

DETERMINATION OF PART SPECIFICATION AND CRITICAL PART FOR FOOD PACKAGE IMPROVEMENT AT MSME AE JAYA BATU BY USING QFD METHOD

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Abstract MSME AE Jaya is a food industrial company which produces Bakpia. It is located in Samadi Road, Batu City. Recently, AE Jaya markets its products in Batu and Malang city. During its marketing, it faces some difficulties and problems in selling the products. Such as it is not accepted in a particular supermarket or even in a souvenir shop. It is because the standard packaging of its bakpia is not fulfilled yet. Not only that, it is also because the packaging is less interesting and less hygienic. Due to this condition, therefore a research is needed. The research aims to identify consumers' attributes, technical requirement attributes and critical part attributes in bakpia's packaging that produces by AE Jaya. Those aspects could be very helpful in identifying or knowing some information about an interesting packaging design and how to make a good packaging which is appropriate with consumer's needs. The method used in this research is called Quality Function Deployment. This research used the first phase and the second phase of QFD. Based on the analysis that has been conducted, there are 8 consumers' attributes, 10 technical requirement attributes and 9 critical part attributes.

Keywords: Design Planning, Packaging, House of Quality, Product Planning, Quality Function Deployment

1. Introduction

MSME (Micro, Small, and Medium Enterprise) AE Jaya is one of MSME that located in Batu. This MSME is producing bakpia that having its address in Jl. Samadi Batu. MSME AE Jaya established in 1995 and producing three kinds of bakpia, wet bakpia, dry bakpia, and crispy bakpia. With more and more MSME in Batu, especially in producing bakpia, MSME AE Jaya must able to compete and have access to wide market. The obstacles that MSME AE Jaya facing is occurring in bakpia package that not yet meet the standards especially for dry bakpia that make MSME effort to market its product to supermarket or souvenir shop became more difficult. The aim of this research is to solve the package problem and make the package appropriate according to consumer preference and meet the specific standard. The method that used in this research is Quality Function Development (QFD). QFD Method is a method that used for planning and product development that in accordance with consumer's need and desire [1]. QFD is widely used to develop a brand new product [2][3] or improve existing product [4]. This research is focused only on QFD's first and second phase

where first phase is product planning and second phase is product design. It is hoped this research can provide input in form of proposed package design in the MSME AE Jaya.

2. Theoretical Basis

2.1 Package

Package is the identity of the products of certain companies that distinguishes a product from another company, the packaging is also an activity that is done the company to protect the contents of the product itself [5]. Package also can be defined as a common activity in goods planning that involving the determination the of design and manufacturing of the wrap or place [5]. There are three types of packaging as follows [5] :

1. Primary packaging, this packaging is a container or a direct place for the product.
2. Secondary packaging, this is a packaging materials that protect primary packaging where this packaging is discarded when the product will be used.
3. Tertiary packaging or delivery, a packaging that used to store, identification, and transportation.

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According to the regulations of Indonesian government number 69 in 1999 about labeling and food advertising, that any person who producing or incorporate food that packaged for trade is mandatory for labeling on food package. The label that is listed on package contain product name, ingredient list or composition, net weight, names and addresses of the parties producing, date, month and year of expiration, halal label, date and production code as well the number of permission path [6].

2.2 Quality Function Deployment

According to Cohen [1] Quality Function Deployment (QFD) is a method that used for planning and produce development in accordance with the wishes and the needs of the customer. The benefits obtained in applying QFD method is so the company can survive, more secure, and can grow. Application of the QFD method also can reduce the cost incurred by companies such as material cost, fee for services, salary, etc. In addition, this method also can be used to increase income, also can monitor the process from beginning to end so the wrong process can be known, the wrong process can be removed and can reduce processing time that will have an impact on the amount of resulting output [1]. QFD has several phases, i.e. product planning phase, design planning, process planning, and production planning [8].

2.3 Product Planning

The first phase of QFD is used to translate customer's voice into part specification. The tools used in this research is House of Quality (HOQ) (Figure 1).

