

Implementation of QFD and Kano Methods in an Effort to Improve the Quality of UNOWEN Temulawak Products

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Article Information	ABSTRAK
Article History Received : January 31, 2025 Revised : February 24, 2025 Published : April 02, 2025	Competition in the Temulawak Unowen MSME industry is getting tighter. Many other producers are also trying to enter the market with various new innovations both in terms of taste and packaging. Therefore, it is important for companies to continue to carry out product development in order to remain competitive and maintain their market share. In this study, the Kano and QFD methods were used. The purpose of the Kano Method is to find out what consumers want about cracker production, and QFD is to offer the most important suggestions for improving quality. The results showed that Kano has 12 one-dimensional attributes, 4 Indifferent attributes. On the other hand, the QFD research results show that the validity testing of all three tiers resulted in a calculated R value that is more than R table 0.55, which indicates that the attributes are valid while the reliability test shows that the alpha value of all 3 tiers is 0.663 and the respondents' answers are considered reliable.
Keywords : <i>Curcuma;</i> <i>Kano;</i> <i>Product Quality;</i> <i>Quality Function Deployment.</i>	

INTRODUCTION

Along with rapid population growth, the need for products and services is increasing. One of the products needed to support human activities is processed food products. (Lukman, 2018). Every business continues to strive to meet consumer demand in order to obtain the expected profit and maintain the survival of the company (Hati, 2018). Companies that are able to meet this demand are companies that are able to sell processed food products at competitive prices. Indonesia is a country whose economic growth supports one of the economic chains that are being worked on by its people, based on data and statistics, MSMEs in Indonesia contribute 61% of gross domestic product (GDP) in the country, around Rp 9,580 trillion, around 117 workers (97%) of the total workforce comes from the MSME sector (UKM, 2024). One of the provinces of East Java has thousands of MSMEs, which contributed to the province's economic performance in 2022 by 58.36 percent. This is a significant increase compared to 2020 and 2021, with these MSMEs covering businesses ranging from food to service providers (Prabowo, 2019).

UNOWEN is an MSME originating from Gresik, East Java. Established in 2022, this MSME is motivated to make spice drinks that can be easily accepted by the public, especially young people who usually do not consume spice drinks, the first spice drink made is a drink made from temulawak. Temulawak, or curcuma zanthorrhiza, is an herbal plant endemic to Indonesia that is often used as an herbal remedy to treat various problems and diseases (Widyana, 2019). These include gastric disorders, decreased appetite, diarrhea, constipation, arthritis, fever, and impaired liver function, temulawak is usually eaten in Indonesia in dried form (Dyana, 2020).

The current problem is that consumer demands always increase and develop in line with the development of science, technology and information which results in rapid changes in consumer tastes for a product. The increasing number of competitors has caused the number of UNOWEN temulawak customers to decrease and there are several customer complaints about UNOWEN temulawak products, which are crucial categories for improving product quality so that in the future UNOWEN Temulawak products can compete in the market and can be well received by customers. Efforts to face the challenges of the above problems, the author uses the QFD and KANO methods by conducting a benchmarking activity to determine the advantages and disadvantages of a product compared to other competing products. The results of the implementation of QFD and KANO will produce a house of quality that will inform product development. To implement this method requires input from consumers in the form of data about what consumers want and consumer perceptions in assessing product quality.

RESEARCH METHODS

Respondents

In the research process on efforts to improve the quality of UNOWEN temulawak beverage products, we need input and assessment of this temulawak product. The number of samples taken was 30 respondents, this is in accordance with the opinion of (Rauf, 2018) which says that the minimum number of questionnaire trials is at least 30 respondents. With a minimum number of 30 people, the distribution of values will be closer to the normal curve by referring to the formula below.

$$n = \frac{Za^2 \cdot p \cdot q}{e^2} \quad (1)$$

This study used a random sampling method, which means that everyone in the population was given an equal chance to become a sample member. The sample criteria for this study were individuals who had consumed Temulawak UNOWEN at least once in the past two months.

Quality

By definition, Quality or value is the level of good or bad of a product produced whether in accordance with predetermined specifications or suitability for needs. While the assessment of the good or bad quality of a product can be determined in 8 (eight) dimensions of quality introduced by a Quality Control Expert named David A. Garvin in 1987 (Hanafie, 2020). The eight dimensions of quality proposed by David A. Garvin are then known as the 8 Garvin Quality Dimensions including: Performance, Features, Reability, Conformance, Durability, Serviceability, Aesthetic, Perserved Quality (Lestari, 2020).

