Design of Tradisional Riau Malay Hat (Tanjak) Packaging Using Kansei Engineering Method

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Abstract

Tanjak is a Riau Malay tradisional hat worn by men from the Malay ethnic group. Tanjak is marketed as regional souvenirs, requires attractive packaging so that it can describe the characteristics of the Riau Malay and attract costumer interest in buying the product especially for souvenirs. The state condition shows the packaging of Tanjak is still very simple using material from plastic packaging, PVC and acrilic with no design for the packaging. Otherwise this product bought as souvenirs or gifted to official government, so the packaging need for representing the product it self. Packaging that is in accordance with the wishes of consumers tends to give a sense of pleasure and increases the desire of consumers to buy products. Packaging designs that follow consumer desires can be obtained using the Kansei Engineering method. Kansei Engineering is a method that can translate the emotions and feelings of consumers towards a product. Tanjak packaging designs that are in accordance with consumer desires are obtained by identifying kansei words. The kansei word is translated into design language and the packaging design is done based on the kansei word. The case study is taken in Tanjak Mak Des, one of crafmen business in Riau. The goal of this research is to design Tanjak packaging as a traditional Riau Malay hat, using Kansei Engineering. Data collection was carried out by collecting kansei words from tanjak consumers and previous research references, then distributing the Differential Semantic Questionnaires 1 and 2.So as to create a packaging design in accordance with the wishes of consumers.

Keywords
Tanjak, Packaging Design, Consumer Desires,Kansei Engineering and Kansei Word

1. Introduction

The use of Tanjak is increasingly popular and growing, resulting in the development of Tanjak craftsmen. Craftsmen offer Tanjak products that have been created with various shapes, colors, motifs and different sizes. The use of Tanjak is not only used during important events, such as Malay traditional events, marriages, and is used by government agencies, but has developed and become one of the souvenirs that are very popular in all circles and are in great demand by tourists visiting Riau. The diversity of attractive fabric motifs and the diverse shapes of Tanjak are not only one of the reasons for consumers to buy Tanjak.Attractive packaging that can describe the characteristics of Tanjak as souvenirs and souvenirs typical of the Malay tribe is also one of the things that encourages consumers' desire to buy Tanjak. In addition to making Tanjak more attractive and more elegant, better and higher quality packaging can also be an advantage for the Tanjak manufacturer with competitors.

TanjakMak Des business is one of the Tanjak craftsmen in Riau Province. TanjakMak Des produces Tanjak with various types and shapes, generally TanjakMak Des produces Tanjak that has been created. The Tanjak is marketed

to a large souvenir shop typical of Riau to be used as souvenirs and souvenirs from Pekanbaru City. The tanjak is also marketed to various Malay clothing shopping centers located in Pekanbaru city to be offered as souvenirs to complement Malay tribal clothing, orders from various government agencies, companies, and schools for daily use as a complement to uniforms or during certain events, as well as purchases for use by individuals.TanjakMak Des business is able to produce as much as 500 to 800 pcs per month, this sales will increase in certain months and events. Based on observations made in the TanjakMak Des business, two Tanjak packaging that exist at this time can be seen in Figure 1, namely packaging made of plastic and acrylic glass. These packaging tend to have more dominant drawbacks than advantages. One of its concerns is that the packaging is easily damaged by tearing and breaking and does not describe Tanjak as a characteristic of the Riau Malays.

(a) (b)

Figure 1. Current Tanjak Packaging (a) Plastic, (b) Acrylic Glass

Because the packaging that exists at this time is still very simple and has several shortcomings, therefore it is necessary to redesign the Tanjak packaging. This packaging redesign is carried out to produce a more attractive packaging design, in order to attract consumers' buying interest. Designs with the result of user desires are more widely known, and products designed based on the user's psychological desires tend to attract more attention from consumers. It is proven that products that please the user's heart are more widely used, and the selection of future purchases of products tends to be influenced by the level of pleasure in the use of the product (Guo et al. 2020). One method that can be used to find out consumers' desires for Tanjak packaging design is the Kansei Engineering method. This method is used because it can translate users' psychological desires and needs for a product into a design language, thus creating a design that is more liked and satisfies the desires of consumers (Li et al. 2020). It is proven in the research conducted (Yola 2021) that produces a packaging design that suits the wishes of consumers.

