

Designing Innovative Packaging to Enhance the Appeal of Adifidz Putra's Small and Medium Enterprises Products

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ABSTRACT

The rapid development of the global market is in the global industry where companies must have the ability to compete globally in the face of advancing times. Therefore, this global market development becomes a challenge for companies, including the Adifidz Putra beef skin cracker Small and Medium Enterprises (SMEs) in Bangkinang City, which must be able to compete by offering their consumers the best taste, quality, service, price, and packaging design compared to other competing products, so that they can continue to maintain their performance. Therefore, it is necessary to develop the packaging design for the skin cracker products from SMEs AdifidzPutra in Bangkinang City by applying the Kansei Engineering approach. This approach considers the emotional and psychological aspects of product packaging with the aim of creating a positive experience for consumers. The Kansei Engineering method will be used to link the physical characteristics of the packaging with the emotional responses expected from consumers. It is hoped that the results of this research will enhance product appeal and consumer satisfaction, while helping SMEs Adifidz Putra to improve their marketing efforts and increase the competitiveness of their products.

Keyword: *Kansei engineering, Product design; Small and Medium Enterprises.*

Introduction

Indonesia is currently experiencing significant development in the tourism and creative economy sectors, which noticeably increases the national market value and enables the country to compete globally with neighboring countries and the world. The development of the tourism and creative economy sectors provides additional benefits for Indonesia, one of which is the development of the food industry. Indonesian food, known for its traditional uniqueness, is a cultural treasure that deserves to be developed and introduced at the international level [1].

In 2023, Riau's economy grew by 4.21 percent, slower than the 4.55 percent growth in 2022. The highest growth was recorded in the Construction sector (9.17 %), Transportation and Warehousing (8.31%), as well as Information and Communication. (7,67 %). The Processing Industry grew by 3.63 percent, Agriculture, Forestry, and Fisheries by 3.23 percent, and Mining and Quarrying by 2.52 percent. Riau's GDP in 2023 reached Rp1,026.47 trillion, with a dominant structure from the Processing Industry (27.55 %), Agriculture (26.30 %), and Mining. (19,78 %). In supporting sustainable economic growth, especially in the Processing Industry and Agriculture sectors, it is important to pay attention to product packaging aspects. Packaging not only protects products from external factors such as moisture and pressure, but also serves as "silent promotion." Attractive packaging can enhance product appeal and sales, as well as strengthen brand awareness in the market [2].

Besides fulfilling basic functions, well-designed packaging can also create a positive image in the eyes of consumers [3]. There are three main reasons for packaging, namely, to ensure product safety during distribution, differentiate the product from competitors, and increase sales through visual appeal. For SMEs in Indonesia, especially in the food sector such as crackers, understanding packaging is very important. However, many SMEs have not yet implemented optimal packaging standards, particularly for cracker products that still require improvements in packaging aspects [4].

One of the promising business potentials in Bangkinang City is the production of skin crackers by the Adifidz Putra MSME. This product has a steadily increasing demand every year, especially among the local community. However, with the growth in demand, it is important for business operators to not only

focus on product quality but also on the packaging used. Packaging is one of the crucial elements in creating a good first impression on consumers and maintaining the quality of the product until it reaches the hands of the buyer.

Based on the results of interviews and direct observations of SMEs Adifidz Putra, it was found that the current packaging of skin crackers has several advantages, such as the use of a laminating press that does not require sophisticated tools and relatively low packaging costs. However, there are still many shortcomings that need to be addressed. These deficiencies include insufficient information aspects, such as the absence of product descriptions, official halal labels, nutritional content, and expiration dates. In addition, the packaging often leaks, is difficult to decompose, and cannot adequately protect the product from damage, especially when the crackers are exposed to wind or fall. This shortcoming indicates that the current packaging is not yet able to meet market needs optimally and requires an update to enhance product competitiveness.

Customers tend to have needs that continuously evolve according to their choices, desires, and comfort. The Adifidz Putra beef skin cracker SMEs must be consumer-oriented to capture their desire for appealing products. Good packaging can build a strong brand image and influence consumer purchasing decisions. Therefore, the product of SMEs Adifidz Putra needs to consider the "Human Kansei" aspects such as feelings, image, and consumer desires in their packaging development. The Kansei Engineering method is an approach that can be utilized in packaging development to more deeply reflect consumer feelings and image [5]. This approach provides designers with the opportunity to understand consumer needs more accurately through their psychological or emotional orientation [6]. By using Kansei Engineering, products can be specifically designed to meet the emotional needs of consumers while simultaneously building a positive brand image [7].