Quality Function Deployment (QFD)

The Quality Function Deployment (QFD) method is a method of developing design quality for customer satisfaction that translates into design target points used during the production stage (Setiawati, 2020). The QFD method involves a systematic procedure for describing customer wishes and interpreting them in process characteristics by creating a matrix that links between customer wishes and the engineering parameters of the product or service House of Quality. The results of the matrix are collected, interpreted, recorded, and analyzed to determine the priority of consumer needs. The stages in the preparation of QFD are as follows (Zakaria, 2020).

1) Validity and Reability Test

The validity test shows the extent to which a measuring device measures what it wants to measure. The type of validity test used is construct validity where researchers look for definitions put forward by experts written in the literature (Suseno, 2021).

$$r_{xy} = \frac{N \sum XY - (\sum X)(\sum Y)}{\sqrt{N \sum X^2 - (\sum X)^2 \{N \sum Y^2 - (\sum Y)^2\}}} \quad (2)$$

Reliability test, namely a measurement instrument (eg a questionnaire) is said to be reliable if it gives consistent score results in each measurement. The question or statement item is said to be reliable or reliable what if the number of people to the question or statement is consistent. The reliability test uses the Cronbach alpha formula as follows (Nurochim, 2021).

$$r = \left[\frac{k}{k-1} \right] \left[1 - \frac{\sum S_i^2}{S^2} \right] \quad (3)$$

2) Calculation of Importance Level and Consumer Satisfaction Level

The level of consumer importance is chosen based on a Likert scale of 1 - 5 (very unimportant - very important), then calculations are made through equation (3).

$$\text{Importance To Customer} = \frac{\text{Total of Each Attribute}}{\sum \text{Respondent}} \quad (4)$$

The level of consumer importance is chosen based on a Likert scale of 1 - 5 (very unimportant - very important), then the calculation is carried out through equation (4).

$$\text{Customer Satisfaction Performance} = \frac{\text{Total of each attribute}}{\sum \text{Respondent}} \quad (5)$$

3) Goals

The goal value is obtained from the comparison between products, namely the object of research product and competitor products.

4) Sales Point

Sales point is the determination of the level of influence of quality attributes on product sales. This component also identifies the level of importance of a consumer need that can be an advantage and have an impact on the company if fulfilled (Hayati, 2022).

5) Weight Calculation of Technical Response and Benchmarking

The technical matrix is the part where the company applies the methods used to realize efforts to fulfill consumer desires. The technical matrix value is obtained from 3 (three) components, namely technical response weight, benchmarking, and targeting through equations (5) and (6), while the targeting value is the highest benchmarking value of each product, both Temulawak Unowen products and other products as competitors. (Simbolon, 2022).

$$\text{Technical Response Weight} = \frac{\text{Technical Response Contribution to } -1}{\text{Normalize Raw Weight}} \quad (6)$$

$$\text{Benchmarking} \quad (7)$$

$$= \frac{(\text{Importance Score for Customers}) \times (\text{Customer Satisfaction Score})}{\sum \text{Technical Response Relationship Score}}$$

Kano

At this point, cano categories are created and customer satisfaction coefficients are calculated to find out the features that customers want and how much influence they exert (Rizki, 2021). The determination of this category is based on the results of both the functional and non-functional questionnaires of the Kano method (Rahmawati, 2022).

Table 1. Kano Evaluation

	Dysfunctional					
	Customer	1	2	3	4	5
	Requirments	Like	Must	Neutral	May	May Not
Functional	1. Like	Q	A	A	A	O
	2. Must	R	I	I	I	M
	3. Neutral	R	I	I	I	M
	4. May	R	I	I	I	M
	5. May Not	R	R	R	R	Q