1.1 Objectives

The purpose of this study is to redesign Tanjak packaging that suits consumers' wishes to attract consumers' buying interest. In addition, to design packaging that can describe the characteristics of Riau Malay Tanjak products as one of the typical souvenirs of Riau Province.

2. Literature Review

Packaging is the main equipment used to protect a product and also serves as part of a marketing mix tool to convey graphic and brand communication messages along with the product itself to be conveyed to consumers (Irhandayaningsih 2018). The function of packaging is as a material that protects and secures a product from external influences that can harm and accelerate the occurrence of damage. Packaging also serves as a medium of information and promotion of a product in question. Good and attractive product packaging will be a special attraction for consumers in attracting buyers (Ermawati 2019).

Consumer behavior is a science of how a person buys a product. Consumer behavior is an activity that is directly involved in acquiring, consuming and disposing of products or services, as well as the decision processes that precede and follow these actions. Consumer behavior can also be defined as the process of individual or group involvement in choosing, buying, or disposing of a product, service, idea or experience to satisfy their needs and desires (Ferinia et al. 2021).

The Kansei engineering method was created to approach consumers in order to be able to translate consumer kansei (emotions) into product design features. Kansei comes from the Japanese word meaning a feeling of psychology that thinks about the design features of a product. Kansei engineering has been developed by Professor Nagamachi since

1970 as one of the branches of cognitive ergonomics, and there have been many products produced with the application of Kansei engineering or Kansei engineering such as electronic devices, vehicles, public facilities, housing, clothing and so on. Kansei engineering is a comprehensive subject that combines the sciences of design, ergonomics and engineering. This requires a designer to be a bridge that connects the psychological feelings of the user towards the design of the product to be created (Guo et al. 2020).

Kansei engineering includes an experiment or research evaluation by conducting statistical analysis of the data that has been obtained, this implementation is generally carried out with 3 steps (Fadlyand Satori 2021) :

a. Performs Kansei word selection, collecting and selecting adjectives.
b. Evaluating Kansei which is a subjective evaluation of consumer perceptions of several products as well as product samples by using a questionnaire containing the word Kansei.
c. Perform data analysis based on evaluation experiments. If you already know the combination of product properties that produces the highest score among descriptive words, it should be able to generate guidelines for creating a new product emotional interface design.

3. Methods

This research was conducted at the Tanjak Mak Des Business which is located at Jl. Permata Ratu, Tangkerang Labuai, Bukit Raya District, Pekanbaru City. The research was conducted using the Kansei Engineering method.

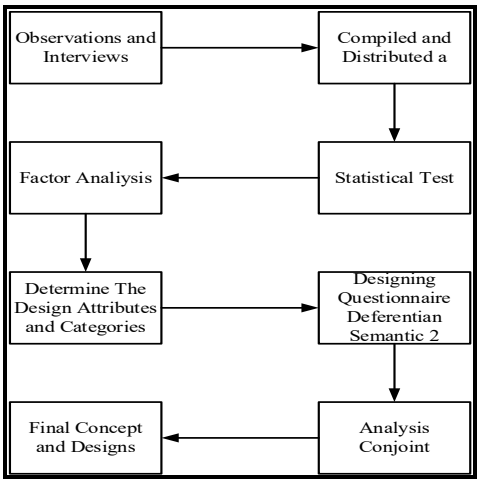

Figure 2. Chart of the stages of research conducted

The explanation of Figure 2 is as follows:

1. Conduct observations and interviews with respondents who are producers and consumers of Tanjak to get needs, wants, complaints and suggestions regarding Tanjak packaging, and identify the kansei word of the interview results.
2. Compiled a Deferential Semantic questionnaire 1 and distributed it to 30 respondents. The determination of the number of respondents was carried out using a quota sampling technique, where the researcher determined the sample provisions in accordance with the study.
3. The results of the questionnaire obtained were carried out statistical tests in the form of validity tests, reliability tests, and data adequacy tests carried out using SPSS 17.0 software.
   The test results are said to be valid if the Rhitung value is > Rtabel, and the data is invalid if the $R_{count} < R_{table}$. The r_{tabel} used for 30 respondents was 0,361. For invalid statements, they will be eliminated and the validity test of the second iteration will be carried out until the entire data is declared valid. The test results are said to be reliable when the cranbach alpha value is large from 0,5. And the data is stated to be sufficient if the value of N' < N, where N is the number of samples which is 30 resondents.
4. The next step is factor analysis by testing Kaiser Meyer Olkin with SPSS 17.0 software. The KMO test results obtained will determine that the data can be carried out further factor analysis. If the KMO value is above 0.6 then the data is said to be quite feasible for further factor analysis.

