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Customer Perception Assessment Technique Kansei Engineering : A Review

Library

KEYWORDS : Emotional Design ,Kansei Engineering Consumers perception

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ABSTRACT

Eventually many customers make their final decision regarding product unconsciously and decision making based on rather subjective factors. They purchase the product which "feels" better and are often unable to explain why. Taking this "feeling" into account ahead of the design process can give a substantial selling advantage to the company. With a view to satisfying consumers' need of a product from a design perspective, the physical elements of the product need to be linked to consumers' perception about the product, a field of research called Emotional Design has been created. To understand the emotional design various methods were developed over the years. One of the technique is Kansei Engineering. In this paper concept of Kansei Engineering and its History , Methodology and its role in product development in industries i.e automobiles ,electronic devices ,home equipment's etc have been described.

1. Introduction

Success of a well-designed product not only depends on the functional requirements alone. The Customers' psychological needs i.e. perceptual and emotional experiences also need to be fulfilled. Eventually many customers make their final decision regarding product through unconsciously and decision making based on rather subjective factors. They purchase the product which "feels" better and are often unable to explain why. Taking this "feeling" into account ahead of the design process can give a substantial selling advantage to the company.

Designers often have difficulties in rationalizing consumers' emotion about the product .With a view to satisfying consumers' need of a product from a design perspective, the physical elements of the product need to be linked to consumers' perception about the product .A field of research called Emotional Design has been created.

The emotional design studies the complex emotional relationships which links product to consumers; these emotion can be of unconscious kind. To understand the emotional design various methods were developed over the years. One of the techniques is Kansei Engineering, which was developed in Japan in the year 1970. In this paper the concept of Kansei Engineering and its History , Methodology and its role in product development in industries for example automobile ,electronic devices (mobiles phones ,tv), Home equipment etc. have been described .

2. Kansei Engineering (Japanese: 感性工学 kanseikougaku, emotional /affective engineering भावयन्त्रानमाव्या Sanskrit)

kansei engineering summarized as the analysis of human expression of feelings on a product (Nagamachi, (1995)). In Japanese the feelings or impressions that the customer wants the product to convey are called 'kansei'.

Kansei Engineering parametrically links customer's emotional responses to a product or service with their as shown in figure 1

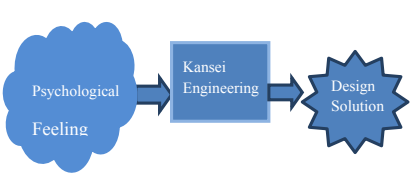

Figure 1 A Kansei Engineering System (KES) adapted from Nagamachi (1995).

2.1 History of Kansei Engineering

Mazda Motor Company manager K. Yamamoto used the term Kansei Engineering for the first time when he delivered a speech at Michigan University in 1986 (Yamamoto, (1992)). Since then the term has been used by many researchers within the area. However, the research field is much older. Before Kansei Engineering was coined the term Sensory or Sensitivity Engineering was used (JSKE,(2004)). Already in the 1970ies Nagamachi presented an affective product development method which he called 'Emotional Engineering' .

Nagamachi was a researcher pioneering the development of Kansei Engineering in an academic context. His approach was to develop Kansei Engineering as an 'ergonomic consumer-oriented technology for new product development aiming at implementation of a consumer's demand in the product. He defined Kansei Engineering as a 'technique for translating the human Kansei into product design elements' (Nagamachi , (1989)).

Today Kansei Engineering is a inter-disciplinary product design methodology that extends over the humanities, social sciences and natural sciences. It integrates affective elements in products already in the development phase.

2.2 Measuring the Kansei

Since Kansei is an internal sensation, it can at present only be measured using external methods. Various methods shown in figure 2.

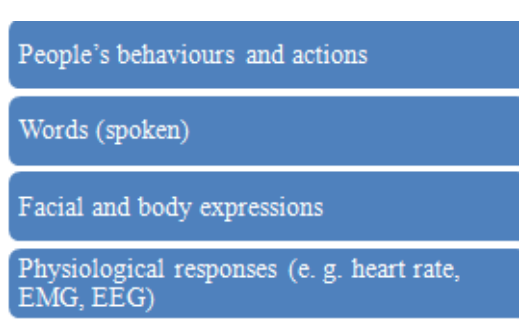

Figure 2 Method measuring kansei

2.3 Type of Kansei Engineering

Kansei Engineering as a unitary methodology has grown more complex due to the number of its applications. Nagamachi

(1997a) collected all these applications on Kansei Engineering and grouped them according to the tools included and task areas. From these groups he identified so called types of Kansei Engineering. At present six different types of Kansei Engineering exist:

2.3.1 Kansei Engineering Type I- Category Classification
In Kansei Engineering Type I, a product strategy and a market segment is identified and developed into a tree structure identifying the customer's affective needs. These affective needs or Kanseis are then connected manually to product properties.