2.3.1 Voice of Customer

This section gives information about consumer's needs from a product, so it brings the attribute consumer's needs. Consumer's needs can be known by doing interview. Determination of the respondents in this research using purposive sampling.

$$n = \frac{T-t_0}{t_1} \quad (1)$$

Description:

N = total of responden

T = available time for research

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t_0 = time for sampling

t_1 = time every sampling unit

2.3.2 Determine the Needs of Customer

a. Customer Importance Level (TKK)

Consumer importance rates are determined by giving a scale of measure of importance. Measuring scale used range is 1 to 5. The following is the formula for determining TKK:

$$TKK = \frac{\sum x}{N} \quad (2)$$

Description:

TKK = Consumer Importance Level

$\sum x$ = The importance total score

N = Number of respondent

b. Consumer Satisfaction (TKP)

The calculation of consumer satisfaction level is the result of the assessment regarding the satisfaction of a product.

$$TKP = \frac{\sum x}{N} \quad (3)$$

Description:

$\sum x$ = Importance total score

c. Goal

Determination of goals by selecting the greatest value between CIL and CSL that have been calculated.

d. Improvement Ratio (IR)

This stage is comparison between the goal and customer satisfaction level.

$$IR = \frac{\text{Goal}}{\text{Competitive Satisfaction Performance}} \quad (4)$$

e. Sales Point

Sales point is point or attributes that could increase sales. Calculation of the sales point is done based on questionnaire. The scale that used in the assessment are as follows:

1 = Sound attribute didn't help sales

1,2 = Sound attribute enough to help sales

1,5 = Sound attribute very helpful to sales

f. Raw Weight

This stage is calculation from weight of the attribute from consumer's needs.

$$\text{Raw weight} = \text{TKK} \times \text{IR} \times \text{sales point} \quad (5)$$

g. Normalized Raw Weight

Normalized raw weight is the calculation of the weight of the attributes from consumer's needs against the entire weight of the attributes from consumer's needs.

$$\text{Normalized raw weight} = \frac{\text{Raw weight}}{\text{Raw weight total}} \quad (6)$$

2.3.3 Part Specification

This part is the process for translating the voice of customers to voice of engineers. Determining the attribute for technical requirements are carried out by doing discussion with experts as resource person.

2.3.4 Relationship

Relationship stage is the stage of the connecting attribute from customer's needs with attribute from technical requirements.

2.3.5 Technical Correlations

In this stage is given the description about the product development process. Not every attribute from technical requirement have connection with others.

2.3.6 Technical Matrix

Priorities stage used for calculate the

technical requirements. The formula that is used for priorities stage are:

$$\text{Priorities} = \sum(\text{nilai relationship} \times \text{normalized raw weight}) \quad (7)$$

Contribution stage are comparison between the value of technical requirements priority against entire amount of value of technical requirements priority.

$$\text{Contribution} = \frac{\text{Priorities}}{\sum \text{Priorities}} \quad (8)$$

Targets stage are sorting value of priorities from biggest to the smallest.

2.4 Design Planning

2.4.1 Part Specification

Part specification obtained on HOQ matrix, technical requirements that selected are those that have highest weight. Determination of the technical requirements are based from discussion with expert.

2.4.2 Critical Part

After technical requirements is obtained, the next step is to determine critical part. Critical part is the determination of parts that should be contained in the product. There are two kinds of critical parts, i.e. primary critical part and secondary critical part.

2.4.3 Determining Importance Value

The importance value will be used to determine priority and trade-off decision. Importance value described the weight for every technical requirements.

