

Redesigning Food Packaging Using Kansei Engineering Method : Case Study at Griya Produksi SME

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Abstract. Food Packaging plays an important role in food industry, as it is not only to protect the food within, but also as a mean of advertisement for the product, a good packaging more or less could improve the awareness of the people to buy more the product. Eggroll Sasha by Griya Produksi SME is one of its best product. Made from sweet potato, the product is known for its taste, but unfortunately the packaging does not represent the taste of the product. Using Kansei Engineering (KE), the current packaging is being redesigned in order to elevate the aesthetics and to inform the customer about the existence of the product. The respondent of this research are people who reside in 3 district around Griya Produksi's Factory, and the one who already purchase or eaten the product. The output of this research is the brand new redesigned package for the eggroll.

Keywords: Packaging; Design; Kansei Engineering; Eggroll; Small Medium Enterprise (SME)

I. INTRODUCTION

Small medium enterprises (SMEs) are the cornerstone of Indonesian Economics, as it is stated by Direktorat Jenderal Perbendaharaan (2022), there are approximately 64,2 million SMEs which contributed to Indonesia's GDP up to 61,07% or equals to 8.573,9 Billion rupiahs. Yogyakarta, as one of the biggest Province in Indonesia which also rely on creative economics and SMEs, roughly have 521.000 SMEs all around it (Edi, 2021), it is also a further prove that SMEs played an important role on shaping Indonesia's Economic. One of the most common enterprise owned by Indonesian is the food SMEs. BPS (2020), stated that by the end of 2019, Yogyakarta is having an increasing number of food industry approximately 2% (8.44 to 10.21%), although small, but it is quite significant on Yogyakarta's economic. Furthermore, Bappeda Yogyakarta (2022), stated that by June 2022, Yogyakarta already has 328.845 units of SMEs, and 86.679

SMEs are located in Bantul Regency showing that Yogyakarta mostly relied on SMEs as its economic growth.

Food, basically is vulnerable to any unwanted substance if not properly closed or sealed. Alimi (2016), stated that the foods that are not fully enclosed or covered, are tend to get microbial hazard, which are dangerous for the customer whom will eat the food, thus the packaging of the food plays an important role. Packaging, mainly functioned as the protector of the food inside, but also acted as the source of information regarding the product, ranging from the ingredients up to the recommended dietary allowance (Cole, 2003). As the food varies in several shape, color or even ingredients, so does the packaging. Ranging from metal, plastic or paper (Marsh & Bugusu, 2007), types of packaging material now adapting to any kinds of food to complement several things such as distribution process and expiring date. A good product, is a well commercialized product, and packaging, plays on that role too. Companies, tend to put logos or some symbols on their package, in order to promote on their companies through their product, failed to do so (bad logos or symbol), will massively caused failure to their promotional campaign (Couste et al, 2012). Another powerful role of packaging is for building an image of the product. Wheeler (2009), stated that a visually good packaging would mostly affect the customer to buy the product, while Sari (2013), claimed that having a good packaging will

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most likely producing both brand awareness and brand image of the product that leads to brand experience toward the customer.

Redesigning process mostly covered on adding some aesthetic feature, in this case on the packaging of the product. One of the most common method in adding aesthetic aspect on product is Kansei Engineering (KE). KE strongly implies on aesthetic point of the product which would be translated into several parameter that shaped the product (Nagamachi, 1996). KE is known to have 4 types of model that could be used in creating or re-creating/redesigning product,(Nagamachi & Lokman, 2011) but most of the time, people tend to use the first type of KE (KE Type 1). The application of KE has been known in several research and items, ranging from electric vehicle design (Baroroh et al, 2019), shoes (Jatmiko & Nugroho, 2022) or home appliance such as drinking goblet (Wu & Yu, 2020), KE is also being used on some product that are food-related such as Chocolate bar (Ghiffari, 2018), Tempe (Adiyanto & Jatmiko, 2019), Candies (Effendi et al, 2020) and rice cake snack (Wattanutchariya & Royintarat, 2012), thus it is further approve that KE is applicable to any kinds of product that emphasize on enhancing the aesthetic of the product.

This research will mostly cover on the product of one of the SME in Yogyakarta, named Griya Produksi which produce eggroll as their most successful product, in this research will mostly covering on the redesigning process of the packaging of the aforementioned product using Kansei Engineering as the tool.

