JOIN (Jurnal Online Informatika)
Volume 6 No. 2 | December 2021: 198-208
DOI: 10.15575/join.v6i2.786
p-ISSN: 2528-1682
e-ISSN: 2527-9165

Kansei Engineering in Designing Web-Based e-Commerce UMKM Product

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Article Info

Article history:

Received July 06, 2021
Revised September 01, 2021
Accepted November 09, 2021
Published December 26, 2021

Keywords:

e-Commerce
Human-Computer Interaction
Kansei Engineering
KEPack
User Interface
Human-Computer Interaction

ABSTRACT

Human-Computer Interaction (HCI) is a part of the development of a system in addition to the usability factor. Several methods were developed in HCI to produce a User Interface design that persuasively attracts the user's interest. One of these methods was Kansei Engineering which involved psychological factors and user emotions in the stage. The study focused on developing the e-commerce User Interface for UMKM products which based on how to maximize the service and quality of e-Commerce because so far the development of the web-based UMKM e-Commerce product user interface has not paid attention to psychological factors. The Research followed Kansei Engineering Type 1 (KEPack) with the stages: (1) Research Initiation, (2) Collecting Kansei Words (KW), (3) Translating KW into SD scale, (4) Collecting Specimens, (5) Classifying Item / Category Specimens, (6) Evaluating Questionnaire Participants' Data, (7) Multivariate Statistical Analysis, (8) Translating Statistical Data into Design Elements, (9) Creating Guideline Matrix Kansei Engineering. This study involved 40 participants, 20 Kansei Words, and ten specimens of UMKM e-Commerce products. The final result is the Kansei e-Commerce matrix guideline for web-based UMKM products, which had two main concepts, they were complexity consisting of formal, natural and simple emotion factors; and Uniqueness consisting of Comfortable, Soft, and Unique which consists of 8 main parts which divided into 65 design elements. The contribution of this Research in the informatics area is to provide recommendations for the appearance of web-based UMKM e-Commerce products based on the psychological factors of the user through the Kansei Engineering Stages.

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1. INTRODUCTION

Indonesia is a country that has the potential for economic growth that continues to increase amid of the global economic downturn due to the trade war between America and China [1]. One of the causes of the stability in the Indonesian economy is the increase in the community's economy, especially in micro, small and medium enterprises (UMKM). The government continues to strive to increase the growth of UMKM, it recorded that based on BPN data until 2013, there were 57,895,721 UMKM units with an average growth rate of 2.41% [2].

One of the government's efforts in increasing the growth rate of UMKM which has an impact on increasing people's productivity and international competitiveness, is the use of information technology [3]. So that currently, many UMKM have joined the marketplace or taken advantage of e-commerce services by creating online stores that are easily accessible to buyers or customers. E-Commerce is a solution to streamline service budgets to improve service quality and goods quality [4]. One of the focusing efforts is to maximize the service and quality of e-commerce is an appearance design is called the user interface that can meet user needs both in usability and ergonomic aspects, which will lead users to use e-commerce persuasively on an ongoing basis. Several methods are used in the development of user interfaces in an effort to meet user needs, One of them is Kansei Engineering.

Kansei, according to Japanese terminology, means sensitivity related to what people think, so Kansei Engineering (KE) is a technology that combines Kansei into engineering [5]. KE is a method that uses psychological factors or user emotional factors in designing a product in an industry, but in its development, KE can be implemented into computer technology, that is, user interface design. There are several specific techniques in KE, One of them is the Kansei Engineering Type 1 or the KEPack. Technically, KEPack has several stages [6], which are defined by: 1) Determining Strategy, 2) Determining Kansei Word, 3) Arranging Semantic Differential Scale Structure, 4) Classifying Item / Category, 5) Data Evaluating, 6) Multivariate Analysis, 7) Interpreting Multivariate Analysis Result, 8) Interpreting Data to the UI Designer and 9) Designing Mockup or Prototyping

The previous study has been carried out the development of user interfaces for modeling the concept of E-Learning by the needs of vocational schools. The Research used the KEPack method involving 30 participants and 15 Kansei Words [7]. While in other studies, KE is implemented in designing a mobile portal of education and children's health information user interface, which involved ten specimens, 26 Kansei Words, and resulting three concepts of Kansei named *Coziness; Easiness;* and *Creative* [8]. This study focuses on developing the e-commerce User Interface for UMKM products that involve psychological factors of e-commerce users of UMKM products translated into user interface designs. The Research uses the KEPack method that uses multivariate statistical analysis, which is defined by Principal Component Analysis, Factor Analysis, and Partial Least Square.

