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REVIEW ARTICLES

VALIDATION OF *KANSEI* ENGINEERING ADOPTION IN E-COMMERCE WEB DESIGN

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Abstract: The evolution of internet business has lead e-Commerce businesses to battle with competitors, especially in the effort to enhance visitor's stickiness to their website targeting to promote visitors conversion and retention. Review on literatures has shown that prospect's decision is based on their feelings and emotion. This has encouraged the study of emotional appeal in website design as interactive space with potential consumer. Based on *Kansei* Engineering methodologies and previous studies involving *Kansei* Engineering, we propose a model on building *Kansei* product design as a foundation to measure consumer emotional responses and incorporate emotional appeal into new product design. We present actual implementation of the model in e-Commerce website, and utilize generated result to validate the model. Justifications are done by the measurement of subject's *Kansei* and analysis by Principal Component Analysis, Cronbach's alpha and averaged evaluation results. Results from the actual measurement of subject's emotional response to e-Commerce website are discussed, which provide evidence that the model presented is valid and justifiable.
Keywords: *Affect, e-Commerce, emotion, Kansei Engineering, web design*

1. INTRODUCTION

Designing website for online retailing used to be easy to e-commerce businesses. In the early days, consumers were naïve and accepted whatever presented on e-commerce sites. However, various offers from wide range of e-Commerce have caused today's consumer to become sophisticated then ever. Consumers have become further demanding and desire product that match their own feelings of design [1]. Inline with this fact, e-Commerce website visitors have also become mature and demand website that match their desire and draw their attention [2].

Nevertheless, current e-commerce websites are highly reliant on functionality and neglects the human emotional aspect. Users perception have been traditionally studied using market research techniques in which users always been included as evaluation source, and not as requirement generator [3]. This makes it complex for e-Commerce to design website that engage consumer desire, which is an essential factor to attract visitors to stay longer in their website targeting to convert them to a prospect and finally customer, and most importantly to stay competitive [2].

Despite many studies conducted in addressing website design, the study on emotion design tends to look at minimizing irrelevant emotions related to usability such as confusion, anger, anxiety and frustration [4]. Major focus have been given to usability test [5-7], looking at only functionality aspects addressing for instance accuracy, speed and portability [8, 9], and has been ignoring the intangible aspect of user experience, such as fun and enjoyment. As today's consumer's satisfaction is mainly based on emotional performance of products [3, 4], providing appropriate emotion via homepages has become important in practice [10, 11]. This is because emotions were found to influence both users' memories of products and their decision processes when they purchased products [12].

However, only little studies have focused on the emotional aspects of websites, and a systematic guideline on how to produce websites that embeds emotional aspects is in almost no existence [2]. This inspires the author to look into emotional aspect and propose a model on building emotional product design as a foundation to measure consumer's emotional responses and incorporate that emotional value into e-Commerce website design.

2. AIM

The study aims to validate the adoption of *Kansei* Engineering in e-Commerce website through application of the model on building *Kansei* product design, demonstrating *Kansei* measurement and empirical analysis. Previous studies involving the adoption of *Kansei* Engineering have enabled the discovery of semantic space of *Kansei* words, and relationships between *Kansei* responses with product design. For example, the study in the study of hair treatment container design [13], beer can surface design [14], kitchen cabinet design [15], gift flower arrangement [16], car instrument panel design [17], and many more. The study of car instrument panel design [17] has implemented *Kansei* Engineering and identified refined, appealing and active as the corresponding *Kansei* space. Another study by [16], in the study of flower arrangements implemented

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Kansei Engineering and successfully identified *Kansei* semantic space for flower arrangements as in the axis of light, heavy and refined. While, in the study of kitchen cabinet design [15] have identified *Kansei* space as light, elegant, modern, and etc. Another study done by Siu & Ho [18] discovers subject's sensitivity to specimens via the average results between subjects.

We can observed from these studies that the success of *Kansei* Engineering implementation relies on it's ability to identify the existence of *Kansei*, i.e. sensitivity of subjects to *Kansei*, and the capability of identifying *Kansei* semantic space from the obtained data.

Thus, this study attempts to validate the adoption of *Kansei* Engineering in e-Commerce website via empirical study and analysis. The proposed model and method used are to be confirmed as valid when subject's *Kansei* are measurable and *Kansei* space are identifiable.

