Strategies for improving the quality of the ground coffee product: a case study at SMEs X Malang, Indonesia

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Abstract. SMEs X is one of the SMEs in Malang City that produces ground coffee. The increasing number of ground coffee producers in Malang City make SMEs X must be able to survive in the competition so that SMEs X needs to improve the quality of ground coffee products. The methods used are Quality Function Deployment (QFD) and Analytical Hierarchy Process (AHP). The results show that five essential attributes for consumers to improve the quality of ground coffee include unique packaging forms, packaging materials that can maintain quality, attractive packaging colours, convenience for consumers to reach sales locations, and convenience for consumers to get products. Strategies that can be used to improve the quality of ground coffee include redesigning the packaging, improving the ground coffee production process, selecting good quality coffee beans, resetting the selling price of the product, increasing marketing effectiveness, and applying for a permit from the national drug and food agency.

1. Introduction

Coffee is one of the most reliable agro-industrial products in the Indonesian plantation sector because coffee has a high market opportunity both domestically and abroad. Indonesian coffee ranks third after Brazil and Colombia in the international market. One of the largest coffee-producing regions in Indonesia is the province of East Java, especially in Malang. In general, the coffee is processed into ground coffee.

SMEs X is one of the SMEs in Malang City that produces ground coffee. SMEs X was founded in 2000. The ground coffee made by SMEs X is the Robusta variant. In line with recent market changes such as marketing methods, consumer interest, and increasing competitors, SMEs X must implement strategic steps. The strategy that SMEs X can carry out is improving product quality. The implementation of this strategy will give certain advantages to the product to meet consumer expectations, compete in the market and expand the desired market [1,2].

Improving product quality can be done by creating products according to consumer desires. After knowing the consumer's desire, the priority aspects can be determined and considered to fulfill the consumer's desire. Quality Function Deployment (QFD) is a method that can be used to solve these problems [3]. The QFD approach has the advantage of identifying consumer expectations and desires, the level of importance of product attributes, the level of consumer satisfaction, and the development that needs to be done to improve product quality [4]. The result of implementing the QFD method is
the House of Quality (HoQ) which will be information in developing a product based on consumer needs [5].

The results of the QFD analysis in the form of a house of quality show two big things, namely recommendations for actions that SMEs X must take to improve the quality of ground coffee and priority contribution value, which will be input for the following analysis with Analytical Hierarchy Process (AHP) method. AHP is a method with a decision support model that will describe complex multi-criteria problems into a hierarchy. The resulting hierarchy can represent an issue into groups to appear more structured and systematic [6]. The top level of the resulting hierarchy is the goal of solving a problem, and there is only one element. In contrast, the next level is the criteria and alternative problem solving [7]. This study aims to analyze the attributes that are important to consumers to improve the quality of ground coffee following consumer taste and to analyze the strategy of enhancing the quality of ground coffee.

2. Methods

The research method used was QFD which was integrated with the AHP method. The variables used are the dimensions of quality developed by Garvin: performance, features, reliability, conformance, durability, serviceability, aesthetics, and perceived quality [8]. The number of samples used was 100 people with criteria including age between 17-55 years, had consumed SMEs X ground coffee and ground coffee belong to 1 competitor of SMEs X in the last three months. Three expert respondents were employed.

2.1. Steps of QFD

QFD implementation consists of three stages where each stage can be applied like a project, with the planning and preparation stages first. The three stages are as follows [9]: (1) voice of customer collection stage, (2) HoQ preparation stage, and (3) analysis and implementation stage. However, this research did not carry out the implementation stage. This research is limited to the recommendation of strategies that SMEs X can use to improve the quality of ground coffee.

