Designing fake nail product packaging at msme dairy nails using the quality function deployment (QFD) method

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ABSTRACT

Dairy Nails is a Bandung-based MSME offering high-quality artificial nail products in various designs. In a survey conducted to Dairy Nails customers, there was a decrease in buying interest caused by customer dissatisfaction. One of the reasons for this is the false nail packaging that does not meet customer expectations. Packaging is an important factor in a product because it protects the product inside. Therefore, it is necessary to improve the packaging design of artificial nails that can increase consumer buying interest. Proposed improvements will be made using the Quality Function Deployment (QFD) method which makes consumer needs a reference in product design. Thus, the proposed packaging design can meet consumer desires and expectations. The results of this study are designing false nail packaging according to customer wants and needs with specifications, namely polycarbonate plastic material, with a clamshell packaging shape, using a hinged lid method cover, with a font size of 12 pt, the font types used are arapey and moontime, the proposed beige packaging has a logo, has dimensions of 8.5 x 8.5 cm. Thus, the packaging contributes to better show the product, is informative and can be reused by consumers.

1. Introduction

One of the ways a woman beautifies herself is by taking care of themselves including the smallest parts such as nails (Resmi & Wismiarsi, 2015). Nail Art is an act of decorating nails to make them look more beautiful and attractive by painting or drawing directly on the nails or using fake nails as a substitute for real nails (Krisnawati et al., 2022). Nail Art is a further development of manicure and pedicure, the treatment aims to treat hands and feet to make them look cleaner (Ridwan & Lutfiati, 2020). Along with the times, fake nails are now appearing with an easier technique of installing fake nails by applying glue to the fake nails and then pasting them on top of the natural nails (Mukhtar & Nurif, 2015). Dairy Nails is one of the MSMEs offering nail art services in Bandung that focuses on nail art services on natural and artificial nails, manicure services, home service nail art and artificial nails. The shop still focuses on their fake nail products as the main products sold with excellence in quality and design. The quality false nail materials and designs offered are diverse and can be costumized according to the customer's wishes. Therefore, in order for Dairy Nails to maintain its existence in the field of false nail sales, it needs customer trust to keep buying its products.

Based on a survey of Dairy Nails customers on their interest in purchasing artificial nails. The survey shows that Dairy Nails has low prospects in attracting customers to use its services. This allows Dairy Nails to focus on improving service quality in order to increase consumer interest in

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buying its products. The following is a fishbone diagram in Fig. 1 regarding the decline in consumer interest in Dairy Nails products.

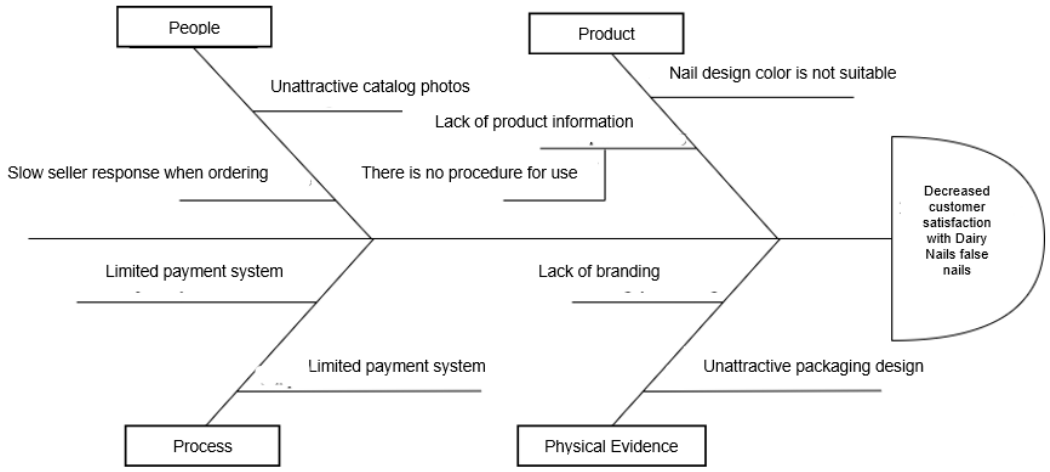

Fig. 1 Fishbone diagram of decreased customer satisfaction.

Fig. 1 shows the problem caused by the unattractiveness of the product received at the time of purchase, it is also related to the unattractive packaging design that reduces the interest in purchasing artificial nails. The main problem that occurred was a decrease in customer satisfaction with Dairy Nails false nails. Dairy Nails packaging cannot meet customer expectations and desires. This is because the packaging does not have a good design to support the product inside.

