

Evaluating Users' Emotion in Web-Based Geographic Information System

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ABSTRACT

GIS is one of the tools ease the user for get information based on map images that have been processed. In addition to technical aspects, GIS needs to involve psychological factors and user emotions so as to provide user comfortable. Kansei Engineering is an engineering method that involves psychological factors and user emotions. This research is an initial analysis to evaluate the emotional aspects of GIS users that have high significance and will then be involved in the Kansei Engineering stage in making recommendations for GIS User Interface. The Initial Study involved 80 Participants with a distribution of 40 female and 40 male, 50 Emotions / Kansei Words, 7 Specimens. The method stages are (1) Preparation of Instruments consisting of specimens, Kansei Word and Evaluation Subjects, (2) Evaluation, (3) Analysis using Cronbach's Alpha, Coefficient Correlation Analysis (CCA) and Factor Analysis (FA). The study result 15 emotions / Kansei Words that have significant based on CCA and FA comparison result for GIS Web UI domain that consist of "Accurate", "Brilliant", "Sharp", "Wonderful", "Dynamic", "Beautiful", "Wide", "Well-Arranged", "Cool", "Authentic", "Elegant", "Formal", "Masculine", "Easy-to-Measure" and "Bright".

Keywords: *Kansei, Emotion, Web-Based-GIS*

1. INTRODUCTION

Geographic Information System (GIS) is a tool to represent certain conditions so that the public can know the phenomena that occur, for example the distribution of forest fire data, population demographics, the distribution of Covid-19 data, and so on [1]. Currently, various GIS variations are presented, both in the form of dynamic and static mappings that are match to the needs of the user. Generally, the information presented in a GIS is representative for the user, because it contains data and information related to the presented domain [2]. Mostly, in its development it has not concern to ergonomic aspects and user aspect from psychological and emotional factors.

Kansei Engineering (KE) is one of the methods used in product development by involving psychological factors and user emotions [3]. KE can be implemented in GIS development, especially the User Interface aspect, how to produce a display that meets ergonomic aspects by involving psychological factors

and user emotions [4]. The thing that must be considered in the KE stage is the quality of the emotions or KW involved which have a significant influence value so that they represent psychological or emotional factors from the user [5] [6]

This study a pilot analysis that aims to assess the quality of KW or emotion factor which has a significant value and see the potential of users and participants who have sensitivity to KW. The KW involved in the study amounted to 50 KW that were taken from various references, including: Personal Perception, GIS user perception, programmer perception, general user perception. While the participants involved were 80 participants with the criteria of 40 male participants and 40 female participants, and using 7 web-based GIS specimens

2. RESEARCH METHOD

The pilot analysis purposes is finding significant emotion for GIS Web UI Domain and valid kansei evaluation subject. Figure 1 shows the phases of the

feelings, emotions and psychology. If it does not meet these elements, then an **exclude** statement is given, and if it is inaccurate but is a word that describes the user's emotions, then a **rephrase** statement is given on the.

