

APPROVAL

I hereby declared that I have read this thesis and this research is sufficient in term of scope and quality. This project is submitted to Universiti Teknikal Malaysia Melaka (UTeM) as a requirement for completion and fulfillment of Bachelor Degree of Technology Management (Technology Innovation) with Honours (BTMI)

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THE APPROACH TO PRODUCT INNOVATION BASED ON QUALITY
ATTRIBUTES AND PARAMETER

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LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURE

KE	-	Kansei Engineering
PSM 1	-	Projek Sarjana Muda 1
PSM 2	-	Projek Sarjana Muda 2
AHP	-	Analytical Hierarchy Process
CL	-	Classic
CA	-	Casual
MO	-	Modern
CO	-	Cool
COM	-	Comfort
BR	-	Brand
AV	-	Availability
NP	-	New Product
FC	-	Favourite Colour
SP	-	Shape of Product
SI	-	Size
SA	-	Sale
AFP	-	As for Present
MA	-	Material
CH	-	Cheap

RE	-	Recyclability
LI	-	Limited Stock
EC	-	Electric Consumption
F	-	Functional
DF	-	Dysfunctional

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DECLARATION

I hereby, declared this report entitled “The Approach to Product Innovation Based On Quality Attributes and Parameter” is the result of my own research except as cited in references.

Signature :

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Date : 28TH June 2019

DEDICATION

This study is wholeheartedly dedicated to our beloved parents Hj. Naning and Hjh. Morlia, who have been our source of inspiration and gave us strength when we thought of giving up, who continually provide their moral, spiritual, emotional, and financial support.

To my brothers, sisters, relatives, supervisor, friends, and classmates who shared their words of advice and encouragement to finish this study. And my special partner Wan Muhamad Wan Mustapar for endless support and always helped if I am lost through the journey of this research.

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ABSTARCT

The main purpose of this study is to investigate the customer satisfaction and preferences based on the quality attributes and parameter and customer characteristic using the Kano Method and Big-5 Inventory respectively. A total of 70 clothes iron design products that are available in the market are used for the study to make the decision on the purchasing preferences reasons. The study is conducted through survey using questionnaire. The preliminary study is conducted using the pilot test using 60 sample respondents and expert opinion (7 lecturers) to sort out the relevant items that will utilize in the main survey. The questionnaire contains three sections which is general information of respondents, customers' preferences, product attributes (functional and dysfunctional question based on the Kano Method) and lastly contains customer characteristic using Big-Five Inventory. The result show that the result show that of higher Kano question that respondents choose is K2 which is the important attributes for clothes iron design is rotate mechanism for temperature adjustment. It is found that using Kansei, most of the respondents choose design 3 and the design is comfort and cool for the Kansei word. Using Big Five Inventory it is found that respondents of the age range 21 to 24 is categorized as Active (Extraversion). It has also been validated using 60 respondents that the three attributes is full handle shape, rotate mechanism for temperature adjustment and steel soleplate types with teflon coating are the most preferred by customers. The result is consistent to the characteristics types of Big-Five Inventory.

