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Investigating the application of Kansei Engineering principles in Mazda car design: A Review

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Abstract- *The integration of user emotions and preferences into vehicle design is becoming important in the current competitive automobile industry. Kansei Engineering, a theory for quantifying the psychological and emotional needs of consumers, has emerged as a valuable approach to address these requirements. The study explores the application of Kansei engineering principles in Mazda car design and explores how Mazda uses this approach to create vehicles that resonate with consumers on an emotional level. This review adopts a systematic methodology that includes a comprehensive literature search and selection of relevant articles, data extraction and insightful analysis to evaluate specific Kansei inspired design components attempted by Mazda and evaluates their impact on user satisfaction and brand loyalty. By understanding user emotions, Mazda designs vehicles that go beyond functional attributes, establishing strong emotional bonds with consumers. The analysis highlights Mazda's successful implementation of Kansei engineering, positioning them as a leader in creating vehicles that inspire and delight drivers in a highly competitive market.*

***Keywords*: Kansei Engineering, Mazda, Car Design, Emotions, Preferences, Aesthetics, User Satisfaction, Automotive**

I. INTRODUCTION

The automobile industry is one of the highly competitive markets in the world, where automobile design plays a crucial role in attracting & holding customers. Aesthetics generate positive user motivations by contributing to the meaningfulness of the product and it is critical for automotive industries to prove such emotions (Auckland University of Technology *et al.*, 2019). In past years, there has been an increasing emphasis on integrating user emotions & preferences into vehicle design, heading to Kansei Engineering as a valuable approach. Kansei engineering focuses on capturing and applying user emotions, sensations & perceptions to create a product that is aesthetically pleasing that evokes positive feelings and enh ances user satisfaction.

The objective of this research is to investigate and understand how the integration of user emotions and preferences into vehicle design, particularly through the application of Kansei Engineering principles, contributes to Mazda's success in the competitive automobile industry. The study aims to explore how Mazda utilizes Kansei Engineering to create cars that resonate with consumers on an emotional level, leading to increased user satisfaction and brand loyalty. Kansei Engineering is the most systematic theory of quantifying the psychological & emotional needs of consumers. Identifying the psychological needs of the consumer, it defines the consumer demand problems (Yao, Hu and Li, 2011). It was originated in Japan during the 1970s and has gained recognition as a powerful tool for product design in various industries, including the automobile. The word "kansei" defines human sensitivity and emotions, highlighting how important to understand and address the consumer's emotional needs. Mazda, world-class Japanese automaker, demonstrates a deep understanding of this concept and has successfully incorporated Kansei engineering for their design philosophy. Mazda designs vehicles that fit the feelings of the driver. This is the result when engineers get together with ergonomists and psychologists to design a car.

One of the main aspects of Kansei Engineering is the identification and analysis of user emotions and preferences. Mazda performs extensive market research, customer surveys, and user feedback to gain insights into the emotional drivers that influence car buying decisions. By understanding consumer desires, aspirations, and needs of their target consumers, Mazda can create vehicles that resonate with their emotional and aesthetic sensibilities (Vezzoli *et al.*, 2018).

Mazda's design language, "Kudo: Soul of Motion", explains the application of Kansei engineering principles in car design. Kudo, meaning "soul of motion", which aims to evoke a sense of dynamic movement, even when the vehicle is stationary. This language explains the fusion of aesthetic functionality,

creating an emotional bond between the driver and the car. Mazda designers craft each vehicle's exterior and interior elements, considering factors such as curves, proportions, and lines to evoke a sense of energy, grace, and agility (López, Murillo and González, 2021).

Mazda has strong human-centric car interior design features that enhance the overall driving experience. By paying more attention to the tactile and sensory aspects of vehicle design, Mazda ensures that the driver and passengers have a sensitive emotional connection with the car. From the choice of materials with a soft touch to the placement of controls, where the places that the passenger's body touches most, and the sound of the door closing, every small detail is carefully considered to enhance positive emotions and user satisfaction (Rosen and Kishawy, 2012).