The steps to build a HoQ are as follows [10]:

a. Create a planning matrix consisting of importance to customer, customer satisfaction performance, goals, improvement ratio, sales points, raw weight, and normalized raw weight
b. Develop technical response
c. Determine the relationship between consumer needs and technical response
d. Setting priorities

2.2. Steps of AHP

The basic steps of the AHP method are as follows [11]:

a. AHP uses several small subproblems to present a complex decision problem
b. The decision matrix, which is based on Saaty’s nine-point scale, is constructed. The decision-maker uses the fundamental 1–9 scale defined by Saaty to assess the priority score
c. The third step involves the comparison in pairs of the elements of the constructed hierarchy
d. AHP also calculates an inconsistency index (or consistency ratio) to reflect the consistency of decision maker’s judgments during the evaluation phase
e. Before all the calculations of the vector of priorities, the comparison matrix has to be normalized
f. For the following part, the eigenvalues of this matrix are needed to be calculated, which would give the relative weights of criteria

2.3. Product quality improvement strategy planning

Product quality improvement strategy planning is based on ranking the weights of each customer satisfaction attribute in the strategic planning matrix generated from the HoQ matrix. In addition, the formulation of a product quality improvement strategy is also based on the order of priority weights
for technical responses carried out by SMEs X based on customer needs. Technical responses with
greater weight will be prioritized for developing product quality improvement strategies.

3. Results and discussion

3.1. The importance of customer attributes
Importance to the customer aims to show the level of importance of product attributes to the customer
needs [12]. Based on a survey using a questionnaire instrument, a list of customer needs and the
calculation of importance to customer was obtained, which can be seen in Table 1.

| Customer needs                                                                 | Importance to customer |
|--------------------------------------------------------------------------------|------------------------|
| The distinctive aroma of ground coffee                                         | 4.62                   |
| The taste is balanced between sour, sweet and bitter                           | 4.85                   |
| Ground coffee has a dark brown-black colour                                    | 4.35                   |
| Completeness of information on the packaging                                   | 4.49                   |
| Availability in various packaging sizes                                        | 4.33                   |
| Many benefits can be obtained after consuming ground coffee                    | 4.83                   |
| The price of ground coffee according to the quality                           | 4.86**                 |
| Conformity of information on the packaging                                      | 4.37                   |
| Ground coffee has a long shelf life                                           | 4.20*                  |
| Ground coffee has an attractive packaging label design                         | 4.58                   |
| Ground coffee has an attractive packaging colour                               | 4.57                   |
| The packaging materials used can maintain the quality of ground coffee         | 4.70                   |
| Ground coffee has a unique packaging form                                      | 4.69                   |
| The popularity of ground coffee products                                       | 4.35                   |
| Ground coffee has a license from the national drug and food agency             | 4.76                   |
| Ease of consumers to get ground coffee products                               | 4.46                   |
| Ease of consumers to reach the location of ground coffee sales                 | 4.47                   |

(*) = lowest weight
(**) = highest weight

The highest importance to the customer is the price of ground coffee according to the quality.
Customers will usually continue to buy ground coffee if the product received has a price that matches
the quality of the product. Consumers have implemented the right saving system by thinking about the
price offered for a product compatible with the product purchased [13]. Meanwhile, the lowest
importance to customer is ground coffee has a long shelf life. According to consumers, the shelf life of
ground coffee is a less important attribute, but the performance of this attribute is very high [14].

3.2. Customer satisfaction performance and goal setting
The assessment of customer satisfaction performance involves products from competitors of SMEs X.
The assessment results of the quality of ground coffee products of SMEs X will be compared with its
competitors. SMEs X's highest customer satisfaction performance weight is the balance of ground
coffee taste between sour, sweet, and bitter (4.74). Customers stated that SMEs X's ground coffee is
better than its competitors. The unique taste of a product will affect consumer interest in buying or
consuming a product. The more unusual or distinctive the products taste, the higher the consumer's
tendency to purchase the product [15].

The lowest customer satisfaction performance for SMEs X is ground coffee has a unique packaging
form (2.59). Compared to its competitors, SMEs X's powdered coffee packaging is considered less
attractive to customers because it does not use a ziplock so that when the ground coffee has not been
used for one time, it must be transferred to a closed container or tied the packaging tightly using a
rope. If the packaging bond is not tight, then air can enter and make the quality of ground coffee
decrease. The packaging of a product is one of the determinants in achieving consumer satisfaction
[16].