The purpose of this Research are to design a Guideline Matrix Kansei of a web-based UMKM product uses the Kansei Engineering stage based on users' perspective, that is user psychological factor. Meanwhile, the scopes of this research use Kansei Engineering Type 1 (KEPack) method, 40 participants, 20 Kansei Words, and ten specimens of UMKM product e-Commerce.

2. METHOD

As explained in the previous point that this Research uses the stages in Kansei Engineering Type 1 (KEPack), the research method can be seen in Figure 1 below:

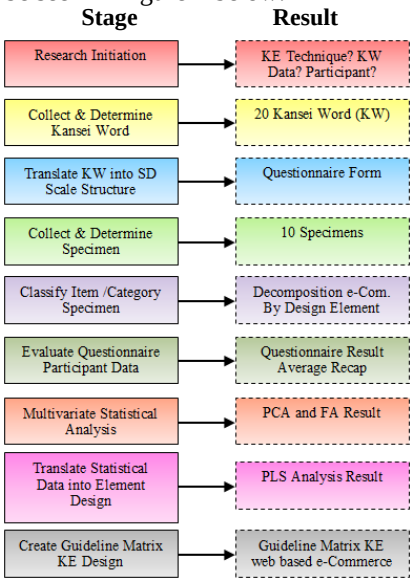


Figure 1. Research Method

The following is the explanation of the Research methods as depicted in Figure 1:

2.1. Research Initiation

The initial stages in this process, where the materials and objects of Research are determined and defining what Kansei technique is involved. In this Research, the thing that is studied is the e-Commerce of UMKM products which involves:

1. 20 Kansei Words that represent characteristics of the ten specimens e-Commerce UMKM product consists of adjectives or nouns
2. 40 participants, which consists of the merchant of UMKM, IT practitioners, and Informatics Management Department Students from 6th semester and above
3. Ten specimens web-based e-Commerce UMKM product with different characteristic
4. Designing method using Kansei Engineering Type 1 (KEPack).

p-ISSN: 2528-1682
e-ISSN: 2527-9165

2.2. Collecting and Determining Kansei Word

In this stage, Kansei words are generated through several references, including web designers, journals, books, and UMKM sellers. The steps are carried out by showing the specimen to the web designers and UMKM sellers then They provide a one-word description in the form of an adjective or noun that represents the characteristics of the specimen. Then these characteristics are used as a Kansei word. The Kansei words involved in this study were 20 words, which including adjectives and nouns such as interesting, colorful, attractive.

2.3. Translating Kansei Word into SD Scale Structure

The next step after determining the Kansei words is translating the Kansei words into the SD scale structure. The pattern of SD scale using five scales from range 1 to 5 with the addition of the word "NOT" at the scale one that means the lowest score and without "NOT" for the scale five that means the highest score. For the sample in **"Attractive Appearance"** Kansei Word, it is added "NOT" for showing the lowest score and become **"Not Attractive Appearance"**, meanwhile without "NOT" to show the highest score.

2.4. Collecting and Determining Specimens of UMKM Product e-Commerce

Several specimenss of UMKM product e-Commerce were selected to produce as many as ten valid specimens with different characteristics. These are "usahadesa.com", "blanja.com", "goukm.id", "craftline", "ukmindonesia.id", "mitraukm.net", "qlapa", "KuKa", "webemall" and "kokoadi". The selection of UMKM product e-Commerce specimens involves the programmer and the UMKM product e-Commerce merchant.

2.5. Classifying the Item of UMKM Product e-Commerce

The next stage is the classification of design elements from ten specimens that have been determined in the previous stage. The classification is divided into eight main parts of the layout of the web-based UMKM e-commerce product, which consists of Header; footer; right menu; left menu; top menu; main menu; body; and sound. The eight design elements are further divided into several sub-categories; for example, the header element consists of the Background color, link-style menu, Existence font type menu, background picture, font size menu, font color menu, font size. After making sub-categories, some specific choices are made based on those sub-categories that represent all the characteristics of the specimen. For example, in the sub-category, **Background color** consists of gray, green, black, blue. From this data, checklists are then made to make it easier to categorize design elements.

