Product Development Methodology in Kansei Engineering

Suchada Sitjongsataporn
Centre of Electronic Systems Design and Signal Processing (CESdSP)
Department of Electronic Engineering, Mahanakorn University of Technology
140 Cheumsamphan Rd., Nong-chok, Bangkok, Thailand 10530
E-mail: ssuchada@mut.ac.th

ABSTRACT— Kansei engineering or ‘affective engineering’ is the key of product development methodology by translating customer's psychological feeling and demands on this product into product's design parameters. This process allows you to design with the customer’s responses such as feelings and emotions in order to guarantee that your product or service will evoke desirable customer’s emotional responses. It was developed in Japan in the early of 1970s and now is widely spread in Japan, Korea, Taiwan and it is applied in Europe such as Sweden, Spain and France. In the early of 2000s, it has been new departures for Kansei engineering that is in the applied science linking with psychology and neural sciences. In this paper, the Kansei engineering is discussed in the various topics in both Japan and Western lifestyle. The author took a general view of them in relation to knowledge based on engineering from the view points of the own author.

Keywords: Kansei engineering, affective engineering, emotional engineering, Kansei business, comfortable lifestyle.

I. INTRODUCTION

In the recent, there are many products and services which have been made us possible to take a comfortable life. Increasing competition makes the product manufacturers more aware of how to satisfy the feelings and affective demands on their customers. Therefore, it is important to design some new products and services to succeed in markets by making emotional impact on the customer’s response. Impression of a product is the one of key word for the decision of purchasing by customers. A suitable methodology for product design and engineering design is called “Kansei engineering”, which aims to develop or improve products or services by translating customer’s feelings and demand on the product’s design parameters in business way.

In this article, a general view of definitions of Kansei and Kansei engineering are described. History of development of Kansei engineering is given briefly. Some research papers developed using Kansei engineering are presented in various topics of Japanese and European lifestyle.

II. WHAT IS KANSEI?

The definition and interpretations of Kansei from various points are presented in this section.

A. Definition on Japanese Dictionaries

According to the Dainihon Japanese dictionary [1], the definition of Kansei is the sensitivity of a sensory organ where sensation or perception takes place in answer to stimuli from the external world. The term ‘Kansei’ in Japanese consists of typically two different Kanji-signs: ‘Kan’ and ‘Sei’, which means sensitivity or sensibility described in Fig. 1. Many dictionaries now define Kansei as ‘sensitivity’, that Kansei had the same meaning in classical literature. Unfortunately, ‘sensitivity’ is not complete as the meaning as Kansei. In [2], Kansei is defined as an internal concept with three basic of taste/sentiment, feeling and emotion. This model is presented in Fig. 2.

B. Definition on Japanese Society

According to the Japanese Society of Kansei Engineering (JSKE), Kansei is the integrated function of the mind and various functions exist during receiving and sending signals [3]. The process of filtering, acquiring information, estimating, recognizing, modeling, making relationship, producing, giving information or presenting that are the contents of Kansei.

C. Definition used in engineering and business

The definition of Kansei engineering [1] has been concluded the definition used in engineering and business which should be considered to be a series of information processing for processes of sensation, perception, cognition, sentiment and expression on the basis of the definition of Kansei of information processing cognitive psychology. More practically, Kansei should be thought to be a series of reactions from sensation to mental responses or sensation and sentiment. In [4], the definition of Kansei engineering has been given as Kansei is the impression someone gets from a certain artifact, environment or situation using all their senses of sight, hearing, feeling, smell, taste as well as their recognition.
III. WHAT IS KANSEI ENGINEERING?

Kansei Engineering is a kind of important product development methodology. First, it translates customer’s impression, feelings and demands on the existing products or concept to design solutions and parameters. Second, it shows how Kansei is translated into design [6]. So, the design by Kansei Engineering parametrically links to customer’s emotional response to the products/services with their properties and characteristics. Consequently, the products can be designed to bring forwards the intended feeling of customer.

IV. HISTORY OF DEVELOPMENT OF KANSEI ENGINEERING

Kansei engineering that was founded by Professor Mitsuo Nagamachi who is the Professor Emeritus of Hiroshima University. With a psychology and medical school education, Professor Nagamachi was appointed to the Engineering Management group there in the early 1970s to develop and emotional ergonomics for product design [6]. He described it as emotional technology or ‘emotional engineering’. The word ‘Kansei’ was first used in 1986 by K.Yamamoto who was the manager of Mazda Motor Corporation when he delivered a speech at Michigan University [7].

A. Kansei engineering in Japan

The term ‘Kansei engineering’ was soon adopted by Prof.Nagamachi [8]. In the decade to 1995, he created many statistical and knowledge engineering systems in order to translate a customer’s feeling and image for a product into design elements. Applications spread to automotive (Mazda, Nissan), cloths industry (Wacoal, Goldwin), electronic home products (Sanyo, Sharp), Office machine (Fuji, Cannon), Cosmetics (Shiseido) and other sectors. [8]

In the early 2000s, Kansei engineering has seen new departures, not only in the design product, but also in the applied science linking with robotic intelligence, psychology and neural sciences. The Japan Society of Kansei Engineering was established on October 9, 1998 and has published an international journal in English [3]. The Society goes beyond the conventional boundaries between the humanities and the social sciences fields such as education, economics, management, etc. and to the natural sciences fields such as medicine, information technology, computer systems and fuses together a broad range of academic fields to launch and develop the new scientific technique.
B. Kansei engineering in Northern Europe

The first contacts in 1999 between Japanese researchers and Linköping University in Sweden was the BT-Industries company (now Toyota/BT Handling Equipment) needed to improve the feelings of driving of their trucks [6],[9]. In order to improve efficiency, the first attempts were done by improving in ergonomics. Consequently, Kansei engineering was applied to improve the feelings of driving and then new models were launched to succeed in the markets. After that, other sectors of European car manufacturer, appliance and food industries were followed.