- The table above shows the results of the kano evaluation which combines the answers of 60 respondents for each quality attribute, both functional and dysfunctional (Huddin, 2021).
- After all answers from respondents are converted into Kano categories, namely A (Attractive), M (Must be), O (One-dimensional), R (Reserve), Q (Questionable), and I (Indifferent), then the number of each category for each question is calculated. (Musyahadah, 2024).
- Determination of the Kano category for each attribute using Blauth's Formula as follows, namely (1) If the value $(O + A + M) > (I + R + Q)$, the maximum value of O, A, or M is obtained. (2) If the value $(O + A + M) < (I + R + Q)$, the maximum value of I, R, or Q is obtained. (3) If the value $(O + A + M) = (I + R + Q)$, the maximum value of all categories is obtained. (Abdullah, 2024).
- The results of calculating the number of each category are then sought for customer satisfaction coefficients through equations (1) and (2) which are then presented in the Kano Quadrant (Oktaviani, 2023).

$$Better = \frac{(A + O)}{(A + O + M + I)} \quad (7)$$

$$Worse = \frac{(O + M)}{(A + O + M + I) (-1)} \quad (8)$$

RESULT AND DISCUSSION

Closed Questionnaire

The distribution of this questionnaire aims to ascertain the attributes that need to be important in the quality of Temulawak UNOWEN products. as a result of the interview conclusions and some suggestions, then the distribution was made to 10 randomly selected respondents, to help determine important attributes about the product based on the quality dimensions that will be used as a closed questionnaire.

Table 2. Closed Questionnaire Attributes

	Atributes	Atribut Code	TP	KP	C	P	SP
Products	Fresh taste	P1					
	Smooth drink texture	P2					
	Appropriate shape/size	P3					
	Does not contain preservatives	K1					
	Packaging informs about ingredient composition	K2					
Packaging	Packaging informs halal labeling	K3					
	Packaging informs of expiration date	K4					
	Design indicates quality product	K5					
	Quality packaging materials	K6					
	Packaging informs brand and address	K7					
	Packaging informs of storage instructions	K8					
Price	Price is in line with the taste and portion of the drink	H1					
	Affordable price for all	H2					
	Competitive price with other brands	H3					

Source: Unowen Temulawak Consumer Questionnaire.

Validity and Reliability Test

Description The validity test is carried out on the results of the level of importance and level of customer satisfaction. With 30 respondents answering an interval scale of 1-5. Then the validity test is carried out to find out whether the question attributes are valid or not and if the

Crosbach's Alpha value > 0.60 then conclude "Reliable", if the Cronbach's Alpha value < 0.60 then conclude "Not Reliable".

Table 3. Validity Test & Reability Test of Questionnaire Results

Attribute Code	R Table	Interests		Satisfaction	
		R Count	Status	R Count	Status
P1	0,361	0,411	Valid	0,419	Valid
P2	0,361	0,375	Valid	0,37	Valid
P3	0,361	0,415	Valid	0,408	Valid
K1	0,361	0,362	Valid	0,403	Valid
K2	0,361	0,55	Valid	0,548	Valid
K3	0,361	0,518	Valid	0,505	Valid
K4	0,361	0,386	Valid	0,373	Valid
K5	0,361	0,481	Valid	0,49	Valid
K6	0,361	0,407	Valid	0,386	Valid
K7	0,361	0,536	Valid	0,458	Valid
K8	0,361	0,615	Valid	0,629	Valid
H1	0,361	0,593	Valid	0,61	Valid
H2	0,361	0,459	Valid	0,473	Valid
H3	0,361	0,454	Valid	0,552	Valid
Reference Value		Cronsbach's Alpha Value		Conclusion	
0,60		0,663		Relabel	

Source: Data Processing of Unowen Temulawak Consumer Questionnaire Results

Importance to Customer and Customer Satisfaction Performance against Competitors

The results of the average calculation of the importance and desire questionnaire data for Unowen temulawak products with competing temulawak.

Table 4. Comparison of Customer Importance Level Value with Competitors

No	ATTRIBUTE	UNOWEN		COMPETITOR	
		Total Score	ITC	Total Score	ITC
1	Fresh taste	143	4,7	130	4,3
2	Smooth drink texture	136	4,5	137	4,6
3	Appropriate shape/size	136	5,0	142	4,7
4	Does not contain preservatives	126	4,7	144	4,8
5	Packaging informs about ingredient composition	140	4,3	118	3,9
6	Packaging informs halal labeling	127	4,2	140	4,7
7	Packaging informs of expiration date	142	4,8	129	4,3
8	Design indicates quality product	145	4,8	128	4,3
9	Quality packaging materials	133	4,4	131	4,4
10	Packaging informs brand and address	128	4,7	141	4,7
11	Packaging informs of storage instructions	144	4,8	138	4,6
12	Price is in line with the taste and portion of the drink	149	4,5	136	4,5
13	Affordable price for all	144	4,8	139	4,6
14	Competitive price with other brands	141	4,2	139	4,6