2.6. Evaluating Questionnaire Data from Participant

In this stage, 40 participants will be involved, which consist of merchants of UMKM, IT practitioners, and Informatics Management Department Students. Technically the 10 specimens were given to the participants, and they operated the website, then wrote down what they felt about the Kansei Word Questionnaire, which has 20 of Kansei Word. After evaluating data from the participants, then the result of participants' questionnaires is recapitulated to be involved in the next stage.

2.7. Multivariate Statistical Analysis

The data recapitulation from the previous stage in evaluating data from participants' questionnaires then is used for further analysis within the multivariate statistical analysis. There are four methods to be involved: Principal Component Analysis, Factor Analysis, Partial Least Square, and Cluster Analysis. The description is shown in table 1 below:

Table 1. Multivariate Statistical Analysis

No	Method	Purpose	Result
1	*Principal Component Analysis (PCA)*	Identifying the relationship between Kansei Word (feeling and motion) to the specimen	Concept of Feeling and Emotion
2	*Factor Analysis (FA)*	Identifying the emotional and feeling factors that affect the specimen	
3	*Partial Least Square (PLS)*	Translating emotion and feeling into design elements (which will be done in point 2.8)	Design requirements for e-Commerce development
4	*Cluster Analysis*	Grouping specimens based on feeling factors that have similarities (which will be done in point 2.8)	

2.8. Translating statistical data into a design element

This stage is still related to the previous stage. Partial Least Square (PLS) and Cluster Analysis (CA) statistical analysis calculations are used to interpret statistical data into design elements. PLS involves variable

of element design and specimen, then calculated resulting in the coefficient score. Meanwhile, Cluster Analysis uses similarity approaching that involves a hierarchical agglomerative method.

2.9. Creating Guideline Matrix of Kansei Engineering UMKM Product e-Commerce

The stages of creating guidelines matrix based on the results of the multivariate statistical analysis in the previous stage. This matrix (hereinafter referred to as the Design Guidelines Matrix) contains the criteria for the proposed appearance of "UMKM" e-Commerce products. The data is taken from PLS Analysis that ranked based on element design. Then those are converted into a guideline matrix based on the concept that have stated in Factor Analysis.

3. RESULTS AND DISCUSSION

As described in the research method, this Research uses 20 Kansei Words, as shown in Table 2 below:

Table 2. Kansei Word (KW) used in the Research

No	Kansei Word	No	Kansei Word
1	Luxury	11	Bold
2	Sweet	12	Fresh
3	Formal	13	Futuristic
4	Warm	14	Harmony
5	Soft	15	Awesome
6	Feminine	16	Comfort
7	Simple	17	Informative
8	Dynamic	18	Childish
9	Unique	19	Masculin
10	Sharp	20	Natural

Furthermore, the 20 KW is translated into a questionnaire form, in the form of filling in a differential scale with a scale of 1 to 5. Naming the weights uses positive and negative words; for example for KW “Unique”, the naming of the weights for the lowest value is 1 (NOT unique) and the highest value is 5 (unique). In detail, the questionnaire form is contained in table 3 below:

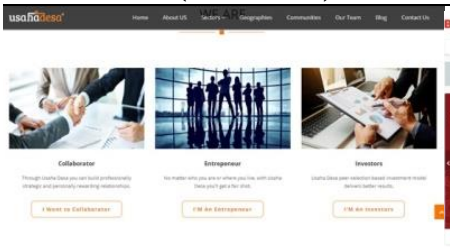
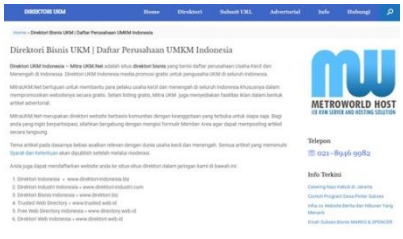
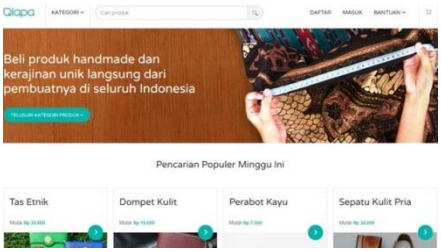
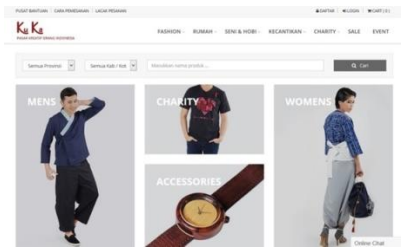
Table 3. Kansei Word Questionnaire Form