3. *KANSEI* ENGINEERING

This section describes the term '*Kansei*' and the concept of '*Kansei* Engineering' as to provide insights to the method adopted in the model.

'*Kansei*' is a Japanese term which means a psychological feeling or image which a consumer will have in mind when purchasing a product [19, 20]. The concept of *Kansei* is domain specific, subjective, and evoked by external stimuli. '*Kansei* Engineering' (KE) was born when the founder realized that most product development methods just did not reveal the deep insights into customers' feelings that enabled emotional needs to be satisfied [1]. The idea is that, consumers always have a kind of feeling and image in their mind when they want to buy something, and if that feeling were readily incorporated in a new product, they would be more satisfied with the product.

The focus of KE is to identify the *Kansei* of products that trigger and mediate emotional response. The KE process implements different techniques to link product emotions with product properties. In the process, the chosen product domain is mapped from both a semantic and physical perspective. In terms of a design methodology, the approach of KE is to organize design requirements around the emotions that embody users' expectations and interaction [21]. Since it was first introduced by one of the author in the seventies, KE has been successfully used to incorporate the emotional appeal in the product design ranging from physical consumer products to IT artefacts. Due to its success in making the connection between designers and consumers of products, KE is a well accepted industrial design method in Japan and Korea. In Europe KE is gaining acceptance but is better known as emotional design.

4. *KANSEI* DESIGN MODEL

This section explains how the author reach to the model establishment, and provide detail description of the model.

Kansei Engineering discipline suggests careful selection of product in a specific domain. Although *Kansei* Engineering suggests different kind of techniques in implementing the methodologies, the study finds *Kansei* Engineering Type I to be the most appropriate to be adopted into the model. The technique begins with identification of product properties, whether by existing product or new concept define by company's objectives. The process of identifying *Kansei* involves tool building and measurement of subjects *Kansei* towards specimens. The result is then used to map subject's *Kansei* to physical product properties, to discover the link between *Kansei* and product design.

Based on the established *Kansei* Engineering methodologies and previous literatures involving *Kansei* Engineering adoptions, we structure the method into a model named *Kansei* Design Model. The model is presented in Figure 1.

The model are divided into 4 levels, L1, L2, L3 and L4. L1 describes synthesizing of specimen. In this level, the level is sub-divided into 2 different procedures. The first procedure, PI, and the second procedure, PII, are different in terms of procedure in the process of selecting specimen. There are four sub-levels in both PI and PII, which are essential in determining valid specimen. One can choose either procedure depending on its objectives.

In PI, as suggested in the model, the process begins with collection of samples with visible differences from existing product in a specific domain. The study emphasizes on controlling the domain, as consumer's response is unique in different domain [19]. Upon completion, the following is

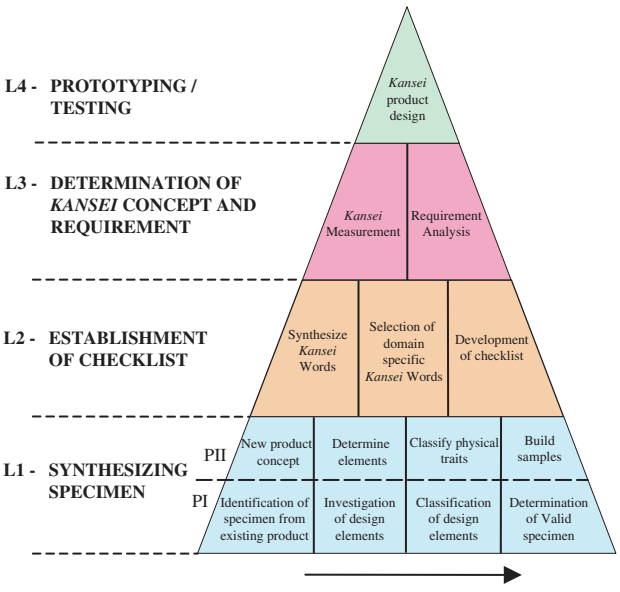

Figure 1: *Kansei* Design Model

the process of identifying design elements in all samples.