Source: Data Processing of Unowen Temulawak Consumer Questionnaire Results

From the comparison of the value of the table above, Unowen temulawak for the value of the level of importance / level of customer desire is superior to competitors even though there are several attributes that are less superior, aka but some of these attributes still make quality improvements to consumer desires.

Table 5. Comparison of Customer Desire Level Value with Competitors

No	ATTRIBUTE	UNOWEN		COMPETITOR	
		Total Score	CSP	Total Score	CSP
1	Fresh taste	143	4,8	139	4,6
2	Smooth drink texture	136	4,5	137	4,6
3	Appropriate shape/size	136	4,5	136	4,5
4	Does not contain preservatives	125	4,2	119	4,0
5	Packaging informs about ingredient composition	140	4,7	132	4,4
6	Packaging informs halal labeling	127	4,2	127	4,2
7	Packaging informs of expiration date	142	4,7	142	4,7
8	Design indicates quality product	145	4,8	137	4,6
9	Quality packaging materials	132	4,4	129	4,3
10	Packaging informs brand and address	126	4,2	126	4,2
11	Packaging informs of storage instructions	144	4,8	144	4,8
12	Price is in line with the taste and portion of the drink	149	5,0	142	4,7
13	Affordable price for all	144	4,8	142	4,7
14	Competitive price with other brands	140	4,7	133	4,4

Source: Data Processing of Unowen Temulawak Consumer Questionnaire Results

From the comparison of the table values above, Temulawak Unowen for the value of customer satisfaction levels is superior to competitors, although there are several attributes that are less superior, aka but some of these attributes continue to improve the quality of consumer desires.

Goal Dan Salespoint

Goal is the level of performance that the company wants to achieve to meet customer needs. This Performance Goal is expressed in the form of the highest numeric scale from the comparison of importance value, satisfaction value of Unowen temulawak products with competitors. To determine the sales point, a direct interview was held with the business owner.

Table 6. Goal & Salespoint

No	Attribute	Sales Point	Goal
1	Fresh taste	1,5	4,8
2	Smooth drink texture	1,2	4,5
3	Appropriate shape/size	1,5	4,5
4	Does not contain preservatives	1,5	4,2
5	Packaging informs about ingredient composition	1,2	4,7
6	Packaging informs halal labeling	1,5	4,2
7	Packaging informs of expiration date	1,5	4,7
8	Design indicates quality product	1,2	4,8
9	Quality packaging materials	1,2	4,4
10	Packaging informs brand and address	1,5	4,3
11	Packaging informs of storage instructions	1,5	4,8
12	Price is in line with the taste and portion of the drink	1,5	5,0
13	Affordable price for all	1,5	4,8
14	Competitive price with other brands	1,5	4,7

Benchmarking

The values in this benchmarking are technical response performance values. Benchmarking shows the level of competition between Temulawak Unowen and competitors.

Table 7. Benchmarking Value Comparison with Competitors

No	Technical Response	Unowen	Competitor
1	Quality of Curcuma	314,84	290,47
2	Raw Materials	349,48	336,81
3	Taste	271,00	258,89
4	Marketing	292,88	289,99
5	Packaging	368,79	359,01
6	Product Appearance	106,64	101,19

Source: Data Processing of Unowen Temulawak Consumer Questionnaire Results

From the data above, it can be seen that the benchmarking value of Unowen temulawak products is almost comparable to competing products. then there needs to be some improvement in technical responses to maintain product quality in order to meet customer satisfaction.