The packaging should give a brief impression of the product image that the manufacturer wants to convey, and the packaging should match the function of the product (Prabowo & Zoelangga, 2019). Packaging design requires a lot of consideration and most importantly the packaging must show the identity of a product (Armstrong et al., 2014). Packaging portrays the brand in the eyes of the consumer and if they remember the brand they will imagine the packaging, in this case it is the packaging that generates sales. The packaging should give a brief impression of the product image that the manufacturer wants to convey, and the packaging should match the function of the product (Hasibuan et al., 2022). Packaging design requires a lot of consideration and most importantly the packaging must show the identity of a product (Setyabudhi & Saputra, 2020). Packaging describes the brand in the eyes of consumers, and if they remember the brand they will imagine the packaging, in this case it is the packaging that generates sales. In addition to providing visual appeal, the design of a package must be a medium of communication between producers and potential customers, therefore the packaging must contain information that must be known by potential customers, so that potential customers are familiar with the packaged product (Telaumbanua, 2022). Packaging provides many benefits such as protection, economy, convenience, and promotion for products (Apriyanti, 2018).

Based on the above problems, the current packaging owned by Dairy Nails does not support in terms of branding as customer awareness in the market because the packaging does not have a special impression that can be remembered by customers. The fishbone diagram in Figure 1 shows that, the problems that exist in the packaging have one problem solution, which is to improve the packaging design to increase consumer buying interest and improve the brand image in the eyes of consumers so as to increase customer satisfaction. Dairy Nails requires improved packaging design in order to increase customer satisfaction. Customer trust greatly affects the existence of Dairy Nails in this business field. Therefore, improving the packaging of artificial nails can help increase customer satisfaction and buying interest. Thus, the benefit of this research is to design packaging and identify packaging specifications needed to increase customer satisfaction in artificial nail products produced by Dairy Nails MSMEs. In this research, the methods that will be considered to be applied include Quality Function Deployment (QFD), Ergonomic Function Deployment (EFD) and Total Quality Management (TQM). The method comparison can be seen in Table 1.

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Table 1 Method comparison

Component	Quality Function Deployment (Chan & Wu, 2002)	Ergonomic Function Deployment (Anshori, 2020)	Total Quality Management (Hackman & Wageman, 1995)
Objective	Meet customer needs by ensuring that developed products meet consumer expectations by translating their needs into clear technical specifications.	Improving user comfort and safety by ensuring that the developed product adapts to the physical and psychological needs of the user.	Achieve maximum customer satisfaction by improving the overall quality of products, services and interactions.
Advantages	Improving product design quality by identifying customer needs	Integrate ergonomics in the design process so that the products developed are safe, comfortable and in accordance with the needs of users.	Better operational efficiency
	Improve the efficiency of the development process by identifying potential problems and making improvements.	Focuses on improving product and service quality through continuous improvement	Focuses on improving product and service quality through continuous improvement
Disadvantages	Time-consuming and costly process	High cost of implementation	High implementation costs
	Complexity in implementation	Requires long-term time to show significant results	Requires long-term time to show significant results
			Complexity in implementation

Based on the explanation above, the proposed improvements will be made using the Quality Function Deployment (QFD) method which makes consumer needs a reference in product design. These consumer needs will be translated into a House of Quality (HOQ) to determine the most important needs that must be met in fake nail packaging (Lubis et al., 2023). So that the proposed packaging design can meet consumer desires and expectations. Quality Function Deployment (QFD) is a structured method used in product or service planning and development. This method allows the development team to clearly identify customer wants and needs, and systematically evaluate each proposed feature, considering its impact on meeting these needs (Wijaya, 2018). The QFD method is the most suitable method in this research because it focuses on the development of one of the problems (Noviana & Hastanto, 2014). According to the background of this research, the packaging of artificial nails has not met good packaging standards. Therefore, it is necessary to develop a packaging concept so that the packaging meets the specifications of good packaging in accordance with the wishes and needs of consumers.

2. Methods

Identification of Integral System Components

Integral system components are each component contained in the system that is interconnected and becomes a unit in the system. Each of these components is interrelated to achieve predetermined goals. The integral system components consist of humans (man), machine, material, information, and energy and one additional component, namely money as a parameter needed for the stages in analyzing the costs required. The following is the identification of integral system components as shown in the Table 2.

