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by Ratna & Heru Incite 2017

Submission date: 04-Dec-2017 09:15PM (UTC+0700)

Submission ID: 889790299

File name: InCITE_2017_paper_6_edit_reference.docx (65.55K)

Word count: 2827

Character count: 15658

Affective Design Identification on Development of Batik Convection Product

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Abstract. Affective design is increasingly applied to product development in order to meet the desires and preferences of customers. Batik is a traditional Indonesian culture containing historical and cultural value. The development of batik design is one of the efforts to strengthen the identity and superiority of Indonesia's creative industries as well as to preserve batik as the cultural heritage of the nation. Batik product designs offered by the manufacturers do not necessarily correspond to consumer wishes, especially the affective value involved. Therefore, to identify the consumer perceptions of convection based batik product in the form of clothing and fabrics is needed, especially the affective value as consideration designer or manufacturer to develop design alternatives to batik convection products. This research aims to obtain information on consumer affective value, to identify the affective value perception differences among Generation X and Y and to classify affective value in the corresponding cluster of the batik products convection. This study uses Kansei Engineering to determine the perception of affective design in the form of Kansei word. Cluster Analysis uses to form clusters that classify affective value of the same class. The results showed that there were 16 pairs of kansei word which is worth as an affective consumer desire, the 3 indicators that have significant differences among Generation X and Y and 4 clusters with different characteristics.

Keywords: Affective Design, Batik, Kansei Engineering, Cluster Analysis

1. Introduction

The affective design increasingly applied to product development in order to meet the desires and preferences of customers. Theoretically, consumer's satisfaction and technical aspects (e.g., functionality, ergonomic and comfort) are equally important in determining the success of product design [1]. Batik is an Indonesian traditional culture containing historical and cultural value. Batik is not limited to the appearance of beauty that is formed from the harmonious composition of motifs and colours, but also has a spiritual beauty that comes through the decoration and preparation of a pattern that has a philosophical meaning. Batik has also been recognized by UNESCO as "Intangible World Heritage" in October 2009. The development of batik is a cultural heritage that begins from *Kraton* then seeps outside community of *Kraton* and eventually formed the industrial based on culture and developed from one generation to the next.

The development of batik design is one of the efforts to strengthen the identity and superiority of Indonesia's creative industries as well as to preserve batik as the cultural heritage of the nation [2]. According to Indrojarwo [3] in his research titled "*Development of Indonesia New Batik Design by Exploration and Exploitation of Recent Context*", batik design related to pattern or *patra*, motif, variety, color, scale and composition. The development of batik design can be classified by the type of *patra*, production process, location and era. Batik design development has quite large opportunity in the derivation of ancient batik designs into thousands various colours, scale and proportion. Batik designers also use voice of consumers regarding the wants of consumers in design. It is important to analyse the affective value of consumer such as feelings or emotions and transform them into appropriate design in new product development.

Kansei Engineering is proposed as a methodology for affective design of product in the early 1970. This methodology aims to translate human psychological processes, such as feelings and notions, become elements of appropriate product design, such as size, shape and characteristic. Kansei engineering was defined as translating technology of a consumer's feeling of the product to the design elements. Kansei engineering use someone's impression that obtained from the environment or

other factors using the senses of sight, hearing, feeling, smell and taste to develop the products according to these responses. This method has been used by the automotive manufacturing company, Mazda, the sports car called “Miyata” and has been a good seller in the U.S and Japan [4].

Creative industries should be developed because it has a significant contribution to the Indonesian economy and the centre of innovated creation and creativity development. Creative industries also attract creative workers who have a high talent and form creative communities and create many innovations that echoed up to the international level [5].

This research aims to obtain information on consumer affective value, to identify the affective value perception differences among Generation X and Y and to classify affective value in the corresponding cluster of the batik products convection. The research try to develop batik design from the customer's voice by obtain information about their wants, especially the affective design in terms of colours, and designs. This information helps designers in designing batik convection product.