The initial KW that has been identified then

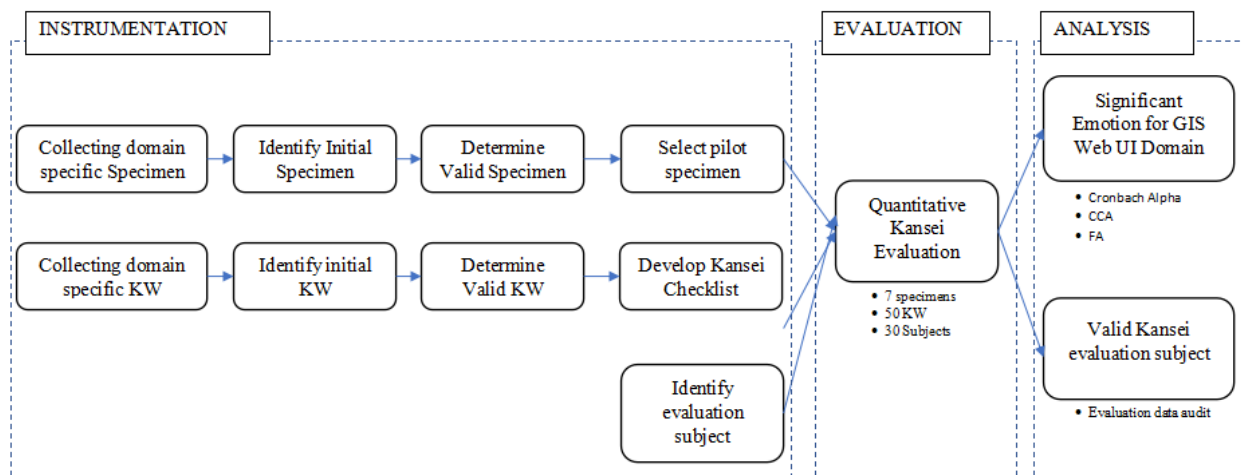


Figure 1. Research Method

study:

In this study there are 3 steps as shown in Figure 1, they are:

2.1. Prepare the Instrumentation

There are 3 aspects to focus on in preparing the instrumentation, namely (1) Selecting pilot specimen, (2) Develop Kansei Checklist, (3) Identify Evaluation Subject. In selecting pilot specimens, it is started by collecting domain specific specimens. The collection of specimens was obtained from the GIS website with various variations. The collected specimen data is then identified by involving various aspects related to UI such as background, color characteristic, theme, font characteristic and others. Furthermore, determining the valid specimen where the specimen has different characteristics between specimens. In this pilot analysis there are 7 specimens selected to be involved in Kansei Evaluation.

Meanwhile in developing the Kansei Checklist started with collecting domain specific Kansei Word (KW) which is a representation of the user's emotional factors, starting with the stage of collecting KW taken from several sources, including the perceptions of researchers, GIS users, general users and web designers. KW retrieval is done by giving all specimens to the user, then the user gives a statement in the form of what feelings feel after seeing the interface of the specimen. Expressions that are shown verbally are then identified to see KW which can provide elements of the user's

determined to be involved in pilot analysis. There are 50 KW(s) that will be included in Kansei Checklist. In Developing Kansei Checklist using Semantic Differential Scale (SD Scale) with 5 scale range. The lowest score is 1, and the highest score is 5. For the questionnaire instrument with the lowest score / number 1, the word "Not" is added, while the highest value / number 5 is added the word "Very".

In the evaluation stage, instruments were distributed to participants. The instrument consisted of 7 specimens and 50 KW and 80 participants. The technique of filling in the instrument is done online via google form. The user is given an access link to the filling instrument, then the user fills in the name and KW questionnaire based on the specimen image contained in the instrument. Users can view specimen images in the google form, also equipped with detailed image links.

2.2. Analysis

The results of filling out the questionnaire were then averaged and data analysis was performed to see Significant Emotion for GIS Web UI Domain and Valid Kansei evaluation subject. The analysis was carried out using Cronbach's Alpha, Coefficient Correlation Analysis (CCA) and Factor Analysis (FA). From the results of this analysis, it can be seen which KW / emotion has a high significance. Meanwhile, to determine the Valid Kansei evaluation subject, it is carried out by evaluating audit data

3. RESULT

3.1. Instrumentation

3.1.1. Specimen

Specimen determination is done by referencing several web-based mappings. Due to the limited number of websites related to web-based regional asset mapping, specimens refer to websites that are integrated into the Geographic Information System. There are 26 prospective specimens to be sorted where unique specimens are sought in terms of coloring, menus, components, map characteristics and other aspects related to the User Interface. Table 1 shows 26 specimen collection results:

Table 1. Collecting Specimens Result

No	Specimen	No	Specimen
1	Peta Sebaran Cov-19 Indonesia	14	USGS. National Water Information System: Mapper
2	Covid-19 Data Explorer: Global Humanitarian Operations	15	Sabah Tourism - Sipadan Island
3	WHO Coronavirus (Covid-19) Dashboard	16	US-EPA. National Aquatic Resource Surveys
4	Open Street Map	17	Water Risk Atlas
5	Peta Online ATR / BPN (Badan Pertanahan Nasional)	18	Atlas Online
6	Portal Peta Indonesia	19	Border-to-border GIS Mapping for Water Sanitation and Health Project
7	Pemetaan Kementerian ESDM Indonesia	20	Florida Department of Environmental Protection
8	Land Portal	21	TNB's Asset (Power Plant, Transmission Networks, Distribution Networks, Fiber Optics Cable and Customers' meter) to be Pinned Down on Digital Map
9	Science for a Changing World	22	Malaysia Covid-19 Dashboard
10	Waze - Navigation & Life Traffic	23	Peta Hospital Rujukan Covid-19, Pusat Kuarantin dan Kemudahan Awam
11	MAGIC Website (UK)	24	GeoBencana Pejabat Setuusaha Kerajaan Negeri Pulau Pinang
12	Sea Grant University of Winconsin	25	NT Atlas and Spatial Data Directory
13	Malaysia Covid-19 Dashboard	26	Esri Map Gallery

From the 26 collecting specimen, then identified initial based on general User Interface aspect, such as background theme, color theme, font style, font color, the characteristic of top menu, left menu, body, right

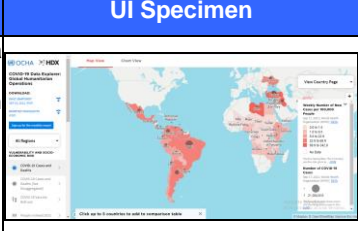
menu and other. Table 2 shows the result of identifying initial specimen:

Table 2. Identifying Specimens Result

No	Specimen	Result
1	Peta Sebaran Cov-19 Indonesia	OK
2	Covid-19 Data Explorer: Global Humanitarian Operations	OK
3	WHO Coronavirus (Covid-19) Dashboard	OK
4	Open Street Map	OK
5	Peta Online ATR / BPN (Badan Pertanahan Nasional)	OK
6	Portal Peta Indonesia	OK
7	Pemetaan Kementerian ESDM Indonesia	OK
8	Land Portal	OK
9	Science for a Changing World	Not OK
10	Waze - Navigation & Life Traffic	Not OK
11	MAGIC Website (UK)	OK
12	Sea Grant University of Winconsin	Not OK
13	Malaysia Covid-19 Dashboard	Not OK
14	USGS. National Water Information System: Mapper	Not OK
15	Sabah Tourism - Sipadan Island	OK
16	US-EPA. National Aquatic Resource Surveys	Not OK
17	Water Risk Atlas	Not OK
18	Atlas Online	OK
19	Border-to-border GIS Mapping for Water Sanitation and Health Project	Not OK
20	Florida Department of Environmental Protection	OK
21	TNB's Asset (Power Plant, Transmission Networks, Distribution Networks, Fiber Optics Cable and Customers' meter) to be Pinned Down on Digital Map	OK
22	Malaysia Covid-19 Dashboard	OK
23	Peta Hospital Rujukan Covid-19, Pusat Kuarantin dan Kemudahan Awam	Not OK
24	GeoBencana Pejabat Setuusaha Kerajaan Negeri Pulau Pinang	OK
25	NT Atlas and Spatial Data Directory	OK
26	Esri Map Gallery	OK

From the 26 specimens identified, then determined 7 specimen that will be involved in evaluation phase. Table 3 shows the 7 specimens that involved in evaluation:

Table 3. 7 Specimens involved in Evaluation

No	Specimen	UI Specimen
1	COVID-19 Data Explorer: Global Humanitarian Operations	

No	Specimen	UI Specimen
2	Peta Online ATR / BPN (Badan Pertanahan Nasional)	
3	Portal Peta Indonesia	
4	Pemetaan Kementerian ESDM Indonesia	
5	Land Portal	
6	Atlas Online	
7	Sabah Tourism – Sipadan Island	

3.1.2. Kansei Word

Kansei Word is taken from several sources including the perception of the research team, user perception, and web designer's perception. The technique of collecting Kansei Word is done by giving specimens to several respondents to give their perception of their feelings when they see the specimen. These perceptions become Kansei Word candidates that need to be validated. After validation, 50 Kansei Words are generated which represent the Web-Based GIS specimens shown in table 4

