DESIGN AND DEVELOPMENT OF AIR DIFFUSER USING KANSEI ENGINEERING AND KANO MODEL

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A thesis submitted
in fulfillment of the requirements for the degree of
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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2022

DECLARATION

I declare that this thesis entitled “Design and Development Of Air Diffuser Using Kansei Engineering and Kano Model” is the result of my own research except as cited in the references. The Choose an item. has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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APPROVAL

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DEDICATION

To my beloved parents who are always supported me:

Mohd Zaki bin Nor
Nik Hasni binti Nik Man

And

For my Supervisor,

Ts. Dr. Kamarul bin Amir Mohamed

For my Families, my Special Friend and my Friends

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who give a warm, caring, encouringing, and verificatory atmosphere. These are characteristics that contribute to the setting that's invariably required to realize the goals a heads.

ABSTRACT

Consumer tastes and market demand are critical elements in the success of a product. As a result, in order to be successful, a product must have a design that meets the expectations of consumers. The goal of this study is to create an air diffuser product inspired by Kansei. Using the Kansei Engineering approach, this analysis was undertaken to improve the design of an air diffuser in order to better suit the demands of the consumers. Kansei Engineering was known for capturing and translating client perceptions into design elements (Kansei words). This study and research has three major objectives: to investigate consumer preferences for product design and characteristics of air diffusers, and to develop new air diffuser designs in 3D modelling based on those choices. The goal of this study may be accomplished by using a questionnaire survey to collect customer data. Questionnaires 1 and 2 will be used in this study, which will include a total of 100 participants. Questionnaire 1 is used to gather information on the types and designs that customers want, while Question 2 is used to determine how respondents feel about the link between kansei terms and design categories. One issue for product development in this setting is capturing consumer product expectations and translating these subjective components into real product design. As a result, Kansei Engineering tools were utilised in this study to classify and categorise Kansei terms from consumer perception into characteristics, which helped with computation and statistical analysis. The Kano method is used in questionnaire 2. The Kano model is helpful in acquiring a comprehensive grasp of a customer's requirements. SPSS Data analysis software has been used to analyze the collected data. The findings show that the majority of consumers prefer air diffusers that are eye-catching, modern, attractive, and trendy. The Pearson correlation was applied to analyze the factors that consumers need in the air diffuser. The Pearson correlation analysis was carried out based on the study's purpose, and it was between the Kansei word and the Kano questionnaire of the design profile. Overall, the correlation between kansei words and the design of the air diffuser is high. It means if we produce a product like an air diffuser with all the Kansei words, the new design of the air diffuser will attract more buyers. Moreover, the correlation between kano and the design of the air diffuser is only positive for Design A and Design D. In the conclusion, the results will be represented by Kansei words obtained through a questionnaire survey and the analyzed data gathered from consumer input utilizing Pearson's correlation. Based on the Pearson's correlation, all Kansei words that have passed all validation procedures will be turned into a final design of air diffuser that satisfies the customer's demands. At the conclusion of this study, the results of the new air diffuser design will be represented by Kansei words obtained through a questionnaire survey and the analysed data gathered from consumer input utilising Kansei Engineering tools. Based on the emotional component of Kansei Engineering, all Kansei words that have passed all validation procedures will be turned into a final design of air diffuser that satisfies the customer's demands.

Keyword: *Kansei engineering, Kansei word, SPSS software, Pearson correlation, Kano Model.*