No	Kansei Word	Score					Kansei Word
		5	4	3	2	1	
1	Luxury (give the impression of glamor, lux, high class)						**Not** Luxury
2	Sweet (give the impression cute, fun)						**Not** Sweet
3	Formal (give the impression mature, on the rule)						**Not** Formal
4	Warm (give the impression acceptable, open)						**Not** Warm
5	Soft (give the impression relax, adaptable)						**Not** Soft
6	Feminine (give the impression pinkish, girly, sweet)						**Not** Feminine
7	Simple (give the impression flat, symmetrical)						**Not** Simple
8	Dynamic (give the impression futuristic, fast, adaptable)						**Not** Dynamic
9	Unique (give the impression anti-mainstream, unusual)						**Not** Unique
10	Sharp (give the impression strong, clear, hard)						**Not** Shart
11	Bold (give the impression tasty, delicious, warm)						**Not** Bold
12	Fresh (give the impression bluish, refreshing, watery)						**Not** Fresh
13	Futuristic (give the impression futuristic, sophisticated, modern)						**Not** Futuristic
14	Harmony (give the impression of calm, life in peace)						**Not** Harmony
15	Awesome (give the impression incredible, intelligent, remarkable)						**Not** Awesome
16	Comfort (give the impression cozy, pleasant, pleasurable)						**Not** Comfort
17	Informative (give the impression easy to use, clear explanation)						**Not** Informative
18	Childish (give the impression colorful, joyful, friendly)						**Not** Childish
19	Masculin (give the impression manly, blackish, strong)						**Not** Masculin
20	Natural (give the impression of the natural, greenish, balance of life)						**Not** Natural

p-ISSN: 2528-1682
e-ISSN: 2527-9165

The collecting of specimens is taken from the internet. There are several specimens, then validated by determining specimens which have a different characteristic between these specimens. In this stage, results in ten specimens of e-Commerce products of UMKM that have a different characters, as shown in Table 4 below:

Table 4. Specimen of UMKM Product e-Commerce

ID = 1 (usahadesa.com)	ID = 2 (blanja.com)
	
ID = 4 (goukm.id)	**ID = 3 (craftline)**
	
ID = 5 (ukmindonesia.id)	**ID = 6 (mitraukm.net)**
	
ID = 7 (qlapa)	**ID = 8 (Kuka)**
	
ID = 9 (webemall)	**ID = 10 (kokokadi)**
	

The next step is to classify the design elements into the most detailed part of the specimen to analyze easier. Classification is divided into eight main groups, They are header, footer, right menu, left menu, top menu, main menu, sound and, body. Then reclassified in more detail; for example, the body consists of Background Style, Background Color, Font Style, Font Color, and others. Table 5 shows the breakdown of the design element in detail:

Table 5. Participant Questionnaire Recapitulation

No	Part	Design Element
1	Header	Background color, link-style menu, Existence font type menu, background picture, font size menu, font color menu, font size
2	Footer	link style, position, background color, font type, Existence, font category, font size, font color
3	Right Menu	link style, position, background color, font type, Existence, font category, font size, font color
4	Left Menu	link style, position, background color, font type, Existence, font category, font size, font color
5	Top Menu	link style, position, background color, font type, Existence, font category, font size, font color
6	Main menu	Background style, background color, background picture, advertising position, font size, font category, text alignment, shape
7	Body	Background style, background color, font style, font color, font effect, font size, border color, border effect
8	Sound	Effect click, back sound appearance, effect sound touching, error, warning/exclamation, reward

After being breakdown into details, then classified into a design elements; for sample, based on ten specimens, **background style** has two types, they are **solid** and **picture**. Next, the data is entered into a checklist. The following Table 6 contain a checklist of design element classifications:

Tabel 6. Design Element Classification

ID	Background Style		Background Color				Font Style			..
	Solid	Pic	Gray	Blue	...	Black	Sans	Fantasy	S.Serif	
1	✓		✓				✓			
2	✓						✓			
3	✓						✓			
4	✓							✓		
5	✓		✓				✓			
6	✓			✓					✓	
7	✓		✓					✓		
8	✓			✓			✓			
9		✓				✓	✓			
10	✓								✓	

After classifying design elements, the next step is multivariate statistical analysis, to determine the relationship between Kansei Word and the design concept [9], making design guidelines for UMKM Product e-Commerce design.