2. Literature Review

2.1. Affective design

Affective is something that related with attitudes and values. Affective includes character and behaviours such as feelings, interests, emotional attitude and values. Some experts say that a person's attitude can be foreseen amendments when someone has high-level cognitive powers. Affective is divided into more detail in five levels, which are receiving, responding, valuing, and organization, characterization by value or complex value.

Emotion/motivation comes from the style of design, function, form, usability and user's experience. User/consumer emotion is a hidden desire. Design can cause some response like happy, upset, excited, frustrated, and **s**6**on**. The design that can motivate users/consumers emotion is called affective design. An example is the signage designed for the Umeda Hospital in Tokyo by the Japanese designer Kenya Hara [6]. Signage is a general term for any type of display **g**6**raphics** that are intended to convey information to the user. The results of study indicated that signage **made of cotton cloth**; it provides a comfortable, **soft feeling to soothe the** patient's mind. Hence, this signage can motivate the users' into a certain kind of emotion response, and this is said to be *Emotional Design* [7].

2.2 Kansei Engineering

The word Kansei means feeling, impression and emotion. Kansei Engineering is a method to translate the image customers or consumers' feelings into real design components. Kansei Engineering⁴ is a technology-oriented that enabling image on how consumers feel united to the design process of a new product. Kansei Engineering is defined as the translation **technology of consumers feeling** (Kansei) about upcoming products into a design element. Kansei emotional structures exist under the attitudes or behaviors of humans. This structure refers to Kansei as a person.

2.3. Cluster Analysis

Cluster analysis is a method of analysing the data. Cluster analysis as one of the methods of Data Mining aims to group data with similar characteristics to the same 'region' and the data with different characteristics to the other 'area', to get a group of objects that have the same values or characteristics. In principle, cluster analysis is a process to reduce the number of large objects becomes fewer called clusters. This method is used by researchers who do not know a member of a group [8].

3. Methodology

3.1. Sample

This research uses stratified sampling techniques to explore affective design in batik convection product development. Samples were taken by dividing the population into groups according to the classification of Generation X (The Baby Bust) and Generation Y (The Echo of the Baby Boom). Generation X was born between the years 1965 to 1976 or around the age of 40 – 51 years old and Generation Y was born between the years 1977 to 1997 or around age 19 -39 years old. 50

respondents have been selected from data from the Department of Cooperatives and SMEs Semarang in March 2016. The respondents are people who understand the convection-based batik product. They are a craftsman or producer of batik, and have a knowledge ability to fill out a questionnaire in accordance with their basic knowledge.

3.2. Determining Kansei Word

Determination of Kansei Word obtained from the magazine source, the existing literature, users, etc. Kansei Word identification was done by observation and Small Group Discussion. The selected word is shown in Table 1.

Table1. Kansei Word

| <i>Kansei ID</i> | <i>Kansei Word</i> | <i>Kansei ID</i> | <i>Kansei Word</i> |
|------------------|-------------------------------|------------------|------------------------------------|
| X1 | <i>Bright – Gloomy</i> | X9 | <i>Formal – Casual</i> |
| X2 | <i>Plain - Gaudy</i> | X10 | <i>Unoriginal – Creative</i> |
| X3 | <i>Colourful – Colourless</i> | X11 | <i>Heavy – Light</i> |
| X4 | <i>Traditional – Modern</i> | X12 | <i>Comfortable – Uncomfortable</i> |
| X5 | <i>Childish – Mature</i> | X13 | <i>Thin – Thick</i> |
| X6 | <i>Elegant – Not Elegant</i> | X14 | <i>Harsh – Soft</i> |
| X7 | <i>Simple – Complex</i> | X15 | <i>Flimsy – Substantial</i> |
| X8 | <i>Cute – Not cute</i> | X16 | <i>Stiff - Pliable</i> |

3.3. Determining and Designing Questionnaire

The questionnaire of semantic differential shows the feelings of the respondents. Tests using Semantic Differential method is done by giving the value on 7 scales of Kansei Word. Respondents were asked to rate batik convection product accordance with Kansei Word that has been described on the questionnaire. The questionnaires also provide a column where respondents can pour desires concerned with batik convection products. Examples of scale on the questionnaire can be seen in Table 2.