Table 2 Identification of integral system components

	Man	Machine	Material	Information	Energy	Money
Object	Consumer	-	*Ivory paper*	-	-	Packaging production cost
Solution design	Customer satisfaction	-	Polycarbonate plastic material	How to use the product	-	Comparison of packaging production costs

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Data Collection and Processing Stage, *Quality Function Deployment (QFD) method*

In carrying out the QFD method, there are several steps that must be taken, the first is Voice of Customer (VOC) which results from conducting interviews with Dairy Nails customers as many as 8 respondents, then using an online questionnaire of 30 respondents in the Telkom University environment. The results of the interview will be analyzed and produce customer needs. Customer needs will be the basis for developing false nail packaging so that the proposed packaging developed is able to meet previously identified consumer needs. The next stage is to create a House of Quality (HOQ). The data that has been obtained in the previous process was collected through two stages: (1) in-depth interviews with 8 respondents, and (2) an online questionnaire completed by 30 respondents who are potential or existing customers of Dairy Nails in the Telkom University area. The interview data was used to construct the *Voice of Customer (VoC)*, which was then translated into eight categories of customer needs. These needs include clarity of packaging, ease of use, durability, information visibility, aesthetics, brand identity, water resistance, and lightweight design. The data that has been obtained will be put together in the form of a quality house, which consists of customer needs, technical response, relationship, planning matrix and technical response priorities. In realizing customer needs, technical response is needed as a metric that can realize the customer's wishes. Customer needs and technical response will be connected to the relationship metric and will produce technical response priorities, which shows the priority scale that needs to be developed in the product. To find out these priorities, planning metrics are needed, which consist of weighted average performance, customer satisfaction, importance to customer, raw weighted, and normalized raw weight. The steps to develop a House of Quality (HOQ) as follows:

First stage, Customer Needs.

The second stage**,** planning Metrics, serves to identify the product attributes that are top priority. The planning matrix has several aspects, as follows:

a. *Weighted Average Performance* (WAP) is a measurement tool used to assess the performance of a product or concept based on factors that are considered important. The following is the equation for calculating WAP.

$$WAP = \frac{(number\ of\ respondents\ who\ answer\ the\ score\ i\ x\ score\ i)}{number\ of\ respondents} \quad (1)$$

b. *Customer Satisfaction Performance,* this value is obtained from the calculation of the weighted average performance on customer satisfaction.
c. *Importance To* Customer**,** the importance to customer value is obtained from the calculation of the weighted average performance of consumer interests.
d. *Goal,* usually measured using the same numerical scale as the performance level. Goal is obtained by calculating the average WAP customer satisfaction and WAP importance to customer.
e. *Improvement ratio*, obtained from the results of dividing goals with customer satisfaction performance. The following is the equation:

$$Improvement\ Ratio = \frac{Goal}{Customer\ satisfaction\ performance} \quad (2)$$

f. *Sales Point* is a parameter that indicates the extent to which a product is able to fulfill customer needs, based on how well customer needs are met. The most common values for sales points can be seen in Table 3.

Table 3 Value of sales point

Value	Description
1	*No sales point*
1.2	*Medium sales point*
1.5	*Strong sales point*

g. *Raw Weight* modeling the overall importance of each customer need, based on the customer importance, improvement ratio and sales point that have been determined previously. Raw weight is calculated by multiplying the value of importance to customer, improvement ratio, and sales point.

$$Raw\ Weight = Importance\ to\ customer\ x\ improvement\ ratio\ x\ sales\ point \quad (3)$$

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h. *Normalized Raw Weight* contains raw weight values that are scaled from 0 to 1 or expressed as a percentage. The normalized raw weight value is a decimal number between 0 and 1.

$$Normalized\ Raw\ Weight = \frac{raw\ weight}{total\ raw\ weight} \quad (4)$$

The third stage, Technical response, is to convert non-technical customer needs into technical data to fulfill the customer needs that have been obtained previously.
The fourth stage, relationship metrics, is to determine the relationship between technical responses and customer needs. The symbols, definitions and numerical values are shown in the Table 4.

Tab**Error! No text of specified style in document.**le 4 Symbol relationship

Symbol	Numeric Value	Definition
Blank	0	Not linked
	1	Possibly linked
	3	Moderately linked
	9	Strongly linked

The fifth stage, technical response priorities is used to determine the technical responses that need to be prioritized. With the calculation equation for technical response priorities as follows:

$$Contribution = (relationship\ i\ x\ Normalized\ raw\ weight\ i) + .. + (relationship\ i\ x\ Normalized\ raw\ weight\ i) \quad (5)$$

$$Normalized\ Contribution = \frac{Contribution}{Total\ contribution} \quad (6)$$

The sixth stage, technical correlation by describing the relationships that exist between the previous stages. In this section there are symbols that represent each relationship as in the Table 5.

Table 5 Symbol *technical corelation*

Symbol	**Description**
√√	*Strong positive impact*
√	*Moderate positive impact*
Blank	*No impact*
x	*Moderate negative impact*
xx	*Strong negative impact*

The last stage, the product specification target setting matrix.

