

Optimization of Packaging Design for *Bumbu Pecel* Putri Srikandi Using the Quality Function Deployment (QFD) Method

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Abstract. *Micro, Small, and Medium Enterprises (MSMEs) play a vital role in the Indonesia economy, contributing over 60% to GDP and employing nearly 97% of the workforce. Competitiveness can be improved through packaging that protects product, strengthens brand identity, and attracts consumers. Putri Srikandi, a traditional peanut sauce (bumbu pecel) producer, still uses simple plastic packaging, limiting its market appeal. This study redesigns the packaging using Quality Function Deployment (QFD) through House of Quality (HoQ) to translate consumer preferences into technical specifications. Data from 112 respondents identify 13 key attributes, with readable font color (A3) and eco-friendly packaging (A5) scoring the highest (4.13), while attractive packaging design (A1) and hygiene (A12) scored the lowest (3.96). Benchmarking shows the product underperforms compared to competitors. HoQ analysis produces 13 technical responses, with top priorities are clear producer information (A6, RW = 7.75; NRW = 9%), and brand/logo visibility (A8, RW = 7.71; NRW = 8%). The final design integrates modern aesthetics, local identity, spiciness-based color coding, and eco-friendly materials to enhance competitiveness and consumer trust.*

Keywords – Competitiveness; Consumer Preferences; House of Quality (HoQ); Micro, Small, and Medium Enterprises (MSMEs); Quality Function Deployment (QFD).

INTRODUCTION

The role of Micro, Small, and Medium Enterprises (MSMEs) as the backbone of the national economy has become increasingly evident from the strong growth trends over the past few years. According to a Press Release from the Coordinating Ministry for economic Affairs of the Republic of Indonesia [1], the number of MSME units reached around 64.2 million in 2020, increased to 64.5 million in 2021, and approximately 65.4 million in 2022. Based on the report from the Ministry of Cooperatives and SMEs [2], by the end of 2024 the total number of MSMEs had reached around 65.5-66 million units, contributing about 60-61% to the national GDP and absorbing nearly 97% of workforce. In addition, the 2024 CPA Australia survey noted that around 83% of small businesses in Indonesia reported positive growth, up from 80% in 2023. This figure is projected to increase 87% in 2025, making Indonesia one of the highest in the Asia-Pacific region [3]. This significant growth indicates that the MSME sector is developing dynamically by delivering quality product, adopting technology, and expanding markets, quality of MSME products, particularly in terms of packaging design, becomes highly important [4], [5]. Packaging protects products while serving as a communication tool that shapes first impressions, builds brand identity, and attracts attentions [6], [7]. As consumers become increasingly selective, packaging that is aesthetic, informative, safe, and reflective of brand identity can significantly enhance that attractiveness and competitiveness of MSME products in an increasingly intense market competition [8], [9].

Putri Srikandi is one of the MSME product with strong potential for broader development. This MSME is located in Sukun District, Malang City. One if its product is *bumbu pecel* (traditional Javanese peanut sauce seasoning), which is still packaged simply using plain plastic and a label sticker that provides only basic information. Given its authentic taste and market potential, developing modern packaging is a strategic step to enhance appeal and competitiveness. To address these limitations, this study designs new packaging that aligns with consumer desires and expectations using Quality Function Deployment (QFD), particularly through the development of the House of Quality (HOQ) matrix. QFD may translates the Voice of Customer (VoC) into technical packaging specifications [6], [10]. In the context of the *bumbu pecel* Putri Srikandi packaging design, QFD helps identify the VoC, then translate it into measurable technical specifications through the HoQ matrix. The HoQ functions to map the relationship between consumer needs (the “what’s”) and the technical specifications of packaging design (“the how’s”). The QFD method is also used to redesign a product because it provides a systematic approach for product development and ensures that customer needs and expectations are fulfilled [11], [12]. Improvements in packaging durability, functionality, and consumer acceptance are consistently reported, and these outcomes are often associated with priority technical

attributes identified through QFD [13], [14], [15]. Thus, the application of QFD in this study not only results in a packaging design for *bumbu pecel* Putri Srikandi that is more appealing and customer-oriented, but also serves a customer-driven product design that can be integrated to improve the quality and competitiveness of MSME products.