Keywords: *Kansei Engineering, Kano Method, Big-Five, Product Attribute*

ABSTRAK

Tujuan utama kajian ini adalah untuk mengkaji kepuasan dan kehendak pelanggan berdasarkan ciri-ciri kualiti dan parameter dan ciri-ciri pelanggan menggunakan Kaedah Kano dan Inventori Big-5 masing-masing. Sebanyak 70 produk reka bentuk setrika baju yang terdapat di pasaran yang digunakan untuk kajian ini bagi membuat keputusan mengenai sebab-sebab keutamaan pembelian. Kajian ini dilakukan melalui soal selidik. Kajian awal telah dijalankan dengan menggunakan 60 sampel responden dan pendapat ahli (7 pensyarah) untuk menyusun item berkaitan yang akan digunakan dalam soalan kajian. Soal selidik mengandungi tiga bahagian iaitu maklumat umum responden, keutamaan pelanggan, atribut produk (soalan berfungsi dan tidak berfungsi berdasarkan Kaedah Kano) dan akhirnya mengandungi ciri pelanggan menggunakan Inventori Big Five. Keputusan menunjukkan bahawa menunjukkan bahawa soalan Kano yang lebih tinggi yang telah dipilih oleh responden adalah K2 yang merupakan sifat penting untuk reka bentuk setrika baju adalah mekanisme putar untuk palarasan suhu. Ia didapati bahawa menggunakan Kansei, kebanyakan responden memilih reka bentuk 3 dan reka bentuk adalah keselesaan dan keyakinan untuk perkataan Kansei. Menggunakan Inventori Besar Lima didapati bahawa responden umur 21 hingga 24 dikategorikan sebagai Active (Extraversion). Ia juga telah disahkan menggunakan 60 responden bahawa tiga atribut adalah bentuk pemegang penuh, mekanisme berputar untuk penyesuaian suhu dan jenis plat tapak dengan lapisan teflon adalah yang paling disukai oleh pelanggan. Hasilnya konsisten dengan jenis ciri-ciri Inventori Big Five.

Kata kunci: Kansei Engineering, Kaedah Kano, Big Five, karektor Produk

CHAPTER 1

INTRODUCTION

1.1 Study Background

In today's highly competitive markets, Iwu (2010:2659) stated that a business exists to satisfy customers while making profit. In this senses, Kotri (2006:29) said that a crucial success factor in today's competitive markets is by knowing customer needs. This also previously emphasized by Hennig-Thurau and Klee (1997), that the most important factor for successful to lead in competitiveness is by satisfying the customer. Johnson and Fornell (1991) argued with a customer's overall evaluation of the performance offered. In this sense, Fornell et al., (2010:29) later stated that this influence to choice and purchase behavior at the individual consumer level. The facts, Khadka and Maharjan (2017:1) stated that customer satisfaction requires incorporated of the long-term goals since it is the key component for the business to success where, according to Suwannapirom and Lertputtarak (2008), does not only depend to how make customer happy. An instance, in the context of loyalty based on company offers

to the customers, Dixon et al., (2010) discussed about the exceeding of customer towards their expectations during service interactions where only marginally customer that more loyal than simply meeting their needs. Here, there were quality perception related to the customer behavior.

First, Desmet (2012:1) based on his research stated there were the effects of positive emotions, as an example, in line with this general tendency. In addition, there were various factors influence consumers' perceptions of product quality (Takeuchi & Quelch, 1983). The product emotions refer to model proposes by Desmet (2003) can be classified into such as instrumental emotions, surprise emotions, social emotions, interest emotions and aesthetic emotions. Besides, the basic function towards the generic product in which the product must be capable to solve the desired problem at the right place, time, price etc. and be able to supply additional benefits (Levitt, 1983).

Second, Olson (1972) conceptualized the formation of quality perception refers to intrinsic or extrinsic to the product. Bolton and Drew (1991) explained that the differences in monetary costs, nonmonetary costs, customer tastes, and customer characteristics influence the consumers' perception towards the value. Due to customers often face the problems to formulate their judgments verbally in a correct way (Katicic et al., 2011:668), and since emotions described as an actual object-related psychic states of humans (Meyer et al., 2001), the company is, therefore, need to employ emotional marketing (Khuong and Tram, 2015:524). In this context, Kotri (2006:6) stated that there is systematically concept required to understand customer needs and to create the value to the customer.

Third, Nagamichi (2005) conceptualized the term of "kansei as expressions that "implies psychological feeling and needs in mind". In this senses, to develop such a product that people want to have deeply in their mind, he suggested the Kansei Engineering where the manufacturers should deeply consider in producing "Product Quality" fit to "Customer's Kansei Value" (Nagamichi, 2008:20). Yang (2011:36) in his study, clearly underlined about the affective responses toward product form design that was articulated and represented in adjectives regarded as class labels for consumers to describe their expression.