Previous *Kansei* Engineering studies have suggested different techniques in selecting specimens. Some of them set a certain limitation. However, the study decided to follow the basic rule on *Kansei* Engineering, which is to include all feasible design elements that can be identified from existing product or product concept [19]. This is to ensure the accuracy of elements identified in the outcome of the study, as consumers are assessing a product as a whole. To match consumer's respond to design elements, the study suggests that controlling or limiting elements will not produce an accurate result. In the next process, design elements are further classified into attributes and values. The process is crucial since the findings will be the essence in the success of *Kansei* translation in the analysis phase. Finally, by following certain rules as basis, valid specimen for *Kansei* measurement will be selected from all the collected samples.

The above explains the model applicable to available product in the market. Similarly, the model can be applied when a company or designer plans to design a new product based on new concept defined by their objectives. The second procedure, PII, serve this situation. This is especially when the product has yet exist in the market, for instance the design process before mobile phone exists. In this case, designer will have to determine product specification based on their inspiration in relation to the target concept, for instance an 'elegant' mobile phone. The process begins with identifying adjectives related to elegant, in the domain of mobile phone. Then, designer has to determine design elements that have connection with 'elegant' feeling, classify the physical traits and build a number of prototypes based on the technical specification. This prototype will then be used as specimen at the following level of the model, to confirm their design with consumers.

The level in this model, as shown in figure 1, L1, PII, is an adoption to the procedure of *Kansei* Engineering Type I, which shows great success in the production of Mazda Miata [1]. The model introduce enhancement, by including consumer *Kansei* evaluation as confirmatory study to the constructed prototypes.

L2 describes preparation and establishment of *Kansei* checklist. The level is also divided into 3 sub-levels, which are; i) Synthesizing *Kansei* Words (KW), ii) Selection of domain specific KW, and iii) Development of checklist. This is the process of synthesizing *Kansei* words, from larger number of possible KW to focused KW which directly related to the product domain. KW can be adjective or noun such as 'calm', 'sophisticated' and 'natural'. These KW can be synthesized by exploring literatures and consulting experts. As an outcome, the level produces *Kansei* checklist in the form of Osgood Semantic Differential scale, to enable measurement of *Kansei* in the next level.

L3 describes determination of *Kansei* concept and requirements. This process of determining *Kansei* concept and requirements is divided into 2 sub-levels; i) *Kansei* measurement, ii) Requirement Analysis. The first level is the process of *Kansei* measurement, which can be done using expert or ordinary consumers as subjects. In this level, subjects are required to rate their impressions towards product specimen into the *Kansei* checklist. Results from the evaluations will be analysed and validate in the subsequent level to interpret links between *Kansei* responses and design elements, identified in L1. The outcome can be used to determine design requirement for the development of *Kansei* product.

L4 describes prototyping/testing level. In the final level, the results from L3 will be used as foundation to build prototype of *Kansei* product design. The process will involve the employment of the *Kansei* concept and design requirements identified in L3. To develop a successful *Kansei* product, expert's creativity should be included in the design process. Testing may be performed to validate the design requirements.

5. VALIDATION

This section describe measures taken to achieve the aim of the study to validate the model presented in Figure 1. The model is justified as valid when existence of *Kansei* can be confirmed and *Kansei* space can be identified.

5.1 *Kansei* measurement

In order to achieve the goal, the study implements the proposed model in the measurement of subject's emotional responses to e-Commerce website. The result is expected to answer the questions whether *Kansei* Engineering adoption into e-Commerce web design study will produce desired result, in an attempt to validate the model and methods used.

5.1.1 Research instrument

This sub-section describes instruments used in the measurement of *Kansei* in e-Commerce website.

The study utilizes the proposed model as foundation in engineering *Kansei* in e-Commerce website. In accordance to it's increasing importance in e-Commerce adoptions, e-Clothing were selected as domain. One hundred and sixty-three e-Clothing websites were initially selected according to their visible differences in designs, e.g. page colour, font size, menu shape, picture existence etc. All these websites were then analysed to identify detail website design elements, and classified into 'attribute' and 'value'.

'Attribute' in this research refers to common elements in all samples. For example, background colour, product

presentation style, menu location etc. On the other hand, 'value' refers to values of each element. For example white, green, blue, or picture, video, animation etc. The rationale of this attribute and value categorization is to maintain the perspective of design being seen from human viewpoint. This is because layman sees design in many different ways. Some of them focus on certain elements, some look at design as a whole. Translating design elements by focusing only on designer-viewpoint will result one-way definition of designs, while classification of designs from human viewpoint is the know-how in KE [20].