3.1. Principal Component Analysis (PCA)

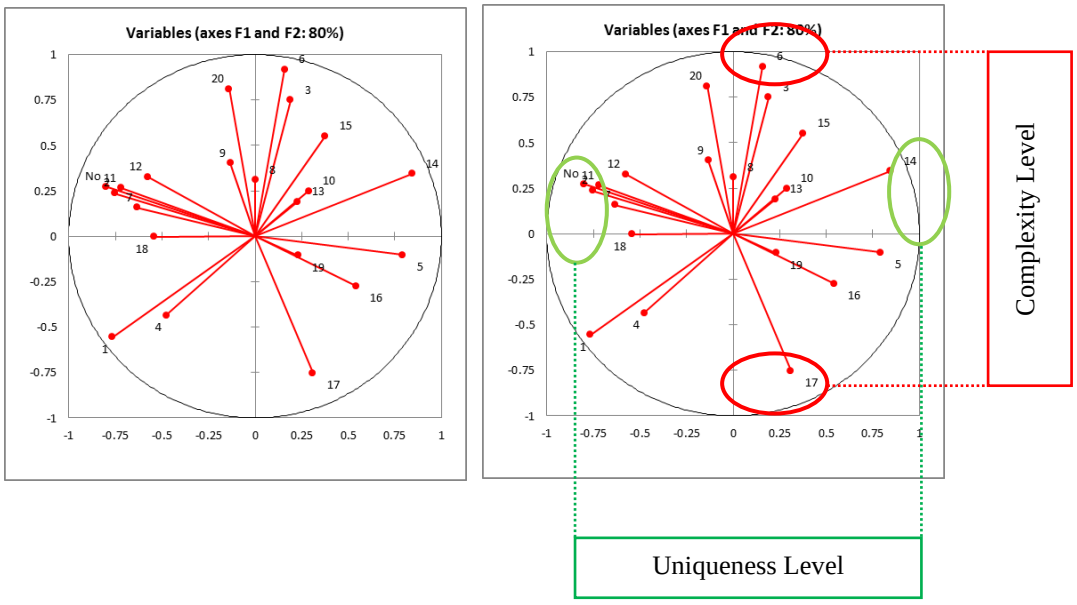
Prior to PCA analysis, the distributed questionnaire data that gave to the participant was then averaged for analysis; PCA needs to be done for identifying the relationship between Kansei Word (feeling and emotion) to the specimens. Table 7 shows the results of the recapitulation of participant questionnaires; row numbers indicate the order of 20 Kansei Words (see table 2), and column numbers indicate the order of specimens (see table 4). The participant questionnaire recapitulation, as shown in table 7 then will be involved in PCA Analysis:

Table 7. Participant Questionnaire Recapitulation

No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	...	20
1	3.39	2.03	3.17	3.23	3.86	2.01	2.36	2.57	2.24	3.89	3.14	2.90	4.90	2.79	3.04	3.40	4.82		2.50
2	3.01	2.00	3.15	2.17	3.10	2.24	3.11	3.27	2.19	3.13	2.15	2.10	3.10	3.65	1.97	4.94	4.80		3.50
3	3.11	2.19	3.89	2.76	3.47	3.19	3.21	3.68	3.58	2.80	2.96	3.04	3.45	3.26	3.51	3.75	4.97		3.55
4	3.15	3.43	3.80	3.17	2.10	3.18	4.01	4.00	4.90	3.22	3.41	3.20	4.01	2.80	3.37	4.00	2.70		4.95
5	2.30	2.15	3.90	2.17	3.60	4.88	3.50	2.15	2.50	3.70	3.75	4.21	4.10	3.39	4.20	3.80	2.10		4.92
6	2.15	2.30	4.80	2.25	3.75	4.90	2.80	3.80	3.85	3.80	3.10	2.70	3.80	4.10	3.10	2.80	3.20		3.90
7	3.80	2.00	3.19	2.17	2.80	3.80	2.90	4.02	4.90	3.30	3.92	3.30	3.50	2.76	2.19	2.30	3.22		4.80
8	4.01	3.10	3.90	3.80	3.00	3.90	3.90	3.88	3.90	3.79	2.40	2.75	2.80	3.17	3.43	2.00	4.90		3.86
9	4.88	2.34	3.19	3.98	3.00	2.38	3.96	2.20	3.21	3.20	4.04	3.90	2.90	2.17	2.15	3.10	3.80		3.06
10	4.00	4.90	3.80	2.80	2.20	3.17	3.65	3.17	2.17	3.18	4.86	3.96	3.90	2.25	2.30	2.34	2.90		3.90

p-ISSN: 2528-1682
e-ISSN: 2527-9165

PCA in this study is used to determine the relationship of emotional factors or Kansei Word to specimens [10], [11]. The results of the PCA are in the form of graphs in Figure 2.a below:



(a) (b)

Figure 2.a. PCA representation result; 2.b. Interpretation of the concept of Emotion or Kansei Word on specimens

In Figure 2.b above, there are X-axis and Y-axis, on Y-axis there are opposite Kansei words / emotional factors, which is number 6 (top) and number 17 (bottom). Number 6 is “simple”, and number 17 is “informative”, so for naming the axis, it can be concluded that this axis subjectively is called "complexity level", where the higher you go, the simpler you get and the lower you get informative as for the opposite axis X-axis is on the left and right. On the left is number 11, which is a “feminine” emotional factor and on the right is number 14, which is a “unique” factor. So subjectively, this X-axis is called the "Uniqueness Level" axis, where the more to the left, the more feminine, and the more to the right, the more unique. The distribution of specimens based on the emotion factor can be seen in Figure 3:

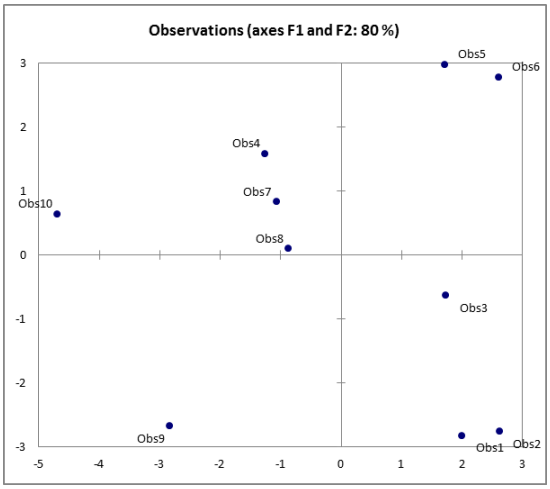


Figure 3. Specimen Distribution based on Emotion Factor

In Figure 3 above, when observed on the Y-axis or axis of complexity level (simple-informative), the top value which means the simpler there is specimen 5 (ukmindonesia.id) and specimen 6 (mitraukm.net) In contrast, the lowest value which means informative there are specimens 1 (usahadesa.com) and specimen 2 (blanja.com). On the X-axis or uniqueness level axis, the leftmost value contains specimen 10 (kokoadi), while on the right side, there is no significant distribution.

3.2. Factor Analysis (FA

In this study, Factor Analysis (FA) is detailed and strengthens the results of PCA analysis [12] by providing recommendations for the highest Kansei Word value, which is then referred to as **The emotion factor** [13], so that not all emotional factors are involved in user interface design. FA using varimax rotation for getting the accuracy result and then resulting factor 1 with percentage contribution 62.38% and factor 2 with percentage 20.44%. After that, the result of factor 1 and factor 2 was analyzed with Emotion and ranked the resulting recommended emotion factor. The recommended emotional factor is based on FA with a value > 0.7. In Factor 1 resulting emotion factors, those are Formal, Natural and Simple which then determined as complexity level, and Factor 2 resulting emotion factor comfort, soft, and unique and determined as Uniqueness Level. Here is table 8 that shows emotion factor recommendation based on FA:

Table 8. Emotion Factor Recommendation based on FA

No	Concept	Emotion Factor	Score
1	Complexity Level (Based on Factor 1)	Formal	0.71
		Natural	0.80
		Simple	0.92
2	Uniqueness Level	Comfort	0.75
		Soft	0.79
		Unique	0.84

3.3. Partial Least Square (PLS) Analysis

PLS analysis is used to translate emotional factors into design elements. There are 3 data used [14], there are:

1. The dependent variable (y) is the result of the recapitulation of the emotional factors of the participants;
2. The specimen (s) of 10 e-commerce websites for UMKM products;
3. The independent variable (x) is the design element.

