

Satisfying Emotional Needs of the Beer Consumer through Kansei Engineering Study.

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ABSTRACT.

This paper describes the use of Kansei Engineering type I for the category classification of beer cans and the identification of the design elements that can satisfy emotional and sensitive needs (sense of vision) of a specific market (Students of the Hiroshima International University). Design elements that satisfy translated customer needs are defined.

Keywords: Kansei Engineering, Quantification Method I, Factor Analysis, Principal Component Analysis, Product Design.

1. INTRODUCTION.

The trend for shorter life cycles due to the constant changes in customer needs, is increasing the importance of product development in the organizations who search for methods and technologies that can reduce development cycle time and also reduce the gap between true needs and expectations of the customers vs. the developed product.

Competitive organizations are clearly customer oriented and have found that the translation of the customer's feelings and sensorial as well as emotional needs (Kansei Voice of the Customer) are critical in product development.

The Japanese word Kansei has multiple meanings such as feeling, sensitivity and emotions. When a customer wants to purchase a product or service, he or she has sensorial needs such as "elegant, feminine and unexpensive...". This kind of feeling is called "Kansei" in Japanese. The Kansei means the customer's psychological feeling as well as the physiological issues. For instance, if the product development target will be a sophisticated automatic room air-conditioner able to control room temperature to give comfort to all people working in the room, the mechanical function of the air-conditioner should be developed based on psychological feelings as well as physiological requirements basis.

The Kansei Engineering or the Kansei Ergonomics was founded by Mitsuo Nagamachi at Hiroshima University about 30 years ago (Nagamachi, 1989; 1991; 1995; 1999) and the Kansei Engineering aims at the implementation of the customer's feeling and demands in the product functions and design. It is an ergonomic human oriented technology for a new product development that has spreaded worldwide.

It is defined as "technology for translating the customer's Kansei (feelings and image) into the product design domain". It is also called "Emotional Quality" or "Affective Design".

In conclusion, Kansei Engineering is a powerful technology for reducing the time and resources invested in new product technology.

2. TYPE I: Category Classification Kansei Engineering.

Type I of Kansei Engineering, also named Category Classification is a method by which a Kansei category of a planned target is broken down in a tree structure to determine the physical design elements. Study starts with the definition of customer Kansei needs (represented by descriptive data or Kansei Words) in a specific target

market and selected product and ends with the definition of design elements for the new product, to be tested in the specific market and then mass produced.

The general procedure for Kansei Engineering application and results in this study were:

1. Selection of a product domain.
2. Collection of Kansei Words.
3. Collection of product samples.
4. Evaluation of product samples vs. Kansei Words on previously designed SD (Semantic Differential) like scales in a laboratory experiment.
5. Identification of the most representative Kansei Needs of the Market using Factor Analysis and Principal Component Analysis.
6. Identification of design elements (independent variables) of the product for the satisfaction of Kansei need (response variable) using Regression Analysis methods for categorical data is conducted.

3. PRODUCT AND KANSEI WORDS.

37 Beer cans from all over the world were selected for the study as well as 27 Kansei Words (fig.3.1).

KANSEI WORDS	
1	Amakuchi <i>Sweet wine</i>
2	Casual <i>Casual</i>
3	Nomiyasui <i>Easy to take</i>
4	Danseirashii <i>Masculine</i>
5	Hade <i>Showy & Bright</i>
6	Hanayaka <i>Gorgeous, Bright & Showy</i>
7	Karui <i>Light</i>
8	Jouhin <i>Elegant</i>
9	Otonappoi <i>Adultlike</i>
10	kakko ii <i>Cool & Groovy</i>
11	Koseiteki <i>Unique & Personality</i>
12	Nou kou <i>Dense & Elaborate</i>
13	Katai <i>Hard & Tough</i>
14	Katsudouteki <i>Active & Energetic</i>
15	Ochitsuita <i>Calm & Quiet</i>
16	Omokurushii <i>Gloomy, Heavy</i>
17	Cool <i>Cool</i>
18	Sawayaka <i>Refreshing</i>
19	Shizen <i>Natural & Spontaneous</i>
20	Simple <i>Simple</i>
21	Tokaiteki <i>Urbanlike</i>
22	Wakawakashii <i>Young & Fresh</i>
23	Zan shin <i>New & Original</i>
24	Yoseirashii <i>Femenine</i>
25	Karakuchi <i>Dry wine</i>
26	Jimi <i>Sober</i>
27	Karoyaka <i>Light</i>

Fig. 3.1 List of Kansei Words for beer can Experiment.