In conclusion, the outstanding product design is the product that according to Baldwin and Clark (2010) translated from customers' wants and needs. Here, the product designs that reinforce the status of products based on choices and encourage a

widely explored variety of disciplines to emotional design, product experience, and user experience based on design and emotion (Desmet & Hekkert, 2009:3&5). In this sense, according to Horváth (2001: 15) there is the “rightness” of any design based on a solution that will depend on the meaning.

1.2 Problem Statement

Today's product design is one of the most complex things to discuss. Some of the factors that affect design are functionality, handling, cost and durability. In this sense, according to Ulrich and Eppinger (2007), product development towards innovation is the set of activities that begin with the perception of a market opportunity and ending with production, sale and delivery of a product. Caliarì et al., (2017:35) stated that product innovation is achieved only when there is no perception error and no consumer tolerance for products. On this issue, Badawy (2011) commented about the innovation that is associated with firm's performance in terms of revenue and growth that plays a key role in the highly competitive global business. To be successful, according to Henard and Dacin (2010:321), firms' must effectively interact with a number of constituents such as customers, competitors, employees, and stakeholders. Also, according to Larsson (2017) in her thesis, the product development based on innovation should therefore pursued production innovation that mainly on cost reductions while increased in quality based on innovative products at a reasonable price as the primary means of acquiring and maintaining competitiveness.

Nørskov et al., (2015) in their study, as an example, discussed about consumers differentiate product benefits by situation where the innovativeness to the attributes based on the functionality of the product. They argued that the impact of complexity and relative advantage increases when consumers' innovativeness increases. Product innovation is to do more with the outputs introduced for the benefit of customers (Utterback & Abernathy, 1975).

Moreover, since innovation is more than developing new technological characteristics (Caliari et al., 2017:35), and innovations comes from a firm's ability to come up with quality products and attractive product designs (Hanaysha et al., 2014), there is a justification required towards the selected criteria and attributes of product innovation (Stevanović et al., 2014). Specifically, towards the created systems that allow breakthrough innovation to happen (Chryssochoidies, 2003:56). This is due to innovation alone is not enough (Minguela-Rata, 2011:81). An instance, there were brand trust mediates the relationships between product innovation and brand image (Hanaysha et al., 2014). According to Pohlmeier (2012:184), where the difference varies existed to some extent as a function of associated product value, there were instrumental attributes are higher priority than no instrumental attributes. She argued that in reducing the disparity from instrumental attributes, aesthetics and emotional involvement were more important, especially towards hedonic rather than utilitarian products.

Furthermore, according to Jiang et al., (2017:4308), the fact is some consumers may still find difficulties to assess their valuations to the new attributes of innovation products, even they know the new product's quality. Here, Tiilikainen (2011:7-8) pointed out the subjective perceptions of the quality of the products, besides the preferences to an existing product framing effects and other factors that are not sufficiently understood. Based on aforementioned, the study will investigate and analyze the product innovation related to quality attributes and parameters. The method used towards quality attributes is Kano method based on functional and dysfunctional quality and importance-performance (IPA) approach. Whiles, Kansei Engineering towards the preferences to the products based on emotional design will be utilized to capture the others factors of non-functionality of products. To analyze the products in the market as a case study, that is rim product, this study will utilize the statistical software (SPSS v.15) and several relevant software processing such as Expert Choice, etc.

1.3 Objective

This project discusses about study and analysis of the approach to product innovation development based on quality attributes using Kansei Engineering towards customer satisfaction and Kano method. towards an aesthetic need to be contracted into the designs that fulfill the customer requirement. In order to achieve the satisfaction level, this mean the product designed need to constructed and based on customer requirement. The objective of this project as follows:

1. To identify the customer satisfaction and preferences based on Kansei Engineering and Kano Method
2. To analyses the approach to innovation product development correlated to quality attributes based on Functional and Dysfunctional of Kano approach.
3. To analyze the the product design preferences towards personality indetification based on Big Five Personality.
4. To evaluate and validate the product preferences and satisfaction toward the quality attributes based on Kano Method

1.4 Scope of Project

In this project the approaches used to determine the customer preferences and satisfaction is towards the disposable food container product based on human Kansei. The clothes iron product is the one of the daily product used by anyone in every day. In addition, the years of production or marketing of clothes iron on the market date back to 1880. The research conducted under this project (PSM) consists of Kano matrix use to analyse the data collection. clients related to personality and cognitive identity.