In the analysis phase, this classification will be used to derive which consumer's *Kansei* is highly associated to which item and especially correspond to which category, so that the design element of each particular *Kansei* can be determined. Table 1 illustrates the detail design elements.

A set of control was followed during the selection of websites. This has enabled the study to identify detail design elements in each websites, and thus enable the analyses of differences and similarities as to conform rules in selecting specimens for the research.

Further analysis was done to the selected specimen to identify valid websites for the evaluation, resulting thirty-five specimens in to be finally used. The specimens selected were website selling youngster genre clothing. The specimen are coded numerically from one to thirty-five, and snapshot of the specimen are shown in Table 2.

Kansei Words, which are used to represent emotional responses were synthesized according to web design guidebook, experts and pertinent literatures. 40 *Kansei* Words were then selected according to their suitability to describe website. Among the synthesized words are adorable, professional, impressive and etc. These *Kansei* Words were used to developed checklist to rate websites. The *Kansei* checklist developed was organized in a 5-point Semantic Differential (SD) scale.

The illustration of the checklist is shown in Figure 2.

Table 1: Illustration of detail design elements.

Sample ID	Page Bg color					Picture Size			Main Text Size			Main Text Alignment			Menu Type				…
	White	Black	Blue	Pink	…	S	M	L	S	M	L	L	R	Ctr	Button	Text	Wite	…	
1	✓					✓			✓					✓	✓				
2	✓						✓			✓				✓	✓	✓			
3		✓					✓		✓			✓					✓		
4	✓					✓				✓	✓			✓		✓			
5			✓					✓			✓			✓				✓	
6				✓			✓				✓			✓		✓			
7					✓			✓	✓				✓			✓			
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Table 2: Specimen code

ID	Specimen	ID	Specimen	ID	Specimen	ID	Specimen	ID	Specimen
1		8		15		22		29	
2		9		16		23		30	
3		10		17		24		31	
4		11		18		25		32	
5		12		19		26		33	
6		13		20		27		34	
7		14		21		28		35	

Subject ID:_____ Sample No.: ___

	5	4	3	2	1	
Adorable	□	□	□	□	□	Not Adorable
Appealing	□	□	□	□	□	Not Appealing
Beautiful	□	□	□	□	□	Not Beautiful
Boring	□	□	□	□	□	Not Boring
Calm	□	□	□	□	□	Not Calm

. . .

Figure 2: Checklist used in the study.

5.1.2 Procedure

The study recruited subjects based on rule specified in KE, which is to undertake specific target consumer as subject in the study [19, 20]. This is inline with the aspired product design that is targeted to suite the *Kansei* of target consumer. Hence, the best subject for the study of young genre e-Clothing retailing is youngster and website user.

Thirty-five valid specimens were shown one by one to all subjects in a systematic and controlled manner. Prior to the evaluations, specific rules were followed in the preparation of screenshots. Subjects were asked to rate their impressions into the checklist according to the given scale. Briefings on rules, tools and objective of measurement were given to ensure subjects correspond accurately to the evaluation, at the beginning of the session. They were also given a time to get familiar with the specimen before the evaluation started. Subjects were later given three minutes to rate their feelings towards each specimen, and a break to relax and clear up their mind. The order of KW in checklist was also changed to eliminate bias. The whole session takes approximately two hours to complete.

5.2 Results and discussions

This sub-section discusses the analysis performed over the result obtained from the experiment. Justification of the model is presented via analysis result.

5.2.1 Cronbach's alpha

Firstly, Cronbach's alpha was calculated as the measure of internal consistency. Cronbach's alpha assesses how reliably survey or test items that are designed to measure the same construct actually do so. Cronbach's alpha values range between 0 and 1 where higher values suggest higher internal consistency. A historical benchmark value of 0.7 is commonly used to suggest that at least some of the items measure the same construct. The analysis yielded overall Cronbach's alpha as 0.9512, which is higher than a commonly used benchmark value of 0.7. This proves the internal consistency, which confirms that the designed *Kansei* checklist are reliable in the measurement of e-Commerce website's visitor's *Kansei* responses.

5.2.2 Average *Kansei* responses

Followingly, average value between evaluation results are analysed. Figure 3 illustrates the result of averaged *Kansei* responses to e-Commerce websites.