Another fundamental component of Kansei Engineering is the integration of modern advanced technologies to support emotional design. Mazda has successfully combined innovative engineering as evidenced by its SKYACTIV technology. These technologies aim to improve driving dynamics, fuel efficiency, handling, and safety while preserving the emotional bond between the driver and the vehicle. By integrating advanced technology into their design philosophy (Zhang and Wang, 2013). Mazda says Kansei Engineering principles lead their cars that are deeply satisfying to own and drive. Cars and trucks that can be driven intuitively by everyone yet provide their own special rewards for the skilled driver.

To evaluate the effectiveness of Kansei engineering principles in Mazda car design, various research has been conducted. This research analyzes user feedback, preferences, and more importantly, the emotional responses to Mazda vehicles, providing insights into the success and impact of Kansei-inspired design components. By understanding users' emotional experiences, Mazda can continuously refine its design approach, ensuring that its vehicles meet and exceed customer expectations (Schifferstein and Cleiren, 2005).

This review aims to investigate the application of Kansei engineering principles in Mazda car design, and how Mazda leverages this approach to create vehicles that resonate with consumers on an emotional level. The application of Kansei engineering principles in Mazda car design has proven to be a successful strategy for creating vehicles that go well beyond functional attributes and establish strong emotional bonds with customers. Mazda's commitment to understanding user emotions and preferences has allowed them to develop vehicles that inspire and delight drivers, setting them apart in a highly competitive market. This review will dive deeper into the specific Kansei-inspired design elements attempted by Mazda and explore the impact of these principles on user satisfaction and brand loyalty.

Methodology

In this review, Investigating the applications of Kansei Engineering principles in Mazda car design was guided by a structured approach. Extensive searches were conducted across databases such as IEEE Xplore, ResearchGate and Google Scholar, utilizing the terms like "Kansei Engineering", "emotional design", "Mazda car design", and "automotive aesthetics". Articles that have been passed through expert evaluation and discussed Kansei Engineering, Mazda's distinct design concepts, blending the emotions into car designing, and the consequential outcomes were retained. Articles which are lacking expert validation or those indirectly related to Kansei engineering principles or Mazda car design were omitted.

Subsequently, articles which were aligned with the core investigation were identified based on their titles, abstracts, and keywords. Information gathered encompassed the Kansei engineering elements embraced by Mazda, specific design attributes, strategies to gauge user feelings, and the resulting impact on user satisfaction and brand allegiance. The accumulated information was categorized, and recurring themes and dominant concepts that resonated across various studies were recognized.

Moreover, considerations were extended to address research gaps and potential limitations which were encountered during review process, promoting transparency in acknowledging potential biases or constraints.

The synthesized findings informed a conclusive deduction, encapsulating the essence of review's discoveries. Also examined the forward-looking recommendations for Mazda's future design endeavours.

Throughout this process, crucial attention was paid to proper citation practices and adherence to ethical research principles. Importantly, the methodology underwent careful inspection by supervisors ensuring its cohesiveness, academic consistency, and alignment with the review's key objectives.

II. LITERATURE REVIEW

This literature review aims to investigate the application of Kansai Engineering principles in the design process of Mazda cars. Kansai Engineering, a design philosophy originating from the Kansai region of Japan, emphasizes simplicity, elegance, and harmony in product design. The review focuses on a case study of Mazda's implementation of Kansai Engineering principles in their car designs, analyzing the impact on aesthetics, functionality, and user experience. By examining relevant literature, this review provides insights into how Mazda integrates Kansai Engineering into its design process, highlighting the benefits and challenges associated with its application.

The primary objective of Kansei Engineering has been to incorporate emotional components into the design. The term "Kansei" encompasses a broad spectrum of meanings, translating to "holistic feelings" or "an individual's subjective impression derived from a specific artifact, environment, or

situation, encompassing all sensory faculties including sight, sound, touch, scent, taste, and cognition." Kansei manifests itself in a variety of ways, encompassing verbal expressions, observable behaviors, facial and bodily cues, as well as physiological brain responses. When implementing Kansei Engineering, careful consideration is given to the preferences and perspectives of the target demographic. For instance, during the design phase of the Mazda Miata, young drivers were actively engaged, and their driving habits, car preferences, and overall lifestyles were thoughtfully taken into account through comprehensive questioning and analysis.