Based on the sales data of SMEs Adifidz Putra product, over the past five years, there have been quite significant fluctuations. In 2020 and 2021, there was a significant decline in sales due to the COVID-19 pandemic, which affected people's purchasing power and product distribution. However, in 2022 and 2023, sales began to increase, driven by The SMEs intensive efforts to expand the marketing network and improve product quality. Although improvements have been made, challenges remain, including fluctuations in raw material prices and changes in consumer preferences. This SMEs continues to innovate in product development and market diversification to face this challenge.

Thus, this research is expected to provide the right solution in developing Kansei Engineering-based packaging to increase product appeal and support sales growth of Adifidz Putra SMEs products. Innovation in packaging will be one of the important strategies to strengthen brand image and ensure business sustainability amid increasingly tight competition.

Research Methods

The research method used is quantitative descriptive. Data collection was conducted in Kumantan Village, Kampar Regency, Riau. The flow of this research process can be seen in Figure 1.

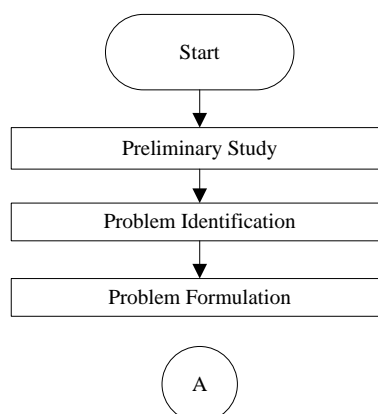


Figure 1. Research Flow Diagram

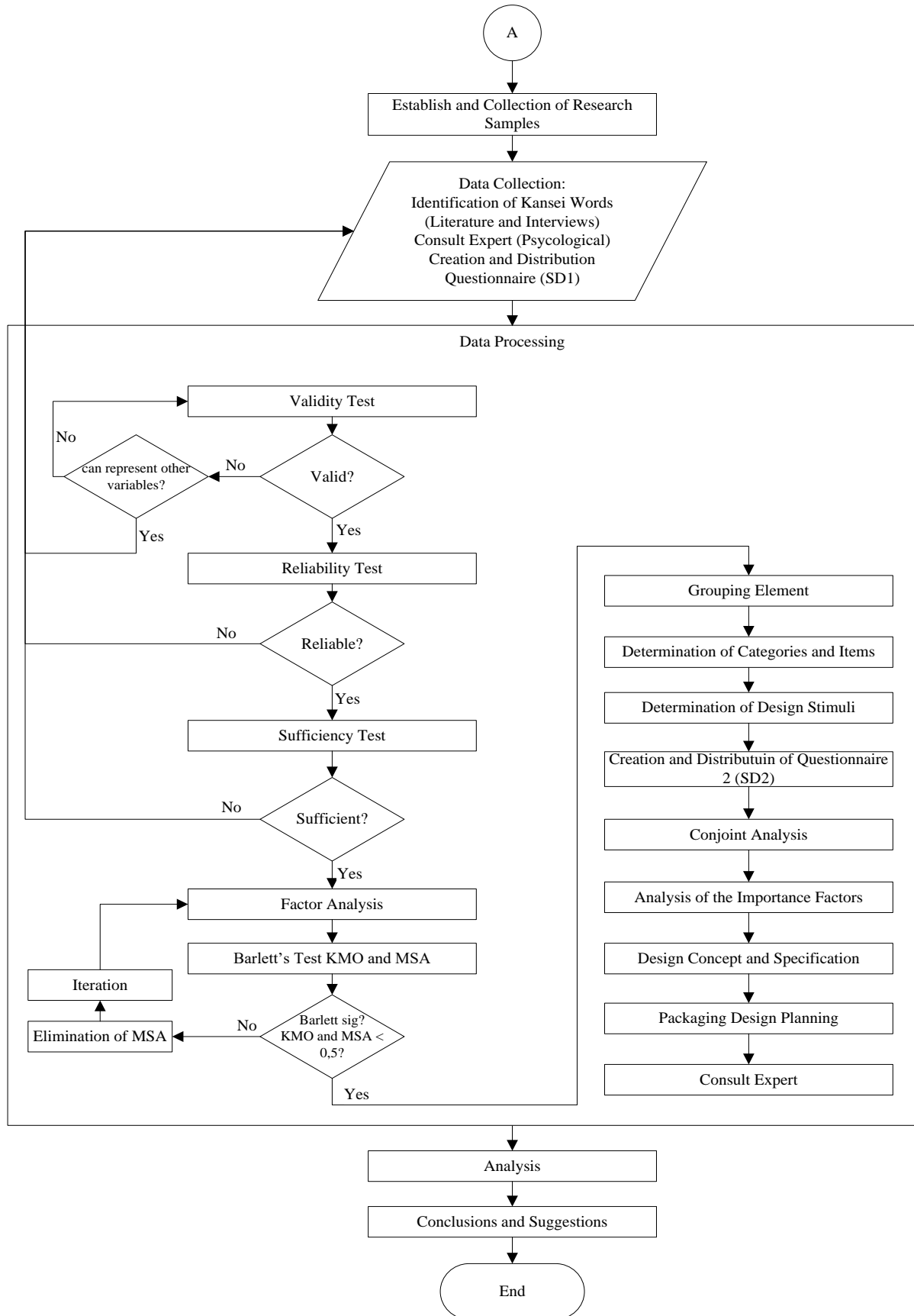


Figure 1. Research Flow Diagram (cont.)

Data Collection

Data collection in this study was conducted by following the stages of Kansei Engineering for the packaging of pork cracklings, tailored to consumer feelings. The steps of data collection begin with identifying Kansei words relevant to the packaging of Cowhide Crackers. This process is carried out through direct interviews with consumers and by referring to various literature from journals and books. Next, a consultation was conducted with a consumer psychology expert. The purpose of this consultation is to assist the researcher in translating the identified Kansei words into consumer needs based on their emotions and psychology. Thus, the emotional needs of consumers related to the packaging of pork cracklings can be formulated in the form of appropriate Kansei words. The next step is the preparation of the questionnaire using the Semantic Differential method. This questionnaire uses a five-point scale, namely: Strongly Disagree (scale 1) for respondents' perceptions that very closely match the Kansei words in the right column, Disagree (scale 2), Neutral (scale 3), Agree (scale 4), and Strongly Agree. (scale 5) [8].

Testing Validity and Reliability