METHOD

This study systematically translates consumer requirements into technical packaging specifications. This methodological approach ensures that the resulting design recommendations are data-driven and aligned with consumer preferences rather than based on subjective assumptions from the designer for business owner. Method was carried out through eight systematic stages, as follows:

1. Initial Data Collection (Voice of Customer – “What’s”)

At this stage, primary data were collected to explore consumer needs and preferences regarding packaging attributes of *bumbu pecel*. Data were obtained through the distribution of exploratory questionnaires that were opened-ended and semi structured in order to capture diverse and comprehensive consumer inputs. Respondents for this initial stage consisted of adult individuals (aged 17 years and above) residing in Malang City and/or Malang Regency, with prior experience in purchasing or consuming packaged *bumbu pecel* within the last 12 months. The determination of the number of respondents in this stage followed a practical guideline (rule of thumb) and the principle of data saturation. The initial target was between 50-100 respondents.

2. Weighting of Customer Importance and Satisfaction with *Bumbu Pecel* Putri Srikandi (“Importance to Customer” and “Customer Satisfaction Performance”)

After identifying the “What’s” attributes in the previous stage, weighting was conducted to determine the level of each attribute according to consumer perception. This was carried out by distributing a second questionnaire in the form of a structured, closed-ended survey with a rating scale. Each attribute was assessed for its importance using a five-point Likert scale (1= Not Importance, 5= Very Importance).

The target population in this study is defined as adult consumers aged 17-60 years who reside in Malang City and/or Malang Regency and actively purchase or consume packaged *bumbu pecel* at least once within the last six months. However, because the total population could not be precisely determined, conventional population-based calculation methods were not applied in determining the sample size. Instead, the number of respondents collected within the research period of three months during the research period which start from May to July 2025 considered adequate and used as the research sample.

After the main questionnaire is distributed for broad data collection, it is important to ensure that the instrument has adequate validity and reliability. Both tests are processed using SPSS software. The weighted results for both the importance level and the satisfaction level are subsequently used as input for the HoQ analysis, which integrates consumer needs with technical specifications to prioritize packaging design improvements. The formulas are as follows:

a. Importance To Customer (ITC)

This step calculates the importance level of each attribute as perceived by customers represents how strongly customers value a particular attribute compared to others. To calculate Importance of Customer, equation (1) is used.

$$ITCi: \frac{\sum_j^n x_{ij}}{n} \dots \dots \dots (1)$$

$ITCi$ refers to importance score for attribute i , x_{ij} is score given by respondent j on attribute i for importance, and n is number of respondents.

b. Customer Satisfaction Performance (CSP)

This step measures customer satisfaction with the current performance of each attribute, reflects how well the existing product meets customer expectations. To calculate Customer Satisfaction Performance, equation (2) is used.

$$CSPi: \frac{\sum_j^n y_{ij}}{n} \dots \dots \dots (2)$$

$CSPi$ refers to satisfaction score for attribute i , y_{ij} is score given by respondent j on attribute i for satisfaction, and n is number of respondents.

3. Benchmarking and Competitor Evaluation

This stage was carried out by analyzing consumer responses toward two types of similar product packaging (competitors) in comparison with the *bumbu pecel* Putri Srikandi packaging. Consumer were asked to evaluate the importance and satisfaction levels based on the same packaging attributes.

4. Identification of Technical Characteristics (“How’s”)

This identification was carried out by the development team to address consumer needs and preferences (Voice of Customer). Each technical characteristic represents a measurable aspect of the product. In addition, at this stage,

the Direction of Improvements (DoI) was also defined to indicate the desired direction of improvement for each technical characteristic. The DoI guidelines are presented in Table 1.