II. RESEARCH METHOD

This research was conducted in Bantul, Yogyakarta, at Griya Produksi SME with one of their product named eggroll Sasha as the object of this research. The research mostly covered on how to redesign the packaging of the eggroll, using Kansei Engineering method. The Kansei Questionnaire in this research is used to find the customer’s needs regarding the packaging of the product, whilst the kansei words are being founded both from online source (product review

with the same type) or offline by interviewing several people related to the packaging process. Using the discovered needs through Kansei Questionnaire, author could redesigned the package according to the expected needs. The drawn concept than being validated both to the owner of Griya Produksi and the respondent.

The following step of this research is finding and deciding the respondents. As the SME located in Bantul, so does the respondent of this research. The respondent will be the inhabitants of the 3 district surrounding the SMEs, namely Piyungan, Banguntapan and Pleret District. The sample size on this research is estimated using Adequacy test and will be roughly estimated about 57 respondent using formulation (1).

$$N' = \left[\frac{k/s \sqrt{(N \sum xi^2) - (\sum xi)^2}}{\sum xi} \right] \tag{1}$$

The 57 respondents will be the one who filled out the Kansei Questionnaire, thus, the need statements are drawn from the filled-out Kansei Questionnaire.

III. RESULT AND DISCUSSION

Finding Kansei Words

The first step on this research are divided into 2 big step, the first one is deciding the respondents and the other is finding the Kansei word. The former, has already been stated in the previous segment, while the latter, as is shown in Table 1.

Table 1, Kansei Words

No.	Kansei Words
1	Informative
2	Attractive Looks
3	Safety Factor
4	Elegant
5	Innovative
6	Distinctive Characteristic
7	Practical

The 7 words, were drawn from several sources ranging from online sources i.e. : food review, same product types, etc, another way of finding the kansei words were drawn from 100 respondents around 3 districts by offline method as it has been described in the previous segment.

Kansei Questionnaire (Semantic Differential)

As the kansei words have been collected, the next step on this research is creating the Semantic Differential Questionnaire, which will be used to find out the needs for the packaging improvement. Aros et al (2009), stated that Semantic Differentiation is a useful tool in an earlier designing phase because the developer could know the expectations of the user, while Rosenberg & Navarro (2018), stated that using a semantic differential could efficiently capture the changing nature of social stereotype that mostly affect on people’s behavior towards a product. In this research, the Kansei Questionnaire or the Semantic Differential, is scaled in a seven-scale, thus it strongly related to Osgood (1952) as cited in Rosenberg & Navarro (2018) that stated a

semantic differential mostly consist of a blank seven-scale item that could benefit the researcher to have a better judgment compared to a five-scale questionnaire. The KE Questionnaire in this research is shown in Table 2.

Table 2. Kansei Questionnaire

Kansei Words	1	2	3	4	5	6	7	Kansei Words
Informative								Less Information
Attractive Look								Boring
Safety Factor								Vulnerable
Elegant								Simple
Innovative								Monotone
Distinctive Characteristic								No Characteristic
Practical								Intricate

Table 3. Kansei Questionnaire Recapitulation

Respondent	KW1	KW 2	KW3	KW4	KW5	KW6	KW7	Respondent	KW1	KW 2	KW3	KW4	KW5	KW6	KW7
a	2	3	2	2	2	1	2	ad	2	2	1	2	2	2	1
b	2	2	1	2	2	2	2	ae	2	1	2	1	1	1	1
c	1	1	3	2	1	1	1	af	1	2	1	1	2	2	2
d	3	2	1	3	3	2	2	ag	2	1	2	3	1	2	1
e	2	2	2	1	2	2	1	ah	2	2	1	2	2	2	2
f	1	2	2	2	1	1	2	ai	1	2	1	2	3	1	1
g	2	1	1	2	2	1	1	aj	2	1	2	1	1	2	1
h	2	2	3	3	3	3	2	ak	3	3	3	2	3	2	2
i	2	1	2	2	1	1	1	al	2	2	2	3	2	1	2
j	1	2	2	1	2	2	2	am	2	1	2	1	1	2	1
k	3	2	1	2	2	2	2	an	1	3	2	2	2	2	1
l	1	1	2	2	1	1	1	ao	2	2	1	3	2	2	2
m	3	2	1	3	2	2	2	ap	2	2	2	3	3	1	2
n	2	1	2	2	3	1	1	aq	1	1	2	2	3	2	1
o	1	1	2	1	1	1	2	ar	2	2	1	2	2	1	2
p	2	2	2	2	2	2	1	as	1	2	2	1	3	2	1
q	1	2	1	2	1	2	1	at	2	3	2	1	2	2	2
r	2	3	2	2	2	2	2	au	2	2	2	2	2	1	1
s	2	2	1	2	1	1	2	av	1	2	1	2	3	2	3
t	2	2	1	1	2	2	1	aw	2	1	2	1	2	2	2
u	1	1	2	2	2	2	2	ax	2	2	2	3	2	1	2
v	2	2	1	2	3	1	2	ay	2	1	1	2	1	1	1
w	3	2	1	2	1	1	1	az	3	2	2	1	2	3	2
x	3	1	2	2	2	2	1	ba	1	1	1	3	1	1	1
y	2	1	2	1	3	2	1	bb	1	1	1	2	1	2	2
z	1	2	1	3	2	1	2	bc	1	1	1	3	2	1	1
aa	3	1	2	1	2	2	1	bd	1	1	1	1	1	1	1
ab	2	3	2	3	3	1	1	be	2	2	2	3	3	2	2
ac	3	2	3	3	2	2	2								