Table 4. Kansei Word Result

Kode	Kansei Word	Kode	Kansei Word
KW1	Sharp	KW 26	Useful
KW 2	Formal	KW 27	Wonderful
KW 3	Simple	KW 28	Beautiful
KW 4	Informative	KW 29	Elegant
KW 5	Gloomy	KW 30	Brilliant
KW 6	Dynamic	KW 31	Impressive
KW 7	Rigid	KW 32	Authentic
KW 8	Natural	KW 33	Easy-to-Measure
KW 9	Calm	KW 34	Empty
KW 10	Sad	KW 35	Sophisticated
KW 11	Prestigious	KW 36	Easy
KW 12	Masculine	KW 37	Vivid
KW 13	Bright	KW 38	Colorful
KW 14	Fresh	KW 39	Complex
KW 15	Catchy	KW 40	Bored
KW 16	Nautical-Look	KW 41	Complete
KW 17	Wide	KW 42	Global
KW 18	Well-Arranged	KW 43	Melancholic
KW 19	Accurate	KW 44	Free
KW 20	Cool	KW 45	Stiff
KW 21	Awesome	KW 46	Modern
KW 22	Trustworthy	KW 47	Confusing
KW 23	Cold	KW 48	Common
KW 24	Cute	KW 49	Creepy
KW 25	Classic	KW 50	Look-Tired

3.2. Evaluation

Evaluation is done by using google form, Kansei Word is translated to google form instrument with adding specimen to make it easy for participant for fulfilling the instrumen. The instrument is defined by 7 part based on 7 instruments. The figure of specimen is added to the instrument. Figure 1 shows the instrument distributed to participant :

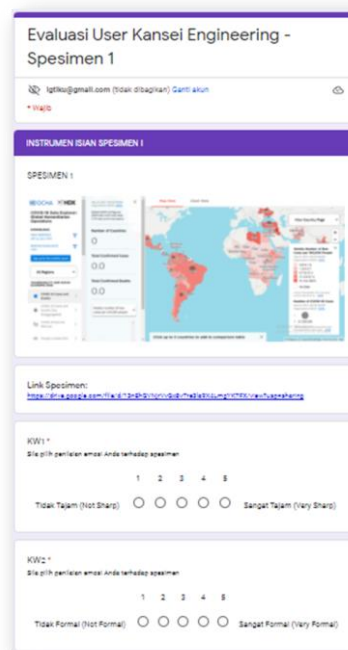


Figure 2. Instrument's Participant

The data collected using instrument then converted into spreadsheet to make calculation and analysis easier, as shown in table 5:

Table 5. Data Participant Result

No	Participant	Sex	KW1	KW2	KW3	KW4	...	KW50
1	Participant 1	Female	4	4	5	5	...	4
2	Participant 2	Male	2	3	1	3	...	5
3	Participant 3	Female	3	3	2	2	...	4
4	Participant 4	Female	5	2	3	3	...	4
5	Participant 5	Female	3	4	1	3	...	3
6	Participant 6	Female	5	5	5	5	...	3
7	Participant 7	Female	4	4	1	4	...	4
8	Participant 8	Male	4	4	2	3	...	4
...
80	Participant 80	Male	5	4	4	5	...	3

Then the data participant result from 7 instruments are recapitulated. Table 6 shows the recapitulation of participant's evaluation with the total 80 participant consists of 40 female dan 40 male:

Table 6. Recapitulation of Participant's Evaluation

No	Description	Sex	KW1	KW2	KW3	KW4	KW5	...	KW50
1	Participant 1	Male	3,29	2,71	2,43	3,86	2,71	...	3,29
2	Participant 2	Female	3,71	4,43	4,29	4,43	2,71	...	1,43
3	Participant 3	Male	2,43	4,14	4,29	4,57	1,71	...	1,29
4	Participant 4	Female	3,86	3,86	2,86	4,29	2,43	...	2,57
5	Participant 5	Male	3,29	3,00	3,29	4,14	1,00	...	1,00
6	Participant 6	Female	3,57	2,86	3,29	3,43	3,00	...	2,57
7	Participant 7	Male	3,14	4,14	4,14	4,43	4,29	...	3,43
8	Participant 8	Male	4,29	4,43	3,57	4,86	1,57	...	2,57
...
80	Participant 80	Male	3,00	3,14	3,14	3,57	1,43	...	2,00

3.3. Analysis

The results of the participant recapitulation were then averaged based on the specimen for analysis as shown in table 7.