An experiment was done with 32 students of the Hiroshima International University in order to evaluate each one of the product samples vs. all the Kansei Words using a pre designed SD (Semantic Differential) format and collect data regarding the possible relationship between Kansei Words and Beer cans (fig. 3.2).

Sample No.	n					
	5	4	3	2	1	
Casual						non casual
Masculine						No masculine
Showy						No showy
Gorgeous						No gorgeous
...						...
...						...
Active						Inactive

Fig. 3.2 Sample of evaluation sheet. Sample can No. "n" vs. Kansei words.

All the results were processed and the next step is to analyze using Factor Analysis and Principal Component Analysis.

4. ANALYSIS RESULTS.

4.1. Quantification method III (Factor Analysis – Principal Component Analysis).

In order to determine the most representative Kansei Needs of the specific market, Principal Component Analysis was used. Main 3 components in our experiment were appealingness, lightness & attractiveness.

Fig. 4.1 and Fig. 4.2 Show the correlation between the components and the Kansei Words, and also how several Kansei words cluster into groups, this is useful to determine the meaning or description of each one of the components.

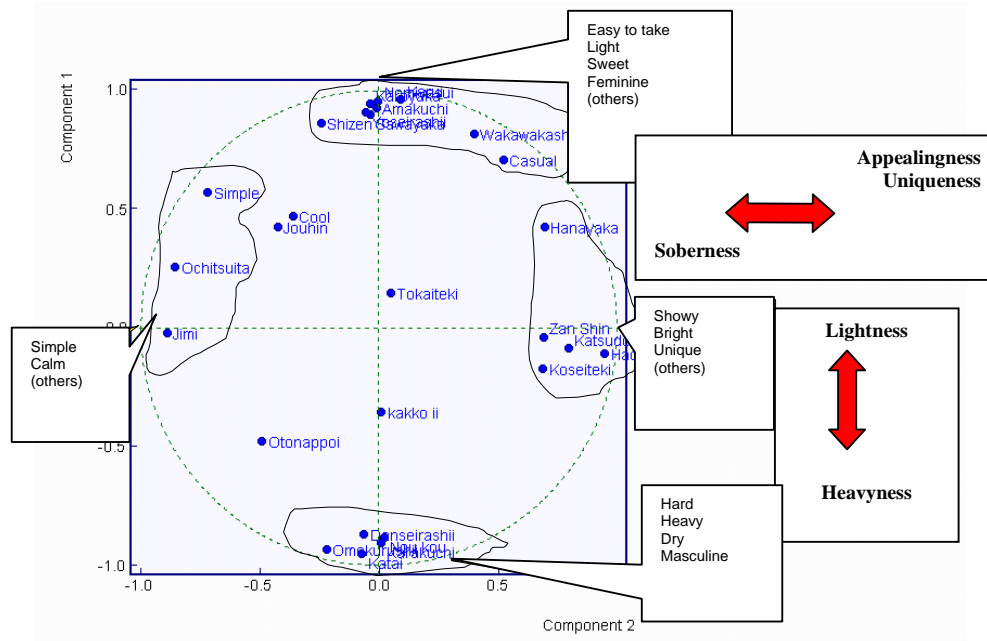


Fig. 4.1 Component 1 = Lightness & Component 2 = Appealingness.

Component 1: As positive correlation is found with easy to take, light, sweet, feminine (an other Kansei Words), and negative correlation is found with hard, heavy, dry, masculine (and others) we defined component 1 as LIGHTNESS.

Component 2: As positive correlation is found with showy, bright, unique (and others), and negative correlation with simple, calm (and others), we defined component 2 as APPEALINGNESS.

Component 3: As positive correlation is found with cool, urban like (and others), we defined component 3 as ATTRACTIVENESS.