In this study, the validity test was conducted using the IBM SPSS Statistics 25 application. The measurement of the validity test can be done by comparing the Sig. count value with the Sig. table Alpha 5%. The validity of the indicators can be seen from the output of the Sig. count (2Tailed) Pearson Correlation value on each row of the total construct of each statement item. If the R count value > R table at a significance level of 0.05, then the statement item is considered valid. Reliability testing is a tool to measure a questionnaire that serves as an indicator of a variable or construct. A questionnaire is said to be reliable or dependable if a person's answers to the questions are consistent or stable over time. Data processing is conducted using SPSS. Data reliability testing can be conducted using the Cronbach Alpha (α) statistical test. A variable is considered reliable if it yields a Cronbach Alpha value ≥ 0.70 [9].

Data Sufficiency Testing

Data sufficiency testing is used to determine whether the measurement data with a certain level of confidence and precision is sufficient or not. The condition for the data sufficiency test is when N' (the calculation result) is less than the total N (amount of data). If the collected data is insufficient, a new data collection will be conducted in the form of samples and Kansei words. The data sufficiency test is conducted as follows [10]:

1. Bartlett and KMO Tests

The Bartlett test aims to determine whether the variables used are correlated with other variables, because if there is no correlation, factor analysis cannot be performed. Meanwhile, the KMO (Kaiser Meyer Olkin) test is used to evaluate whether the sampling method has met the criteria, which implies the data's suitability for further analysis. The obtained KMO value determines the quality of the data, with a range of 0.9 - 1.0 indicating that the data is very good for factor analysis, and a value of ≤ 0.5 means the data is not suitable for factor analysis. If the KMO value is below 0.5 or the variables are not correlated, the next step is to consult again with a psychologist to find a more accurate interpretation of the Kansei words to meet the requirements for factor analysis.

2. MSA (Measure of Sampling Adequacy)

MSA (Measure of Sampling Adequacy) is a statistic used to assess the extent to which a variable can be predicted by other variables with a low error rate, thus serving as a measure of attribute validity. The MSA value ranges from 0 to 1, where $MSA = 1$ indicates that each variable can be accurately predicted by other variables without error, $MSA > 0.5$ indicates that the variable can still be predicted by other variables, while $MSA < 0.5$ indicates that the variable cannot be predicted and should be removed from the analysis. If the MSA value is less than 0.5, the elimination of the variable must be conducted, and further MSA testing is required until the MSA value can predict each variable well.