As evident from the chart, the average value of evaluation results to each sample are distributed to above and below three, the neutral response point. This indicates that subject's *Kansei* are well distributed to both negative and positive value. Also evident is the range values between the average *Kansei* responses to each specimen are more than one, which indicates that subjects are responding well to the specimens. Hence, from both readings we could conclude that subjects are sensitive to *Kansei* value. Thus, subject's *Kansei* are undoubtedly measurable.

5.2.3 *Kansei* semantic space

We analyzed the semantic space for our websites by principal component analysis using the averaged evaluation value for the evaluation session. We obtained the first principal component (PC1) (eigenvalue: 27.036, contribution ratio: 67.6%) that implied complexity, and the PC2 (eigenvalue: 4.130, contribution ratio: 10.3%, cumulative contribution ratio: 77.9%) that implied attractiveness from the evaluation. Together, the first two principal components represent 77.9% of the total variability. Thus, most of the data structure can be captured in the two underlying dimensions. This means, the structure of *Kansei* Words are highly influenced by the first two principle components. The remaining principal components account for a very small proportion of the variability and are probably unimportant. This means, they have very less influence to *Kansei* structure and probably can be ignored.

As the primary outcome expected from *Kansei* Engineering implementation is evident, the analysis proceed to identify semantic space of *Kansei* Words from the result. Figure 4 shows PC loadings for first and second principal components from the evaluation result. The PC loadings show how much the evaluation on a *Kansei* affects variables, which used to obtain semantic structure of KW.

Along the first principal component, implying the axis of attractiveness, the evaluation word "old-fashion" got the lowest loading, and "boring" was the next. To the contrary, "gorgeous," "impressive," "stylish," appealing" got the highest loadings. On the other hand, along the second principal component, implying the axis of complexity, the words "plain" and "simple" had the largest loading values, and next were "neat," and "natural." In contrary, the word that had the negatively largest value was "crowded".

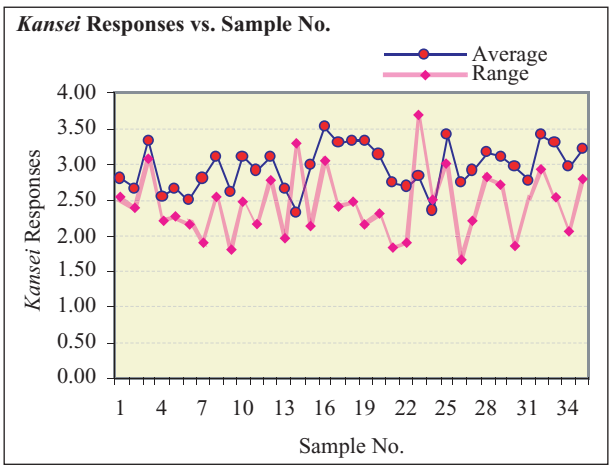

Figure 3: Averaged value of evaluation results between subjects.

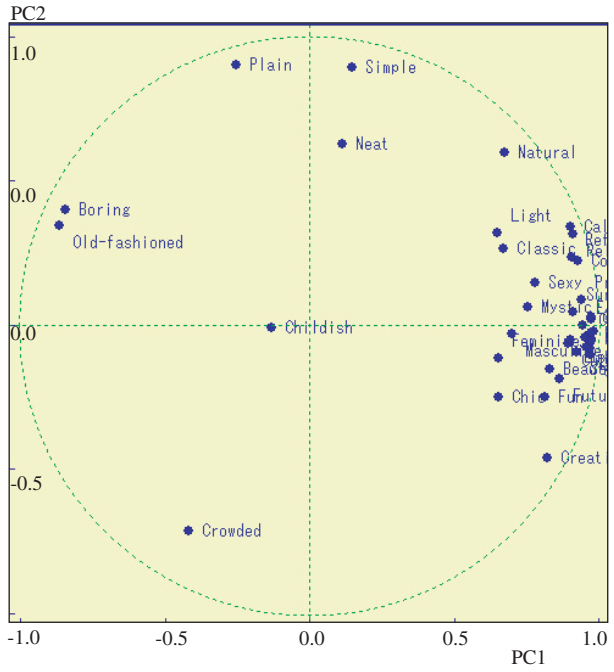

Figure 4: PC Loadings result.