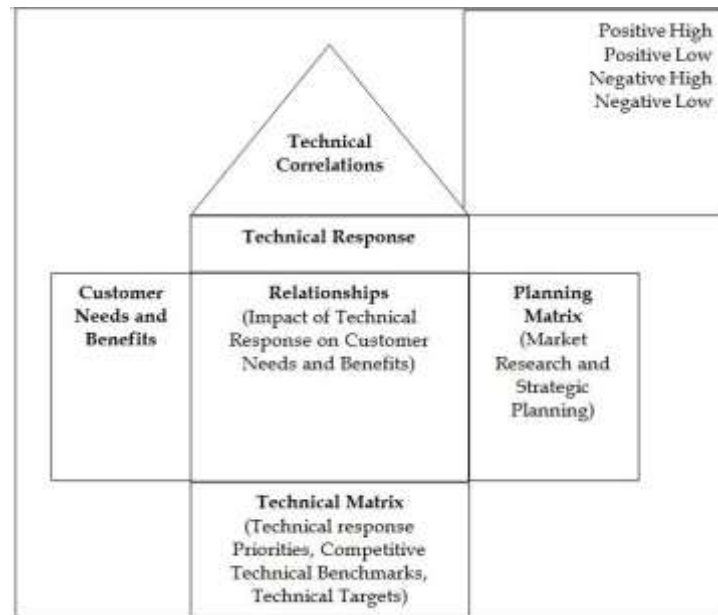


Figure 1. House of Quality [8]

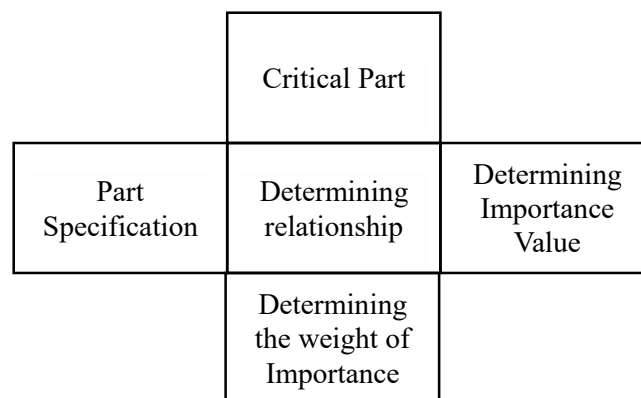


Figure 2 Design Planning Matrix [8]

2.4.4 Determining relationship

The next step is to determine relationship. This step is connecting attribute from technical requirements with attribute from critical part.

2.4.5 Determining the Weight of Importance

The final step is to determine the weight of importance. This step aims is to analyze the priority from attribute from critical part.

3. Final Result

Based from interview with 25 respondent that ever consume bakpia, 12 attribute for

consumer's needs is obtained. Those attributes are attractive packaging, packaging that can be opened and closed again, transparent packaging, easy to carry packaging, packaging has a complete label, packaging is easily stored, packaging is not easily damaged, strong packaging, inside packaging has form that appropriate for bakpia, packaging can accommodate many pia, packaging is tight, also the materials for packaging is safe for bakpia. Attribute from consumer's needs will be used in the questionnaire about customer importance level.