Grouping of Design Elements

The grouping of these design elements is carried out to determine which design element group each category item will belong to. Design elements used in the packaging design of skin crackers include color, design, physical materials, and traditional values displayed on the skin cracker packaging.

Determination of Categories and Items

In the determination of categories and items, they are used to form sample combinations that will later be used as the second questionnaire object. The sample is divided into packaging elements determined

by the researcher that correspond to the skin cracker packaging. In determining the categories and items, notations for each category will be obtained on the design elements used to combine each element based on its category [11].

Determination of Design Stimuli

In the determination of design stimuli, it is done based on the grouping of design elements according to item categories. Stimuli are obtained from SPSS output through the Menu or Dialog Box, and execution writing in the Syntax Editor. At this step, combinations of each category of elements will be obtained, which will serve as evaluation sheets in questionnaire 2 [12].

Creation and Distribution of Questionnaire 2 (Semantic Differential 2)

In the second questionnaire, research respondents were asked again to evaluate each design element provided in the form of the combination stimuli that had been created. The purpose of the second semantic differential evaluation is to analyze the relationship between each Kansei word and the subjects' image of each given packaging design element. The average value of each packaging design element stimulus against each Kansei word from the respondents' evaluation is then calculated. The average value of each packaging design element from the results of questionnaire 2 (SD2) is used as input data in the conjoint analysis process [13].

Conjoint Analysis

Conjoint analysis serves the function of determining the relationship between design elements and Kansei words according to the results from questionnaire 2 or semantic differential 2. Based on the processing of the conjoint analysis, utility values will be obtained for each category of design elements.

Analysis of the Importance of Factors

The importance factor analysis is used to determine the contribution percentage of each Kansei word based on packaging design elements related to the conjoint test. Thus, the highest weight rankings of each category of design elements are obtained based on utility values. Where the highest value is the selected design category according to the packaging design elements needed by consumers [14].

Design Concept and Specifications

After obtaining the highest value based on the conjoint test, the specifications of the selected product were determined. The next step is to create a design concept based on the selected specifications from the conjoint test and the importance of the factor analysis conducted earlier.

Packaging Design Planning

The packaging design was conceptualized and created using Photoshop software to assist in designing the skin cracker packaging. The redesign of the skin cracker packaging was conducted based on the selected design concept and specifications obtained through data processing of Kansei words, which had undergone factor analysis and the established design elements.

Consult Expert

After the redesign of the skin cracker packaging based on the selected specifications, the next step is to consult experts to identify shortcomings and suggestions regarding material needs, pricing, and improvement proposals from the design that has been conducted. This is done to serve as a consideration in the necessary aspects before conducting a production activity [15].

Consult Expert

After the processing is conducted, the results of the data processing will be obtained. Once the results of the data processing are known, the next step is analysis based on the results of the data processing adjusted to the problems that have been identified previously. The analysis conducted will show the results of the research carried out. Of course, the analysis is conducted with the guidance of the literature study that has been conducted previously [16].

Results and Discussion

Identification of Kansei Words

The identification of Kansei words was carried out by providing a sample of Adifidz Putra's skin cracker packaging to the respondents, where they were asked to give their opinions, suggestions, complaints, and comments regarding the provided packaging. After the identification is done, the results are generalized or organized into the structure of Kansei words. This generalization process is carried out with the help of an expert who understands consumer psychology. Table 1 shows the results of the generalized Kansei words.

Table 1. Results of Kansei Word Identification

| No | Kansei Word | No | Kansei Word |
|----|------------------|----|------------------------------|
| 1 | Neat | 13 | Easy to store |
| 2 | Simple form | 14 | Waterproof |
| 3 | Easy to open | 15 | Safe |
| 4 | Easy to close | 16 | Unobtrusive Color |
| 5 | Cute Shape | 17 | Light Color |
| 6 | Practical | 18 | Many Colors |
| 7 | Low price | 19 | Simple design |
| 8 | Transparent | 20 | Trendy design |
| 9 | Easy to organize | 21 | Long-lasting screen printing |
| 10 | Sturdy | 22 | Product related pictures |
| 11 | Elegante | 23 | Traditional design |
| 12 | Long lasting | 24 | Informative |

Design and Distribution of Level of Importance Questionnaire-1

The process of designing and distributing the importance-1 questionnaire was carried out using 24 Kansei words selected based on the initial identification results. The questionnaire was specifically designed to measure respondents' perceptions of certain attributes, using the semantic differential technique as the main approach. This technique allows respondents to provide a more in-depth evaluation of their preferences and feelings regarding the product, through a scale that reflects various levels of judgment, ranging from strongly agree to strongly disagree. As such, the data obtained from this questionnaire can provide a more comprehensive insight into consumer perceptions of the products.