Prior to the PLS analysis process, the classification of 65 design elements (see table 5) was changed to a dummy variable by assigning a value of 1 and 0, as shown in Table 9 below:

Table 9. Design Element Dummy Variable

ID	BGStyleSolid	BGStylePic	BGCGray	BGCBlue	BGCWhite	BGCGreen	BGCPinkish	BGCBlack	…
1	1	0	1	0	0	0	0	0	…
2	1	0	0	0	0	0	1	0	…
3	1	1	0	0	0	1	0	0	…
4	0	1	1	1	0	0	0	0	…
5	0	0	0	0	1	0	1	1	…
6	1	1	0	0	1	0	0	0	…
7	0	0	0	0	1	0	1	0	…
8	0	1	0	1	0	0	0	0	…
9	0	0	0	1	0	0	0	1	…
10	1	0	0	0	0	0	1	0	…

The dummy variable (variable x) and the data recapitulation of the participant emotion factor (variable y) were processed by PLS analysis, resulting in value data as shown in table 10:

Tabel 10. PLS Analysis Result

Unique		Dynamic		…
Variable	**Coefficient**	**Variable**	**Coefficient**	
Body BGCol DarkBlue	-0.068	Body BGCol DarkBlue	-0.068	…
Body BGCol Blue	0.034	Body BGCol Blue	0.033	…
Body BGCol White	-0.019	Body BGCol White	-0.018	…
Body BGCol Gray	0.005	Body BGCol Gray	0.020	…
Body BGCol Green	0.050	Body BGCol Green	0.034	…
Body BGCol Maroon	0.006	Body BGCol Maroon	-0.002	…
…	…	…	…	…

p-ISSN: 2528-1682
e-ISSN: 2527-9165

The next stage is determining the range value for each category. Range Value of category is done to find out how much impact the variables (design elements) have on the concept of Emotion. The steps taken in determining the range value of the category are as follows:

1. Determine each variable to the category, for sample in table 11 there are BodyBGColGray, BodyBGColWhite, BodyBGColBlue, BodyBGCol Green, and BodyBGColMaroon are categorized in **BodyBGColor** Category
2. Determine the maximum variable coefficient value in a category. In table 11, the maximum coefficient of the BodyBGColor category is BodyBGColGreen, with a value of 0.050
3. Determine the minimum variable coefficient value in a category. In table 11, the minimum coefficient of The BodyBGColor category is BodyBGColDarkBlue with a value of -0.068
4. Find the difference between the maximum and minimum coefficient with formulation Coefficient(Max)-Coefficient(Min). That means BodyBGColGreen(0.050) – BodyBGColDarkBlue (-0.068) resulted **0.118**
5. Repeat step number 3 for all categories below
6. After all range values is determined, find the standard range value by calculating the average of the results of category range value. As we see in table 11, the average standard range value of the category is **0.054**
7. Then The value of the highest category range has a strong influence on the concept of Emotion. At the same time the category range that has a value below the benchmark range does not effect on the concept of Emotion.

Table 11. Range Category Result based on The Emotion

Unique			Range	Dynamic			Range	
Category	**Variable**	**Coefficient**	**0.054**	**Category**	**Variable**	**Coefficient**	**0.056**	...
Body BGColor	**Body BGCol DarkBlue**	**-0.068**	0.118	Body BGColor	Body BGCol DarkBlue	-0.068	0.102	...
	Body BGCol Blue	0.034			Body BGCol Blue	0.033		...
	Body BGCol White	-0.019			Body BGCol White	-0.018		...
	Body BGCol Gray	0.005			Body BGCol Gray	0.020		...
	Body BGCol Green	**0.050**			Body BGCol Green	0.034		...
	Body BGCol Maroon	0.006			Body BGCol Maroon	-0.002		...
BodyBGStyle	BG Style Solid	0.026	0.094	Body BGStyle	BG Style Solid	0.027	0.095	...
	BG Style Picture	-0.068			BG Style Picture	-0.068		...
Body Font	Fbod Sans Serif	0.000	0.000	Body Font	Fbod Sans Serif	0.000	0.000	...
Body Font Color	CF Bod White	0.050	0.143	Body Font Color	CF Bod White	0.034	0.144	...
..	...	...	...	...	...	...	...	...