Table 1. Guidelines for Direction of Improvements

Symbol	Meaning	Description
	Increase	The technical attribute performs better if its value is increased.
	Decrease	The technical attribute performs better if its value is reduced.
	Maintain	The technical attribute does not need to be changed, as it is already appropriate.
	Stable/Balanced	The technical attribute must be kept within a certain range, not too high and not too low.

5. Matrix Calculation

Based on the second questionnaire, importance and satisfaction data are processed to calculate the planning matrix as follows:

a. Determination of Goals

In this stage, the goal for each attribute is determined in order to define the target performance that needs to be achieved. To calculate Determination of Goals, equation (3) is used.

$$Goal = Competitor Value (CV) + Improvement Margin (IM) \dots \dots \dots (3)$$

CV refers to benchmark value from competitors and IM is desired improvement beyond competitor value.

b. Improvement Ratio (IR)

The IR shows the relative gap between the goal and current customer satisfaction. To calculate IR, equation (4) is used.

$$IR = \frac{Goal (Target Performance)}{Satisfaction Score (SS)} \dots \dots \dots (4)$$

Goal refers to target performance of an attribute and SS is current performance perceived by customers.

c. Identification of Sales Point

The sales point is an additional weight assigned to certain customer needs or product attributes that are considered potential key selling points. The evaluation scale is presented in Table 2.

Table 2. Scale of Sales Point

Scale	Description
1.0	No direct impact on sales, only serves as a complement.
1.2	Moderate impact, influences purchasing decisions but is not the main factor.
1.5	Highly influential, becomes the main reason consumers purchase the product.

d. Raw Weight (RW)

Raw weight determines the significance of each attribute by combining importance, improvement needs, and sales impact. To calculate RW, equation (5) is used.

$$RW = Importance to Customer \times Improvement Ratio \times Sales Point \dots \dots \dots (5)$$

ITC refers to degree of importance assigned by customers, IR is relative gap between goal and satisfaction score, and SP is market advantage obtained by improving the attribute.

e. Normalized Raw Weight (NRW)

The normalized raw weight expresses each attribute's contribution in percentage terms. To calculate NRW, equation (6) is used.

$$NRW = \frac{RW_i}{Total Raw Weight} \times 100\% \dots \dots \dots (6)$$

RW_i refers to raw weight of attribute i and Total RW is sum of all raw weights across attributes.

6. Determination of the Relationship Between Technical Responses and Customer Needs (Relation Matrix)

This analysis involves mapping the relationship between the "What's" (customer needs) and the "How's" (technical characteristic). Degree of relationship is represented using symbols with the scale shown in Table 3.

Table 3. Symbols of the Relationship Between What's and How's

Symbol	Meaning	Value
●	Strong relationship	9
○	Moderate relationship	3
△	Weak relationship	1
(blank)	No Relationship	0

7. Correlation Analysis of Technical Characteristics and Level of Difficulty (Roof of the House)

This analysis identifies the interrelationships among technical characteristics, whether positive or negative. Integration of the House of Quality (HoQ) Matrix. This stage represents the final step in constructing in the HoQ, by integrating all information from the QFD process. The symbol representing correlation are shown in Table 4.

Table 4. Symbols Correlation Between Technical Responses

Symbol	Meaning	Description
++	Strong positive relation	+9
+	Positive relation	+3
(blank)	No relation	0
-	Negative relation	-3
--	Strong negative relation	-9

8. Formulation of Packaging Design Recommendations

Based on the results of the House of Quality analysis, particularly the prioritization of technical characteristics, recommendations for packaging design are formulated. These recommendations are directed toward achieving an optimal design that is customer-oriented and aligned with market expectations.