2.3.2 Kansei Engineering Type II- Kansei Engineering System
Kansei Engineering Type II is often a computer aided system using interference engines and Kansei databases (Nagamachi, 2001). The connections between Kansei and product properties are made using mathematical statistical tools.

2.3.3 Kansei Engineering Type III- Hybrid Kansei Engineering System
Kansei Engineering Type III is also a computer database system similar to the second type. However, it can not only suggest suitable product properties from an intended Kansei, but also predict the Kansei that product properties elicit, e.g. a using prototype or mock-up.

2.3.4 Kansei Engineering Type IV- Kansei Engineering Modelling
The forth type of Kansei Engineering focuses on building mathematical prediction models. These models are more strongly validated as in the Types II and III.

2.3.5 Kansei Engineering Type V- Virtual Kansei Engineering
Kansei Engineering Type V integrates Virtual Reality (VR) techniques with standard data collection systems. This type replaces the presentation of real products with VR representations.

2.3.6 Kansei Engineering Type VI- Collaborative Kansei Engineering Designing
In Kansei Engineering Type VI, the Kansei database is accessible via Internet. Such design supports group work and concurrent engineering. (Nagamachi, 1997a, Nagamachi, 2001)

3. A Model on Kansei Engineering Methodology
In Japanese publications, different types of Kansei Engineering are identified and applied in various contexts.

Schütte ,(2002)examined different types of Kansei Engineering and developed a general model covering the contents of Kansei Engineering. This model is shown in figure 3

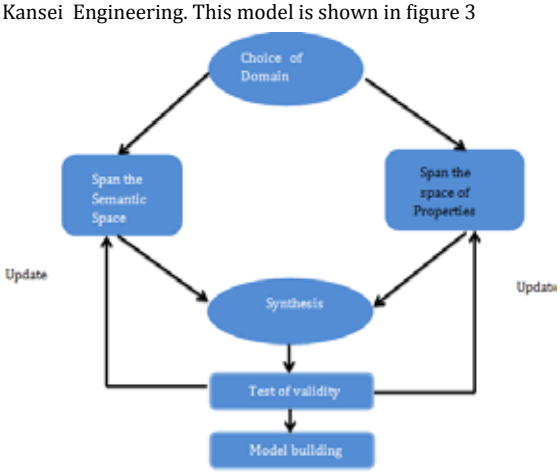

Figure 3 Kansei Engineering procedure (Schütte, 2002)

3.1 Choice of Domain
Choice of domain includes the selection of a target group of people , market niche and specification of the new product. Based on this information, product samples are collected, representing the domain. The Kansei Domain can be understood as the ideal concept behind a certain product. In this context domain describes the overall idea behind and product type assembly of products. Practical any consumer product can be studied by using kansei engineering some of these products shown in figure 4

Figure 4 Example of various products

3.2 Span the Semantic Space
The expression 'Semantic Space' was addressed for the first time by Osgood et al (1969). He posed that every artefact can be described in a certain vector space defined by semantic expressions (words). This is done by collecting a large number of words that describe the domain. Suitable sources are pertinent literature, commercials, manuals, specification list, experts etc. The number of the words gathered typically varies, depending on the product between 100 and 1000 words. In a second step the words are grouped using manual (e.g. Affinity diagram, compare: Bergman and Klefsjö, (1994) or mathematical methods (e.g. factor and/or cluster analysis, compare: Ishihara et al., 1998). Finally a few representing words are selected from this spanning the Semantic Space. These words are called Kansei words or Kansei Engineering words. For Examples Luxuriousness, Simplicity, Attractiveness, Texture etc.typical semantic space with chair shown in figure 5

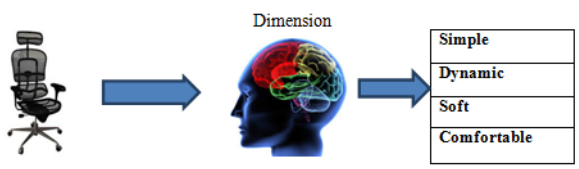

Figure 5 Semantic Space

3.3 Span the Space of Properties
The next step is to span the Space of Product Properties, which is similar to the Semantic Space. The Space of Product Properties collects products representing the domain, identifies key features and selects product properties for further evaluation. Typical space properties for mobile phones are shown in figure 6 .

Figure 6 Product properties example

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3.4 Synthesis
The probably most important step, which makes Kansei Engineering unique is its ability to connect the describing words (Kansei words) with the properties of the product. The figure 7 below illustrates the substance of the synthesis step. The data are gathered using semantic scales and evaluated by statistical methods.

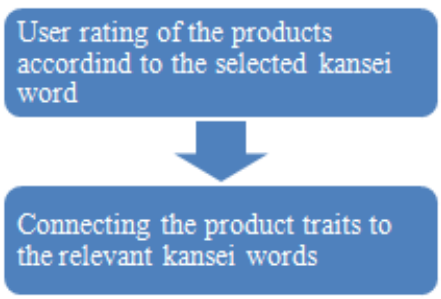

Figure 7 The Synthesis phase.

