



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**STUDY AND ANALYSIS OF COGNITIVE STYLE TOWARDS
THE AFFECTIVE DESIGN IN KANSEI ENGINEERING**

This report submitted in accordance with requirement of the Universiti Teknikal
Malaysia Melaka (UTeM) for the Bachelor of Manufacturing Engineering
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ABSTRAK

Projek ini adalah mengenai ciri-ciri reka bentuk produk berdasarkan pilihan dan kepuasan pelanggan melalui Gaya Kognitif pelanggan (CoS), Kepuasan Pelanggan (CS), Kansei Kejuruteraan (KE), dan Pembezaan Semantik (SD). Kaji selidik itu dijalankan dengan soal selidik yang dibangunkan di Melaka yang mengandungi 3 jenis kereta (Kereta Sedan, Kereta City, dan MPV) digunakan dalam berskala 1 hingga 5 daripada perbezaan semantik kata-kata Kansei. Oleh kerana pelanggan lebih suka reka bentuk produk yang sebenarnya percanggahan antara ciri-ciri teknikal mereka (mudah, eksklusif, sporty, pintar dan moden). Objektif kajian ini adalah untuk menyiasat, menganalisis, menilai, dan mengesahkan ciri dan pilihan reka bentuk disamping untuk menjana membuat keputusan untuk mencari keutamaan produk terhadap profil reka bentuk kereta tersebut. Pasca ujian diperlukan untuk mengesahkan keputusan ,disamping analisis kolerasi untuk Kaedah Gaya Kognitif yang dipilih menggunakan Ujian Personaliti Eysenck Ujian, Indeks Gaya Kognitif dan Teori Big . Tujuan menggunakan Kaedah Gaya Kognitif ini adalah untuk mencari penjelasan personel sifat-sifat dan keaslian tingkah laku personel persepsi, pemahaman dan psikologi manusia terhadap reka bentuk. Hasil kajian utama menunjukkan bahawa keutamaan reka bentuk produk berkaitan dengan gaya kognitif terhadap emosi pelanggan dimana kognitif pelanggan-sifat peribadi (berdasarkan CSI & Teori Big) mempunyai kolerasi ketara terhadap ‘Safe’ dan ‘Sporty’, masing-masing untuk kereta Sedan, dan City. Manakala untuk kereta MPV, kolerasi yang ketara wujud antara kognitif pelanggan-sifat peribadi adalah dengan (menggunakan CSI dan EPQ) terhadap ‘Sporty’ dan (berdasarkan Teori Big 5) terhadap ‘Comfortable’. Melalui dapatan ini, kognitif pelanggan-sifat peribadi boleh digunakan untuk meramalkan ekspresi pelanggan terhadap sesuatu produk.

ABSTRACT

This project is about product design features based on customer preferences related to customer's Cognitive Style (CoS), Kansei Engineering (KE), and Semantic Differential (SD). The survey conducted with the questionnaires developed in Melaka that contained 3 types of car product (Sedan Car, City Car, and MPV) applied in the scaled 1 to 5 semantic differential of Kansei words. Since the customer preferences to the design of product that are actually contradiction to their technical characteristic (simple, comfortable, safe, sporty and luxury). The objectives of this study us to investigate, analyze, evaluate and validate the features and the design preferences of the product in order to find the priority of the product towards the profile design of the car. The Post- Test is required in order to validate the results, beside the correlation analysis of cognitive style selected (Eysenck Personality Test, Cognitive Style Index and the Big 5 Theory). The purpose of using theses personality and cognitive test is to find an explanation of personal traits and originality of personal behaviour of perception towards the understanding of human psychology related to the product design. The result of main survey shows that the preferences of product design were related to Cognitive Style toward customer's emotional feelings in which customers' cognitive – personality traits (based on CSI and The Big 5 test) is having significant correlation towards Safe and Sporty for City Car and Sedan respectively, while based on EPQ, the significant correlation existed towards Luxury and Safe for City Car and Sedan respectively. Whiles, for MPV car the significant correlation existed between the customers' cognitive – personality traits using CSI and The EPQ towards Sporty and The Big 5 towards Comfortable. Based on these finding, the customers' cognitive – personality traits can use employed to predict what the customer expression towards the product design.

