

PRELIMINARY STUDY OF THE IMPLEMENTATION OF KANSEI ENGINEERING METHOD FOR THE EARLY SUSTAINABLE DEVELOPMENT PROCESSED WALLET DESIGN BY USING BANANA MIDRIBS

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Abstract Efforts to protect the environment were useful to reduce waste of banana tree which can cause global warming from the burning waste of banana tree. One of the effort to reduce waste of banana tree was used the waste as wallet products' material. In order for wallet products to be able to compete in the market, it was necessary to have the right design to be able to describe the desires of consumers. The purpose of this research was to design a wallet made from waste of banana tree which can fulfill the needs of wallet consumers in the process of sustainable development. Kansei Engineering was used as a method to translate consumer feelings. Validation tests and evaluation were conducted to examine the research hypothesis using a 5% significance level. Consumer desires in the form of Kansei words that were obtained were strong, durable, waterproof, attractive, simple, neat, has a string, smooth, lightweight, environmentally friendly and multifunctional. Among consumers' wishes (Kansei words), consumers wanted the Kansei words to be strong and environmentally friendly which was prioritized in wallet design. The results of this study were obtained midrib of banana tree wallets in accordance with the wishes of the wallet consumers with the criteria of strong, environmentally friendly and multifunctional, moreover attractive because it shows more the original fiber of the midrib's banana tree.

Keywords: kansei engineering, wallet, banana tree midrib, product design, sustainable development

1. Introduction

Based on Agriculture Fisheries and Forestry Agency Sleman [1], the number of banana tree plants in Yogyakarta reaches 317,100 trees. Each banana tree will produce banana tree waste, namely midrib. However, people in Madura preserve large amounts of banana trees but they only use the fruit and leaves, while the midrib is left to be scattered garbage [2]. Therefore, the higher consumption of banana will have an effect to increase the number of midrib as a waste of the banana tree. On the other side, there are communities which have been concerning this issue and have been taking some actions to reduce the banana tree waste. Along with the proliferation of various issues regarding environmentally friendly

products and the demands of consumers for quality products, they encourage the awareness of various parties to start making friends with the environment [3]. This is related to the results of interviews with one of the handicraft producers, by processing banana midribs into an economically valuable product. The products made from banana fronds that have been produced by handicraft makers are carpets and baskets by twisting the banana midrib so that the typical fibers of the banana midrib do not look. The results of this interview are in line with the research on the use of banana fiber as a

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creative craft company of Pekalongan [4], that along with the increase in science and technology, much can be used from wastes that are rarely utilized by the community so will improve the quality of the waste and increase the economic value of the waste. With the global issue, a product that is made from materials that are environmentally friendly is needed. Environmentally friendly materials that can be used in making a product are natural fibers because natural fibers are fibers made from natural ingredients. These materials are very easy to obtain and can decompose well so they can reduce environmental pollution [5].

The banana midrib is used as raw material by handicraft craftsmen. Moreover, it is also used as a substitute for wood in paper production in Indonesia due to the demand is very high. The high level of paper consumption makes the trees which are the raw material for making paper decreases. If this problem continues, the trees in Indonesia will be exhausted and natural disasters will arise due to deforestation. Therefore, banana fronds are used as a substitute for wood, in order to reduce tree felling [6]. If the community can continue to use the banana stem waste, it will certainly be able to reduce the waste of banana midribs and reduce global warming due to the destruction of banana midrib waste by burning the banana midrib waste. from the banana midrib, which is the main attraction possessed by the midrib. Based on the results of interviews with consumers, the most popular products are wallets, this product is in demand because the wallet has benefits as a place to save money when consumers travel. Therefore, the product to be examined in this study is a wallet. The success of this product depends on consumers. The success of a product can be measured by how much the existence of the product can be accepted by consumers, and will directly increase profits for the company or producer and vice versa [7]. In this discussion, the form of feelings that consumers receive in using a particular product will be an important aspect that needs to be studied more deeply in the initial process of product design. One method commonly used in product development to get a better understanding of emotions and their relevance to specific design characteristics, which can then be used to design products in communicating desirable feelings is the Kansei engineering method [8].

The involvement of feeling aspects in the initial design process will make the perception of subjectivity between consumers appear. However, Kansei Engineering is an ergonomic approach to product development or services that can translate consumers' subjective perceptions into design specifications [9]. This is a distinct advantage for the Kansei Engineering method compared to other similar methods. Kansei Engineering will help an appropriate framework in which data processing attributes and consumer perceptions are not determined by experts or researchers, but are expressed from the words or feelings of the consumers themselves [10]. Manufacturing production carried out in the future is expected to survive continuously accepted by consumers. This is supported by how the initial product design process, in this case, the wallet, seeks to focus and be centrally oriented towards consumer feelings with the Kansei Engineering method [11].