Concept generation
Concept generation contains a selection of possible development concepts for artificial nail packaging. Concept generation is done after HOQ, which is based on the technical response selected in the technical response priorities. The first step is to create a black box diagram by determining the inputs and outputs. Furthermore, based on the black box diagram, determine the problem decomposition of the false nail packaging development. the problem decomposition will be the basis for making morphology charts.

Concept selection
Concept selection is the selection of concepts based on predetermined concepts. After selecting possible concepts on the morphology chart, one of the selected concepts is then selected. This is based on the selection criteria determined based on the technical response and target. Each concept goes through a concept screening and concept scoring process. Concept screening is done by comparing the concept with existing packaging references. Next is concept scoring, which is weighting the concepts that have gone through the concept screening process. The concept with the highest score in concept scoring will be continued as a developed product.

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Design Results

This stage is the finalization of the Dairy Nails false nail packaging design. This stage is the end of the packaging design, at this stage the results have been obtained from the development of Dairy Nails false nail packaging using the QFD method. The results of the design have met the standards set by the consumers themselves through the need statement that has been obtained previously. The design results are expected to be able to meet the wants and needs of consumers so as to increase Dairy Nails customer satisfaction.

3. Results and Discussion

House of Quality

Before making the House of Quality, there are several steps that must be taken first as follows:
Weighted Average Performance (WAP), based on calculations with Equation 1, the results of the WAP of consumer satisfaction and interests are shown in the Table 6.

Table 7 Weighted average performance value

Variable	Satisfaction	Importance
V1	2.77	4.23
V2	2.57	4.30
V3	2.43	4.30
V4	2.57	4.43
V5	2.70	4.47
V6	2.37	4.13
V7	2.60	4.57
V8	2.77	4.47

Planning Metrics, has several aspects, WAP customer satisfaction performance value, WAP importance to customer value, goal, improvement ratio which is calculated based on Equation 2, sales point, raw weight which is calculated based on Equation 3 and the last aspect is normalized raw weight which is calculated using Equation 4 Based on the calculations carried out, the value of the planning metric can be seen in the Table 8.

Table 8 Planning matrix

Code	Customer Satisfaction Performance	Importance To Customer	Goal	Improvement Ratio	Sales Point	Raw Weight	Normalized Raw Weight
V1	2.77	4.23	3.50	1.26	1.2	6.41	0.12
V2	2.57	4.30	3.44	1.34	1	5.75	0.10
V3	2.43	4.30	3.37	1.38	1	5.95	0.11
V4	2.57	4.43	3.50	1.36	1.2	7.24	0.13
V5	2.70	4.47	3.59	1.33	1.5	8.90	0.16
V6	2.37	4.13	3.25	1.37	1.5	8.50	0.15
V7	2.60	4.57	3.59	1.38	1	6.30	0.11
V8	2.77	4.47	3.62	1.31	1	5.84	0.11
					Total	54.90	1.00

Technical response includes technical attributes, features, or characteristics of the product to be developed. The Table 9 shows the technical response for each customer need.

Table 9 Technical response

Code	Customer Needs	Technical Response	Unit
V1	Packaging clearly displays press on nails	Material type	List
V2	Press on nails packaging is easy to open and close	Packaging form	List
	Strong press on nails packaging	Closing mechanism	List
V3	Packaging includes information about press on nails	Material type	List
V4	Attractive packaging of press on nails	Font size of test	pt

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Code	Customer Needs	Technical Response	Unit
	Press on nails packaging can be a product identity	Font type	List
V5	Waterproof press on nails packaging	Font size of test Packaging colour	pt List
V6	Packaging clearly displays press on nails	Logo Presence	Binary
V7	Press on nails packaging is easy to open and close	Material type	List
V8	Strong press on nails packaging	Material type Material type Packaging width	List cm cm

Relationship, the Fig. 2 is the identification of the relationship between each customer need and the technical response of the false nail packaging development.

Metric Needs Statement	Material type	Packaging form	Closing mechanism	Font size of test	Font type	Packaging colour	Logo Presence	Material type	Packaging width
	1	2	3	4	5	6	7	8	9
Packaging clearly displays press on nails	◎	○							
Press on nails packaging is easy to open and close		◎	◎						
Strong press on nails packaging	◎							○	○
Packaging includes information about press on nails					◎		○		
Attractive packaging of press on nails		◎		◎	◎	◎	○		
Press on nails packaging can be a product identity		◎			△	◎	◎		
Waterproof press on nails packaging	○	△							
Lightweight press on nails packaging	○								
Contribution	2.7	4.3	0.9	2.6	2.8	2.9	2.3	1.3	1.3
Normalized Contribution	0.13	0.20	0.04	0.13	0.13	0.14	0.11	0.06	0.06
Priorities	4	1	9	5	3	2	6	7	7

Fig. 2 Relationship matrix.