Table2. Scale on Questionnaire

| Color | <i>Bright</i> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | <i>Gloomy</i> |
|-------|---------------|---|----|----|----|---|---|---|---------------|
| | <i>Score</i> | | -3 | -2 | -1 | 0 | 1 | 2 | 3 |

4. Result And Discussion

4.1. Perception of Batik Convection Product

Customers Perception of Batik Convection Product identified by Kansei Word trend in 16 indicators show in Table 3.

Table 3. Perception of Product in Close-Ended Questionnaire

| | | | |
|--------------------|---|----------------------|---|
| <i>Bright</i> | + | <i>Gloomy</i> | |
| <i>Plain</i> | + | <i>Gaudy</i> | |
| <i>Colourful</i> | + | <i>Colourless</i> | |
| <i>Traditional</i> | + | <i>Modern</i> | + |
| <i>Childish</i> | | <i>Mature</i> | + |
| <i>Simple</i> | + | <i>Complex</i> | |
| <i>Elegant</i> | + | <i>Not-Elegant</i> | |
| <i>Cute</i> | + | <i>Not-Cute</i> | |
| <i>Formal</i> | + | <i>Casual</i> | + |
| <i>Unoriginal</i> | | <i>Creative</i> | + |
| <i>Heavy</i> | | <i>Light</i> | + |
| <i>Comfortable</i> | + | <i>Uncomfortable</i> | |
| <i>Thin</i> | + | <i>Thick</i> | |
| <i>Harsh</i> | | <i>Soft</i> | + |
| <i>Flimsy</i> | | <i>Substantial</i> | + |
| <i>Stiff</i> | | <i>Pliable</i> | + |

Table 3 shows that customer perception of the affective dimension image can be focused on the bright, soft and colourful colours. Respondents prefer a more traditional design but does not leave a modern touch and also contains the impression of a mature and simple but elegant. The design is also not separated from visual cuteness and creativity, not a formal design. Respondents chose the type of material that is light, thin and soft that can cause a sense of comfort. Material also must be a strong and flexible material.

4.2. Testing The Questionnaire

There are 16 indicators that performed on this test. Each indicator will be valid if the value of r calculations on Corrected Item-Total Correlation is greater than the value of r table. Data collected from 50 respondents and use a significance level of 5%. Obtained r table is 0.279 and the value of r table on each indicator that exceeds 0.279 declared valid and will be concluded that the result of questionnaire are valid.

Next test is reliability test to show the level of consistency of a questionnaire. Test was done by comparison of the value of Cronbach's Alpha to the value of questionnaire test results. When questionnaire test result has a value greater than 0.6, then this questionnaire is a reliable.

4.3. T-Test

T-test is used to determine differences in the average of two independent sets of data, which in this study the group are Generation X and Generation Y. Results from the SPSS by Independent T-Test showed the value sig (2-tailed). If the value of sig (2-tailed) < 0.05 , it means that the indicator has a significant different to others. Result show that few indicators have significant differences; plain-gaudy, flimsy-substantial and stiff-pliable. Can be conclude that the perception of respondents generation x and y can be distinguished by the aspect of color and statement of material belonging to the batik convection products.

In plain-gaudy indicators between Gen X and Y, the difference that Gen X respondents tend to prefer a positive statement (gaudy), while Gen Y tend to prefer negative statements (plain). At the flimsy-substantial indicators Gen X choose positive statements (substantial) with high scores while Gen Y is more likely to have a value that is spread on the positive statement. In the stiff-pliable indicator seen that Gen X dominates a high value on the positive statement while Gen Y has a distribution value on the positive statement (pliable).

4.4. Cluster Analysis

Clusters used a hierarchical cluster analysis by using Ward Method. Determine the number of clusters by ward method at the stage of agglomeration. Agglomeration will perform grouping one by one [10]. Output of cluster analysis classified respondent into 4 clusters. The next step is to divide the data into a form clusters using K-Means method. The obtained results are shown in Table 4. The result of the average of each cluster according to the respondents' perception on batik convection product can be seen in Figure 1.