In addition, a statistical approach is needed to analyze the data collected through a survey conducted by generating a questionnaire. The developed questionnaire is a preliminary step in the production of appropriate and relevant measurement tools to study and analyze the aesthetics of products, while the verification of results is done during the post-test phase. To develop a questionnaire, the semantic differentiation of words (as a feeling of emotion or emotion with Kansei) is used through an effective identification of the design of a product using the approach of Kansei Engineering. In parallel, for statistical analysis purposes, the project will use SPSS 15 software to study and identify the relationship between characteristics (customer satisfaction and Kano method).

The questionnaire developed for this project has been distributed in the Melaka region as a response to clothes iron. The questionnaire will cover a wide range of demographic data, age, occupation, salary, etc., as well as the aesthetic characteristics of beverage iron, such as shapes, colors, functions, prices, etc. Figure 1.1 shows the framework for this research. This is the fourth phase of this project which consists of a phase of collection, analysis, evaluation and validation of the results phase.

1.5 Summary

This chapter focused on research in developing innovative products to satisfy the customer through the development of products using Kansei Engineering. Kansei Engineering's approach consists in determining the affective characteristics and the attributes necessary for the aesthetic characteristics of the product in order to satisfy the customer. Knowing the emotional aspect of a design product, the resulting project leads to the analysis and assessment of personality and cognitive style.