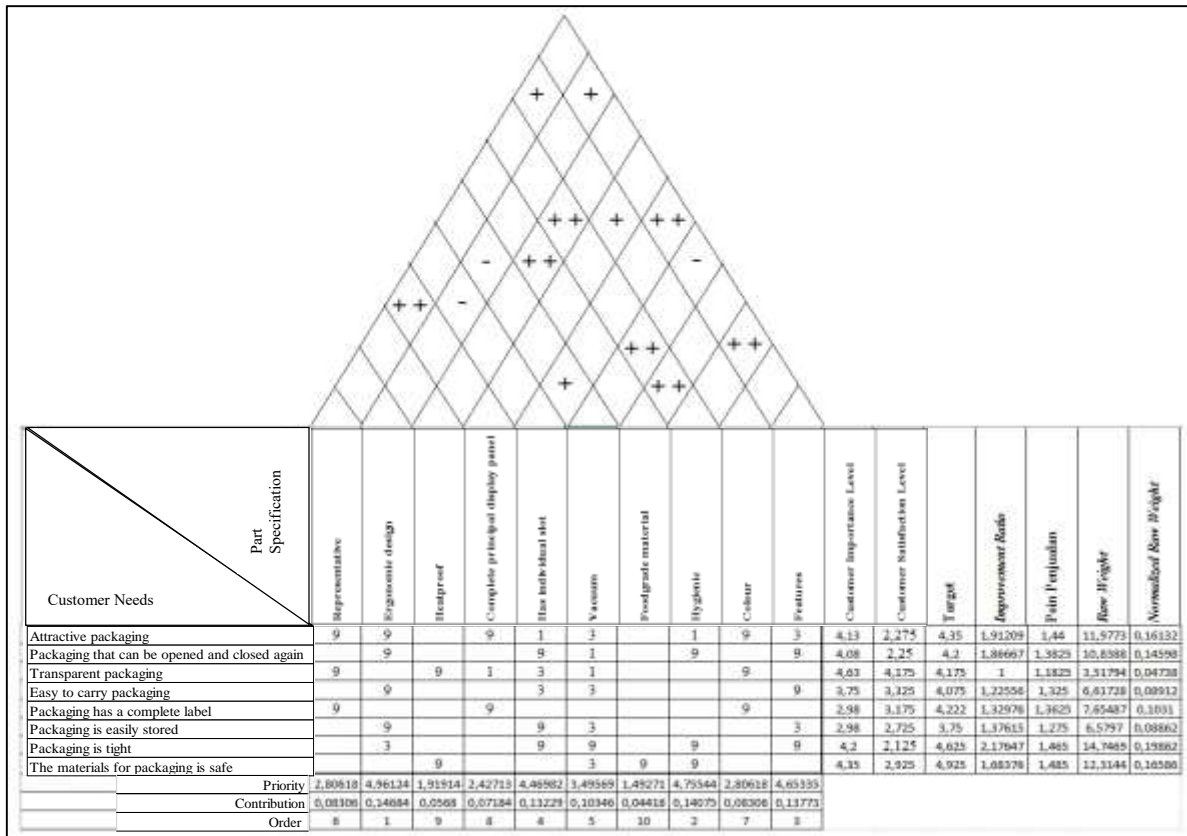


Figure 3 House of Quality

After calculation about consumer importance level, then do a test about validity and reliability. The result from validity test are there are few attributes that are not valid and needs to do some deletion to some non-valid attributes. Attributes that are not valid are package is not easily damaged, strong packaging, inside packaging has form that appropriate for bakpia, and packaging can accommodate many pia. So attributes from consumer needs that used in this research is as much as 8 attributes.

Technical requirements attributes determined by using help from two experts, i.e experts in field of packaging and experts in field of food. From discussion with the experts, 10 technical requirements are obtained. After attribute for technical requirements is determined, then do the calculations for priority, contributions and target. Those attribute from technical requirements will be

used in QFD second phase i.e. part specification.

Based on a design product matrix that has been created, it can be known that the primary packaging dry bakpia AE that made from plastic PP has the greatest importance weight i.e. of 9236.46 and became first priority. Attribute from critical part that became second priority are bakpia packaging using zip-lock or tint tie as a means of opening and closing for the packaging. Attribute from critical part that became third priority are packaging has hole on upper side. Attribute from critical part that became third and fourth priority have same importance weight i.e. 6236.22. Those attribute are packaging material food grade and secondary packaging material created from aluminum foil plastic. Sixth priority are packaging label that directly printed on the packaging.