RESULT AND DISCUSSION

This section outlines the study results in line with the QFD stages, beginning with consumer need identification, instrument testing, importance satisfaction analysis, competitor benchmarking, technical responses, matrix calculation, and HoQ integration, followed by packaging design recommendation.

1. Initial Data (Voice of Customer "What's")

In identifying consumer preferences regarding packaging attributes, 89 respondents from Malang City and Malang Regency who had purchased or consumed packaged *bumbu pecel* were surveyed. This number was deemed sufficient, as no new significant attributes emerged from additional responses. The desired packaging attributes are presented in Table 5.

Table 5. Consumer-Desired Packaging Attributes "What's" (Voice of Customer)

No.	Attributes	Code
1.	Attractive packaging design	A1
2.	Clarity of information on the packaging	A2
3.	Readable font color on the label	A3
4.	Ease of opening and closing the packaging	A4
5.	Eco-friendly packaging	A5
6.	Clear producer/manufacturer information	A6
7.	Presence of product photo/image	A7
8.	Brand/logo position is easy to see and read	A8
9.	Appropriate packaging size	A9
10.	Layout of information	A10
11.	Strength/durability of packaging material	A11
12.	Hygienic and safe for food	A12
13.	Visual appeal	A13

2. Weighting of Importance Level and Consumer Satisfaction

The main questionnaire was distributed over approximately three months and successfully gathered responses from 112 consumers. Data were collected from respondents (aged 17-60 years) residing in Malang City and/or Malang Regency, who actively purchased and/or consumed packaged *bumbu pecel* at least once in the last six months. The demographic of respondents are summarized in the following figures:

a) Gender

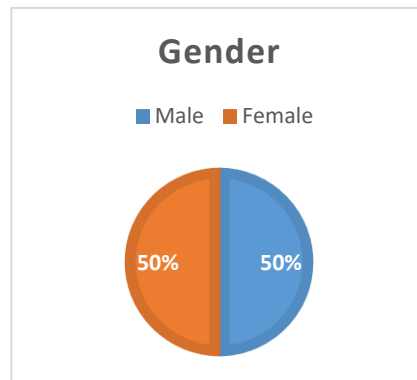


Figure 1. Distribution of Respondents by Gender

The number of male and female respondents was evenly distributed, with 66 respondents each, resulting in a total of 112 respondents.

b) Age range

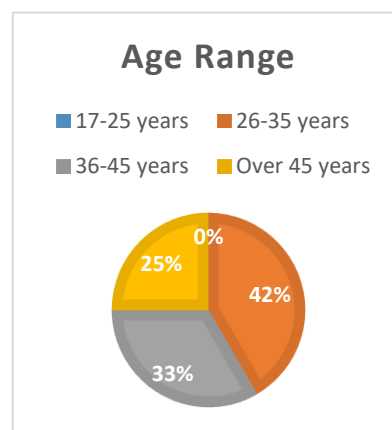


Figure 2. Distribution of Respondents by Age Range

Among the 112 respondents, the majority were aged 26-35 years (36% $\approx$ 40 respondents). This was followed by 36-45 years (29% $\approx$ 32 respondents), and above 45 years (21% $\approx$ 24 respondents). The 17-25 age group was the smallest, at 14% $\approx$ 16 respondents. These results suggest that most respondents are in the mid-productive age range, typically associated with stronger purchasing power.

c) Domicile

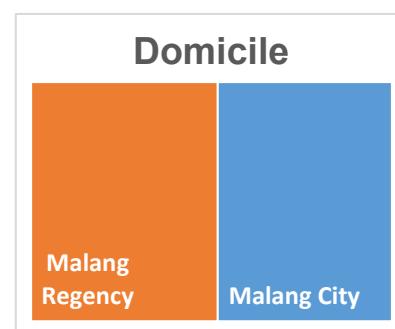


Figure 3. Distribution of Respondents by Domicile

Data shown that 52% of respondents were from Malang Regency, while 48% resided in Malang City. This indicates that the study covers both urban and rural consumer representation within the Malang area.