Using the questionnaire in Table 2, authors then starting to collecting the needed data in order to find the expected need of the new packaging. The result of this questionnaire will be used to determine which semantic words describe best for the new packaging, and it is shown in Table 3.

Based on the results of Table 2 and 3, we could found the total score for each and every Kansei Words used in the questionnaire as it is shown in Table 4.

Table 4. Kansei Questionnaire Total Score

Total	KW 1	KW 2	KW 3	KW 4	KW 5	KW 6	KW 7
Score	105	99	95	113	111	92	87

Kansei Questionnaire Interpretation

As it is stated in Table 1, there are 7 semantic words related to the re-packaging process. These 7 semantic words, are then spread into 57 respected respondent in order to found out the total score for each and every semantic words, as it shown in Table 2 to 4. From the previous result, it is imperative to do some interpretation towards the result for each and every semantic words, based on the final score, as it is will be used to redesign the current packaging.

1. **Informative:** Information plays an important role for a product package, as it is representing the company's profile and any ingredients contained in the food. Based on Table 4, it is known that the final score of this kansei words is 105, meaning that the current product does not having sufficient information, thus the respondents are expecting a more informative packaging for the redesigning.
2. **Attractive Look:** The following kansei words that will be interpreted is attractive look. Based on the final score obtained in Table 4 (99 points), it is shown that the look of the packaging plays an important role as it will attract more customer to be more aware with this product and could boost the sales of it. One of the main point on the attractive looks, is that the respondents are not keen to a hyperbolic picture or insignificant color usage.

3. **Safety Factor:** As stated by Cole (2003), one of packaging role for food is to protect from any unwanted substance, thus safety factor getting a high score of 95 points (shown in Table 4) does represent what the customer's really needed. The current design of the packaging neglecting the safety factor of the food, thus making the eggroll inside the box, getting soggy so easily, this is not what the customer's want, because eggroll supposed to be crunchy, not soggy.
4. **Elegant:** Elegance, in this research is interpreted as "not using unnecessary color and picture" on the packaging. Less picture and unnecessary color sometimes could elevate the elegance of the packaging, thus the packaging for this product should considering the elegant factor.
5. **Innovative:** The next interpreted Kansei Word is innovative. As the word implies, respondents seeks to get a more innovative packaging compared to the old one. The current packaging condition is outdated, judging from the inability to keep the food crunchy as it should be. This kansei words gets a 111 score, thus implies the importance of innovation for the new packaging design.
6. **Distinctive Characteristic:** As packaging could provide information to the product, thus it needs to have a distinctive characteristic in order to differentiate the product with another product or even brand. The total score obtained for this kansei word is 92, thus proving the importance of this feature to be fully embedded to the new packaging design.
7. **Practical:** The last kansei word that needs to be interpreted is practical. Practical could be interpreted as ease of use of the packaging, but still having and not losing any functionality for the packaging. As practicality increase for the packaging, the functionality decrease, thus reducing the main purpose of the packaging, so the newly package design should not neglecting both factor.

Designing Process

As the recapitulation of the kansei words score has been done and also being interpreted

for each and every kansei words, the next step of this research is creating the design for the new packaging. The current design of Egroll ubi ungu Sasha is shown in Figure 2.