Technical response priorities are calculated using the contribution formula in Equation 5 and normalized contribution is calculated using Equation 6. The Table 10 shows the results of the calculation of technical response priorities.

Table 10 Technical response priorities value

Contribution	2.7	4.3	0.9	2.6	2.8	2.9	2.3	1.3	1.3
Normalized Contribution	0.13	0.20	0.04	0.13	0.13	0.14	0.11	0.06	0.06
Priorities	4	1	9	5	3	2	6	7	7

Technical Correlation, based on the figure below, it is known that the type of material and packaging form have a strong positive impact, then the packaging form and closing mechanism also have a strong positive impact. While moderate positive impact occurs on the closing mechanism with the length of the packaging, and the closing mechanism with the width of the packaging. The technical corelation can be seen in Fig. 3.

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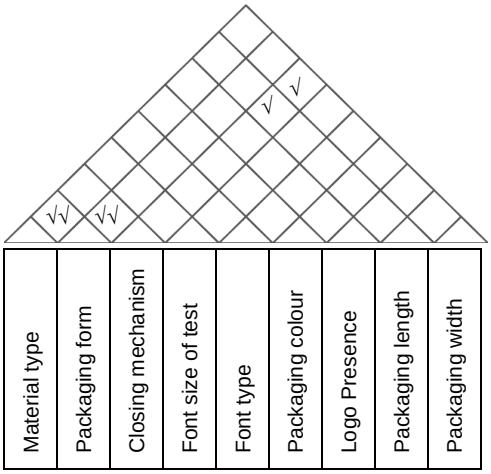

Fig. 3 Technical corelation.

Targets, in developing false nail packaging, there are targets that must be met as in the Table 11 below.

Table 11. The goal

Goal
Display products inside
Packaging shape customize
Simplify the working mechanism of packaging
Font size between 14 – 20 pt.
Easy to read font type
Packaging colour matches all press on nails designs
Logo present
Packaging length no more than 10 cm
Packaging width no more than 10 cm

The Fig. 4 show a house of quality consisting of customer requirements, technical responses, planning matrix, relationships, technical response priorities, and technical correlations. It can be seen that there are 8 categories of customer needs required in developing Dairy Nails packaging. To realize these needs, there are 9 technical responses used. There are symbols that determine the relationship between each need and technical response. At the top of the HOQ, there is a technical correlation relationship that indicates the relationship of the technical responses to each other. Then on the right side of HOQ, there is a planning matrix or planning metric, based on the planning metric, it is known that the largest normalized raw weight value is in customer needs 5 and 6. Therefore, the technical responses that are prioritized to be developed are those that have a relationship with these needs.

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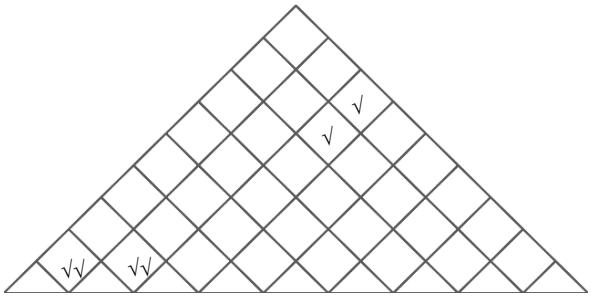

	Metric / Needs Statement	Material type	Packaging form	Closing mechanism	Font size of test	Font type	Packaging colour	Logo Presence	Packaging length	Packaging width	Customer satisfaction performance	Importance to customers	Goal	Improvement ratio	Sales point	Raw weight	Normalized raw weight
		1	2	3	4	5	6	7	8	9							
1	Packaging clearly displays press on nails	◎	○								2.77	4.23	3.50	1.26	1.2	6.41	0.12
2	Press on nails packaging is easy to open and close		◎	◎							2.57	4.30	3.44	1.34	1.0	5.75	0.10
3	Strong press on nails packaging	◎							○	○	2.43	4.30	3.37	1.38	1.0	5.95	0.11
4	Packaging includes information about press on nails					◎		○			2.57	4.43	3.50	1.36	1.5	7.24	0.13
5	Attractive packaging of press on nails		◎		◎	◎	◎	○			2.70	4.47	3.59	1.33	1.5	8.90	0.16
6	Press on nails packaging can be a product identity		◎			△	◎	◎			2.37	4.13	3.25	1.37	1.5	8.50	0.15
7	Waterproof press on nails packaging	○	△								2.60	4.57	3.59	1.38	1.0	6.30	0.11
8	Lightweight press on nails packaging	○									2.77	4.47	3.62	1.31	1.0	5.84	0.11
	Contribution	2.7	4.3	0.9	2.6	2.8	2.9	2.3	1.3	1.3							
	Normalized Contribution	0.13	0.20	0.04	0.13	0.13	0.14	0.11	0.,06	0.06							
	Priorities	4	1	9	5	3	2	6	7	7							
		Display products inside	Packaging shape customize	Simplify the working mechanism of packaging	Font size between 14 – 20 pt	Easy to read font type	Packaging colour matches all press on nails designs	Logo present	Packaging length no more than 10 cm	Packaging width no more than 10 cm							