Figure 1 show that respondents in cluster 1 tend to agree with negative statements of kansei of colour aspect (bright, plain and colourful). In design aspects they choose a traditional design (mature, simple, elegant, cute, formal and unoriginal-creative). In material aspect they prefer a light, comfortable, thin, soft, substantial and pliable material. While respondents in cluster 2 has little in common with cluster 1, which is inclined to agree with negative statements of kansei but with different average value, which is the colour aspect of bright-gloomy, plain and colourful, prefer traditional design (childish, simple, elegant, cute, formal-casual and creative), and on material prefer a heavy, comfortable, thin, soft, flimsy-substantial and stiff-pliable.

Table 4. The Cluster

| Cluster | Member |
|--------------|-----------|
| 1 | 12 |
| 2 | 6 |
| 3 | 21 |
| 4 | 11 |
| Total | 50 |

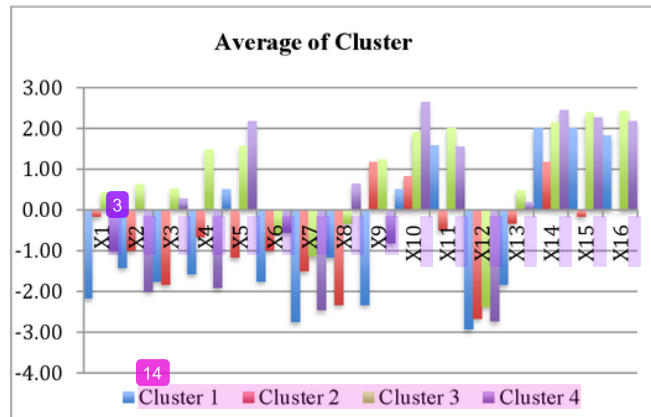


Figure 1. Average of Cluster

Respondents in cluster 3 tend to agree on a positive statement of Kansei on colour aspect of gloomy, gaudy, and colourless; on design aspects of modern, mature, simple, elegant, cute, casual and creative; in the aspect of material that is light, comfortable, thick, soft, substantial and pliable. Respondents in cluster 4 looks balanced on both positive and negative statements of Kansei on colour aspect of bright, plain and colourless; in design aspects that traditional, mature, simple, elegant, cute-not cute, formal and creative; in the aspect of material that is light, comfortable, thin-thick, soft, substantial and pliable.

5. Conclusion

Based on the analysis and discussion can be concluded that there are 16 pairs of Kansei Word to reflect customer emotion on batik convection product. Overall respondents tend to choose the bright, plain and colorful in the aspect of color; traditional- modern, mature, simple, elegant, cute, formal-casual and creative on design aspect; light, comfortable, thin, soft, substantial and pliable in the aspect of materials.

Respondents in the generation x and generation y is not too much attention to other indicators. The respondents perception of generation x and y can be distinguished by the aspect of color and preference on material of products. Gen X respondents tend to prefer a positive statement (gaudy), while Gen Y tends to prefer negative statements (plain). In flimsy-substantial indicators, Gen X choose positive statements (substantial) with high scores while Gen Y is more likely to have a value that is spread on the positive statement. In the stiff-pliable indicator seen that Gen X dominates a high value on the positive statement while Gen Y has a distribution value on the positive statement (pliable).

Cluster analysis formed respondent in to 4 clusters. 2 dominant cluster are cluster 3 and cluster 1. Cluster 1 with 12 respondent, has a high perception in color that bright, plain and colorful; in design that traditional, mature, simple, elegant, cute, formal and unoriginal-creative; the material that light, comfortable, thin, soft, substantial and pliable. Cluster 3 consist of 21 respondents have a high perception of the color that gloomy, gaudy and colorless; the design that modern, mature, simple, elegant, cute, casual and creative; the material that light, comfortable, thick, soft, substantial and pliable.

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