Validity and Reliability Test

In the first stage of validity testing, it was found that there were 4 Kansei words that did not meet the validity criteria. Therefore, a second stage of validity testing was conducted to re-evaluate all the Kansei words. The results of the second iteration of testing showed that all items were declared valid, with a Cronbach's Alpha value of 0.978 for 20 items. This value indicates that the internal consistency level of all the items is in the good category, so the data generated from these 20 items can be considered reliable for further analysis. With the validity and reliability already achieved, the Kansei words are now ready to be used in the next stage to understand consumer preferences and perceptions.

Data Sufficiency Testing

Data adequacy testing was conducted using a sample of 68 respondents with 20 statement items as evaluation instruments. The purpose of this test is to ensure that the number of respondents used is sufficient to obtain valid and representative results. Through precise statistical calculations, it is measured how adequate the collected data is for further analysis. By considering the sample size and distribution of respondents' answers, this test will determine whether the available data is sufficient or still requires additional respondents to obtain more accurate and significant results. To calculate the amount of data adequacy required, equation (1) is used. The results of this test will be the basis for the next analysis steps.

$$N' = \left[\frac{\beta/\alpha \sqrt{N \sum X_i^2 - (\sum X_i)^2}}{\sum X_i} \right]^2 \quad (1)$$

$$N' = \left[\frac{2/0,05 \sqrt{68(431910) - (5374)^2}}{5374} \right]^2$$

$$N' = 27,147$$

From the calculation results of equation (1) it can be seen that the amount of data collected has exceeded the minimum amount of data required ($N' = 27,147 < N = 68$). Then, the data that has been taken is declared sufficient.

Factor Analysis

Based on the results of MSA testing in the first iteration, it was found that there were two variables with a value of less than 0.5, which indicated that these variables should be eliminated. After elimination, the data processing process continued to the second iteration. In the second iteration, all remaining items showed MSA values greater than 0.5, which means that all Kansei words can be predicted well, and the data is suitable for further analysis.

Table 2. Determination of Items and Categories

| KMO and Barlett's Test | | |
|--|--------------------|----------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | 0,870 |
| Barlett's Test of Sphericity | Approx. Chi-Square | 1556,544 |
| | Df | 173 |
| | Sig. | 0,00 |

Determination of Items and Categories

The packaging design of leather crackers is divided into four main elements, namely color, design, physical materials, and traditional values. Details regarding the division of these design elements can be seen in the table below.

Table 3. Determination of Items and Categories

| No | Element | Category | Notation |
|----|--------------------|-------------------|----------|
| 1 | Color | Light Color | X11 |
| | | Many Colors | X12 |
| | | Unobtrusive Color | X13 |
| 2 | Design | Cute Shape | X21 |
| | | Elegant | X22 |
| | | Simple Design | X23 |
| 3 | Physical Material | Aluminum Foil | X31 |
| | | Plastic | X32 |
| | | Cardboard | X33 |
| 4 | Traditional Values | Regional Icon | X41 |
| | | Unique Attributes | X42 |

Determination of Stimuli Combination

The process of determining the combination of stimuli is done through the use of a design method known as orthogonal array. This method makes it possible to organize and arrange a wide variety of stimuli in a systematic and efficient manner, so that all factors under consideration can be analyzed in depth. By using the orthogonal array approach, the various combinations of stimuli generated ensure that each test element gets a balanced and optimal representation in the research or experiment conducted.

Table 4. Stimuli Design Results

| No | Color | Design | Physical Material | Traditional Values |
|----|-------------------|---------------|-------------------|--------------------|
| 1 | Unobtrusive Color | Elegant | Cardboard | Regional Icon |
| 2 | Unobtrusive Color | Simple Design | AL Foil | Unique Attributes |
| 4 | Many Colors | Simple Design | Plastic | Regional Icon |
| 5 | Many Colors | Elegant | AL Foil | Regional Icon |
| 6 | Light Color | Simple Design | Cardboard | Regional Icon |
| 7 | Light Color | Funny Shape | AL Foil | Regional Icon |
| 8 | Unobtrusive Color | Funny Shape | Plastic | Regional Icon |
| 9 | Light Color | Elegant | Plastic | Unique Attributes |

Design and Distribution of the Level of Importance Evaluation Questionnaire

After the process of forming the stimuli of Adifidz Putra's cowhide cracker packaging design elements was completed, a questionnaire was distributed to evaluate the level of importance of these elements. This evaluation involved 22 respondents consisting of SMEs and re-sellers, especially those who are engaged in the middle to upper scale and have a high volume of product sales.