2. Method

Based on the background described in the previous section. So this study will use a quantitative approach to determine the desires and needs of consumers, based on scientific calculations (Kansei Engineering) derived from samples of respondents who were asked to answer a number of questions about surveys to determine the number of frequencies of Kansei words. The method of this research is Kansei engineering. According to Nagamachi [12], Kansei engineering is a method for translating consumer emotional feelings into design components. According to Hartono [13], the desire of consumers need begins to see and demand emotional satisfaction. The fulfill of consumer's emotional needs is increasingly important to note, especially in developing industries. The consumer's emotional needs are considered important to note because it can affect consumer loyalty [14]. Kansei value is the imagination of consumer to product or service [15]. The four steps conducted in this research explain in the following sections.

a. Planning and Preparation

At this stage, the researcher makes direct observation of consumer's need from the banana midrib wallet. This observation was carried out by interviewing consumers and craftsmen to find out the needs and desires of

consumers on banana midrib wallet products.

b. Survey about consumer needs

The researcher conducted a survey of consumer's wallet to find out the needs and desires of Kansei words for wallet products by interviewing and distributing open questionnaires to respondents.

c. Validity and reliability tests

Furthermore, the Kansei word was tested for validity and reliability test to find out whether or not the reliability of the questionnaire results had been obtained through the distribution of the questionnaire.

d. Survey to know the priority of Kansei words (importance rating)

The next step is to distribute the questionnaire again to find out and calculate the importance of Kansei words after assuring that Kansei words are valid and reliable. Afterwards the design is formed according to the level of importance of each Kansei word.

3. Result and Discussion

▪ Planning and Preparation

The first step is to conduct literature studies and field observations. The literature studies related to this research is the study of product planning and development, the concept of Kansei engineering and previous studies such as journals and final assignments related to the method. The field observation was carried out in order to find out the wallet design like what consumers want from wallet products. In research of data collection conducted questionnaires as many as 30 pieces on each questionnaire. There are 5 stages in distributing the questionnaire, namely the first questionnaire which contains 1 question about what respondents want in the banana midrib wallet. The second questionnaire contains several questions about Kansei words. The Kansei words appropriate to the respondents' feelings for the design of the banana midrib wallet. The third questionnaire contains several questions about consumer needs which are more important in designing a banana midrib wallet. The fourth questionnaire contains several questions to compare the design of the new banana midrib wallet with the old banana midrib design. After making a banana midrib wallet prototype with a new design, the banana

midrib wallet will be tested with the old design for the validity process. The validation test will be used in the Marginal Homogeneity test. To find out the different design, the fifth questionnaire will be distributed and then process design the Marginal Homogeneity test.

Table 1. Validity Test Results

Kansei Words	<i>r table</i>	<i>r hitung</i>	Status
Neat	0,367	0,589	Valid
Solid	0,367	0,544	Valid
Lightweight	0,367	0,520	Valid
Simple	0,367	0,514	Valid
Smooth	0,367	0,496	Valid
Has Straps	0,367	0,486	Valid
Durable	0,367	0,480	Valid
Water Resistant	0,367	0,468	Valid
Multifunctional	0,367	0,435	Valid
Environmentally Friendly	0,367	0,399	Valid
Attractive	0,367	0,367	Valid
Trendy	0,367	0,364	Unvalid
Small Size	0,367	0,289	Unvalid
Large Capacity	0,367	0,157	Unvalid
Traditional	0,367	0,097	Unvalid
Resettling Cover	0,367	0,091	Unvalid
Unique	0,367	0,058	Unvalid
Have Several Bulkheads	0,367	0,034	Unvalid

▪ Kansei Engineering

The results obtained from the interviews process and distributing questionnaires to 30 respondents were 18 Kansei words. Kansei words are human psychological feelings. In this case, adjectives are expressed in words [16]. Kansei words are multifunctional, durable, attractive, water resistant, neat, strong, environmentally friendly, large capacity, smooth, unique, lightweight, simple, trendy, small size, resettling cover, has straps, have several bulkheads, traditional. Kansei said that it was obtained then the validity test and reliability test would be carried out. Validity test is used to measure whether or not the results of the questionnaire are valid. The validity test of this study using SPSS 16.00 software, a significant level of 5%, the results of the SPSS 16.00 software must be above (n-1) 0.367. From the results of the validity test (Table 1), it is seen that not all Kansei words have significant results. Moreover, the Kansei words cannot be included for testing and work on the next stage. The reliability tests are then carried out to see whether a questionnaire can be said

to be reliable or not. The reliability test conducted using SPSS 16.00 software. The Kansei word is said to be reliable if it gives Cronbach Alpha values > 0.70. The results from this reliability test can be seen in the Table 2.