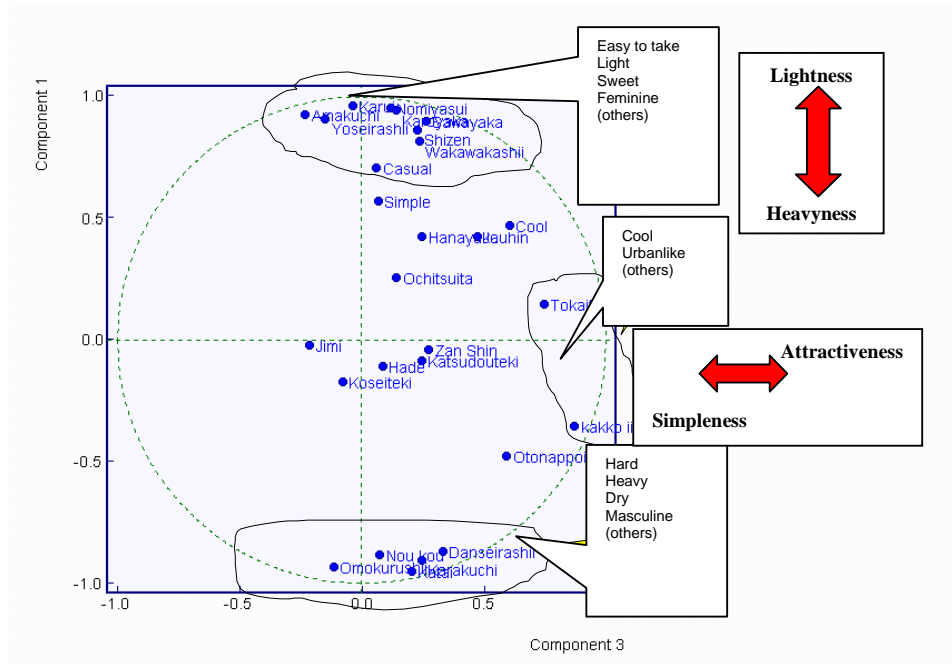


Fig. 4.2 Component 1 = Lightness & Component 3 = Attractiveness.

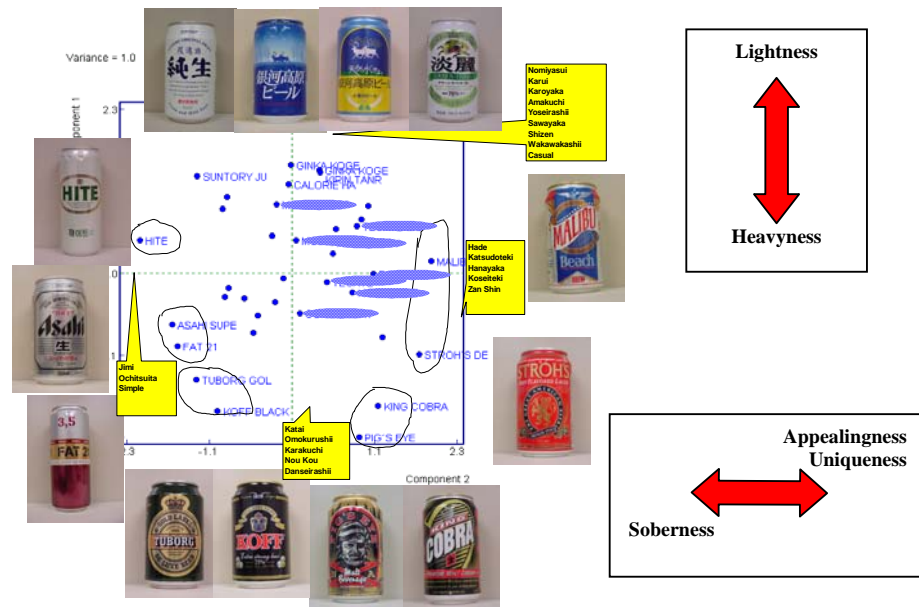


Fig. 4.3 Category score graphs and positioning of component 1 & 2.

Once we defined principal Kansei needs of target market vs. Beer cans, we plotted the score graphs (fig. 4.3 & 4.4). The result is the definition of position each one of the Beer cans vs. the 3 Principal Components, in other

The regression model with categorical data is constructed and response variables can be chosen in order to determine which independent variables contribute the most.

For example, the results of items and their value (categories) that have the most contribution to the variables "LIGHTNESS" and "GOURGOUS" are as follows.