After obtaining the range value of each category and the standard range of the entire category, the value of the category range that has a value higher or lower than the average range is obtained, as in the "Unique" column in table 12, where **BodyBGColor** category has a value of 0.118 which is meaning that it is higher than the standard value range of 0.054 and has a strong impact in the design of the "Unique" emotion concept design, in contrast the Body Font has a lower value than the standard range of 0.000 which means it does not effect on the design of the "Unique" emotion concept design. Table 12 shows the results of the range of values in each category:

Table 12. Range Value for each Category

Unique Category	Range 0.054	Dynamic Category	Range 0.056	...
Body BGColor	0.118	Body BGColor	0.102	...
Body BGStyle	0.094	Body BGStyle	0.095	...
Body Font	0.000	Body Font	0.000	...
Body Font Color	0.143	Body Font Color	0.144	...
Main Menu BGColor	0.092	Main Menu BGColor	0.093	...
Head	0.000	Head	0.000	...

Unique Category	Range 0.054	Dynamic Category	Range 0.056	...
Head Picture	0.009	Head Picture	0.009	...
Head Position	0.125	Head Position	0.101	...
Head Font Size	0.034	Head Font Size	0.031	...
Head Font	0.054	Head Font	0.051	...
Top Menu	0.072	Top Menu	0.088	...
Top Menu Style	0.090	Top Menu Style	0.111	...
...	...	...	...	...

To make it easier in interpreting table 12, the categories are arranged in order of largest to smallest as in table 13, categories that have values above or equal to the standard range are variables that have an impact on the layout design of the Emotion concept. As in the "Unique" column, the variables that have an impact are TopMenuPosition to HeadFont. While the RightMenu Font to the last variable below it has a lower value than the standard range (as seen in gray color table 13), meaning that these variables have no impact on the design of the emotion concept "Unique".

Table 13. PLS Analysis sorted from highest to lowest value

Unique Category	Range 0,054	Dynamic Category	Range 0,056	...
Top Menu Position	0,160	Main Menu BGColor	0,141	···
Body BGColor	0,154	Body BGColor	0,137	···
Head Font	0,147	Left Menu Font Color	0,123	···
Right Menu Font Color	0,126	Top Menu Style	0,102	···
Left Menu Font Color	0,123	Footer Font Color	0,102	···
Top Menu BGColor	0,121	Body BGStyle	0,092	···
Head Font Size	0,115	Right Menu Font Color	0,089	···
Footer Font Color	0,094	Body Font Color	0,088	···
Body Font Color	0,090	Left Menu Font	0,084	···
Top Menu Style	0,081	Top Menu BGColor	0,083	···
Left Menu Picture	0,062	Right Menu PicSize	0,082	···
Footer PicSize	0.063	Left Menu Font	0.064	···
Top Menu BGColor	0.057	Head Font	0.051	···
Head Font	0.054	Footer Picture	0.051	···
Right Menu Font	0.053	Footer PicSize	0.051	···
...	...	...	...	...

Furthermore, the variables which has been sorted from the highest to the lowest value, then the highest value is determined as an accepted variable to be included into the recommendation of Guideline Matrix for the e-Commerce user interface design for UMKM products based on the concepts and emotional factors that have been determined previously (see table 8), as shown in table 14 below :

Table 14. User Interface Guideline Matrix UMKM Product e-Commerce

No	Concept	Faktor *Emotion*	Body			Menu Utama	…
			Background Style	...	Font Color	Background Style	...
1	Complexity	**Formal**	Solid	…	Dark	Gradation	…
		Natural	Solid	…	Brown	Solid	…
		Simple	Solid	…	Black	Solid	…
		Comfort	Solid	…	Cyan	Picture	…
2	Uniqueness	**Soft**	Picture	…	Black	Solid	…
		Unique	Solid	…	Brown	Gradation	…

4. CONCLUSION

This study implements the stages in Kansei Engineering Type 1 to design recommendations for e-Commerce user interfaces for UMKM products, which use user psychological factors and emotion that are

translated into user interface recommendations. The stages resulting two main concepts were obtained based on multivariate analysis (Principal Component Analysis and Factor Analysis), which determined as **Complexity Concept** consists of formal, natural and simple emotion factors; and **Uniqueness** consists of Comfortable, Soft and Unique. Then, distributed into the recommendation matrix for the e-Commerce UMKM product user interface, which consists of 8 main parts, namely header, footer, right menu, left menu, top menu, main menu, sound, and body divided into 65 element design. The 65 of element design then become the best practice and guideline for designing Web-Based UMKM e-Commerce Product design.

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