We could presume that websites with high score on the first principal component is having high characteristic of attractiveness and so in the contrary. On the other hand, we could presume that websites with high score over the second principal component is having high characteristic of complexity and so in the contrary. Thus, it can be concluded that *Kansei* structure on website design has two components, which are attractive and simple. In addition, blending and balancing these two components are determinants of new website design.

The principal score of each website is plotted in Figure 5. The figure made possible of the identification of websites, which holds strong *kansei*. Those located at the edge of the corresponding *kansei* space, have strong meanings. For example, sample website no. 24 which is located at the very left edge, indicates very much "not attractive". Sample no. 14, at the upper-left, is "not attractive" and "plain". Sample no.16, 25 and 32 are at the very right edge, which indicates very "attractive". Sample no. 30 and 12 are at the bottom edge space, which indicates "crowded".

Websites in "not attractive" category, for instance sample no. 24 and 14 seems to have small size pictures, consist of mostly text, observable empty spaces, and no modeling on clothing. On the contrary, "Attractive" website, such as sample no. 16, 32 and 25 are having large size picture, very less empty space, less text and model is used to demonstrate clothing. Also, sample websites with darker backgrounds are mostly sided at "attractive" category.

Thus, PCA performed to the evaluation result has enabled the study to identify *Kansei* semantic space, and relationships between *Kansei* and web design. This shows that the implementation of the presented model in e-Commerce website can produce the intended *Kansei* semantic space, as targeted in *Kansei* Engineering studies.

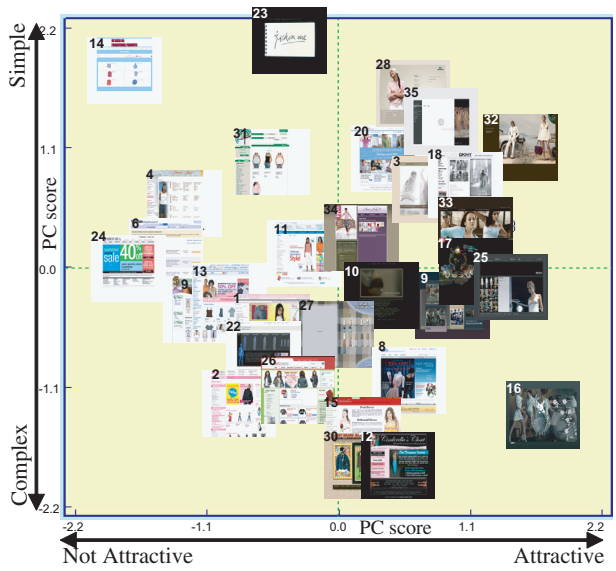

Figure 5: Principal Component Score of websites.

6. CONCLUSION

The paper begins with discussions whether the implementation of *Kansei* Engineering is feasible in the study of emotional values in e-Commerce website design. Previous literatures involving the study and adoption of *Kansei* Engineering were scrutinized, as to comprehend the concept of *Kansei* Engineering and forecast it's viability in the intended study.

Based on the methodologies of *Kansei* Engineering and previous studies involving *Kansei* Engineering, the study have proposed a model in building *Kansei* product design. The study aims to explore whether the model is valid as to be adopted in the measurement of *Kansei* in e-Commerce website. The model is suggested as applicable for *Kansei* Engineering implementation in both existing product or targeted concept of new product innovation.

In order to test validity of the model, the study has taken e-Commerce website as the specific domain. In the measurement process, the study has adopted procedure I in the first level of the proposed model, which is to take existing e-Commerce websites as samples.

Cronbach's alpha test has proven that the instruments used are reliable. The study has revealed the usability of the model in practice, and the presence of *Kansei* value in existing e-Commerce website is evident. The average value from the evaluation result were used to validate subjects responses. The result has shown scattered value, which indicates that subjects were responsive to the measurement tools, which were the *Kansei* checklist. As variations in the averaged data is visible, it can be concluded that subjects are sensitive to *Kansei*, and that subject's *Kansei* are measurable.

Principal Component Analysis has resulted the identification of *Kansei* semantic space, as anticipated by the study. This is inline with *Kansei* Engineering technique, which is to identify semantic space of *Kansei* Words and relationships of *Kansei* and web design. Thus, it is evident that the implementation of the model enables the identification of *Kansei* space.

The analyses results have made it possible for us to conclude that implementation of *Kansei* Engineering in e-Commerce website design is valid, and the proposed model is justifiable. Although, the study has not gone up to 'Prototyping' level, the result of the analysis has provided enough evidence as anticipated by the paper.