Fig. 4 House of quality.

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Concept Generation

Problem Decomposition. The first step in problem decomposition is to represent the problem as a blckbox that describes the overall function of fake nail packaging. The input to the blackbox is based on the largest normalized raw weight value in HOQ. The highest normalized raw weight values are customer needs for attractive false nail packaging (V5) and false nail packaging can be a product identity (V6). With the output of the diagram, namely packaging that is in accordance with customer desires. Black box diagram can be seen in Fig. 5.

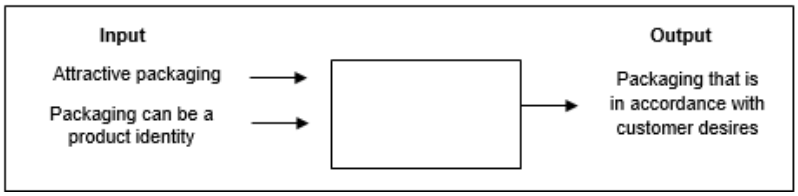


Fig. 5 Black box diagram.

The next step in problem decomposition is to divide the blackbox input into sub-functions to provide a more specific description of what the product elements can do to implement the overall function of the product. Problem decomposition consists of four sub-functions, each of which helps in selecting the best concept in the development of false nail packaging. The problem decomposition can be seen in the Fig. 6.

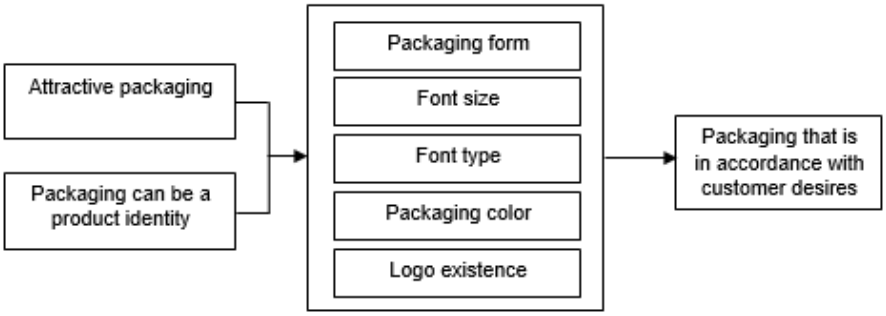


Fig. 6 Problem decomposition

Concept Combination Table

Table 12 Morphology chart

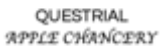
Concept	Decomposition				
	1	2	3	4	5
	Packaging Form	Font Size	Font Type	Color	Logo
1					
	Box	12 pt	Arapey and moontime	White	With logo
2					
	Clamshell	10 pt	Questrial and apple chancery	Crem	Without logo
3					
		9 pt			

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Table 12 is a morphology chart as a tool used in concept selection. The morphology chart helps in identifying and exploring various combinations of solutions that meet customer desires and desired design specifications. The vertical columns on the morphology chart categorize aspects based on problem decomposition. There are 5 different categories. The horizontal rows show alternative solutions that represent tools or alternatives that fulfil specific functions or sub-functions.

Table 13 Concept selection

Concept	Decomposition				
	1 Packaging Form	2 Font Size	3 Font Type	4 Color	5 Logo
A					
	Box	10 pt.	Arapey and moon time	White	Without logo
B					
	Clamshell	12 pt.	Arapey and moon time	Cream	With logo
C					
	Clamshell	12 pt.	Questrial and apple chancery	Cream	Without logo
D					
	Box	9 pt.	Questrial and apple chancery	White	With logo
E					
	Clamshell	10 pt.	Arapey and moon time	White	Without logo

Table 13 is the result of a combination of various alternative solutions that have been selected previously. After an internal and external search, 5 variations of the concept were obtained, one of which will be chosen to be developed.

Concept Selection

The Table 14 shows the selection criteria in the development of false nail packaging.