4.2.1. LIGHTNESS.

y= KARUI LIGHT	3.07+	0.486	Can color	+	1.756	Label main colors	+	1.623	Brand letter color	+	0.513	Can illustration	+	0.717	Can Texture	+	0	Label shape	
	0	0	Green (Light): 8		1.75	Black / Dark: 2		0.678	Black: 2		0.467	Trad. Symbol: 4		0	Lines: 2		-0.081	Oval/Circular: 1	
	-0.149	-0.499	White / Cream: 1		0.59	Blue: 5		0	Blue: 4		0	Barley/Hop: 3		-0.224	Solid: 1		-0.224	Squared: 2	
	-0.683	-0.995	Red: 7		0.073	Red: 6		-0.579	Green (Dark): 6		-0.671	Modern Symbol: 5							
	-1.086	-1.363	Yellow: 9		0	Gold: 3		-1.843	White: 1			0							
	-1.363	-2.542	Blue (Med): 5		-0.178	White: 1			Green (Light): 7			0							
			Silver: 4		-1.412	Green (Light): 7			White: 1			0							
			Gold: 3			Silver: 4			Gold: 3			0							
			Black / Dark: 2									0							
			Wine: 6									0							

Fig. 4.2.1.1 Regression model with categorical data, Y= LIGHTNESS Kansei.

The prediction model indicates that in order to have a LIGHTNESS Kansei in the specific target market of our study, items should be:

1. Can color = Green light or White.
2. Label main colors = Black, Dark or Blue.
3. Brand letter color = Black.
4. Can illustration = Traditional symbol.
5. Can texture = With lines.
6. Label shape = Oval or circular.

Our prediction model estimates that for the target market, the MOST LIGHT Kansei Cans are:



Fig. 4.2.1.2 Examples of cans that satisfy the LIGHTNESS Kansei.

Our model also estimates less LIGHTNESS Kansei cans:



Fig. 4.2.1.3 Examples of cans that do not satisfy the LIGHTNESS Kansei.

4.2.2. GORGEOUS.

Y=	2.86 +	1.424	1.287	0.856	0.485	0.856	0.485	0	-0.793	0.456	0	-0.562	0.259	0	-0.013
		Yellow: 9	Red: 7	Green (Light): 7	Red: 6	Shinny: 1	Green (Light): 7	Mate: 2	Modern Symbol: 1	Person: 2	Solid: 1	None: 3	None: 3	Oval/Circular: 1	Squared: 2
		Green (Light): 8	Gold: 3	Silver: 4	Blue: 5	Trad. Symbol: 4	Silver: 4	Black / Dark: 2	Animal: 1	Barley/Hop: 3	Lines: 2	Oval/Circular: 1	Squared: 2		
		0.576	0.197	0	0.105	0	0.105	White: 1							
		0	-0.019	-0.397	Gold: 3										
		White / Cream: 1	Wine: 6												

Fig. 4.2.2.1 Regression model with categorical data, Y= GORGEOUS Kansei.

The prediction model indicates that in order to have a GORGEOUS Kansei in the specific target market of our study, items should be:

1. Can color = Red or Yellow.
2. Label main colors = Green.
3. Label brightness = Shinny.
4. Can illustration = Modern symbol.
5. Can texture = Solid.
6. Label shape = None.

Our prediction model estimates that for the target market, the MOST LIGHT Kansei Cans are:



Fig. 4.2.1.2 Examples of cans that satisfy the GORGEOUS Kansei.

Our model also estimates less GORGEOUS Kansei cans:



Fig. 4.2.2.3 Examples of cans that do not satisfy the GORGEOUS Kansei.

With all this information, a new product can be developed (trial Beer can) by the designers and in a second stage, tested in the market to obtain evidence based results. This Kansei Engineering approach reduces the new product development cycle, trial products testing number and development costs, assuring the translation of the Kansei needs of the customer into the developed product or service.

5. CONCLUSION.

Kansei engineering is a powerful technology for new product development and definition of new micro segmented niche marketing strategies, as well as for existing products improvement.

Kansei engineering proves to be a useful tool to determine the existing Kansei needs of a target population vs. a specific product, and also a powerful technology to translate these needs into design domain.

Results are coincident with previous Kansei analysis using neural networks by Dr. Ishihara (Ishihara, 1998) and prove that Kansei needs, depend on the target market or niche and so products must be designed not only considering functional and fit for use needs, but also integrating sensorial, sensitive and emotional requirements.

The present study also proposes Score graphs as a powerful tool to identify the position of current company products vs. the competition products (local or global), in order to design future product strategies.

This study must continue to verify existing differences between same target markets (socio demographic filters) in different countries (or same country but with different cultural backgrounds). This will prove that same products that succeed in one country not necessarily will in other countries because customer perceptions play an important role in sales and product penetration.

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