DEDICATION

For my beloved parents who were always supported me,

Khairulazdan Bin Abdullah
Ruzniyati Binti Md. Noorwawi

For my supervisor,

Mr. Hasoloan Haery Ian Pieter

For my families and my friends, thanks for your love and care.

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LIST OF ABBREVIATIONS, SYMBOLS AND NOMENLATURE

CAR	- Consumer Affective Response
CoS	- Cognitive style
CS	- Customer Satisfaction
CSI	- Cognitive Style Index
CSA	- Cognitive Style Analysis
DP	- Digital Physiognomy Software
EPQ	- Eysenck Personality Questionnaire
GUI	- Graphical User Interface
KAI	- Kirton Adaptation-Innovation Index
KE	- Kansei Engineering
KES	- Kansei Engineering System
MDS	- Multi-dimensional Scaling
MPV	- Multi-Purpose Vehicle
QFD	- Quality Function Deployment
SD	- Semantic Differential
SPSS	- Statistical Package for the Social Science
VOC	- Voice of Customer

CHAPTER 1

INTRODUCTION

1.1 Project Background

In today's dynamic business environment, an organization must always outperform their relevant business strategy to consistently deliver quality products/services to their customers. Specifically, to consumer loyalty programs as a key component in their future business prospects and the highest point of their concerned to their existence in the market (Gitman & Carl, 2005; Jiao *et al.*, 2006). On this case, the company should treat the consumer loyalty agenda is not only through the item's accessibility that is best fit to the customers' need, however also to customer's full of feeling reactions to the presence of an item that enormously impact their acquiring choices.

Based on the perspective of product, this is influenced by successful products development where the modelling of consumer's affective responses (CARs) should work in every company's plan related to their product design (product development) as competitive advantages (Yang, 2011:11382). Particularly, to the appearance of a product that will greatly influence the customer purchasing decision as the subjective feelings of customers (Shieh *et al.*, 2011:197). By grouping the product design into adjustable item stage families (in which mass customization is not only to comply with whatever required by customers), they are also should be able to answer the question of who the their

customer related to market segmentation and target marketing, and towards the question of what the customer wants that depends on how to identify the product attributes and their importance to targeted market segment (Oztekina *et al.*, 2011:2). Therefore, to impart plans to the customers (through item or framework of product design) includes perception and its formal style needs to be conveyed through formal styles (Chen *et al.*, 2006: 207). Here, a product identity should be formed as an arrangement of solid human identity components in order to recognize the customers associated with numerous choices on how the product looks and acts in the market by promoting the company's effort and messages in their products (Dumitrescu, 2010). In an era of product diversification, according to Luh *et al.*, (2012:230), since the meaning of a product to consumers is not necessarily the same as its meaning to designers, designers should therefore not only enough to analyze consumers' demands and preferences solely based on their own professional thought processes.

Para perspectiva acima mencionado antes, Du et al, (2006: 396). Ele argumentou que a empresa deve oferecer uma combinação "correta" dos objetivos do mercado de materiais. Isto significa que as definições de personalização versáteis (que se refere à maioria dos parâmetros do plano com o esquema de parâmetros fase adaptável usando definição de rede) ligados à configuração das categorias de produtos deve cumprir com os requisitos clientes e fortalecer cliente auto-estima (Krishnapillai e Zeid, 2006: 29). Ao nível individual, a identidade do produto é o efeito da cooperação de cada cliente ou telespectador com os itens, enquanto um nível geral, os itens identidades foram feitas por técnica de engenharia ou desenho e / ou planejador. De acordo com Nagamichi (2007: 1) relacionado a um desenvolvimento de produto, ele disse que é "mercado-in" filosofia do que a orientação do consumidor para o desenvolvimento de produtos, enquanto a outra é como a filosofia "de saída do produto "envolvendo o fabricante fornece as especificações da tecnologia e design de acordo com a decisão do lado do fabricante.