d) Frequency of Packaged Bumbu Pecel Consumption

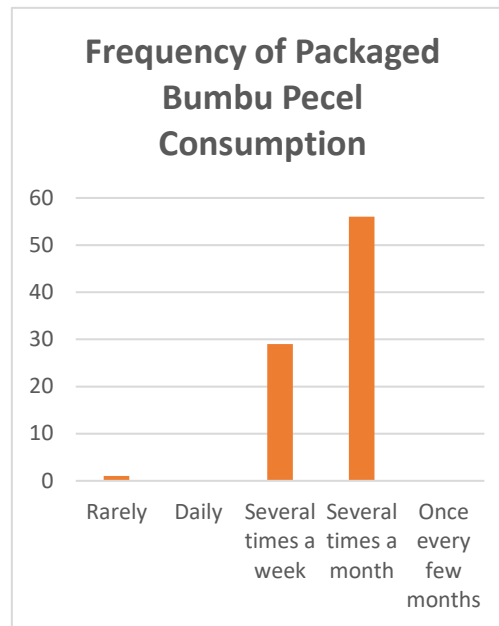


Figure 4. Frequency of Packaged Bumbu Pecel Consumption

The majority of respondents consume packaged *bumbu pecel* *several times a month* (56 respondents), followed by *several times a week* (29 respondents), and *every few months* (25 respondents). Very few consume it *rarely*, and none reported *consuming it daily*. This finding indicates that consumption tends to be periodic, which suggest that marketing strategies could be oriented toward weekly or monthly repeat purchases.

After distributing the initial questionnaire, a validity and reliability test is conducted on 52 respondents who share similar characteristics with the target population. Here are the results:

a. Validity Test

In this study, the degree of freedom is 50 ($n-2$) with a total of trial respondents are 52. At a significance level of 0.05, a statement is considered valid if the calculated r -value is greater than 0.2306 or if the significance value (2-tailed) is smaller than (0.05). The validity test result is presented in Table 6.

Table 6. Validity Test Importance to Customer and Customer Satisfaction Performance

Code	r-value (ITC)	Sig-2 Tailed (ITC)	Conclusion (ITC)	r-value (CSP)	Sig-2 Tailed (CSP)	Conclusion (CSP)
A1	0.903	0.000	Valid	0.913	0.000	Valid
A2	0.929	0.000	Valid	0.888	0.000	Valid
A3	0.906	0.000	Valid	0.876	0.000	Valid
A4	0.868	0.000	Valid	0.898	0.000	Valid
A5	0.889	0.000	Valid	0.884	0.000	Valid
A6	0.896	0.000	Valid	0.928	0.000	Valid
A7	0.884	0.000	Valid	0.914	0.000	Valid
A8	0.897	0.000	Valid	0.929	0.000	Valid
A9	0.931	0.000	Valid	0.892	0.000	Valid
A10	0.909	0.000	Valid	0.891	0.000	Valid
A11	0.901	0.000	Valid	0.903	0.000	Valid
A12	0.909	0.000	Valid	0.918	0.000	Valid
A13	0.909	0.000	Valid	0.891	0.000	Valid

The analysis shows both validity tests, all items are confirmed to be valid. Therefore, the questionnaire is considered appropriate for use in further analysis within this study.

b. Reliability Test

The instrument is considered to have good reliability since the Cronbach's Alpha coefficient exceeds 0.6. The reliability test result is presented in Table 7.