Kano

To process data with the cano method, respondents' answers were put into cano categories, which combined respondents' answers with functional and dysfunctional statements. Furthermore, mapping is done based on the cano categories. Table 8 shows the recapitulation and determination of product attributes based on cano categories :

Table 8. Hasil Perhitungan Kano

No	Attribute	Kano Category						Grade	Better	Worse
		A	O	M	I	R	Q			
1	Fresh taste	2	12	4	5	6	1	O	0,61	-0,70
2	Smooth drink texture	6	6	5	10	1	2	I	0,44	-0,41
3	Appropriate shape/size	4	12	4	8	0	2	O	0,57	-0,57
4	Does not contain preservatives	5	12	4	7	0	2	O	0,61	-0,57
5	Packaging informs about ingredient composition	3	9	3	10	4	1	O	0,48	-0,48
6	Packaging informs halal labeling	5	9	2	10	2	2	O	0,54	-0,42
7	Packaging informs of expiration date	3	9	5	8	4	1	O	0,48	-0,56
8	Design indicates quality product	4	11	3	8	2	2	O	0,58	-0,54
9	Quality packaging materials	5	10	4	10	0	1	O	0,52	-0,48
10	Packaging informs brand and address	2	10	4	11	1	2	I	0,44	-0,52
11	Packaging informs of storage instructions	2	11	7	6	2	2	O	0,50	-0,69
12	Price is in line with the taste and portion of the drink	2	11	4	7	4	2	O	0,54	-0,63
13	Affordable price for all	3	12	6	5	2	2	O	0,58	-0,69
14	Competitive price with other brands	4	11	7	8	0	0	O	0,50	-0,60

Source: Data Processing of Unowen Temulawak Consumer Questionnaire Results

Based on the recapitulation of the value of the answers to the product attributes with the kano diagram, an explanation of the results obtained is presented, namely all the product attributes of Temulawak Unowen fall into a very important category to be prioritized. Based on the recapitulation results, the majority of product attributes fall into the One-Dimensional category in other words in this category the level of consumer satisfaction will be comparable to the level of attribute performance. Attributes included in the One-Dimensional category are as follows: Fresh taste ; Appropriate shape / size ; Does not contain preservatives ; Packaging informs the composition of the ingredients ; Packaging informs the halal label ; Packaging informs the expiration date ; Design shows quality products ; Quality packaging materials ; Packaging informs storage instructions ; Price according to the taste and portion of the drink ; Affordable prices for all groups ; Competitive prices with other brands. For attributes that fall into the Indifferent category are: Smooth drink texture; Packaging informs the brand and address.

Based on Table 8, it can be seen that the better value indicates how much increase in consumer satisfaction with the product if the product attributes are fulfilled and conversely the worse value indicates how much decrease in consumer satisfaction with the product. As in the fresh taste attribute, the better value is 61% as an indication of consumer satisfaction with Temulawak Unowen products increases by 61% if the fresh taste attribute is well fulfilled, but will experience 70% consumer dissatisfaction (worse value) with the product if the attribute is not fulfilled.

House Of Quality (HOQ)

Based on the nature and level of the relationship, four types of relationships between technical responses are classified, namely strong positive relationships with symbols $++$, positive relationship with symbols $+$, negative relationship with symbols $-$, and a strong negative relationship with the symbol ∇ . The figure below shows the relationship between the technical responses in the Quality Function Deployment building, as well as bringing all the other calculations together in one final QFD picture.

