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 Word, 7 Specimen. 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 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 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 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                                      | 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 Wisconsin             | 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                             | 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 Setuausaha 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 | ![Image](image_url) |

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 Wisconsin             | Not OK  |
| 13 | Malaysia Covid-19 Dashboard                  | Not OK  |
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.

| No | Specimen | UI Specimen |
|----|----------|-------------|
| 2  | Peta Online ATR / BPN (Badan Pertanahan Nasional) | ![UI Specimen](image1.png) |
| 3  | Portal Peta Indonesia | ![UI Specimen](image2.png) |
| 4  | Pemetaan Kementerian ESDM Indonesia | ![UI Specimen](image3.png) |
| 5  | Land Portal | ![UI Specimen](image4.png) |
| 6  | Atlas Online | ![UI Specimen](image5.png) |
| 7  | Sabah Tourism – Sipadan Island | ![UI Specimen](image6.png) |

| Table 4. Kansei Word Result |
|-----------------------------|
| Kode | Kansei Word | Kode | Kansei Word |
| KW1  | Sharp       | KW26 | Useful       |
| KW2  | Formal      | KW27 | Wonderful    |
| KW3  | Simple      | KW28 | Beautiful    |
| KW4  | Informative | KW29 | Elegant      |
| KW5  | Gloomy      | KW30 | Brilliant    |
| KW6  | Dynamic     | KW31 | Impressive   |
| KW7  | Rigid       | KW32 | Authentic    |
| KW8  | Natural     | KW33 | Easy-to-Measure |
| KW9  | Calm        | KW34 | Empty        |
| KW10 | Sad         | KW35 | Sophisticated |
| KW11 | Prestigious | KW36 | Easy         |
| KW12 | Masculine   | KW37 | Vivid        |
| KW13 | Bright      | KW38 | Colorful     |
| KW14 | Fresh       | KW39 | Complex      |
| KW15 | Catchy      | KW40 | Bored        |
| KW16 | Nautical-Look | KW41 | Complete     |
| KW17 | Wide        | KW42 | Global       |
| KW18 | Well-Arranged | KW43 | Melancholic  |
| KW19 | Accurate    | KW44 | Free         |
| KW20 | Cool        | KW45 | Stiff        |
| KW21 | Awesome     | KW46 | Modern       |
| KW22 | Trustworthy | KW47 | Confusing    |
| KW23 | Cold        | KW48 | Common       |
| KW24 | Cute        | KW49 | Creepy       |
| KW25 | Classic     | KW50 | 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](image7.png)
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 | KW5 | KW6 | KW7 | KW8 | KW9 | KW10 |
|----|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| 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 and 40 male:

**Table 6. Recapitulation of Participant’s Evaluation**

| No | Participant | Sex | KW1 | KW2 | KW3 | KW4 | KW5 | KW6 | KW7 | KW8 | KW9 | KW10 |
|----|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| 1  | Participant 1 | Male | 3.29 | 2.71 | 2.43 | 3.86 | 2.71 | ... | 3.29 |
| 2  | Participant 2 | Male | 3.71 | 4.43 | 4.29 | 4.43 | 2.71 | ... | 1.43 |
| 3  | Participant 3 | Female | 2.43 | 4.14 | 4.29 | 4.57 | 1.71 | ... | 1.29 |
| 4  | Participant 4 | Female | 3.86 | 3.86 | 2.86 | 4.29 | 4.23 | ... | 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 |
| KW10        | 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**

| Description of Standardized | Cronbach’s alpha | Alpha 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 | KW7 | KW8 | KW9 | KW10 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
|     | 1   | -0.639 | 0.800 | -0.625 | 0.936 | ... | -0.541 |
| KW2 | 0.903 | 1   | 0.276 | 0.831 | 0.843 | 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 | 0.886 | 1   | -0.767 | ... | 0.852 |
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  | 8.898           | 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  | 0.868  | 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 | 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 | 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 | 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 | 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 | 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
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-Arrayed”, “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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