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ABSTRAK

Cita rasa pengguna dan permintaan pasaran adalah elemen kritikal dalam kejayaan sesuatu produk. Hasilnya, untuk berjaya, sesuatu produk mestilah mempunyai reka bentuk yang menepati jangkaan pengguna. Matlamat kajian ini adalah untuk mencipta produk peresap udara yang diilhamkan oleh Kansei. Menggunakan pendekatan Kejuruteraan Kansei, analisis ini dijalankan untuk menambah baik reka bentuk peresap udara agar lebih sesuai dengan permintaan pengguna. Kansei Engineering terkenal kerana menangkap dan menterjemah persepsi pelanggan ke dalam elemen reka bentuk (perkataan Kansei). Kajian dan penyelidikan ini mempunyai tiga objektif utama: untuk menyiasat keutamaan pengguna untuk reka bentuk produk dan ciri-ciri peresap udara, dan untuk membangunkan reka bentuk peresap udara baharu dalam pemodelan 3D berdasarkan pilihan tersebut. Matlamat kajian ini boleh dicapai dengan menggunakan tinjauan soal selidik untuk mengumpul data pelanggan. Soal selidik 1 dan 2 akan digunakan dalam kajian ini yang melibatkan seramai 100 orang peserta. Soal selidik 1 digunakan untuk mengumpul maklumat tentang jenis dan reka bentuk yang dikehendaki pelanggan, manakala Soalan 2 digunakan untuk menentukan perasaan responden tentang hubungan antara istilah kansei dan kategori reka bentuk. Satu isu untuk pembangunan produk dalam tetapan ini ialah menangkap jangkaan produk pengguna dan menterjemah komponen subjektif ini ke dalam reka bentuk produk sebenar. Hasilnya, alat Kejuruteraan Kansei telah digunakan dalam kajian ini untuk mengklasifikasikan dan mengkategorikan istilah Kansei daripada persepsi pengguna kepada ciri, yang membantu dengan pengiraan dan analisis statistik. Kaedah Kano digunakan dalam soal selidik 2. Model Kano membantu dalam memperoleh pemahaman yang menyeluruh tentang keperluan pelanggan. Perisian analisis Data SPSS telah digunakan untuk menganalisis data yang dikumpul. Penemuan menunjukkan bahawa majoriti pengguna lebih suka peresap udara yang menarik perhatian, moden, menarik dan bergaya. Korelasi Pearson digunakan untuk menganalisis faktor yang diperlukan oleh pengguna dalam peresap udara. Analisis korelasi Pearson telah dijalankan berdasarkan tujuan kajian, dan ia adalah antara perkataan Kansei dan soal selidik Kano bagi profil reka bentuk. Secara keseluruhannya, korelasi antara perkataan kansei dan reka bentuk peresap udara adalah tinggi. Ini bermakna jika kita menghasilkan produk seperti peresap udara dengan semua perkataan Kansei, reka bentuk baru peresap udara akan menarik lebih ramai pembeli. Selain itu, korelasi antara kano dan reka bentuk peresap udara hanya positif untuk Reka Bentuk A dan Reka Bentuk D. Kesimpulannya, keputusan akan diwakili oleh perkataan Kansei yang diperolehi melalui tinjauan soal selidik dan data yang dianalisis yang dikumpul daripada input pengguna menggunakan Pearson's korelasi. Berdasarkan korelasi Pearson, semua perkataan Kansei yang telah melepasi semua prosedur pengesahan akan diubah menjadi reka bentuk akhir peresap udara yang memenuhi permintaan pelanggan. Pada akhir kajian ini, hasil reka bentuk peresap udara baharu akan diwakili oleh perkataan Kansei yang diperolehi melalui tinjauan soal selidik dan data yang dianalisis yang dikumpul daripada input pengguna menggunakan alat Kansei Engineering. Berdasarkan komponen emosi Kansei Engineering, semua perkataan Kansei yang telah melepasi semua prosedur pengesahan akan diubah menjadi reka bentuk akhir peresap udara yang memenuhi permintaan pelanggan.

Kata kunci: *Kejuruteraan Kansei, kata Kansei, Perisian SPSS, Korelasi Pearson, Model Kano.*

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LIST OF SYMBOLS AND ABBREVIATIONS

KE	-	Kansei Engineering
KW	-	Kansei word
NPD		New Product Development

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CHAPTER 1

INTRODUCTION

1.1 Background

Consumer goods manufacturing capacity has risen on a never-before-seen scale in the last few decades. New national and international competitors emerge, and marketplaces around the world are rapidly globalizing. As a result, changes play a larger role, resulted in shorter product life cycles than previously. Product design is one of the approaches that can be used to cope with the increasingly fierce competition. Since it is possible that consumers will form their first opinion of a product based on its appearance, the appeal of the product cannot be distinguished from its appearance. The aesthetic value or beauty of a product's display is closely linked to its ability to attract potential customers. It's also worth noting that the product design will have a distinct benefit or feature of the product or service as compared to competitors (Tama et al., 2015).

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Kansei Engineering could be a theory that focuses on psychology, design science, perception, and different subjects which will facilitate humans understand engineering technology. Kansei Engineering not only assists manufacturers in gaining a better understanding of their customers' perspectives, but it also streamlines the product development process and lowers design costs. Kansei Engineering is a method of examining how a user's sensibility interacts with a product's design aspects using engineering technology. It has the ability to turn consumers' perceptual desires into product design elements and production technologies (Xue et al., 2020). Figure 1.1 show the modern