern E. Meanwhile the left side section in Code-Pattern D is applied by the reflection on the right side
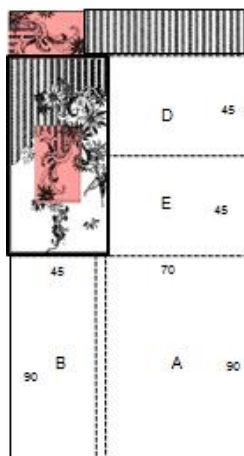

Figure 2f Pocket motif is applied to the pattern of the G section in a horizontal position, and parts F are made with arbitrary motifs (lines)
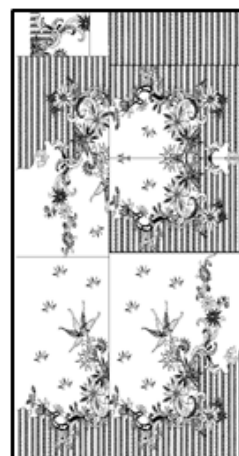

Figure 2g The results of applying the motif to all parts of the pattern of short sleeve shirts

Figure 2h Examples of batik motif patterns of short sleeve shirts

Figure 3 Front side view

Figure 4 Backside view

Figure 5 Right side view

Figure 6 Left side view

4 DISCUSSION AND CONCLUSION

This research has proposed a model of pattern design and motif placement for batik *sanggit* in short-sleeves shirt style. Theoretically, the proposed model could solve the aesthetic problem in the modern batik production, particularly to make batik in *sanggit* style. The authors outline the combination between pattern design and motif placement as the theoretical foundation to generate batik *sanggit* in short-sleeves shirt style. This is supporting argumentation about the importance of the conceptual foundation of pattern design and motif placement to harmonizing the motifs [10].

Along with Almond's finding [20], this research shows that the pattern cutting and design determines the production of modern outfit. Thus, the efforts to develop the innovative cutting pattern and design should be evolved. In the cases of batik production, the innovative cutting pattern should be followed by a precise motif placement.

The appropriate design pattern and motif placement potentially could solve the problem of fractal problems and the problem of Irregular Strip Packing Problem (Irregular SPP).

The important key is to place the motif into the blocs of the pattern designs by precisely flipping and mirroring the motif until it reach the harmonious motif junction. The harmonious motif junction could be attained by extending the motif over the measurement of pattern design that provides a space to harmonizing the motif. Thus, the motif would match each other even it is located in different bloc of pattern. The archetype of the sequential process [21], also become a decisive element to match the batik motifs as a whole part of the short-sleeve shirt, particularly in the collar and pocket blocs that takes from the waste of main patterns. The precise motif placement, especially on the collar and pocket section, is considered to the zero-waste pattern particularly for the developed motif placement in the collar and pocket section.

However, the ease problem in the pattern design and motif placement of batik *sanggit* is unresolved. The ease problem in batik production could not be resolved only just comparing the common and original body dimension [22]. In the cases of pattern construction of batik *sanggit*, these problems become more complex because it also relates to the detail ornaments in every bloc. The developed pattern and motif placement only can be used in regular measurement of short-sleeve shirt, which means that it probably disregard the fitness of pattern and body dimension.

In the further research and development, the proposed model could be used as the foundation for technologizing the modern batik production based on the traditional tacit knowledge. Following Page's suggestion [23], the develop pattern design and motif placement should be more integrated into creative pattern technology to evolve the quantity of batik *sanggit* production. Thus, the usage of computer-aided designed [24] and 3D printing technology [25] are important to be considered by the batik technology developer. As highlight [26], this process would be likely the era of transmission when the old knowledge of batik production, that underlines the handcraft skill, meets with the new knowledge of modern batik production, with its technology and computational usage, in which, in the cases of batik production, this transmission required revolution in the pattern design and motifs placement.

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