3.4.1 User rating of the products
Basically, the data collection is carried out by assembling a number of voluntary participants and asking them to rate the product on semantic scales (Osgood, 1969).For example , a 5 point likert scale for motorcycle as shown in figure 9

Figure 9 User rating of the product Motorcycle

3.4.2 Connecting the Semantic Space to the Space of Product Properties
A number of different statistical procedures using different mathematical have been developed (Nagamachi, 2001).various Mathematical methods used shown in figure 10

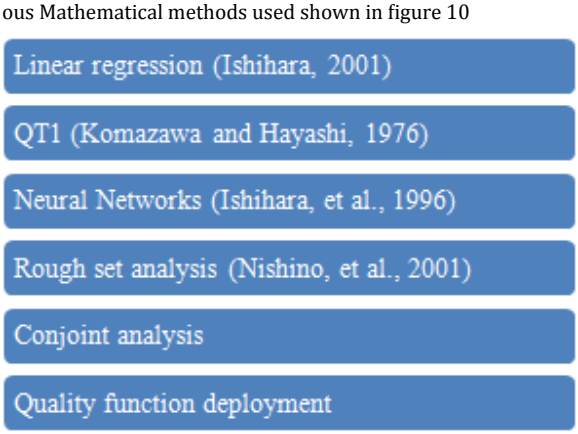

Figure 10 Mathematical methods for kansei evaluation

3.5 Test of Validity
Using (Weinreich, 1958) ideas about the Semantic Space it is possible to conduct a factor analysis from the data gathered and compare the results with the Kansei words delivered from the Semantic Space.

By comparing the result from the first (after selecting the Kansei Words) and the second factor analysis (after the completed synthesis) it is now possible to spot the words which have no effect on the Kansei. This is fed back to the Semantic Space and if an iteration process is necessary only, when the new words are used.

3.6 Model Building
When the validity tests give a satisfactory result, the data gathered from the synthesis can be presented as a model. These models are a function depending on the product properties and predict the Kansei score for a certain word. Typically model linked emotional response product property shown in figure 11

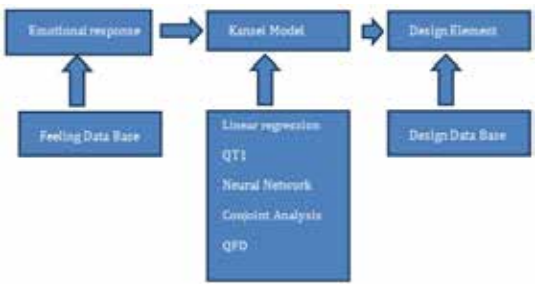

Figure 11 Translatation proces =Modeling

4. Applications of the Kansei Engineering
Kansei Engineering has a wide area of applications. The range of industrial business areas stretches from Automobile industry, Electronic devices ,Home equipment, Everyday things via packaging design to cloth and furniture manufacturers.

4.1 Automotive industry
In the automotive industry, companies like Mazda, Ford, Nissan and Honda have cooperated in projects. Jindo and Hirasago conducted a project on the front-end design of vehicles (Jindo and Hirasago 1997b). Matsubara examined the car exterior (Matsubara et al. (1999)) and conducted a comparison between European and Japanese Kansei regarding car exterior design in co-operation with the University of Nottingham. The automobile interior was evaluated in a study of Ishihara (Ishihara et al. 2001), who examined, the emotional impact of different instrument panels of passenger cars on the user.

Figure 12 The Mazda MX5 an Example of applied Kansei Engineering

4.2 Electronic devices
One of the great success stories within Kansei Engineering's history is Sharp's video camera with an adjustable external LCD display (Nagamachi 1997c). But also colour copiers were the object of Kansei Engineering examinations (Fukushima et al. 1995).

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Figure 13 Sharp Camcoder

4.3 Home equipment

In the home-equipment sector, several studies were carried out in order to build up a KES for kitchen design (Imamura et al. 1997) and (Matsubara and Nagamachi 1996). Skogman (2002) made comparisons of different types and brands of vacuum cleaners at Electrolux in Sweden.

4.4 Everyday things

Everyday things like packaging design are often evaluated. Ishihara made examinations of the exterior design of coffee cans (Ishihara et al. 1997b), beer cans (Ishihara et al. 1998a) as well as of milk cartons (Ishihara et al. 1996). It was intended to express the taste of the contents by colour setting, the shape of the logo and illustration on the outside.

5. Conclusion

Aim of Kansei Engineering is to gain valuable knowledge to assist in design process. Kansei Engineering system enables an interaction between customers and manufacturing by providing communication between two parties.

It helps customers to improve the understanding about the products, in which they are interested and also helps designers to explore and capture the customers' emotional requirement and refine the designs according to the emotional response from the customers. With the increase of globalisation and flexibility of manufacturing systems, the companies can accommodate different styles of consumers purchasing behaviour.

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