



**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

**CONVOLUTION DESIGN PROFILE TOWARD KANSEI  
ENGINEERING**

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

by

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**BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA**

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## **DEDICATION**

Thank you for always be there, this is for you, Mom.

*Romiah binti Mamat*

Thank you for guide me well and sharing your knowledge.

*Mr. Hasolon Haery Ian Peter*

## **APPROVAL**

This report is submitted to the Faculty of Manufacturing Engineering of UTeM as a partial fulfilment of the requirements for the degree of Bachelor of Manufacturing Engineering (Manufacturing Design) with Honours. The members of the supervisory committee are as follow:

(Signature of Principal Supervisor)

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(Official Stamp of Principal Supervisor)

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## ABSTRAK

Tujuan kajian ini adalah untuk mengenal pasti dan menyiasat perasaan emosi pelanggan (reka bentuk produk) berdasarkan kepuasan pelanggan dan keutamaan dalam perbezaan semantik berbanding produk imej ke arah Kansei Kejuruteraan. Projek ini menganalisis perasaan emosi pelanggan dan tanggapan mengenai produk (reka bentuk kereta), melalui kaji selidik yang dijalankan terhadap 511 pelajar dan kakitangan di Universiti Teknikal Malaysia Melaka (UTeM) dan penduduk Melaka di Melaka Sentral. Terdapat tiga jenis reka bentuk kereta yang digunakan dalam projek ini dan dianalisis dengan menggunakan pemprosesan imej untuk menentukan keutamaan yang diperlukan untuk reka bentuk ciri-ciri produk, manakala perisian yang digunakan untuk mendapatkan data mengenai profil reka bentuk yang dijalankan dalam kajian ini adalah Curve Pakar bagi persamaan matematik. Dalam projek ini, Pakej Statistik untuk Sains Sosial (SPSS) digunakan untuk menganalisis dan mendapatkan korelasi bagi data statistik berdasarkan kemahuan pelanggan apabila mereka membeli produk dan juga apa sifat-sifat tertentu yang berkaitan ciri-ciri reka bentuk kereta . Terdapat 6 daripada 20 profil reka bentuk untuk setiap jenis kereta yang dipilih oleh responden mengikut keutamaan mereka. Sementara perkataan Kansei 5 daripada 15 perkataan Kansei dipilih oleh responden untuk mewakili profil reka bentuk. Selepas analisis data persamaan matematik dibangunkan menggunakan Curve Pakar. Berdasarkan persamaan matematik keutamaan perkataan Kansei untuk setiap jenis kereta telah ditentukan mengikut kuadran. Untuk kereta bandar yang 'mudah' mewakili dalam kuadran 1, untuk sedan 'Eksklusif' mewakili dalam kuadran 2 dan bagi MPV 'Eksklusif' mewakili dalam kuadran 3. Untuk mengesahkan data dalam kajian utama, ujian pos dijalankan dan Hasilnya adalah sama dengan kajian

## **ABSTRACT**

The purpose of this study is to identify and investigate the customers emotional feeling (product design) based on customer satisfaction and preferences in semantic differential versus image product toward Kansei Engineering. This project analyzes the customer emotional feeling and impression about the product (car design), through the survey conducted towards 511 students and staff at Universiti Teknikal Malaysia Melaka (UTeM) and citizen of Melaka at Melaka Central. There are three types of car design used in this project and were analyzed using Image processing in order to determine the priorities required to the characteristic product design, while the software used to get the data about the design profile carried out in this study is Curve Expert for the mathematical equation. In this project, the Statistical Package for the Social Sciences (SPSS) is used to analyse and obtain the correlation for statistical data based on what customers' needs when they purchase a product and also what the particular related attributes to their preferences characteristics on car design. There are 6 out of 20 design profiles for each car types that choose by respondents as the most preference design profile. Meanwhile for the Kansei words 5 out of 15 Kansei words were chose by respondents to represent the design profile. After data analysis were obtained the mathematical equation was develop using Curve Expert. Based on mathematical equation the preference Kansei word for each type of cars was determined in which quadrant. For the city car the 'Simple' represent in quadrant 1, for sedan 'Exclusive' represent in quadrant 2 and for the MPV 'Exclusive' represent in quadrant 3. To validate the data obtain in main survey, post-test was conducted and the result is same as the main survey.





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## **LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURE.**

KE	-	Kansei Engineering
NSM	-	Natural Semantic Metalanguage
PSM	-	Project Sarjana Muda
SPSS	-	Statistical Package for the Social Science
SD	-	Semantic Differential

# CHAPTER 1

## INTRODUCTION

This chapter contains the project background of the project, the problem statement, objective of the project, the scope of the project and the project framework.

### 1.1 Project Background

In today's life environments, the consumers have a lot of goods at home and they want to have goods more needed, attractive, and very sensitive to their personality. They need the quality product that is an essential part of the design process and psychological needs towards their emotional satisfaction. To fulfil their satisfaction, the basic requirements that they consider are the valuable products to their desire; fulfil the psychological needs (such as feeling and emotion) and that also satisfy the physical requirements (Mamaghani & Ebrahimi 2010:14). Hence, the product design and development in the current years had shifted its focus from product functional requirements to user experiences that gained from the interaction with the products for the sake to satisfy a more discerning eye of consumers (Huang *et al.*, 2010:113). In brief, the consumers will look beyond functionality to consider emotional design features.