Figure 2. Ubi Ungu Sasha Current Design

As it shown in Figure 2, the current packaging for the product is quite outdated, with several unnecessary and irrelevant color palette. The plastic wrap, wrapping the eggroll, also could not contain the crunchy texture of the eggroll once it has been opened, thus the essence of eating a crunchy eggroll is gone, and that could affect the customer's decision on buying the product. While recreating and redesigning the new packaging, it is recommended to have a benchmark for the product, Bonnici (2015) defining benchmarking as a comparison of product, services and process, while Erdil & Erbiyik (2019) stated that benchmarking provides a competitive advantages in business world. In this research, authors are using Monde Eggroll as the benchmark for the new packaging as it has the same types of product and it could contain the crunchiness of the eggroll



Figure 3. Monde Eggrolls Packaging

Based on the benchmarked product and the result from the Kansei questionnaire, it can be inferred the proposed design for the product, as they are shown in Figure 4 to Figure 6.



Figure 4. Newly Designed Packaging

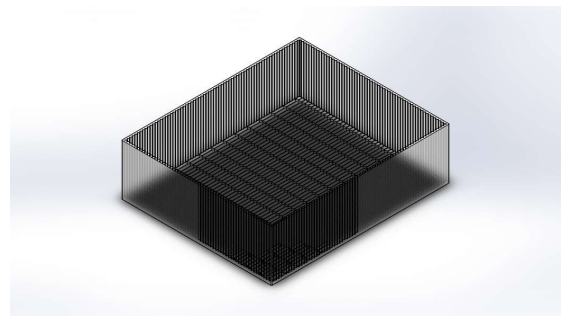


Figure 5. Eggroll's Container

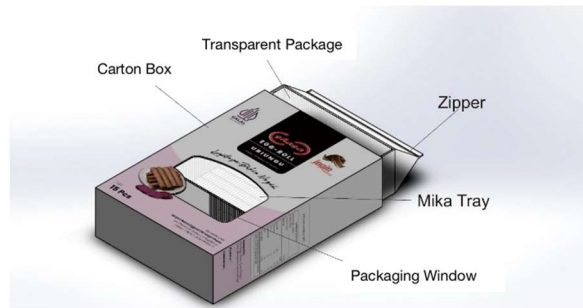


Figure 6. 3D Looks of the packaging

The newly designed packaging are basically and used in the questionnaire in Table 1, as it is described below.

1. **Informative:** Being informative in a way of design, plays an important role for the longevity of the product. Gunay (2021) stated that design is a visual language that describe the message, while Baldzi (2016) stated that design is a process of transferring, announcing and advertising to the audience. Based on that, the newly design package elevate the current product by adding several information

such as : nutritional adequacy, Griya Produksi's social media account, production's place, product's picture and a "window" in the front packaging in order to convince potential customer's that the product relevant with the picture attached.

2. **Attractive Look:** Apriyanti (2018) stated that having a good packaging could affect consumer's decision on buying the product, while Elina (2015), that packaging could play as a silent sales person for a product. Judging by that, the newly packaging elevating the word attractive and implemented on the new design. Compared to the old design, the new one is more appealing, starting from the usage of two-tone color white and pink to amplify the product image (sweet potato based food), a better font (clearer and precise), to an iconic product image on both sides of the packaging.
3. **Safety Factor:** The previous design of the packaging does not provide sufficient safety factor for the product. As the product has been opened, if the customers do not finish the eggroll, the food will be soggy by the time being. Another downside of the previous packaging, most likely the product will crumble if somehow it dropped. Both problem, should be taken as note for author and the producer, thus the newly package answering both of the problem. Starting from the resealable package that could retain the crunchiness of the food and protecting it from any unwanted substance to a better carton box filled with nitrogen flushing that could prevent the food to be crumbled if the box somehow fell.
4. **Elegant:** The current design of the packaging, using to many colors thus affecting customer's preference on the product. Based on the result in the kansei questionnaire, customers demand a better packaging in terms of quality and design. Elegance, is being translated by the author with the reduced number of color palette in the packaging and using less vibrant color in order to elevate the value of the product.
5. **Innovative:** Based on the Kansei Questionnaire results, Innovative plays an

important role on the redesigning process as it becomes the distinguishing feature compared to the old one. The innovative aspect on the new packaging is shown by adding some features such as a zipper to act as a resealable packaging, a plastic tray for the eggroll, and an aluminum standing flat box.