Based on Table 1, there are nine attributes that have lower customer satisfaction performance
weights than a competitor. Two of the nine attributes that have high weight and are considered
necessary are packaging materials and packaging forms. Therefore, SMEs X must innovate on
packaging materials and shapes to increase consumer satisfaction with ground coffee products. The
other seven attributes with low customer satisfaction performance weight are considered not to
significantly affect consumer satisfaction with SMEs X because the importance of customer attribute
weight is also common.

The goal is determined based on the best attribute performance from the results of customer
assessments between SMEs X and its competitor, SMEs Y. The results of this weight determination
will be used as the basis for SMEs X to improve the attributes of customer expectations. The highest
goal weight is the coffee taste attribute balanced between sour, sweet, and bitter (4.74). The overall
taste attribute is almost always the most important attribute because the taste of a product is the
primary image or description of product quality [17]. The lowest goal weight is the attribute of
completeness of information on the packaging (2.81).

3.3. Improvement ratio and sales point

The improvement ratio can be determined by comparing the goals with the performance of SMEs X.
This calculation shows how much effort must be made by SMEs X to increase customer satisfaction.
If the value of the improvement ratio is good, the company's action to improve the quality of a product
or service must also be more significant [18].

The highest value of the improvement ratio is the packaging form attribute (1.79), so the packaging
form attribute requires a higher improvement effort than other attributes. This aims to increase
customer satisfaction for SMEs X’s ground coffee. The form of packaging positively influences
buying interest, where the higher the consumer's perception of the packaging form, the higher the
consumer's purchase interest in a product [19]. The form of packaging can affect the psychology of
prospective consumers because an attractive packaging form will make consumers more interested in
buying a product.

Sales point is information that shows SME X's ability to sell ground coffee based on importance to
the customer. If the customer's needs have an importance to customer (ITC) value greater than 3 (ITC
> 3), then the sales point value is set at 1.5 (strong sales point). If the customer's needs are met, there
will be an increase in sales. Customer needs that have a value of 2 < ITC 3, then the sales point value
is set at 1.2, which means that if these needs are met, there will be an increase in sales, although not
too big. For consumer needs with an ITC value < 2, a sales point value of 1 is set (no sales point), and
if these needs are met, there will be no increase in sales [20].

All quality attributes of SMEs X's ground coffee products have a sales point value of 1.5. This
shows that all quality attributes of SMEs X's ground coffee products significantly affect product sales.
The business unit can fulfill attributes that strongly influence sales to increase sales of ground coffee
products. If the value of the sales point or point of sale is good, the greater the influence of these
attributes in determining purchasing decisions.

3.4. Raw weight and normalized raw weight

The priority weight is determined to improve and develop the customer satisfaction attributes
produced by UKM X. The priority weight is obtained based on the importance to the customer,
 improvement ratio, and sales point. The results of customer satisfaction performance show that there
are attributes of SMEs X which have lower values compared to its competitors. Therefore, if we want
to increase customer satisfaction, it is necessary to determine the weight of each quality attribute of
ground coffee products. The attribute that has the largest raw weight value is the form of packaging
(12.60) which means that the packaging form attribute is an attribute that needs to be improved to meet customer satisfaction. The attribute that has the lowest raw weight value is ground coffee has a long shelf life (6.33). The high raw weight will be the main focus of a company to improve product quality to meet consumer satisfaction [21].

The normalized raw weight value is the raw weight value which is converted into a percentage. The attribute that has the highest normalized raw weight value is ground coffee has a unique packaging form (0.0941), while the attribute that has the lowest normalized raw weight value is ground coffee has a long shelf life (0.0473). The normalized raw weight value is also high if the raw weight value is high. The higher the normalized raw weight value, the more critical these needs are for customers, so business units need to consider this to improve their products [20].