In today's world, consumers pay more attention to how products look when they decide what to buy. The way a product is designed and styled has become a competitive advantage for designers because it creates the first impression on buyers. When a product has an appealing and attractive appearance, it catches the attention of potential customers and gives them a positive initial impression. Designers carefully choose colors, textures, and shapes to make products visually appealing. By creating products that look good and feel right, designers can make people want to buy them. In this era, where consumers value emotional connections with products, focusing on aesthetics is a powerful way for designers to stand out and build strong relationships with customers. Designers who understand and take advantage of this preference are more likely to succeed in today's competitive market.

A. Car Center Stack Design

The study conducted by M.S Syed Mohamed and others explored the application of Kansei Engineering technique in incorporating consumers' emotional preferences into the design of automotive center stack components. The research focused on Malaysian young adults and aimed to establish a correlation between center stack design elements and the emotional needs of this specific demographic. The keywords employed in this study encompassed Kansei Engineering, Malaysian, young adults, car center stack, and vehicle interior. By utilizing three Kansei words, namely "exclusive," "elegant," and "high tech," the researchers examined ten center stack design samples from B segment cars. Furthermore, a group of 30 young Malaysian individuals aged between 18 and 30 participated in the Kansei evaluation research. The collected data was analyzed using the Partial Least Squares method (M.S Syed Mohamed1 and Shahzizi Mustafa, 2014).

Figure 1: Example for car center stack design

B. Luxuriousness

As per the findings of Bahn et al, the Kansei engineering method was employed to uncover significant emotional aspects such as luxuriousness in product design. This method consisted of three key steps: (1) identification of relevant affective features and product design attributes; (2) implementation of evaluation experiments; and (3) development of Kansei models through multivariate statistical analysis, with a specific focus on crucial product design attributes. The evaluation studies conducted in this research utilized meticulously designed questionnaires, featuring a 100-point magnitude scale and a 7-point scale for semantic differentials, ensuring comprehensive data collection and analysis (Bahn *et al.*, 2009).

Figure 2: Example for luxurious features

C. Instrumental Cluster Panel

In their paper, Jung et al presents an examination of consumer perceptions regarding the design of the instrument cluster panel, specifically considering the influence of gender, lighting hue, and meter arrangement. This study employed factor analysis and multidimensional scaling (MDS) techniques to identify significant affective factors and assess the instrument panel design. The research findings offer valuable insights and guidelines for the implementation of user-centered design principles in this domain (. M. K. S. Y. K. E. S. J. S. P. Gahun Jung, 2010).

Figure 3: Example for Instrumental Cluster Panel

D. Speedometer and Steering Wheel.

The research conducted by Tomio Jindo and others showcased the application of Kansei engineering in the realm of passenger automobile interior design, with a specific focus on the speedometer and steering wheel. This study primarily explored the subjective evaluation of the relationship between

steering wheel attributes and the impressions they evoke. Subsequently, the researchers analyzed and quantified the evaluation findings, leading to the development of an image retrieval system. This system was designed to generate the most suitable image on a CRT display based on the user's input of descriptive adjectives, thus enhancing the precision and effectiveness of image selection in this context (Chang and Chen, 2016).

Figure 4: Example for speedometer and steering wheel

E. Self-Organizing Neural Networks

As stated in the publication by Shigekazu Ishihara, a self-organizing neural network called ART1.5-SSS was introduced as an automatic builder for Kansei expert systems. ART1.5-SSS is a reliable non-hierarchical cluster analyzer and feature extractor, known for its enhanced learning rule performance. The primary function of this network is to facilitate the automatic construction of rules within Kansei Engineering expert systems, thereby streamlining the process of rule generation and enhancing the efficiency of the overall system (Ishihara *et al.*, 1995).