Table 7. Reliability Test Importance to Customer and Customer Satisfaction Performance

Code	Cronbach's Alpha (ITC)	Cronbach's Alpha (CSP)	Conclusion
A1	0.979	0.979	Reliable
A2	0.979	0.979	Reliable
A3	0.979	0.980	Reliable
A4	0.980	0.979	Reliable
A5	0.979	0.980	Reliable
A6	0.979	0.978	Reliable
A7	0.980	0.979	Reliable
A8	0.979	0.979	Reliable
A9	0.979	0.979	Reliable
A10	0.979	0.979	Reliable
A11	0.979	0.979	Reliable
A12	0.979	0.979	Reliable
A13	0.979	0.979	Reliable

The results indicate that the instrument is reliable, as all Cronbach's Alpha coefficients exceed the threshold value of 0.60. Thus, the questionnaire demonstrates internal consistency and is suitable for further analysis.

The weighting of importance and satisfaction levels was processed, and the results are presented in Table 8.

Table 8. Weighting of Importance and Satisfaction Level

Code	Importance to Customer	Customer Satisfaction Performance
A1	3.96	3.96
A2	4.03	3.96
A3	4.13	3.88
A4	4.03	3.86
A5	4.13	3.82
A6	4.02	3.89
A7	4.13	3.76
A8	4.02	3.91
A9	3.96	3.90
A10	3.99	3.89
A11	4.02	3.97
A12	3.96	3.87
A13	3.99	3.94

3. Benchmarking and Competitor Evaluation

Benchmarking and competitor evaluation results comparing with competitors shown in Table 9.

Table 9. Results of Competitor Evaluation and Benchmarking

Code	Competitor 1	Competitor 1	Putri Srikandi	Position
A1	3.91	4.11	3.96	Below
A2	3.99	4.00	3.96	Below
A3	3.91	3.96	3.88	Below
A4	3.75	3.99	3.86	Below
A5	3.96	3.92	3.82	Below
A6	3.93	3.99	3.89	Below
A7	4.09	3.88	3.76	Below
A8	4.03	3.91	3.91	Below
A9	4.03	3.89	3.90	Below
A10	4.00	3.87	3.89	Below
A11	4.02	3.92	3.97	Below
A12	3.96	3.97	3.87	Below
A13	4.00	3.97	3.94	Below

The result of the analysis indicates that among all the attributes, the *bumbu pecel* Putri Srikandi product is positioned below the two other competitors. This finding shows that the product packaging of Putri Srikandi *pecel* seasoning remains less competitive compared to similar products in the market.

4. Identification of Technical Characteristics (Technical Response) “How’s”

In this study, a total of 13 technical responses were formulated, each of which is intended to address one or more consumer needs, as presented in Table 10.

Table 10. Result of Technical Responses

Code	Attributes	Technical Responses
A1	Attractive packaging design	Contemporary design with additional premium visual elements.
A2	Clarity of information on the packaging	Inclusion of product variant, description, composition, halal label, and other essential information.
A3	Readable font color on the label	High-contrast text and background color combination in line with readability standards.
A4	Ease of opening and closing the packaging	Ergonomic packaging with flexible yet durable materials, easy to open.
A5	Eco-friendly packaging	Use of eco-friendly, recyclable packaging materials.
A6	Clear producer/manufacturer information	Clear display of producer's name, address, and contact information with readable font and strategic placement.
A7	Presence of product photo/image	High-resolution illustration of <i>pecel</i> dish with accurate colors to represent the product contents.
A8	Brand/logo position is easy to see and read	Brand/logo positioned at the centre of the packaging with proportional sizing.
A9	Appropriate packaging size	Packaging size that fits comfortably in hand and is easy to carry.
A10	Layout of information	Well-organized label design with neat layout and legible font usage.
A11	Strength/durability of packaging material	Triple layer packaging: vacuum plastic, aluminium foil, and cardboard.
A12	Hygienic and safe for food	Food-grade packaging materials that are BPA-free, contamination-resistant, and compliant with food packaging standards.
A13	Visual appeal	Harmonious color composition according to variant, attractive typography, and appropriate graphic elements.

5. Result of Matrix Calculation

The result of matrix calculations can be seen in Table 11.