Table 2. Reliability Test Results

Kansei Words	<i>r table</i>	<i>r hitung</i>	Status
Environmentally Friendly	0,7	0,734	Reliable
Attractive	0,7	0,732	Reliable
Multifunctional	0,7	0,727	Reliable
Water Resistant	0,7	0,725	Reliable
Smooth	0,7	0,723	Reliable
Durable	0,7	0,722	Reliable
Lightweight	0,7	0,72	Reliable
Strong	0,7	0,72	Reliable
Simple	0,7	0,716	Reliable
Has Straps	0,7	0,716	Reliable
Neat	0,7	0,714	Reliable

4. Conclusion

The application of Kansei engineering reveals the consumer's desire (Kansei word) towards the initial process of sustainable development in the design of banana frond wallet products is strong, durable, water resistant, attractive, simple, neat, has straps, smooth, lightweight, environmentally friendly and multifunctional. The highest priority of consumer's desire is strong and environmentally friendly. Therefore, the Kansai engineering process can be carried out to assist the stages of sustainable development in the initial design of the product. In further research, the initial design of the product will be made based on the priority of Kansei words such as strong and environmentally friendly. These Kansei words will be the consumer's need for quality function deployment (QFD) method. then it will produce a product design based on sustainable development processed wallet design by using banana midribs.

References

[1.] Agriculture Fisheries and Forestry Agency Sleman. Agriculture, Fisheries and Forestry. Available from: <http://www.slemankab.go.id/3271/pertanian-perikanan-dankehutanan,slm> [Accessed 6th November 2014]; 2013

[2.] Gustiaawati E, Fahrizaltaufiqurrachman, Qomariah NL. Utilization of PAPP Waste

as an alternative material for the manufacture of Madura slippers and bags. Bangkalan: University of Trunojoyo Madura; 2011.

[3.] Prawitasari RA. Scientific work for business opportunities. Yogyakarta: STIMIK AMIKOM. 2011.

[4.] Maimunah N. Utilization of banana fiber as a textile craft material in woven and creative craft companies in Pekalongan. Surakarta: FSSR Sebelas Maret University. 2006.

[5.] Nashikhah M. The effect of warp distance against results as bags with gel-based tapestry techniques. Surabaya: The State University of Surabaya. 2012.

[6.] Yunifath. Paper from banana tree stems "Emil Heuser" method. Available from: <http://chemichemo.wordpress.com/2012/07/03/kertas-dari-batang-pohon-pisangmetode-emil-heuser-2/> [Accessed 6th November 2014]; 2012

[7.] Yuliarty P, Permana T, Pratama A. Development of whiteboard product design with Quality Function Deployment (QFD) method. Jurnal Pasti : Penelitian dan Aplikasi Sistem dan Teknik Industri; 2013. p. 1-13.

[8.] Green A., Chattaraman V. Creating an affective design typology for basketball shoes using Kansei Engineering methods. In: Fukuda S. (eds) Advances in Affective and Pleasurable Design. AHFE 2018. Advances in Intelligent Systems and Computing, vol 774. Springer, Cham; 2019

[9.] Yeh CT, Chen MC. Applying Kansei Engineering and Data Mining to design door-to-door delivery service. Computers & Industrial Engineering; 2018(120). p. 401-417.

[10.] Castilla N, Llinares C, Bisegna F, Blanca-Giménez V. Affective evaluation of the luminous environment in university classrooms. Journal of Environmental Psychology; 2018(58). p. 52-62.

[11.] Vieira J, Osório JMA, Mouta S, Delgado P, Portinha A, Meireles JF, Santos JA. Kansei Engineering as a tool for the design of in-vehicle rubber keypads. Applied Ergonomics. 2017(61). p. 1-11.

[12.] Nagamachi M. Kansei Engineering; the implication and applications to product development. Proceeding of System, Man, and Cybernetic; 1995.

- [13.] Hartono M. Servqual integration conceptual framework, Kano Model and Kansei Engineering with QFD in the service industry. Proceeding Industrial Engineering Conference; 2012. p. 33-1 – 33-7.
- [14.] Hartono M, Suseno A, Surjani, Meitha R. Application of integration of Kansei Engineering and TRIZ method at Villa Nunia Services, Bali. Surabaya: Industrial Engineering University of Surabaya; 2013.
- [15.] Restatin YN, Ushada M, Ainuri M. Prototype design of portable beach tables and chairs with ergonomic approach integration. Value Engineering and Kansei Engineering; 2012. p. 1-9.
- [16.] Marlyana N, Nurwidiana, Taufiq AR. Application of the Kansei Engineering and Anthropometry Method to the selection of design facilities for Cafe Rooms. ISBN: 978 – 602-097-305-0; 2012. p. 1-9.