Moreover, since the design of products are likely to be incremental innovations (such as involving an enhanced or differentiated exterior styling), the

cognitive and emotional attributes of objects (that make them either easier or more difficult to use) is, therefore, as an essential key role in communicating the expectation as for the better usability of product that may be achieved through the visual design principles and meaning (Dillman *et al.*, 2005:211-212). Here, Blijlevens *et al.*, (2012:45), specifically, discussed about consumers' aesthetic appraisal of products that depends on the presence of certain product design properties in the product design (*e.g.*, colour, shape). Luh *et al.*, (2012:23) stated the consumer feelings toward a product where the product has meaning to the consumer and this meaning is generated by cognition. On this issue, the product properties can put different cognitive and affective processes in motion that influence aesthetic appraisal. Typically, this is based on a cognitive process and an affective process as the experience that arouse to influences aesthetic appraisal (Berlyne, 1960; Veryzer & Hutchinson, 1998).

Según Mahlke (2008: 01), porque la estética visual es una dimensión importante de cualidades no instrumentales entonces las preguntas son cómo utilizar métodos de ingeniería y estudio científico conceptos estéticos en el diseño del sistema y de producto, y incorporar la ingeniería y métodos científicos en el diseño y la evaluación estética. En primer lugar, en relación con un conjunto de procesos cognitivos que caracterizan a los individuos con las tendencias para la creatividad en el diseño representado los campos de la creatividad y algo de dominio como menor (Casakin et al 2011:. 167). En segundo lugar, en relación con una construcción conceptual de la carga cognitiva y un modelo teórico de ejecución de la tarea, el esfuerzo mental y la carga cognitiva para revelar la comprensión pantalla interrelación (Huang et al, 2009:. 150). En tercer lugar, el diseño integrado que puede activarse, proporcionando nuevas herramientas para el diálogo entre los participantes a través de una plataforma de diseño experimental, el análisis detallado de los mensajes intercambiados entre los participantes (Tickiewitch y Verón, 1997: 81).

En conclusión, ya que "estados de ánimo" preferencias positivos y negativos y cognitivos y experiencias de representación tienen impactos en el

cognitive and emotional attributes of objects (that make them either easier or more difficult to use) is, therefore, as an essential key role in communicating the expectation as for the better usability of product that may be achieved through the visual design principles and meaning (Dillman *et al.*, 2005:211-212). Here, Blijlevens *et al.*, (2012:45), specifically, discussed about consumers' aesthetic appraisal of products that depends on the presence of certain product design properties in the product design (*e.g.*, colour, shape). Luh *et al.*, (2012:23) stated the consumer feelings toward a product where the product has meaning to the consumer and this meaning is generated by cognition. On this issue, the product properties can put different cognitive and affective processes in motion that influence aesthetic appraisal. Typically, this is based on a cognitive process and an affective process as the experience that arouse to influences aesthetic appraisal (Berlyne, 1960; Veryzer & Hutchinson, 1998).

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1.2 Problem Statements

The way of designers to plan the development of a new product related for customer satisfaction, the designer's have to understand what the buyers or customers' desires. This plan is, actually, based on numerous items which are effective from an originator's point of view in the commercial centre that will imply the buyers' insight models (Chuang *et al.*, 2001). In this perspective, the psychological need towards emotional satisfaction of product is an essential part of design process. Therefore, the company has to develop the products that embody the values connected to their customers' aspirations and desires (Chen *et al.*, 2009:18).