Table 11. Result of Matrix Calculation

Code	Importance To Customer	Customer Satisfaction Performance	Customer Satisfaction Performance C.1	Customer Satisfaction Performance C.2	Goal	IR	SP	RW	NRW
A1	3.96	3.96	3.91	4.11	5	1.26	1.2	6.00	7%
A2	4.03	3.96	3.99	4.00	5	1.26	1.5	7.63	8%
A3	4.13	3.88	3.91	3.96	5	1.29	1.2	6.39	7%
A4	4.03	3.86	37.5	3.99	5	1.30	1.2	6.26	7%
A5	4.13	3.82	3.96	3.92	5	1.31	1.2	6.49	7%
A6	4.02	3.89	3.93	3.99	5	1.29	1.5	7.75	9%
A7	4.13	3.76	4.09	3.88	4,5	1.20	1.5	7.41	8%
A8	4.02	3.91	4.03	3.91	5	1.28	1.5	7.71	8%
A9	3.96	3.90	4.03	3.89	4,5	1.15	1.5	6.85	8%
A10	3.99	3.89	4.00	3.87	4,5	1.16	1.5	6.92	8%
A11	4.02	3.97	4.02	3.92	5	1.26	1.5	7.59	8%
A12	3.96	3.87	3.96	3.97	5	1.29	1.5	7.67	8%
A13	3.99	3.94	4	3.97	5	1.27	1.2	6.08	7%

The matrix calculation shows that consumer satisfaction performances (3.76-3.97) is still below the target value of 5.00, indicating a clear gap. The top priorities are eco-friendly design, producer information (A6, NRW = 7.75; RW = 9%), and brand/logo visibility (A8, RW = 7.71; NRW = 8%).

6. Integration of House of Quality (HoQ)

The Quality Function Deployment (QFD) method was applied using the House of Quality (HoQ) to translate costumer needs into measurable technical responses. The results of the HoQ can be seen in Figure 5.

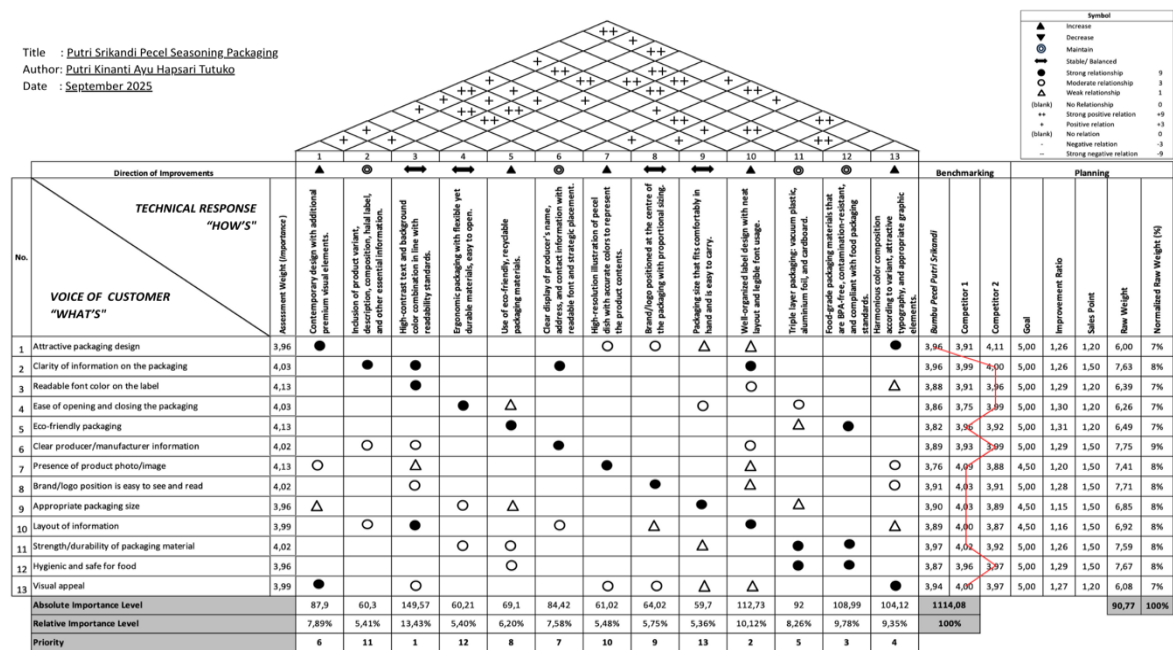


Figure 5. House of Quality (HoQ)