In addition, since of all human being interactions involved emotions towards the thing that's they see about the products, the different people will also experience with the different emotions towards the same product because of emotions as an essentially personal characteristic (Desmet *et al.*.,2001:32). To address such issues, Laurans (2009: 1) proposed the forms of emotional products in terms of general shape, structure, design, appearance, and type. Cai (2003:233) noted there are five components of emotion represented the forms, such as feelings, expression,

behaviour, physiological activation, and appraisal. Since the customers will actively demand to the design features that are important to their satisfaction (Helander *et al.*, 2013:456), the designers must understand and know how to utilize the components of affective design consumer's psychological feeling towards a product when they create the products that completely suits to the taste of customers (Shieh *et al.*, 2011:197). Therefore, in developing the product design should be based on the transformation from traditional one-way expression to a two-way dialogue between the designers and users. By considering the "voice of the customer", the designer priority should be focused on customer's satisfaction in various customer needs, the functionality, and affective needs (Jiao *et al.*, 2006:658).

Furthermore, since modern consumers concerned with the products possessed superior feeling features that is usually dependent on its external appearances and characteristics (such as form and colour), the designer therefore needs to continue and strengthen a specific brand image of products to the individual model level (Chen *et al.*, 2007:6775). Even though the kind of products chosen lack obvious to the advanced technologies and functions, the way of a product looks is one of the most important factors that designers must consider when they design products. Therefore, it is a must for designers to learn how truly delight their customers by incorporating the learning more about them, such as their needs and how their perceiving and judgement to various aspects of the products. Specifically, on how the designers must creatively make the innovation of the design product for usability, the design product for performances, and the perceptual of design product with details of their criteria (Wang, 2011:8738). Here, once they want to purchase any products as their preference, the quality and the functionality would be influenced in making their choosing (Tsuchiya *et al.*, 1996:135).

Since the way of a product looks is one of the most important factors affecting a consumers' purchasing decision Yang (2011:382), argue that how to develop the product design which satisfies consumers' affective responses effectively. Even though the customers' satisfaction is an ambiguous and abstract concept the satisfaction of consumers' toward the product design still be as a key element of business strategy. Bell (2002) stated that the customer loyalty and retention is as the most important challenges of the business to make the quality of product. Based on

theoretical perspective, Childrens and Houston (1983) stated that by showing this different type of imagery can have very different impact on how customers describe the image using their words. Since the design quality is the degree to each product design that's must be fits to customer expectation and needs the degree of quality must match between the features of a specific product and its specification in order to meet the related characteristic that determine its value in market place ( Meirovich *et al.*, 2007: 242-243). This means that if manufacturers can understand the consumers' psychological feelings toward a product, their product design should meet to the needs of consumers as the interpretation of human sensibilities and bring the higher satisfaction than expected. Moreover, since customer's requirements are not only a "need" but also a "must" and the consumer's feelings about any objects is subjective (Chen *et al.*, 2008:971), in the case of how to define the characteristic of an automobile, Liang *et al.*, (2010:129) stated about the important role of the shape, colour, and design as the most important visual element in a design in which there is no standard to judge the appropriateness of any design.

For above reason, Halliday and Setchi (2009) suggested on how to quantify the qualitative feelings of the subjective emotional requirements to represent customer emotion demands into Kansei Engineering. Since the Kansei Engineering referred to sensitivity, sensibility, feeling and emotion that express one's impression towards artefact, situation, and surrounding (Lokman, 2010), the techniques to analyze the customer's emotional responses based on the design, emotions, and engineering knowledge to translate human psychology can be integrated into the evaluation process of a product using word forms represented the feelings. Here, Ishihara *et al.*, (1997:94) and Ayas *et al.*, (2008: 390) discussed and proposed of a high-level semantic structure to identify the important semantics for building ontology that translate a customer's ambiguous image of product by providing the relations among customer's feelings and corresponding designs.

## **1.2 Problem statement**

The main challenge of affective design is to grasp the customers' affective needs accurately and subsequently to the design of products (Helander *et al.*, 2005:659; Jiao *et al.*, 2006). Instead of a product's design depended on the designers' artistic

sensibilities are successful in the marketplace, the real situations show to us that this way quite often did not meet with great acceptance in the marketplace. This is due to some difficulties faced by producers/designers related to the linguistic origins representing each individual emotion. Specifically, since subjective impressions are difficult to translate into verbal descriptions and the affective needs are relatively short-lasting emotional states which tend to be imprecise and ambiguous.

Therefore, on this case, Desmet *et al.*, (2001) stated about the difficulties to find the relationships between design features and emotional responses. Hence, how to develop the product design that satisfies consumers' affective responses (CARs) are the greatest challenge to the traditional approach of product development (Shieh *et al.*, 2011:196), especially since individual subjective impressions are from a certain artefact based on, the senses of sight, hearing, feeling, smell, taste, recognition and balance (Mamaghani & Tajoddini, 2010). The main reason is due to no single standard to judge the appropriateness of any design (Liang *et al.*, 2010). Specifically, on how to optimize the product performances that explicitly based on subjective and objective to deal with usage functions. Even though, the product functional requirements to user experiences were gained from the interaction with the products (Huanga *et al.*, 2013:113).

In addition, to address aforementioned issues, Helander *et al.*, (2005:659) described the necessary to understand and know how to utilise the components of affective design and the source(s) of customer affect, to establish valid measures for assessing the affective responses to design, and also how to predict customer affect to proposed design solutions. This is, especially, since a product's quality usually dependent on its external appearances and characteristics where the way of a product looks is one of the most important factors (Chen *et al.*, 2007). Since, the new design focuses on the processes ranging from finding critical human psychological responses to determine the abstract views for ontological concepts (Chi, 2009:2492), there are also several approaches required to analyse the data from the semantic differential method using statistical and mathematical model approach (Pitaktiratham *et al.*, 2012:198).

Moreover, since the choice availabilities for the customers are more likely to the products in which they are not only fulfil to the customers objective needs, the