The next stage is to conduct a Barlett test by finding the Chi-Square value and determining the significance value. The signification value below 0,05 means that the variables used in the questionnaire correlate with other variables and can be carried out further factor analysis. It then performs a Measures of Sampling Adequacy (MSA) test to find out how strongly the item correlates with other items. The data is said to be valid if the MSA test result > 0,5, and the item is strongly correlated with other items. Meanwhile, if the MSA test result < 0,5, then the data is said to be invalid so that the data is eliminated and then the second iteration of the MSA test is carried out until the entire data is declared valid.

5. Determine the design attributes and categories to be carried out based on the elements of the Tanjak packaging design.
6. Designing the Deferential Semantic questionnaire 2 by determining the combination of stimulation of design elements obtained in the previous stage and distributing the questionnaire to 30 respondents.
7. Perform a conjoin analysis of the results of the questionnaire deployment and calculate the utility value of the packaging design attributes. The highest utility test results are an important attribute that is the selected specification for designing Tanjak packaging designs.
8. The final stage sets the concept and designs the Tanjak packaging design in accordance with the results of data processing.

4. Data Collection

The data needed in this study were collected and then processed in order to find a solution to the problem being studied. The data collected is in the form of.

4.1 Classification of Kansei Word

Kansei words are obtained from the results of observations and interviews that have been conducted by collecting consumer desires for packaging, then identified and structured based on words that have the same meaning (Table 1).

Table 1. Kansei Word

No	KanseiWord	No	Kansei Word
1	Simple from	8	Display product images
2	Practical	9	Durable screen printing
3	Easy to open	10	Showing the characteristics of Riau
4	Neat	11	Complete information
5	Colored	12	Protected product
6	Contemporary design	13	Easy to carry
7	Elegant look	14	Durable packaging

5. Results and Discussion

5.1 Validity Test

The results of testing the validity of the differential semantic questionnaire 1 on 30 respondents were carried out using SPSS 17.0 software. Data is said to be valid if $R_{count} > R_{table}$. The value of r table for 30 respondents is 0,361 which is obtained from the value of df = N-1 (Table 2).

Table 2. Recapitulation of Iteration 1 Validity Test Results

No	NoStatement	Statement	R_{Count}	R_{table}	Description
1	1	Simple from	0,275	0,361	Invalid
2	2	Colored	0,458	0,361	Valid
3	3	Contemporary design	0,557	0,361	Valid
4	4	Elegant look	0,382	0,361	Valid
5	5	Display product images	0,687	0,361	Valid
6	6	Complete information	0,256	0,361	Invalid
7	7	Practical	0,604	0,361	Valid
8	8	Protected product	0,547	0,361	Valid

9	9	Easy to carry	0,479	0,361	Valid
10	10	Durable packaging	0,666	0,361	Valid
11	11	Easy to open	0,493	0,361	Valid
12	12	Neat	0,711	0,361	Valid
13	13	Durable screen printing	0,754	0,361	Valid
14	14	Showing the characteristics of Riau	0,740	0,361	Valid

Based on the recapitulation of the validity test that has been carried out, it is known that statement 1 (simple form) and statement 6 (complete information) are declared invalid, because R_{count} is smaller than R_{table}. Statements that were declared invalid were eliminated and a second iteration validity test was carried out.The results of the iteration 2 validity test can be seen in table 3.

Table 3. Recapitulation of Iteration 2 Validity Test Results

No	NoStatement	Statement	R_{Count}	R_{table}	Description
1	2	Colored	0,458	0,361	Valid
2	3	Contemporary design	0,557	0,361	Valid
3	4	Elegant look	0,382	0,361	Valid
4	5	Display product images	0,687	0,361	Valid
5	7	Practical	0,604	0,361	Valid
6	8	Protected product	0,547	0,361	Valid
7	9	Easy to carry	0,479	0,361	Valid
8	10	Durable packaging	0,666	0,361	Valid
9	11	Easy to open	0,493	0,361	Valid
10	12	Neat	0,711	0,361	Valid
11	13	Durable screen printing	0,754	0,361	Valid
12	14	Showing the characteristics of Riau	0,740	0,361	Valid

Based on the recapitulation of the second iteration of the validity test, 12 valid statements were obtained, because the R_{count} is greater than the R_{table}. The results of the validity test can be seen in the attachment.