Table 7. Average Evaluation Data

Specimen ID	1	2	3	4	5	6	7
KW1	3,46	3,44	3,19	4,28	2,34	2,70	2,70
KW2	3,56	3,38	3,63	4,13	3,25	3,24	3,24
KW3	3,03	2,48	3,38	2,81	3,46	3,13	3,13
KW4	4,30	3,59	4,01	4,45	3,39	3,79	3,79
KW5	2,38	2,99	2,10	2,11	3,54	2,55	2,55
KW6	3,51	3,18	3,45	3,93	2,88	3,05	3,05
KW7	2,70	3,54	2,83	2,51	3,54	2,98	2,98
KW8	3,55	2,99	3,48	4,08	2,88	3,10	3,10
KW9	3,55	2,70	3,54	3,71	3,15	3,06	3,06
...
KW50	2,60	3,36	2,26	2,11	3,10	2,79	2,79

3.3.1. Cronbach's Alpha

Cronbach's Alpha is involved to measure of internal consistency how closely related a set of items are as a group that range value between 0 to 1 [7]. In this study, the Cronbach's Alpha value generated from 80 respondents with and 50 KW is **0.931** as shown in table 8:

Table 8. Cronbach's Alpha Statistic

Cronbach's alpha	Standardized Cronbach's Alpha
0,931	0,939

Cronbach's Alpha score of 0.931 is included in the high category because it is greater than > 0.60 so it can be concluded that all instrument items are consistent and reliable [7].

3.3.2. Coefficient Correlation Analysis (CCA)

CCA is used to see the correlation of 50 KW which has a high influence value of other KW. CCA uses the XLStat 2021 tool. The CCA results are in table 9 below:

Table 9. Coefficient Correlation Analysis Result

	KW1	KW2	KW3	KW4	KW5	KW6	...	KW50
KW1	1	0,903	-0,639	0,800	-0,625	0,936	...	-0,541
KW2	0,903	1	-0,276	0,831	-0,643	0,967	...	-0,770
KW3	-0,639	-0,276	1	-0,200	0,112	-0,339	...	-0,231
KW4	0,800	0,831	-0,200	1	-0,864	0,927	...	-0,845
KW5	-0,625	-0,643	0,112	-0,864	1	-0,767	...	0,852

KW6	0,936	0,967	-0,339	0,927	-0,767	1	...	-0,789
KW7	-0,592	-0,697	-0,032	-0,942	0,912	-0,793	...	0,920
KW8	0,856	0,954	-0,189	0,953	-0,794	0,977	...	-0,879
KW9	0,515	0,773	0,309	0,826	-0,659	0,777	...	-0,916
KW10	-0,255	-0,232	0,245	-0,127	0,502	-0,219	...	0,315
KW11	0,829	0,908	-0,139	0,960	-0,804	0,966	...	-0,859
KW12	0,870	0,956	-0,343	0,664	-0,396	0,874	...	-0,578
KW13	0,756	0,606	-0,470	0,850	-0,913	0,771	...	-0,623
KW14	0,882	0,899	-0,305	0,972	-0,886	0,971	...	-0,844
...
KW50	-0,818	-0,471	-0,896	0,569	-0,615	-0,813	...	1

From the table of CCA results above, it can be seen that there are several KWs that have high influence values. In the CCA analysis this refers to a value greater than 0.9. Some of them are KW21 with the emotion “Awesome” which has a correlation with a value above 0.9 against the other 28 KW, namely KW1 or “Sharp”, KW4 or “Informative”, KW06 or “Dynamic”, KW8 or “Natural” and so on. From CCA result, top 25 KW that have correlation score to other KW more than 0.9 is shown in table 10:

Table 10. Top 25 CCA Result

No	Kode	Emotion	No	Kode	Emotion
1	KW21	Awesome	14	KW22	Trustworthy
2	KW30	Brilliant	15	KW4	Informative
3	KW31	Impressive	16	KW26	Useful
4	KW27	Wonderful	17	KW16	Nautical-Look
5	KW20	Cool	18	KW15	Catchy
6	KW14	Fresh	19	KW37	Vivid
7	KW11	Prestigious	20	KW2	Formal
8	KW8	Natural	21	KW19	Accurate
9	KW6	Dynamic	22	KW1	Sharp
10	KW46	Modern	23	KW18	Well-Arranged
11	KW35	Sophisticated	24	KW38	Colorful
12	KW27	Wonderful	25	KW23	Cold
13	KW28	Beautiful			

3.3.3. Factor Analysis

Factor analysis was conducted to see the concept of emotion that appear from the participants. From the Factor Analysis, 5 factors (F1 – F5) were produced after varimax rotation, as shown in table 11:

Table 11. Factor Variability Table

	Variability (%)	Cumulative %
F1	49,902	49,902
F2	24,777	74,679
F3	9,243	83,923
F4	8,998	92,921
F5	7,079	100

In table 11 F1 produces a factor value of 49.902% and F2 is 24.777%. If it is accumulated between F1 and F2, it results in an accumulation value of 74,679%, as well as furthermore on F3, F4 and F5, the accumulation percentage increases to 100%. However, the factors that have a high value are F1 and F2 because they cumulatively produce more than 70%. Table 12 shows specifically the KW contained in F1 and F2 sorted in ascending order.

Table 12. Sorted FA Result

KW	F1	KW	F2	KW	F3	...
KW34	-0,850	KW25	-0,884	KW39	-0,964	...
KW40	-0,843	KW5	-0,780	KW45	-0,510	...
...
KW46	0,819	KW16	0,480	KW37	0,065	...
KW21	0,824	KW21	0,499	KW29	0,079	...
KW22	0,838	KW31	0,505	KW8	0,105	...
KW8	0,844	KW22	0,528	KW11	0,176	...
KW31	0,847	KW26	0,564	KW36	0,208	...
KW19	0,853	KW46	0,568	KW10	0,222	...
KW30	0,854	KW11	0,576	KW42	0,238	...
KW1	0,888	KW14	0,597	KW16	0,244	...
KW27	0,891	KW36	0,604	KW33	0,250	...
KW6	0,891	KW35	0,619	KW19	0,268	...
KW28	0,892	KW15	0,636	KW24	0,283	...
KW17	0,897	KW37	0,646	KW48	0,304	...
KW18	0,902	KW38	0,679	KW34	0,305	...
KW20	0,929	KW4	0,693	KW25	0,307	...
KW32	0,935	KW41	0,703	KW44	0,365	...
KW29	0,962	KW33	0,719	KW9	0,571	...
KW2	0,965	KW24	0,763	KW23	0,634	...
KW12	0,995	KW13	0,803	KW3	0,923	...

In table 12, the F1 value taken is more than 0.85 which produces 13 KW that is consist of “Accurate”, “Brilliant”, “Sharp”, “Wonderful”, “Dynamic”, “Beautiful”, “Wide”, “ Well-Arranged”, “Cool”, “Authentic”, “Elegant”, “Formal”, “Masculine”; F2 consists of 4 KW with the emotions “Complete”, “Easy-to-Measure”, “Cute” and “Bright”; F3 consists of KW3 “Simple”; F4 consists of KW10 “Sad” and KW49 “Creepy” and F5 consists of “Global”.

Then is comparing the results of the FA with the CCA, for example in F1 there is KW19 with the emotion "Accurate". The results from the CCA show that KW19 has a correlation value with other KWs

which is greater than the value of 0.7 for 29 correlation, greater than the value of 0.8 for 23 relations and greater than 0.9 for 7 relations. Table 13 is a comparison of the results of FA Factor 1 with CCA:

Table 13. Comparison Factor 1 Result and CCA

No	KW	Factor 1 Result	CCA Result		
			n>0.7	n>0.8	n>0.9
1	KW19	0.853	29	23	7
2	KW30	0.854	32	28	20
3	KW1	0.888	29	22	11
4	KW27	0.891	31	27	29
5	KW6	0.891	32	27	19
6	KW28	0.892	32	26	19
7	KW17	0.897	24	11	4
8	KW18	0.902	25	20	5
9	KW20	0.929	28	27	16
10	KW32	0.935	25	19	8
11	KW29	0.962	29	26	16
12	KW2	0.965	29	24	16
13	KW12	0.995	24	17	7