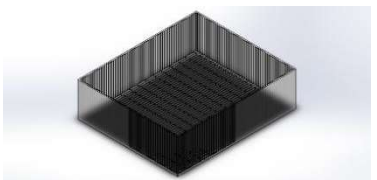
6. **Distinctive Characteristic:** The current packaging does not really giving any distinctive feature compares to any other snack, moreover an eggroll snack. Based on the Kansei Questionnaire result, authors then giving several improvement in order to elevate the distinctive feature on the packaging. The first one, is adding the logo of Eggroll Sasha on the package, thus it could be a major differentiating factor, another feature to improve the characteristic is using a better color palette namely white and purple. Both white and purple could act as information for the customers as those 2 colors are the colors of the sweet potato, the main ingredient of the eggroll. Last one, is giving a jargon for the product, that could increase the products image. The jargon in the new packaging read as " Enaknya bikin nagih!" which are roughly translated as it could make the customers addicted to eat more and more of the product.
7. **Practical:** Being practical, always gives and advantage for a product, thus, based on the Kansei Questionnaire practical become one of the main attribute that needs to be considered. The practical aspect on the newly design packaging is the resealable part of the food, mainly because customers do not need to finish the food after they open the package, but can finish it later on thanks to the zipper on the package.

Validating the Design

The following step on this research is validating the current design. Using the newly created design, authors then validating the current design back to the respondents of this research and also the owner of Sasha Eggroll. The way of validating the design is by comparing the current design with the new one, and finding

feedback of the respondent with an open ended questionnaire as it shown in Table 5 and 6.

Table 5. Validation Questionnaire

Packaging Comparison	
	
Current Design	Newly Design
Design Details	
Design Details	Explanation
	Detailed design of the right side of the packaging
	Detailed design of the left side of the packaging
	Detailed design of the tray
Please kindly write any opinion regarding the newly design	

Using the questionnaire in Table 5 and 6, the results of the validation process is shown in Figure 7. Based on Figure 7, it can be inferred that the current design is already fitted with what the customers want, shown by 95% of the respondent agreed with the proposed design. 5% of the respondent whom asking for a revision on the design, only saying that the "halal" logo used on the proposed design should be bigger to ensure the halal of the product.

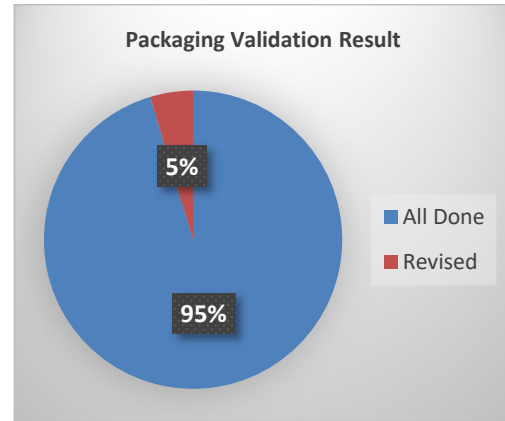


Figure 7. Validation Result

Aside from the respondents, the validation process also being held with the owner of the SME. The result of this process as it follows :

1. Using a carton box combined with a resealable packaging really elevate the product's brand because most of the competitor only using plastics as their package.
2. Adding a "window" in front of the packaging is a smart way to promote more of the product, by doing so, customers could check on what is inside the box.
3. Providing a complete information ranging from the ingredients to any social media held by the company, could impact the brand awareness.
4. Putting "Blangkon", a traditional javanese hat on the packaging also help promoting not only the brand and the eggroll but also Yogyakarta as the place of the current SME. It could also give a tourism boost for Yogyakarta.

Based on both result of the validation process, authors could inferred that the current design has already suitable to both customers and owners.

IV. CONCLUSION

Using Kansei Engineering on this research, could help the redesigning process of the packaging of Eggroll Sasha. Kansei Words mining process, found that there are 7 words that are related to packaging of an eggroll food, using the kansei words, the kansei questionnaire is made, which will be used to found out what are the need for repackaging process of the eggroll.

Based on the results, it is found that the proposed design have a lot of improvement such as : change of color palette, provide more information, adding logos and applying newly technology such as adding zipper for resealable package.

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