5.2 Reliability Test

The reliability test was carried out on 30 respondents with 12 valid statements in the iteration 2 validity test. The results of the reliability test were.Table 4 is the result of the validity test.

Table 4. Reliability Test Results

ReliabilityStatistics		
Cronbach'sAlpha	*Cronbach's Alpha Based on Standardized Items*	*N of Items*
0,735	*0,735*	*13*

Based on the reliability test of 12 statements which were declared valid, the Cronbach's alpha value was 0,735 with reliable criteria (close).

5.3 Data Adequacy Test

The data adequacy test was carried out on 12 statements which were declared valid in the third iteration of 30 respondents. Data adequacy test is done by formula.

$$N' = \left[\frac{\beta/\alpha\sqrt{N\sum(Xi^2) - \sum(Xi)^2}}{\sum Xi}\right]^2$$

The results of the data adequacy test are.

$$\beta/\alpha = \frac{2}{0{,}05}$$

$\beta/\alpha = 40$
N = Number of Samples
N = 30

$$N' = \left[\frac{\beta/\alpha\sqrt{N\sum(Xi^2) - \sum(Xi)^2}}{\sum Xi}\right]^2$$

$$N' = \left[\frac{40\sqrt{30(71.421)\text{-}(1.457)}}{1.457}\right]^2$$

$$N' = \left[\frac{40\sqrt{2.142.630\ \text{-}2.122.840}}{1.457}\right]^2$$

$N' = [3{,}86]^2$
$N' = 14{,}90$

Based on the data adequacy test above, the N' value is 14,90. Then the data has been declared sufficient because the value of N' is smaller than the value of N, which is 30 and further factor analysis can be carried out.

5.4 Factor Analysis

Factor analysis was performed to determine the number and rotation of factors. Factor analysis was carried out by testing using the Kaiser Meyer Olkin formula and Barlett'ssphericity test. The results of the first iteration of KMO and Barlett tests are as follows in Table 5:

Table 5. KMO Test Results and Barlett's Iteration 1

KMO and Bartlett's Test		
Kaiser-Meyer-OlkinMeasure of Sampling Adequacy.		*0,606*
Bartlett'sTest of	*Approx. Chi-Square*	*171,557*
Sphericity	*Df*	*91*
	Sig.	*0,000*

Based on the results of the factor analysis data processing above, it can be seen that the KMO test result is 0,606, which means that the data is more than enough for factor analysis, because the KMO value is in the range of 0,6 – 0,7. In the Barlett's test, the Chi-Square value was 171,557 with a significance value of 0,000. This value is below 0,05, which means that the variables used are correlated with other variables.
Then carry out the MSA test, Table 6 is a recapitulation of the MSA test results as follows:

Table 6. Recapitulation of MSA Test Results Iteration 1

No	NoStatement	Statement	MSA Test Value	MSA	Description
1	1	Simple from	0,363	0,5	Invalid
2	2	Colored	0,480	0,5	Invalid
3	3	Contemporary design	0,630	0,5	Valid
4	4	Elegant look	0,469	0,5	Invalid
5	5	Display product images	0,829	0,5	Valid
6	6	Complete information	0,330	0,5	Invalid
7	7	Practical	0,569	0,5	Valid
8	8	Protected product	0,701	0,5	Valid
9	9	Easy to carry	0,405	0,5	Invalid
10	10	Durable packaging	0,636	0,5	Valid
11	11	Easy to open	0,583	0,5	Valid
12	12	Neat	0,613	0,5	Valid
13	13	Durable screen printing	0,790	0,5	Valid
14	14	Showing the characteristics of Riau	0,671	0,5	Valid

Based on the MSA test that has been carried out, it can be seen that there are 5 invalid statements, namely statement 1 (simple form) with a value of 0,363, statement 2 (colored) with a value of 0,480, statement 4 (elegant appearance) with a value of 0,469, statement 6 (complete information) with a value of 0,330, and statement 9 (easy to carry) with a value of 0,405. This statement is said to be invalid because the MSA test result is smaller than the MSA value, which is 0,5. Then the second iteration of the KMO and MSA tests was carried out by eliminating invalid statements in the first iteration of the test.Table 7 is the result of the KMO test and Bartlett Iteration 2 test.