F. The Design of In-Vehicle Rubber Keypads

Within the document authored by Joana Viera and others, the Kansei methodology was employed to assess the subjective perception of rubber keypads. The evaluation encompassed the utilization of seven Kansei words, ranging from "pleasantness" to "clickiness," in order to capture the emotional responses associated with these keypads. The outcomes of the study revealed robust correlations between the identified Kansei words and various physical properties of the rubber keypads. These findings, in turn, provide valuable insights and guidance for the design of user-centered in-vehicle rubber keypads, ensuring that the design process takes into account the subjective concerns and preferences of the end users (Vieira *et al.*, 2017).

Figure 5: Example for In-Vehicle Rubber Key Pads

G. Automotive Interior Images and Their Perceived Value

The research conducted by Ching-Chien Liang and others employed the Kansei engineering approach to identify crucial elements within a car interior that impact drivers' emotions. The study comprised four distinct stages: conducting interviews with marketing experts to extract design elements, performing Kansei evaluation experiments, and constructing perceived value through a questionnaire survey. The overarching goal of this research was to offer practical and effective guidelines for car interior designers in their future endeavors, ensuring that the design choices effectively cater to the emotional needs and preferences of drivers (‘SEMANTIC SCHOLAR’, 2014).

Figure 6: Example for Automotive Interior Images

H. Automotive Exterior Design

In the publication authored by Carolina Viera Liberatti Rosa and others, the focus of the research revolved around the external design of vehicles, aiming to delve into the intricacies of seven selected case studies. The primary objectives were twofold: firstly, to identify the specific Kansei category applied in each research case, and secondly, to scrutinize the semantic aspects inherent in the design and how they interrelate with the actual components of the design. The keywords employed in this study encompassed automotive design, Kansei engineering, and product development,

signifying the core areas of investigation within the research (Liberatti and Zuanon, 2019).

I. The Analysis of Body Styling Design of a Car

In the paper, by Xiang YAO and others described the use of Kansei Engineering in Automotive Body-side Styling Design. Here, this provides some car profile samples to six vehicle engineering professors. According to the contour of the car side and modelling techniques should be marked with graphics. After the analytical results of six experts, they concluded that four regions can most influence consumers feeling about the car side form. They are front fog lights, front bumper, engine hood and the nearby area of front windscreen. As well as four categories at the vertical direction, representative characteristic line summed up from all categories at the horizontal direction respectively "A,B,C,D,E" for the instruction code (Xiang YAO, Hong-yan HU and Jia LI, no date).

J. Operation Load Mechanism

In this paper, by Masayuki Kikumoto and others the use of Kansei Engineering in Study on Car Seat Lever Position. In here describes improving customer satisfaction, driving safety and the appearance, exterior and interior design of customers is crucial, detailed investigations of regarding comfort in operating levers. In here they are suggest a solution, the operational load should be created in a way that prevents it from malfunctioning even if anything carelessly slips into the space between the seat and the door while the vehicle is in motion (Kikumoto, Kurita and Ishihara, 2021).

K. Lever Shape

In the paper, Guo et al stated that the control lever shape might affect the burden on the operator. As well as, According to Chengalur et al. (2004), the design of the lever grip has an impact on how smoothly and powerfully it operates. And also , Lever shapes play a role in shaping the overall user experience inside the car. Kansei Engineering principles can guide designers to consider the tactile qualities, haptic feedback, and sound associated with the lever operation. By focusing on creating pleasant sensory experiences, such as smooth and precise lever movements or satisfying clicking sounds, designers can enhance the overall user experience and satisfaction. In this study, to focus on the lever position , which is the most critical design factor, the cross-sectional shape of the experimental apparatus of the lever-grip was fixed to a straight (Kikumoto, Kurita and Ishihara, 2021).

L. Lever Position

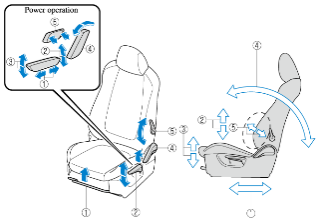

Figure7 : 2021 MAZDA CX- 5

In here, discuss the seat operation lever's design position (vertical and horizontal distance) is indispensable for collision safety.