3.5. Determination of technical response
The technical response is the response of producers or business unit owners who have technical factors in meeting consumer needs [12]. Technical responses were obtained through interviews with the owners of SMEs X. The technical responses included selecting quality coffee beans, ground coffee production technique, resetting the selling price of ground coffee, redesigning ground coffee packaging, applying for a permit to the national drug and food agency and expanding the marketing area.

The variables used in this study are used as criteria levels, while technical responses are used as strategy levels, where each level will be weighed using the AHP method. The calculation results show that the highest weight for the criteria level is performance (0.22), while at the strategy level, the highest weight is redesigning ground coffee packaging (0.22). Based on the results of the calculation of the consistency ratio, both the criteria level and the strategy level, the results are less than 0.1. The value of the consistency ratio for the criteria level is 0.009182, and for the strategy, the level is 0.087866. If the value of the consistency ratio is less or equal to 0.1, then the calculation results can be declared consistent [22].

Based on previous calculations, it is known that the technical response that has the highest weight is redesigning ground coffee packaging with a weight of 0.22. Therefore, redesigning ground coffee packaging is a top priority because it contributes to improving the quality of ground coffee products. SMEs X hopes that redesigning the packaging of ground coffee can attract more consumers to buy ground coffee. The technical response with the lowest weight is that ground coffee has a license from the national drug and food agency with a weight of 0.06.

3.6. Benchmarking and targeting
Benchmarking can help business units determine the extent of the company's position compared to its competitors [23]. Based on the calculation results, there are several attributes of the technical response of SMEs X, which are lower than its competitors. Attributes that have a lower value are resetting the selling price of ground coffee, redesigning ground coffee packaging, and expanding the marketing area. The selling price of SMEs X’s ground coffee in 250 grams is IDR 14,000, while its competitors are IDR 25,000. Redesigning ground coffee packaging is one of the technical responses that need improvement because SMEs X's ground coffee packaging is less attractive than its competitors, both in packaging design and packaging form. The last technical response that needs to be improved is expanding the market area. Currently, SMEs X's marketing area for ground coffee is only in Malang City. SMEs X only relies on sales outlets to market its products.

Targeting is an action taken to meet the technical response requirements based on the results of benchmarking calculations. SMEs X can use the results of targeting to determine actions that can be taken to increase customer satisfaction. In addition, SMEs X can find out what attributes are in accordance with the desired target and maintain these attributes. The target value can be determined based on benchmarking calculations adjusted to attributes that still have values below their competitors. Targeting meets customer satisfaction through technical responses carried out. The target value is determined from the largest benchmarking value when compared to its competitors [24].
3.7. House of quality
House of Quality (HoQ) is designed based on a combination of several matrices that describe the relationship between customer needs and the technical response in the company, as well as evaluate the company's ability against its competitors to meet customer needs. The HoQ matrix shows that the company's strategy in improving product quality is by assessing in accordance with the order of priority for technical responses and attributes of importance [25]. The HoQ matrix can be seen in Figure 1.

![Figure 1. House of quality.](image)

4. Conclusions
The attributes that are important for consumers to improve the quality of ground coffee include: ground coffee has a unique packaging form, the packaging materials can maintain the quality of ground coffee, attractive packaging colour, ease of consumers to reach the location of sales, ease of...
consumers to get products, the popularity of products, the price of ground coffee according to the quality, the taste is balanced between sour, sweet and bitter, many benefits can be obtained after consuming ground coffee, attractive packaging label design, a license from the national drug and food agency, distinctive aroma of ground coffee, completeness of information on the packaging, conformity of details on the packaging with the contents of the product, ground coffee has a dark brown-black colour, availability in various packaging sizes, and ground coffee has a long shelf life.

Strategies that can be used to improve the quality of ground coffee following consumer requirements include redesigning the packaging, improving the ground coffee production process, selecting good quality coffee beans, resetting the selling price of the product, increasing marketing effectiveness, and applying for a permit from the national drug and food agency.

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