Table 7. KMO Test Results and Bartlett's Iteration 2

KMO and Bartlett's Test		
Kaiser-Meyer-OlkinMeasure of Sampling Adequacy.		*0,759*
Bartlett'sTest of Sphericity	*Approx. Chi-Square*	*101,626*
	Df	*36*
	Sig.	*0,000*

Based on the results of the factor analysis data processing above, it can be seen that the KMO test result is 0,759, which means that the data is good for factor analysis, because the KMO value is in the range of 0,7 – 0,8. In the Bartlett's test, the Chi-Square value was 101,626 with a significance value of 0,000. This value is below 0,05, which means that the variables used are correlated with other variables. Then do the second iteration of the MSA test.The recapitulation of the iteration 2 MSA test results can be seen in table 8.

Table 8. Recapitulation of Iteration 2 MSA Test Results

No	No Statement	Statement	MSA Test Value	MSA	Description
1	3	Contemporary design	0,774	0,5	Valid
2	5	Display product images	0,825	0,5	Valid
3	7	Practical	0,764	0,5	Valid
4	8	Protected product	0,686	0,5	Valid
5	10	Durable packaging	0,723	0,5	Valid
6	11	Easy to open	0,696	0,5	Valid
7	12	Neat	0,826	0,5	Valid
8	13	Durable screen printing	0,738	0,5	Valid
9	14	Showing the characteristics of Riau	0,763	0,5	Valid

Based on the second iteration of the MSA test that has been carried out, it can be seen that all statements are said to be valid because the results of the second iteration of the MSA test are greater than the MAS value, which is 0,5. This means that the MSA values of the 9 statements above can be predicted by other statements with smaller errors.

5.5 Determination of Attributes and Categories

The design of tanjak packaging is carried out using 4 categories of packaging elements, namely color, packaging shape or design, packaging materials and traditional values. For sizes to adjust to the needs and choices of manufacturers. The determination of the attributes and categories of Tanjak packaging can be seen in Table 9 below.

Table 9. Determination of Items and Categories

No	Element	Category	Notation
1	Color	Monochrome	X_{11}
		Many colors	X_{12}
		Typical Riau color	X_{13}
2	Contemporary Design	Vektor	X_{21}
		Bitmap	X_{22}
		Simple	X_{23}

3	Material	Ivory paper	X_{31}
		PVC plastic	X_{32}
		Plastic	X_{33}
4	Tradisional Values	Custom house image	X_{41}
		Weaving motifs	X_{42}
		Malay Arabic script	X_{43}

5.6 Stimulation Combination Determination

After obtaining the attributes and categories of Tanjak plants, the next step is to determine the combination of stimulation for each design element that has been grouped. It aims to provide an assessment of the suitability or relationship between design elements that have been arranged in a combination of stimulation on the importance level questionnaire or differential semantics 2.Determination of the combination of design elements is carried out using orthogonal arrays in SPSS 17.0 software.Table 10 is the result of orthogonal array combination stimulation design.

Table 10. Design Stimuli Combination

No	Color	Contemporary Design	Material	Tradisional Values
1	Typical Riau color	Bitmap	Plastic	Custom house image
2	Typical Riau color	Simple	Ivory paper	Weaving motifs
3	Many colors	Vektor	Plastic	Weaving motifs
4	Many colors	Simple	PVC plastic	Custom house image
5	Many colors	Bitmap	Ivory paper	Malay Arabic script
6	Monochrome	Simple	Plastic	Malay Arabic script
7	Monochrome	Vektor	Ivory paper	Custom house image
8	Typical Riau color	Vektor	PVC plastic	Malay Arabic script
9	Monochrome	Bitmap	PVC plastic	Weaving motifs

5.7 Conjoint Analysis

Conjoint analysis is used to determine the level of relative importance based on consumer perceptions and needs that are brought from the attributes of a particular product and the useful value contained in the related product attributes. Conjoint analysis was carried out by distributing questionnaires of importance level or differential semantics 2 to 30 respondents who are consumers who buy tanjak. The Table 11 is a recapitulation of utility values and conjoint analysis calculations for each combination of hillside packaging design stimulation.