De acordo Mahlke (2008: 01), porque a estética visual é uma dimensão importante de qualidades não-instrumentais, em seguida, as perguntas são como usar métodos de engenharia e conceitHowever estudo científico, Desmet (2003: 1) comentou que as emoções articulada através da aparência o produto são, na verdade, muitas vezes intangíveis e impossíveis de prever ou desenho é. Em primeiro lugar, desde que os clientes individuais impressões subjetivas devem ser traduzidos em descrições verbais que são relativamente curta duração estados emocionais, o que, no entanto, tendem a ser vago e ambíguo (e Khalid Helander, 2006). Nesta perspectiva (centrada nas pessoas disciplina a práticas industriais), também é muito difícil de captar as necessidades emocionais dos clientes por meio de suas origens linguísticas. Para garantir a satisfação do cliente, então você precisa experimentar as chamadas porque cada um o número de clientes, provavelmente, irá correlacionar de forma expressiva (e experiência) para atender as demandas que exigem pessoa privada ou detalhado.

Em segundo lugar, existe uma lacuna entre a sensibilidade subjetiva do usuário (impressão, olhar e sentir) o grau e o valor correspondente no banco de dados (Sakurai et al, (2012: .. 25) Esta condição refere-se à data opinião do design do produto da ilustração (por exemplo, imagem, ou seja, filmes, som, etc.) refere-se à (memória preferências cognitivo-de personalidade) tipo de clientes que

representam os julgamentos de fatos ou decisões deve ser feita de modo a que têm impactos sobre acórdãos e confiança em julgamentos (Hastie e Pennington, 1995), por esta razão, Yang (2011: 11.382) respostas afetivas proposta consumo de modelagem (CAR) (Enterprise. produtores) para ter a capacidade de cauda para atender a satisfação a implementação de consumidores dos clientes respostas emocionais para a aparência do produto terá grande influência nas decisões de compra (Shieh et al, 2011: ... 197) Basicamente, o modelo centra-se na escala qualitativa de avaliação (tratado o conjunto linguística prazo da variável linguística) que comentou sobre o problema da multi-critério tomada de decisão (Huynh et al, 2010 :. 575). Kansei abordagem japonesa deste modelo é muitas vezes interpretado 'emoções' completa " para representar os sentimentos, impressões e emoções (Haliday e Setchi, 2009: 2). Como a principal filosofia que foi especialmente criado para medir ou avaliar as necessidades dos clientes entusiasmados, Kansei Engenharia é visto 'e coordenado com a configuração última vez (Beitia et al 2009: 453).

Em terceiro lugar, Averril et ai, (2011: 39). Ele comentou sobre a linha de emoções tendência a ser relevante para a criatividade com três grandes meios de comunicação. A partir da história para ajudar a criatividade, a criatividade Isso é quase sempre uma experiência emocional e, em seguida, as emoções em si podem ser elementos imaginativos. Um dos vários métodos altamente eficazes (juntamente com a sua principal preocupação especial em relação à variedade de funções da opção) é "quase todos os pontos possíveis", a fim de distinguir a empresa para a satisfação do cliente como resultado de procedimento do exame do valor do cliente (Du et al, 2006: 396). Neste sentido (em relação à satisfação do cliente), não existe uma base sólida para a avaliação direta dos especialistas em avaliação de habilidades incluído sensibilidade e experiência (Tanoue et al 1997: 115). Portanto, de acordo com Wang et al, (2011: 8738)., A especificação útil norma voltada para padrão projetado para recursos (design ergonômico) Eficiência (desenho útil) que são agora raramente revigorado quase qualquer opção ambicioso de programas de desenvolvimento do produto pode ser necessária através do padrão por meio de conseguir as emoções dos clientes.