Conjoin Analysis

Based on the results of the utility analysis shown in table 5, it is known that each design element has the highest utility value. Therefore, the design element with the highest utility value was selected to be used as the final specification.

Tabel 5. Overall Utility

| Element | Item | Constant | X Item | Utility |
|--------------------|--------------------|----------|--------|---------|
| Packaging Color | Bright Colors | | 3,852 | 0,447 |
| | Many Colors | 3,604 | 3,573 | 0,331 |
| | Unobtrusive Colors | | 3,488 | 0,316 |
| Packaging Design | Cute Shape | | 3,730 | 0,326 |
| | Elegant | 3,404 | 3,700 | 0,296 |
| | Simple Design | | 3,382 | 0,522 |
| Packaging Material | AL Foil | | 3,306 | 0,498 |
| | Plastic | 3,404 | 3,579 | 0,225 |
| | Cardboard | | 3,927 | 0,523 |
| Traditional Value | Regional icon | | 3,670 | 0,266 |
| | Unique Attributes | 3,604 | 3,473 | 0,331 |

Design Concept and Specifications

Based on the results of the previous factor analysis feasibility test, it was found that 18 Kansei words had an MSA value of more than 0.5. This indicates that these Kansei words are the main factors that consumers always consider when choosing leather cracker products, especially in terms of packaging. The final packaging specification produced in this research is a leather cracker packaging that uses cardboard material with bright colors and has an attractive design and includes traditional elements such as the introduction of the Kampar region or Riau Province. The main purpose of this design is to introduce the region at the national and international levels. This leather cracker packaging is also equipped with various functional features, such as easy to open and close, practical, affordable, easy to organize and store, waterproof, safe, durable screen printing, and informative. These features are designed based on consumer preferences and psychology to create the ideal packaging.

Consult Expert

Table 6 shows the breakdown of current packaging costs, while Table 6 presents the estimated costs after adjustments and improvements.

Tabel 6. Packaging Cost Before Improvement

| Type of Need | Bulk Price | Packaging Price |
|-----------------|-----------------|-----------------|
| Packaging costs | Rp. 54.000/pack | Rp.6.00,00/Pcs |
| Rubber cost | Rp. 27.000/pack | Rp. 18,00/Pcs |
| Total | | Rp.6.18,00/Pcs |

Tabel 7. Packaging cost after improvement

| Type of Need | Bulk Price | Packaging Price |
|--------------------------------|------------------------------|------------------------------|
| Plain standing pouch packaging | Rp. 450.000/ Plano (500 pcs) | Rp. 900,00/Pcs |
| Printing and shipping costs | Rp. 950.000/ Plano (500 pcs) | Rp. 1.900/Pcs after printing |
| Total | | Rp. 2.800/Pcs |

The results of the calculation of production costs show that the current packaging of leather crackers using plastic and screen-printing materials has a total production cost of Rp. 6,18.00 per package. After improving the packaging design by considering consumer preferences and psychology through the Kansei engineering method, the production cost per package increased to Rp. 2,800.00.

Packaging Design

After going through a series of product design selection processes based on consumer desires translated using the Kansei method, the results of the design selection based on the Kansei method show that user preferences are influenced by aesthetic elements and functions that match their emotions. The selected designs successfully reflect the desired characteristics, such as trendy, elegant, and easy to use, according to the results of the Kansei keyword analysis. This process also shows that visual attributes, such as color, shape, and texture, have a significant influence on the final decision. Thus, the Kansei method has proven effective in systematically integrating user emotional needs into product design. The product design can be realized as shown in Figure 2.



Figure 2: Packaging Design of Adifidz Putra's Cowhide Crackers

Conclusion

The results of the development of Adifidz Putra's leather cracker packaging, based on consumer feeling orientation through the Kansei engineering method, show that the desired final packaging specifications must meet criteria such as neat, easy to open, easy to close, practical, affordable, easy to arrange, easy to store, waterproof, safe, have durable screen printing, and also informative. The cost of making the new packaging shows a difference of Rp. 2,182, but this cost difference can be offset by increasing the price of the product. For further research, it is recommended to add supporting methods to improve the application of the Kansei Engineering method in multi-criteria decision making.

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