Table 14 Criteria selection

Selection Criteria	Need statement
Functional	Packaging clearly displays false nails
	False nail packaging is easy to open and close
Durability	False nail packaging is strong
	False nail packaging is waterproof
Clarity of information	Packaging includes information about artificial nails
Aesthetics	False nail packaging is attractive
Branding	False nail packaging can be a product identity
Weight	Lightweight false nail packaging

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Concept Screening

After getting the selection criteria, then do concept screening. In concept screening there are 3 categories of assessment for each concept against the selection criteria. The concept screening results of the concept can be seen in the Table 15.

Table 15 *Concept screening*

	Concepts					
Selection Criteria	A	B	C	D	E	Reference
Functional	-	0	0	0	0	0
Durability	-	+	+	-	+	0
Clarity of information	0	0	0	0	-	0
Branding	0	+	0	0	0	0
Aesthetics	+	+	0	+	-	0
Weight	+	0	-	+	+	0
Sum +'s	2	3	1	2	2	0
Sum 0's	2	3	4	3	2	6
Sum -'s	2	0	1	1	2	0
Net Score	0	3	0	1	0	0
Rank	3	1	3	2	3	
Continue?	No	Yes	No	Yes	No	

Description: Better than reference (+), Same as reference (0), Worse than reference (-)

Table 15, it can be seen that the selected concepts are concepts A, B, D and E. Concept B has the highest score of 3 with the first rank. Concepts A, C and E have a net score of 0 with the third rank, then concept D with a value of 1 at rank 2. The assessment is done by comparing the proposed concept with other false nail packaging references. Based on Table 15, the selected concepts are the two concepts with the highest net score values.

Concept Scoring

Concept scoring for the two selected packaging designs for artificial nails is shown in Table 16.

Table 16 Concept scoring

		B		D	
Criteria Selection	Weight	Rating	Weight Score	Rating	Weight Score
Functional	24%	3	0.73	3	0.73
Durability	25%	4	1.02	2	0.51
Clarity of information	13%	3	0.38	3	0.38
Branding	12%	4	0.47	2	0.24
Product Aesthetics	13%	5	0.64	3	0.38
Weight	13%	2	0.26	4	0.51
Total Score			3.50		2.76
Rank			1		2
Continue?			DEVELOP		NO

Based on the concept weighting values shown in Table 16, it can be seen that the selected concept is concept B with the highest total score of 3.50. The specifications owned by the concept are polycarbonate plastic material with a packaging form in the form of a clamshell having a hinged lid with appropriate dimensions of 8.5 x 8.5 cm. This concept uses paper as a false nail storage compartment, the paper is beige in color with 2 types of 12 pt. fonts used on the packaging.

Design Results, Selected Concept Specifications

The concept selection results were chosen based on the needs of Dairy Nails false nail packaging that can fulfil customer needs. The selected concept specifications can be seen in Table 17.

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Table 17 Selected concept specifications

No	Technical Response	Unit	Value
1	Material type	List	Polycarbonate plastic material
2	Packaging form	List	Clamshell
3	Closing mechanism	List	Hinged lid
4	Font size of text	Pt	12
5	Font type	List	Arapey dan Moontime
6	Packaging color	List	Crem
7.	Logo presence	Binary	Yes
8	Packaging length	Cm	8.5 cm
9	Packaging width	Cm	8.5 cm

Based on the Table 17, the illustration of the packaging form shown in the figure below is the Illustration of the Selected Concept. The illustration is continued to the prototype making process can be seen Fig. 7.

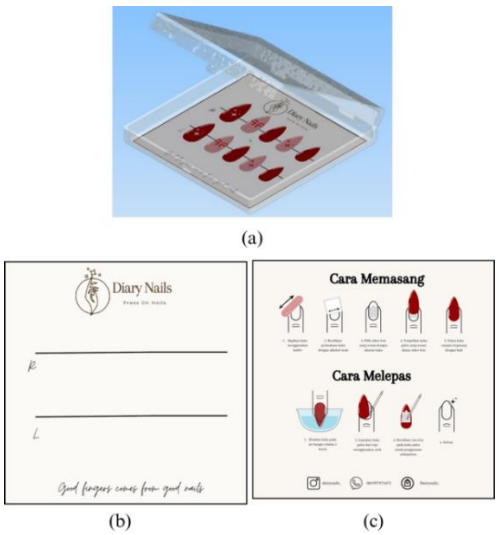

Fig. 7 Illustration of the selected concept.

In the packaging compartment, information on how to install and remove the artificial nails is added. Part (a) is the front of the nail compartment, showing the left and right hand sides with R (right) and L (left) indicators as information for users. Then part (b) is the back side of the artificial nail compartment, which contains how to attach and remove artificial nails. The method is easy to understand by users, thus making the packaging informative according to previous customer needs.