Pela aplicação do conhecimento nos campos acima design é, no entanto, não estrutural complexa. Primeiro, é difícil de ser categorizada e universalmente aplicável uma vez que este é o princípio simples (Lee, 2012: 137). Embora esta seja uma principais influências sucesso de um novo produto através de como capturar o fator "voz do cliente". (Chen et al, 2008 :. 971). Lai et al, (2005: 445) Sua pesquisa para o desenvolvimento contou sobre designers de produto, que geralmente são fornecidos com um sentido de destino gerado com base na análise do mercado em que, em seguida, usa suas experiências subjetivas para desenvolver o produto física .. Porque havia um sentido de destino em função dos critérios que o sucesso ou o fracasso do projeto final, havia o risco de que o produto é realmente a falha antes mesmo de entrar no mercado. Em segundo lugar, uma vez que em design de produto é, no entanto, uma tarefa importante e crítico, os designers que participaram dos processos de desenvolvimento de design industrial não deve ser o uso e desenvolvimento de modelo científico e quantificável específico para análise formas (Lee 2012, precisamente e de forma adequada: 137). Anteriormente, Roy et al, (2009: 172). Sublinhar este assunto relacionado com a reação individual contra os elementos existentes usando palavras Kansei, a fim de fazer novos contornos em design de produto que vai trazer para fora uma reação positiva. Sobre como fazer uma interpretação das exigências dos clientes em componentes da estrutura, Kun et al 'artigos, (2011: 420) estudou com a técnica focada no uso de desdobramento da função qualidade (QFD) para ajudar designers no caracterização de elemento individual .. Todas estas técnicas existentes aplicados estão sendo adaptados para montar a data que pode ser usado pelo designer para construir novos elementos para atender vários estilos de vida.

Além disso, as abordagens acima é basicamente sobre como recolher dados sobre a maioria dos poderes, o que eles querem, avisos, sabores, sons e melhor. Embora seja abordagens famosos para decifrar os sentimentos mentais de clientes em torno de componentes elemento de percepção de esquema ("Engenharia Kansei"), portanto, não foi suficiente devido ao valor intrínseco de

produtos de qualidade reais (sob a condição de que as óbvias tecnologias mais recentes de deficiência, juntamente com a ópera). É por isso que o design de produtos com características superiores de experiência são, na verdade, ainda tem um monte de complicações (Lai et al, 2005: 446). Para abordar esta questão, Koleini et al., (2010: 1) projeto de solução e estilo que é muitas vezes a atividade de resolução de problemas na criação de uma linha de produtos produtiva ajustado para as exigências dos consumidores é enfatizada. De acordo com Chi (2009: 7838), o conhecimento ontologia do sentimento humano (para compartilhar e reutilizar entendimentos comuns entre diferentes aplicativos), a fim de atingir os requisitos de concepção centrada no consumidor deve basear nos sentidos, portanto, usada para capturar a propriedade e define semântica (observe a ordem da sequência, continuidade, coordenação e integração para que se torne clara, transparente, menos complicado e mais fácil de classificar) recuperação da interpretação subjectiva. O objetivo principal deste objectivo é capturar com precisão as necessidades emocionais dos clientes relacionadas com jogo design de produto às necessidades (Wang 2011: 8738). No entanto, uma vez que os objetos feitos pelo homem ter formas diferentes e podem ser considerados como estruturalmente dissemelhantes (Kahlaoui et ai, 2007: 2), o contexto em que ocorreu a estimulação influencia a formação da representação perceptual do estímulo ("codificação perceptual" la) (Borowski & Mason, 1996: 70) para a satisfação depende realidade em grande parte vai em uma comparação de imagem baseada em e atual dos produtos expectativas.

Além disso, uma vez que os desejos emocionais de clientes não deverão ser pensados ao fazer itens que desencadeiam a resposta emocional ao cliente para os detalhes do padrão de percepção (por exemplo, modelo) com os produtos (Jordan, 2000; e Demirbilek Sener, 2003), as bases que envolviam ideais pessoas e pessoas de bom senso poderia incidir sobre que tipo de produto padrão, na verdade, parecem vulneráveis (Helander e Tham, 2003). Desmet et al, (2004: 2). No seu parecer relacionado com o design eo designer comentou sobre as tendências emocionais intangíveis e sensações particulares induzidas pelas suposições sobre sentimentos na preservação de sensações que normalmente ser