V. Business based on Kansei engineering

In this section, some examples of product developed based on Kansei engineering for product development support systems are presented such as a traditional Japanese product in Japan, the improvement of retail stores in Spain and a conceptual model of brand aesthetics in France, respectively.

A. Wet Cotton Hand Towels called “Oshibori” in Japan

When you come into cafes and restaurants in Japan, you will be given a glass of water and oshibori. Oshibori is a kind of small wet towels to wipe face and hands. Serving oshibori is one of the long-standing traditions in Japan. In order to assess the qualitative and sensory characteristics of oshibori, an evaluation using cotton and paper for oshibori has been presented in [10]. This paper reported that the cotton oshibori were assessed more favorably than paper oshibori in many aspects. Then, an extension of this work above presented in [11] in order to identify the feeling of comfort associated with woven cotton oshibori, including the various sizes and thicknesses of oshibori are studied focusing on the viewpoints of ‘gender’ and ‘generation’ in 2012. This work concluded that the female felt the changes in thickness, weight and moistness of oshibori more sensitive than the male subjects.

B. The Valencian retail stores competitiveness in Spain

Improvement of the Valencian Trade in Spain presented in [12] was the case study modified further by applying Kansei or Emotional engineering in the stage of development of a strategic plan. A general model in Fig. 3 was first introduced from a bibliographical search of scientific commercial and informative literature according to the purchase experience of customers as a paradigm of innovation in the commercial sector. There are 35 Valencian retail stores in Spain from different sectors which are used for this study. The results described that the strength of methodology based on Kansei or emotional to collaborate in the design of an effective service of differential strategy.

C. Brand aesthetics model in France

A brand is a name and series of symbols and signs protected by law. Brand and design are close to each other, but there is no study in both marketing and design research. Consequently, a conceptual model of brand aesthetics in both business and education was introduced in [13]. This aesthetic model is a proposed representation of actual links between the fields of marketing and design. The proposed brand aesthetics model is summarized in Table 1. The results of this study presented that the brand aesthetics model under the same theoretical framework is able to merge the specific knowledge of both professions of marketing and design.
Table 1 Model of brand aesthetics model [14]

<table>
<thead>
<tr>
<th>Brand Management</th>
<th>Level of decision</th>
<th>Brand decision</th>
<th>Design process</th>
<th>Design Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Brand definition</td>
<td>• Strategic</td>
<td>• Problems to solve with brand/positioning</td>
<td>• Intention</td>
<td>• Philosophy of brand</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Expression</td>
<td>• Concept</td>
<td>• Mission</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Narration</td>
<td>• Aesthetic universe of the brand</td>
<td>• Vision</td>
</tr>
<tr>
<td>• Brand identity</td>
<td>• Tactical</td>
<td>• Brand concept values</td>
<td>• Idea</td>
<td>• Basic and principles of permanent aesthetic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Brand architecture</td>
<td>• History</td>
<td>• Visualisation of brand architecture</td>
</tr>
<tr>
<td>• Brand image</td>
<td>• Operational</td>
<td>• Formalisation</td>
<td>• Experience</td>
<td>• Character</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Creation</td>
<td>• Experience</td>
<td>• Character</td>
</tr>
<tr>
<td>• Brand equity</td>
<td>• Strategic</td>
<td>• Brand repositioning</td>
<td>• Intention</td>
<td>• Idea</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Audit mission and actualization of aesthetic codes</td>
<td>• Character</td>
</tr>
</tbody>
</table>

VI. CONCLUSION

In this paper, the Kansei engineering was discussed in the various topics in Japanese and Western lifestyle. While referring to Kansei or Kansei engineering and their recent trends that were related to sensory, feelings and emotional evaluation. Many research works development based on Kansei engineering in Japan and Europe have been made it possible to improve products for better life in this recent.

VII. ACKNOWLEDGMENT

The author would like to express her gratitude to Professor Masao Kasuga at Graduate School of Engineering at Utsunomiya University in Japan for his vision, precious guidance, invaluable discussion and encouragement when visiting at Utsunomiya University in November 2012.

REFERENCES

Suchada Sitjongsataporn received the B.Eng. and D.Eng. degrees in Electrical Engineering from Mahanakorn University of Technology, Bangkok, Thailand in 2002 and 2009, respectively. She has worked as lecturer at department of Electronic Engineering, Mahanakorn University of Technology since 2002. Currently, she is an Assistant Professor of Electronic Engineering in Mahanakorn University of Technology. She was a visiting professor in November 2012 at Utsunomiya University, Utsunomiya in Japan. Her research interests are in the area of adaptive signal processing for communications, image processing and Kansei Engineering. She is a member of IEEE and the Japan Society of Kansei Engineering (JSKE).