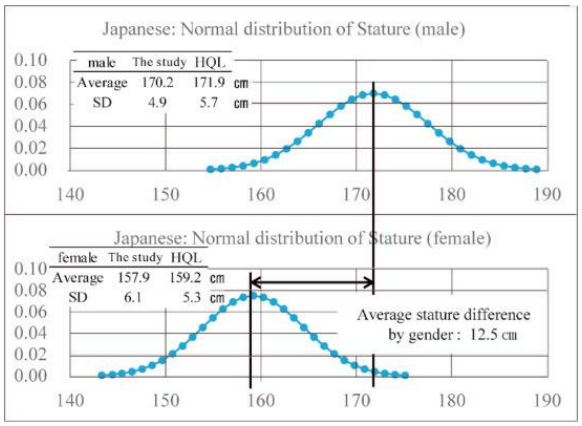

Figure 8 : . Height of the participants in this study and Japanese. The height of the participants followed the results of the HQL (2008).

Figure 8 supports the design constraints of the car seat lever position. It is necessary to design the operation lever position such that the lock mechanism does not come off by contacting the operation lever.

Using the Mazda-recommended driving position setup process enables you to have a relaxed posture, operate the car for extended periods of time without getting fatigued, and do things quickly and naturally.

Additionally, you can count on having a clear view in front of you to improve the safety and comfort of your driving.

The following steps are used to make the changes for the Mazda-recommended driving posture according to the figure 7 ('2021 Mazda CX-5 Owner's Manual', no date).

1. Moving the steering wheel and seat to their default positions.
2. Adjusting the seatback angle.
3. Adjusting the seat position forward and back.
4. Adjusting the seat height.
5. Adjusting the steering wheel position.
6. Adjusting the head restraint position.

III. ANALYSIS AND EXPERIMENT DESIGN

Kansei Engineering is an approach that focuses on incorporating human emotions and sensory experiences into product design. Mazda has long been recognized for its

commitment to designing cars that evoke strong emotional connections with drivers. To achieve this, Mazda incorporates Kansei Engineering, a methodology that focuses on integrating human emotions and sensory experiences into product design. This article explores the Kansei Engineering methodology employed by Mazda in crafting their cars, highlighting the key steps and principles involved in creating emotionally engaging vehicles. Mazda uses Kansei engineering to create cars that evoke certain emotions in the user. The methodology involves five steps (‘2021 Mazda CX-5 Owner’s Manual’, no date):

In the first step of the process, Mazda focuses on gathering data on customer preferences and emotions. This is done through various methods such as surveys, interviews, and focus groups. Mazda aims to understand the specific needs and desires of their target customers, as well as the emotional responses they seek from a car. This data collection phase allows Mazda to gain valuable perceptions into the emotional aspects of car ownership and helps them identify the key factors that contribute to customer satisfaction and emotional connection with their vehicles.

Once the data has been collected, Mazda moves on to the next step, which is Kansei Engineering. Kansei implies the emotional qualities or feelings that customers desire in a car. Mazda analyzes the gathered data to identify the specific kansei that are important to their customers. This involves understanding the emotions associated with car ownership, such as excitement, joy, comfort, and elegance. By identifying and defining these kansei, Mazda sets the foundation for designing cars that evoke these desired emotional responses in customers.

In Technical Translation step, Mazda translates the identified kansei into technical specifications that can be incorporated into the design and manufacturing processes. This involves linking the gap between the emotional qualities desired by customers and the tangible elements of the car's design. Mazda's team of engineers and designers work closely together to translate the emotional aspects into specific design features, materials, colors, and technologies. This step requires a deep understanding of both the emotional aspects and the technical capabilities of the manufacturing process to ensure that the desired emotional qualities are effectively translated into the final product. (‘The KANSAI Guide’, no date)

Once the technical specifications have been determined, Mazda proceeds to build prototypes of the car. Prototyping allows Mazda to test and evaluate the effectiveness of the kansei engineering in practice. These prototypes are thoroughly crafted to embody the desired emotional qualities and provide a tangible representation of the final product. Through thorough testing and feedback gathering, Mazda can refine and fine-tune the design to ensure that the emotional impact intended by the kansei engineering is effectively delivered to the customers.