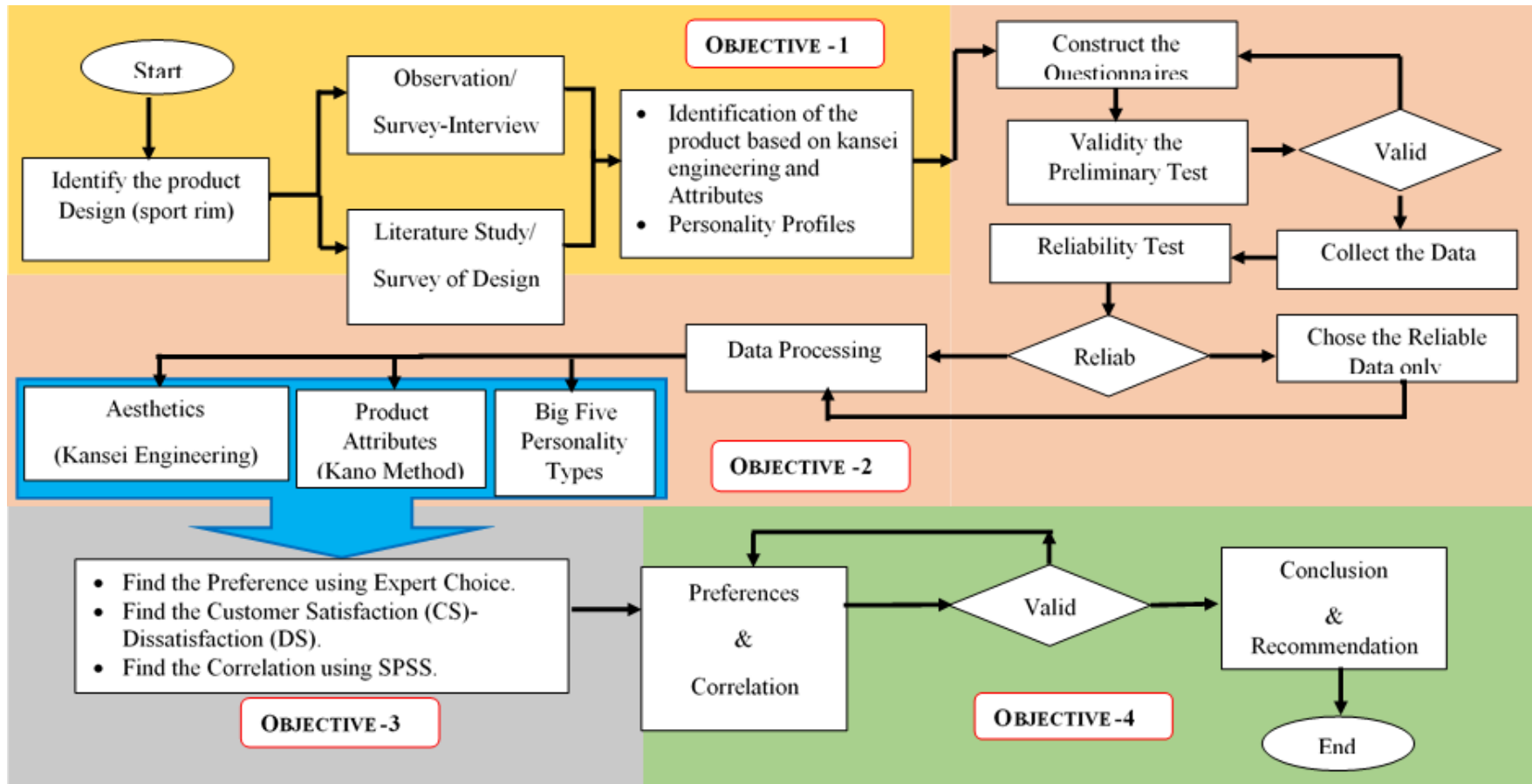


Figure 1.1: Framework of Study

CHAPTER 2

LITERATURE REVIEW

This chapter contains the literature review of this study which related to the scope of the study. Basically, this literature review is about a review of the literature compiles and evaluates the available research on a specific issue or problem in which it is found researching and writing about. This review of the literature explores the research that publishes editorial materials based on publications, books, theses, technical documents and case studies. The entire source must be related to the development of product innovation and the quality of the product that should be selected based on the scope study. This chapter also includes the Kano Method and Kansei Engineering for the development of product innovation and product quality attributes. At the end of this chapter, the element will be described in depth with the work measurement method that was used in the study.

2.1 Kano Method

2.1.1 Introduction

The Kano model in customer satisfaction is a very useful tool for classifying and prioritizing customer needs based on how it affects customer satisfaction (Kano et al., 1984). Kano models have been developed through customer survey methods, this method is carried out with clients who have to answer the questionnaire that contains a set of pairs of questions for all the attributes or information about the product. The questions contain questions about the function of the product, which describes the customer's response if the product has a question and explains if the product does not have a function for the attribute. (Xu.Q, et al2008).

This model has been widely used in the industry as an effective way to understand customer support based on how the product affects customer satisfaction (Kano et al., 1984). In the Kano model, clarifying the different levels of the client's needs is defined as how well customers can respond that can satisfy their satisfaction with a product. In addition, the canoe model is also interpreted as a different relationship between the level of customer needs, especially in nonlinear relationships. However, this model focuses more on classification methods and qualitative explanations in relation curves. (Wang and Ji,2009)

The use of the quality function (QFD) using the Kano model in terms of the structuring aspects of the integral QFD matrix. The client's product characteristics may be altered due to the mixing of the model type of the QFD matrix. For example, mixing the characteristics of the Must-Be product, such as cost, reliability, labor, safety and technology used in the product, in the initial Quality House will generally produce lines and columns that are completely filled with a high correlation value. Another integral method of QFD has been used with an additional matrix to avoid problems.

The canoe model has provided information on the dynamics of the client's choice to explore the dynamics of the methodology. In the Kano Model method, provide information on the characteristics of the product that are classified as important to customers. The purpose of this method is to support the characteristics of the product