Table 11. Results of Interest Level Questionnaire Distribution 2

No	Color	Contemporary Design	Material	Tradisional Values	Jumlah
1	Typical Riau color	Bitmap	Plastic	Custom house image	122
2	Typical Riau color	Simple	Ivory paper	Weaving motifs	124
3	Many colors	Vektor	Plastic	Weaving motifs	102
4	Many colors	Simple	PVC plastic	Custom house image	112
5	Many colors	Bitmap	Ivory paper	Malay Arabic script	120
6	Monochrome	Simple	Plastic	Malay Arabic script	116
7	Monochrome	Vektor	Ivory paper	Custom house image	107
8	Typical Riau color	Vektor	PVC plastic	Malay Arabic script	107
9	Monochrome	Bitmap	PVC plastic	Weaving motifs	127
					1.037
					3,84

1. Constant Value Calculation

$$\text{Constant Value} = \frac{\sum \text{Weight}}{n} = \frac{122+124+102+112+120+116+107+107+127}{9x30} = \frac{1.037}{270} = 3,84$$

2. Calculation of Design Attribute Utility Values

The utility value is obtained by subtracting the average of related items from the average of all items. The average associated attribute is obtained by dividing the total weight of the related attribute divided by the total number of related attribute statements.Table 12 is a recapitulation of the calculation results of the design attribute utility values.

Utility Value = X attribute-Xwhole date (Constant)

Example :

$$\text{Monochrome} = \frac{116+107+127}{4 \text{ x } 30} - 3,84 = \frac{350}{120} - 3,84 = 2,92 - 3,84 = -0,92$$

Table 12. Overall Utility Recapitulation

Factor	Items	*Constant*	XItem	*Utility*
Color	Monochrome	3,84	2,92	-0,92
	Many colors		2,78	-1,06
	Typical Riau color		2,94	**-0,90**
Contemporary Design	Vektor	3,84	2,63	-1,21
	Bitmap		3,01	**-0,83**
	Simple		2,93	-0,91
Material	Ivory paper	3,84	2,93	**-0,91**
	PVC plastic		2,88	-0,96
	Plastic		2,83	-1,01
Tradisional Values	Custom house image	3,84	2,84	-1
	Weaving motifs		3,94	**-0,90**
	Malay Arabic script		2,86	-0,98

5.8 The Importance of Factor Analysis

Based on the utility values that have been obtained from the conjoint analysis processing, important values are obtained for each indicator or design element, in this case the greatest utility for each factor is the selected specification for the slope packaging design as shown in the following Table 13.

Table 13. Importance Factor Analysis Value

Factor	Items	*Utility*
Packaging Color	Typical Riau color	-0,90
Packaging Design	Bitmap	-0,83
Packaging material	Ivory paper	-0,91
Tradisional Values	Weaving motifs	-0,90

5.9 Concept and Design Design

The design concept is the final step before planning and designing the hillside packaging. The design of Tanjak packaging was carried out based on the results of the feasibility test on factor analysis with the MSA test where the Kansei words chosen were words that had an MSA value of > 0,5. The number of Kansei words that have an MSA

value of> 0,5 is 9 words. The final packaging specifications obtained are based on the Kansei engineering method, namely the typical Riau packaging color with a contemporary design type, namely bitmap design and made of ivory paper as the material and has traditional values by displaying Malay woven motifs as a Tanjak characteristic. In addition to the main specifications of the packaging, there are also additional supporting items for the slope packaging design, including: (1) Contempory design, (2) Display product images, (3) Practical, (4) Products are protected, (5) Durable packaging, (6) Easy to open, (7) Neat, (8) Long-lasting screen printing, (9) Showing the characteristics of Riau.
Figure 4 is the result of the ramp packaging design.

Figure 3. Tanjak Packaging Design

6. Conclusion

Based on data processing using the Kansei engineering method, four packaging elements were obtained which became the basis for the development of Tanjak packaging according to consumer desires. These elements produce packaging development specifications in the form of typical Riau packaging colors with a contemporary design type, namely bitmap designs and made of ivory paper as the material and have traditional values by displaying Malay woven motifs as a tanjak characteristic. The packaging design is also supported by additional items obtained from valid data on the MSA test, namely contemporary design, displaying product images, practical, protected products, durable packaging, easy to open, neat, durable screen printing, and displaying Riau characteristics. This

packaging design is in accordance with the wishes and needs of consumers because it is obtained from the interpretation of the user's perception of the Tanjak packaging.

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