From the table comparing factor 1 with CCA, it can be seen that the number of correlations that have a value of more than 0.7 are mostly above 24 correlations between KWs. For the number of KW with “n > 0.7”, the highest number is KW30 emotion “Brilliant”, KW6 emotion “Dynamic” and KW28 “Beautiful”. Meanwhile for “n > 0.9” is KW20 with “cool” emotion. The emotions contained in table 13 are classified as having a high significance value because based on the CCA analysis they have a high correlation value, also based on the FA analysis they have a high factor value above 0.8. The results of the comparative analysis between factor 2 and CCA can be seen in table 14 below.

Table 14. Comparison Factor 2 Result and CCA

No	KW	Factor 2 Result	CCA Result		
			n>0.7	n>0.8	n>0.9
1	KW41	0.703	18	6	1
2	KW33	0.719	20	10	2
3	KW24	0.763	16	6	1
4	KW13	0.803	22	9	2

In table 14 above, KW33 and KW13 have more than 20 correlations for “n>0.7” with other KWs in the CCA, and this is still a KW with a high significance value. Furthermore, for the comparison of factor 3, factor 4, and factor 5, the average CCA value is below 0.7, so that KW on factor 3, factor 4 and factor 5 has a small

number of n correlations. As shown in table 15, table 16 and table 17

Table 15. Comparison Factor 3 Result and CCA

No	KW	Factor 3 Result	CCA Result		
			n>0.7	n>0.8	n>0.9
1	KW3	0.923	1	1	1

Table 16. Comparison Factor 4 Result and CCA

No	KW	Factor 4 Result	CCA Result		
			n>0.7	n>0.8	n>0.9
1	KW10	0.957	2	2	2

Table 17. Comparison Factor 5 Result and CCA

No	KW	Factor 5 Result	CCA Result		
			n>0.7	n>0.8	n>0.9
1	KW42	0.953	2	2	2

3.3.4. Evaluation Data Audit

Evaluation of audit data was carried out by selecting the instruments involved, including Kansei Word (Emotion) and Specimen. In the audit data, the emotions are collected and then given a checklist whether the emotions are OK or Not OK. If it is OK then it will be included in the analysis, if it is not OK then the KW will be given the statement “Exclude” or “Rephrase” and given a revision. For “Exclude” is given if the emotion is not an initial statement of the user's perception, then the emotion is replaced. While “Rephrase” is given if the emotion is the user's perception but is less representative to express the emotion so that the element of feeling and emotion that is close is sought. Table 18 is KW (Emotion) Audit Data

Table 18. KW (Emotion) Data Audit

No	KE (Emotion)	(Exclude Rephrase)	Revision
1	Sharp	-	-
2	Formal	-	-
...
32	Uniform	Rephrase	Authentic
33	Equidistant	Rephrase	Easy-to-Measure
34	Equivalent	Exclude	Empty
35	Digitasi	Rephrase	Sophisticated
36	Interactive	Rephrase	Easy
37	Representative	Rephrase	Vivid

4. CONCLUSION

From the results of the pilot analysis, it is concluded that the Factor Analysis resulted in the accumulation of Factor 1 (F1) and Factor 2 (F2) with a percentage of 74,679% with F1 worth 49.902% and F2 24.777%. Based on the comparison results of Factor 1 and CCA that has high significant are “Accurate”, “Brilliant”, “Sharp”, “Wonderful”, “Dynamic”, “Beautiful”, “Wide”, “Well-Arranged”, “Cool”, “Authentic”, “Elegant”, “Formal”, “Masculine”. Emotion by comparison between Factor 2 and CCA that has high significant are “Easy-to-Measure” and “Bright”. While the emotion of the comparison of Factor 3, Factor 4 and Factor 5 with CCA is still relatively low, because the number of correlations in CCA with other emotions is lower than 0.7.

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