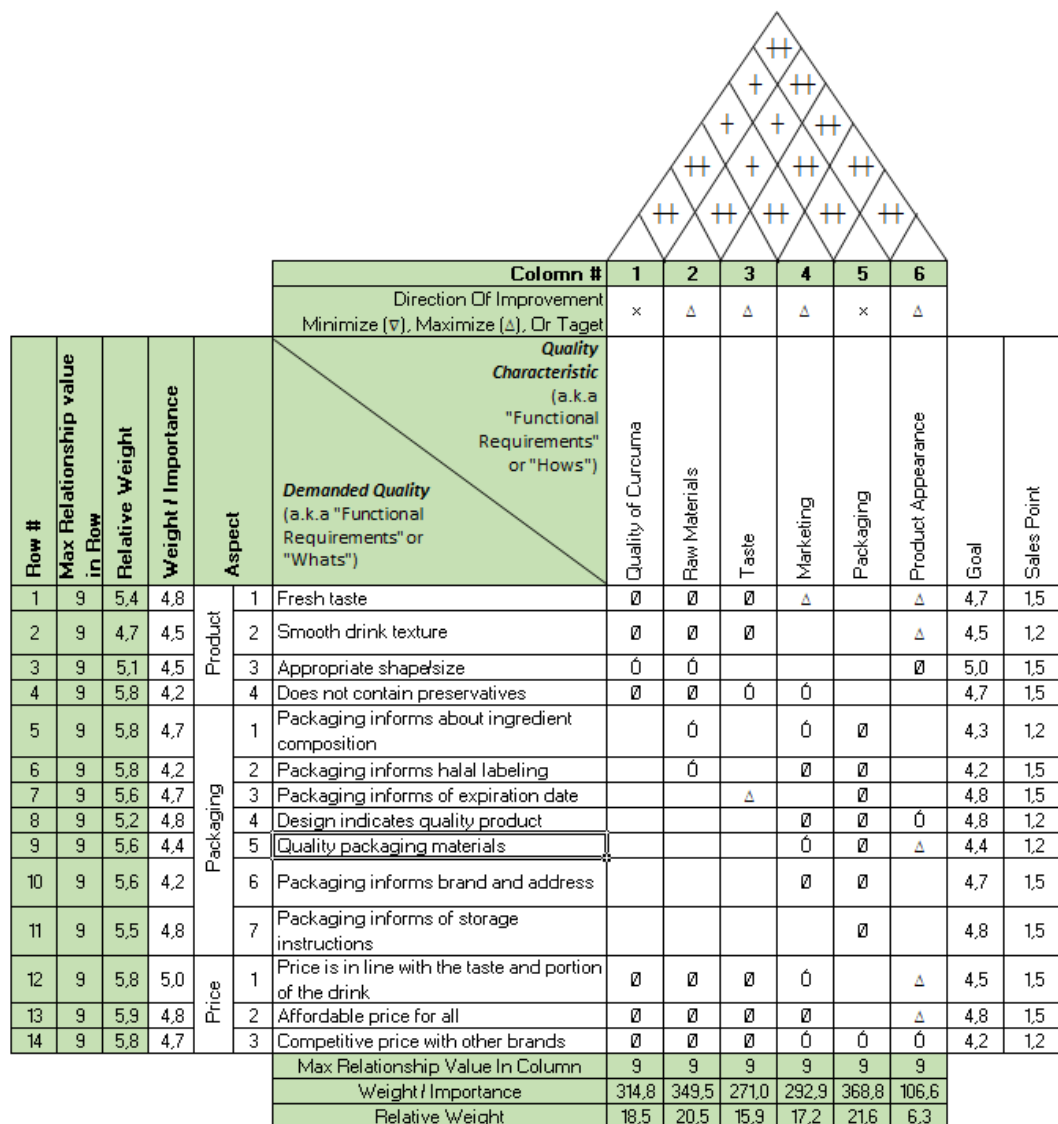


Figure 1. House Of Quality (HOQ)

Based on the results of the QFD analysis to improve product quality and customer satisfaction, the recommended improvement strategy is to provide solutions in the form of technical responses that are appropriate and can be implemented by looking at the priority order.

Then the order of priority is developed into a quality improvement strategy for Temulawak Unowen, which includes the selection of quality raw materials, periodic taste tests to ensure flavor consistency, and optimization of the mixing process. It is expected that these strategies will improve customer satisfaction and product quality of Temulawak Unowen.

CONCLUSIONS

Based on calculations on the Quality Function Deployment (QFD) method research shows that all attributes measured are valid and reliable, measurements using an ordinal scale. The level of consumer interest in Temulawak Unowen products with the largest value is the shape / size attribute (5.0) and the smallest level of importance is the packaging attribute informing the halal label and competitive prices with other brands (4.2). While the level of satisfaction of Temulawak Unowen consumers with the greatest value is the Price attribute according to the taste and portion of the drink (5.0), and the smallest level of satisfaction is the attribute does not contain preservatives (4.2). Based on the results of the Kano Method calculation, the One-Dimensional category is obtained as many as 12 attributes and the Indifferent category as many as 2 attributes, to improve the quality of competition in products 14 attributes of consumer needs must be prioritized to improve or maintain their quality. Where the 14 attributes of consumer needs are mutually influential on consumer satisfaction.

The company must do several things to improve the quality of its products, such as choosing high-quality raw materials so that the quality of the products produced can be accepted by consumers, providing training to employees regularly to ensure that the product is hygienic during the production process, and expanding the target market by making attractive packaging to attract customers to buy Temulawak Unowen.

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