The House of Quality (HoQ) analysis shows that the relationship between customer needs and technical characteristics for *Bumbu Pecel* Putri Srikandi packaging, shows a dominance of strong relationships (● = 9) in most aspects, indicating a direct influence on customer satisfaction. The current product performance scores range from 3.76 to 3.97, still below the customer target of 5.00, with an improvement ratio between 1.15-1.31. The technical priorities analysis, where the relationship between customer requirements (what consumers want) and technical requirements (how the product responds to them) is translated into weighted priorities for product development, the results highlight the top priorities as priorities as font color readability (13.43%), information layout (10.12%), packaging material durability (9.78%), color composition elements (9.35%), triple layer packaging (8.26%), and design packaging (7.89%). Correlations among technical aspects in the roof of the HoQ reveal many strong positive relationships (++), such as between layout information readability, as well as between material durability and food safety, meaning that improvements in one aspect can enhance others without causing design conflicts.

Strategically these results emphasize that the development of MSME packaging like Putri Srikandi should focus on information clarity, readability, and material sustainability, rather than merely on visual aesthetics. The HoQ findings also serve as a reference for other MSMEs to apply a customer-driven design approach, where technical decisions are based on real consumer needs to create high quality, competitive, and sustainability oriented products.

7. Packaging Design Recommendations

Based on the analysis, a packaging design concept was developed to represent local identity and the uniqueness of traditional *pecel* seasoning. In addition, the application of color tones also differentiates the level of spiciness: green for the non-spicy variant, blue for medium spicy, and red for spicy, making it easier for consumers to recognize the flavor variants according to their preferences. The packaging design is also equipped with a halal logo, P-IRT, certification, barcode, and producer detail information, which add credibility and build consumer trust. To strengthen its visual appeal, an appetizing image of *pecel* is displayed along with a peanut background to emphasize the main natural ingredient. The back of the packaging includes nutritional information, serving instructions with simple illustrations, and a disposal icon that friendliness. Overall, the design concept combines traditional values with a modern touch to attract consumer interest while emphasizing product quality. Beyond the appealing external look, the product packaging consists of three protective layers to maintain the quality and durability of *pecel* seasoning. The implementation of *bumbu pecel* Putri Srikandi's packaging design are presented in Figure 6.



Figure 6. Implementation of *Bumbu Pecel* Putri Srikandi Packaging

CONCLUSION

This study shows that the average performance of Putri Srikandi *pecel* packaging remains at 3.82-3.99, below the consumer target of 5.00, with notable gaps in eco-friendliness, ease of opening, and safety. The top priorities for improvement are readable font color (13.43%), information layout (10.12%), and packaging materials (9.78%), which could rise the performances to 4.50-5.00 and strengthen competitiveness. The QFD results highlight with readable font color (A3), eco-friendliness packaging (A5), and visual appeal (A7) as the most important attributes (4.13), while benchmarking confirms that the packaging lags behind competitors across all aspects. The redesigned packaging integrating triple-layer protection, clear production, halal certification, and variant-based design, successfully addresses consumer priorities while reinforcing brand identity. These improvements are expected to enhance consumer trust, market attractiveness, and competitiveness. Overall, this study demonstrates that QFD provides an effectiveness and practical framework for MSMEs to align packaging design with consumer demands and to promote sustainable, innovative practices in highly competitive markets.

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