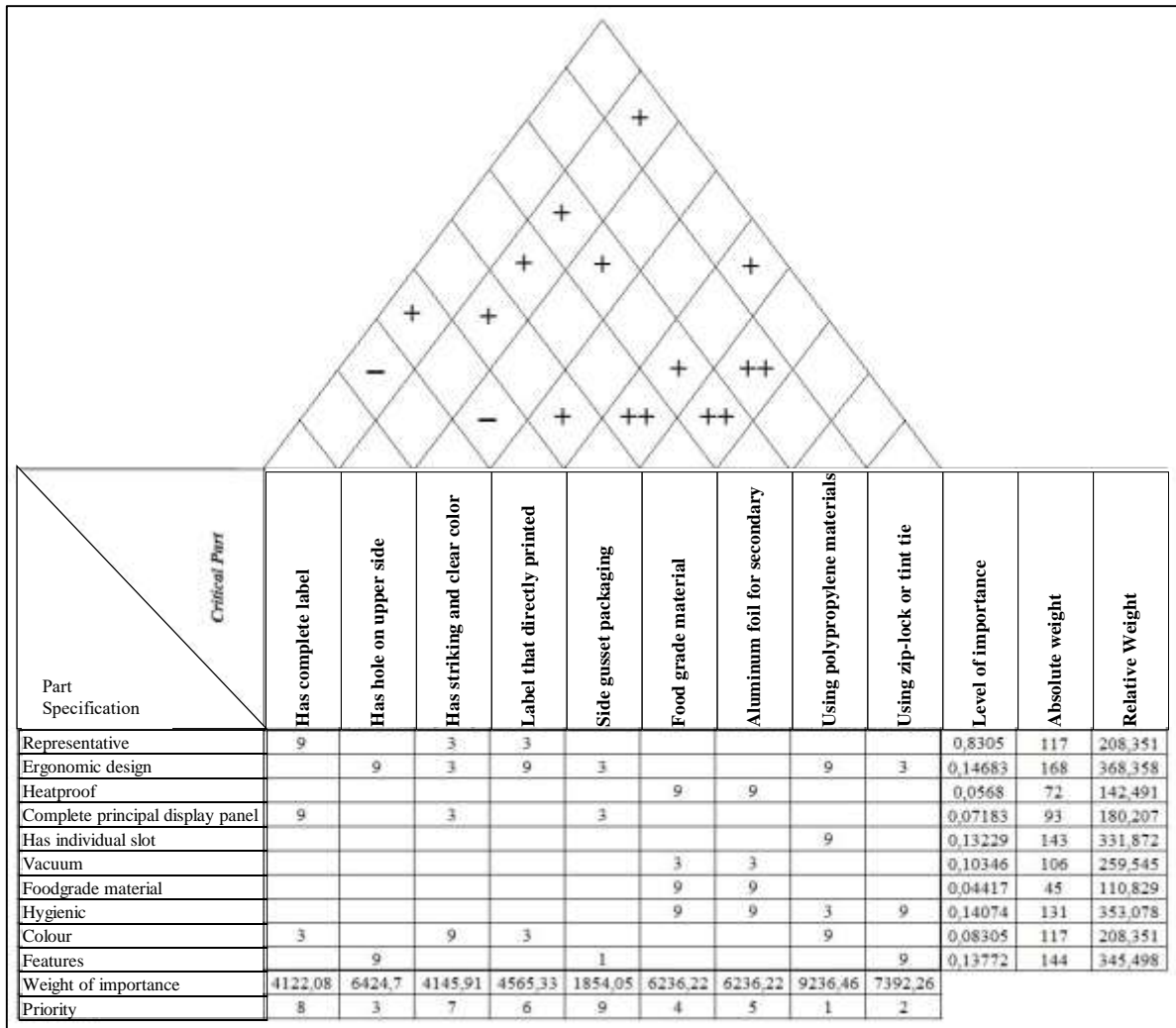


Figure 4 Product Design Matrix

Attribute of critical part that package have striking and clear color are seventh priority that also affect the packaging. The eighth priority are complete label. Labels in question is the name of product, the brand of the product, composition, net weight, company producing, PIRT, as well as information about nutritional value on the product. The ninth priority is the form of side gusset packaging. This attribute is important because by using side gusset as a form of bakpia packaging it will attract the attention of customers.

4. Conclusion

Based on interviews with 25 respondents, twelve attributes for consumer needs is obtained. The attributes from consumer needs will be used in the importance of the consumer questionnaire. After the calculation Site this Article As

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on consumer importance level, then do the test for validity and reliability. The results obtained from validity test is there are some attributes that are not valid, deletion needs to be done to the attributes that are not valid. So the attribute from consumer needs used in this research is as much as eight attributes. There are ten attributes for technical requirements derived from the results of the discussion with experts. In the second phase of QFD the determination of attributes for critical part is conducted that also obtained from elaboration of part specification / attribute from technical requirements. The determination of the attribute for critical part also done by the help of the experts, so it brings to nine attributes of critical part.

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