Prototype

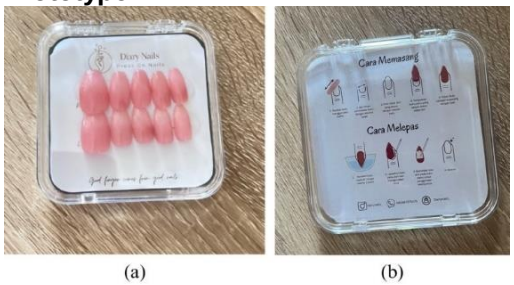

Fig. 8 Prototype front view (a), prototype rear view (b)

The packaging prototype is made with polycarbonate plastic which is transparent to show the product. Polycarbonate plastic is also strong, so it can protect the product inside from impact, lighter

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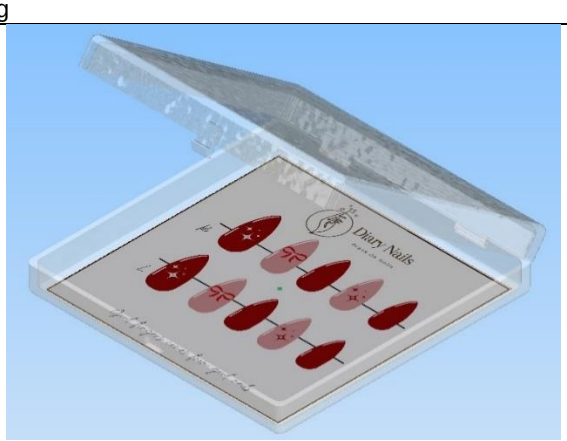
than glass so it is often used for packaging materials, besides that polycarbonate plastic is also waterproof. With these material properties, the packaging can be reused. This packaging is clamshell-shaped with a hinged lid mechanism. The clamshell packaging has good security, as it has two layers protecting the product. The hinged lid method has the advantage of being easy to open and close. This type of lid has a hinge or fold, which allows the lid to remain connected to the main part of the package. The package label contains information about the tutorial for installing and removing artificial nails. The writing on the label uses 2 types of fonts with a size of 12 pt so that the writing is easy for consumers to read. The label also contains the Dairy Nails logo as the product's identity and branding.

Design Result Analysis

Based on the problems discussed in the background, the packaging of fake nails does not meet several categories of packaging requirements. The comparison of existing and proposed packaging can be seen in Table 18.

Table 18 Comparison of existing and proposed packaging

 Existing		 Proposed	
Advantages	Disadvantages	Advantages	Disadvantages
Transparent Material	Material is easily damaged	Transparent material	More expensive production costs
Color matches with various types of false nails	Not informative because there is no tutorial on how to put on and take off false nails	• Strong material that can protect false nails well so that they can be reused.	
Low production cost	Lack of visual appeal	• Attractive colors and match with various types of artificial nails	
		• Informative packaging as there is a tutorial on installing and removing false nails	
		• Packaging has an attractive appearance and adds to the selling value of the product	

4. Conclusion

This study successfully identified and redesigned the packaging of artificial nail products at MSME Dairy Nails using the Quality Function Deployment (QFD) method. Based on the analysis, it was found that the existing packaging did not meet several important standards such as material durability and product information delivery. This contributes to a decrease in customer satisfaction which has a direct impact on consumer buying interest. Using the QFD method, customer needs and wants were successfully translated into clear technical specifications, resulting in a new packaging design that is more in line with consumer expectations. The proposed new packaging has several advantages over the previous version. The material used is polycarbonate plastic with a clamshell design that is safer and more durable. In addition, the packaging is also equipped with a hinged lid, clear usage

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information, and more prominent branding, so as to increase visual appeal and strengthen the brand identity of Dairy Nails. The font size, font type, and packaging color are also chosen based on consumer preferences, so that the new packaging is more informative and attractive in the eyes of customers with specifications of artificial nail packaging, which is made of polycarbonate plastic, with a clamshell shape, using a hinged lid, has a font size of 12, with the fonts used are arapey and moontime, the packaging is beige in color with a length and width of 8.5 x 8.5 cm.

The implementation of the redesigned packaging is expected to significantly increase customer satisfaction and, ultimately, improve sales of Dairy Nails' artificial nail products. This research also provides recommendations that the process of improving packaging design should be carried out on an ongoing basis, in line with changing consumer needs and preferences. Thus, Dairy Nails MSME can maintain its competitiveness in the market and continue to grow as a provider of quality Nail Art products in Bandung.

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