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REFERENCES

1. Nagamachi, M. (1999, Oct. 12-15). *Kansei Engineering: The Implication and Applications to Product Development*. Paper presented at the 1999 IEEE International Conference.
2. Anitawati, M. L. and Nor Laila, M.N. (2006) *Kansei* Engineering: A Study on Perception of Online Clothing Websites. Proceedings of the 10th International Conference on Quality Management and Operation Development 2008 (QMOD '07), Sweden: Linköping University Electronic Press, ISSN 1650-3740.
3. Bouchard, C., Lim, D., Aoussat, A. (2003). Development of a *Kansei* Engineering System for Industrial Design: Identification of input data for KES, *6thADC PROGRAM*.
4. Norman, D. A. (2002). Emotional Design: Attractive Things Work Better. *Interactions: New Visions of Human-Computer Interaction, ix*(4), pp.36-42.
5. Bevan, N., Kirakowski, J., Maissel, J. (1991, Sept. 1991). *What is usability?* Paper presented at The 4th International Conference on HCI, Stuttgart.
6. McGillis, L., Toms, E. G. (2001). Usability of the Academic Library Website: Implications for Design. *College & Research Libraries*.
7. van Welie, M., van der Veer, G. C., Eliëns, A. (1999). *Breaking Down Usability*. Paper presented at the Proceedings of Interact 99, Edinburgh, Scotland.
8. Dix, A. (1999). *Design of User Interfaces for the Web*. Paper presented at the User Interfaces to Data Intensive Systems - UIDIS'99.
9. Egger, F. N. (2001). *Affective Design of e-Commerce User Interfaces: How to Maximise Perceived Trustworthiness*. Paper presented at the Proceedings of The International Conference on Affective Human Factors Design, London.
10. Kim, J., Lee, J., Choe, D. (2003). Designing Emotionally Evocative Homepages: An Empirical Study of the Quantitative Relations Between Design Factors and Emotional Dimensions. *International Journal of Human-Computer Studies*, 56(6), pp.899-940.
11. Li, N., Zhang, P. (2005, December 14). *Towards e-Commerce Websites Evaluation and Use: An Affective Perspective*. Paper presented at the Post-ICIS'05 JAIS Theory Development Workshop, Las Vegas, NV.
12. Kim, J., Moon, J. (1998). Designing Towards Emotional Usability in Customer Interface. *Interacting with computers*, 10(1), pp.1-29.
13. Ishihara, S., Ishihara, K., Nagamachi, M. (2000). *Kansei Analysis on Product Development of Hair Treatment*. Paper presented at the Ergonomic and Safety for global Business Quality and Productivity.
14. Ishihara, S., Ishihara, K., Nagamachi, M. (1999). Analysis of Individual Differences in *Kansei* Evaluation Data Based on Cluster Analysis. *Kansei Engineering International*, 1(1), pp.49-58.
15. Nomura, J., Imamura, K., Enomoto, N., Nagamachi, M. (1998). Virtual Space Decision Support System Using *Kansei* Engineering. *Cyberworld*, pp.273-288.
16. Ishihara, S., Ishihara, K., Nagamachi, M. (2001). *Kansei Engineering Analysis on Car Instrument Panel*. Paper presented at the International Conference on Affective Human Factor Design, London.
17. Ishihara, K., Ishihara, S., Nagamachi, M. (2006, Sept, 2006). *An Expert System that Incorporates Constraints into Gift Flower Arrangements*. Paper presented at The 8th International Conference on Industrial Management, China.
18. Siu, H. H. Y., Ho, J. K. L. (2005). *Visual Design for a Web page*. Paper presented at The Fourth International Cyberspace Conference on Ergonomics, Johannesburg.
19. Ishihara, I., Nishino, T., Matsubara, Y., Tsuchiya, T., Kanda, F., Inoue, K. (2005). *Kansei and Product Development (in Japanese)* (Vol.1). Tokyo: Kaibundo.
20. Nagamachi, M. (2003). *The Story of Kansei Engineering (in Japanese)* (Vol. 6). Tokyo: Japanese Standards Association.
21. Spillers, F. (2004). Emotion as a Cognitive Artifact and the Design Implications for Products that are Perceived as Pleasurable. Experience Dynamics.

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