After the prototyping phase, Mazda moves into the production stage. The final design specifications, refined through prototyping, are translated into the manufacturing process. Mazda ensures that the production line holds to the technical specifications and quality standards defined in the previous steps. This involves coordinating various aspects of production, such as sourcing materials, assembly, quality control, and final inspection. Mazda's focus is on delivering cars that not only meet the functional requirements but also embody the desired emotional qualities and provide a satisfying ownership experience for customers.

By following these detailed steps, Mazda effectively integrates data collection, kansei engineering, technical translation, prototyping, and production to create cars that successfully evoke desired emotional responses in customers. This comprehensive approach enables Mazda to set its products apart from the competition and build a deep emotional bond with its customers, ultimately raising customer happiness and loyalty. (‘MAZDA’, 2021)

Mazda has been using Kansei engineering since the 1980s, and the methodology has been instrumental in the development of some of the company's most popular cars, including the Mazda MX-5 Miata and the Mazda3. Here are some specific examples of how Kansei engineering has been used in Mazda cars: (Justin, 2016)

The Mazda MX-5 Miata is a two-seat sports car that has been praised for its engaging driving experience and emotional appeal. The Miata's design was inspired by the human form, and the car's interior is filled with soft-touch surfaces and luxurious materials.

Figure 9: Mazda MX-5 Miata

The Mazda3 is a compact car that is known for its stylish design and comfortable ride. The Mazda3's interior features a spacious cabin and high-quality material.

Figure 10: Mazda3

The Mazda6 is a mid-size sedan that is known for its powerful engine and agile handling. The Mazda6's interior is luxurious and spacious, and the car comes standard with a variety of advanced safety features.

Figure 11: Mazda6

Mazda's use of Kansei engineering has helped the company to create cars that are not only fun to drive, but also emotionally appealing. This has helped Mazda to differentiate its cars from those of its competitors and has contributed to the company's success in the automotive market. (‘MAZDA’, 2021)

IV. RESULTS AND DISCUSSION

A. Results

The application of Kansei Engineering principles in Mazda car design has yielded positive results. By incorporating emotional qualities into their design process, Mazda has been successful in creating vehicles that evoke desired emotional responses in customers. This has led to increased customer satisfaction and a stronger emotional connection with their cars.

Overall, it has been successful to incorporate Kansei Engineering ideas into the creation of Mazda automobiles. The addition of emotive elements has improved consumer satisfaction and strengthened the emotional bond that customers have with their vehicles. Mazda has established itself as a pioneer in producing emotionally engaging automobiles thanks to their dedication to comprehending customer preferences and turning them into practical design aspects.

B. Discussion

The investigation into the application of Kansei Engineering principles in Mazda car design revealed several significant findings. The review aimed to understand how Mazda incorporates emotional qualities and customer preferences into its car design process, ultimately enhancing customer satisfaction and creating a strong emotional connection with its vehicles.

The study about car seat levers examines upper arm posture impacting lever operation in the Japanese population, finding changes in reach area, ease of use, elbow joint movement, and lever height adjustment. Females have lower muscle strength.

The study about car interior experiments on small passenger car interiors provided detailed impression data on evaluation scores and styling features. Future studies will analyze total evaluation and unit evaluation adjectives, constructing styling support systems for whole car interiors.

The Kansei Engineering study about car center stack design found that the Chevrolet Aveo center stack design is most emotionally appealing for young Malaysian adults, with elements like glossy black and LCD 1 strongly associated with exclusivity, elegance, and high tech. The elegance, sportiness, and creativity of the Mazda brand can be reflected in designs for Mazda vehicles' center stacks by using Kansei Engineering concepts. The center stack can inspire a feeling of exclusivity, improve the user experience, and support Mazda's brand image of attractive and sporty vehicles by adding components such clean lines, simple controls, and premium materials.

In order to analyze users' perceptions and experiences about the physical characteristics of keys used in human-machine interfaces, specifically in car radios and navigation systems, the study applied the Kansei technique to the design of in-vehicle rubber keypads. Mazda can consider the recommendations for force, stroke, and snap ratio values in order to make sure that the keys in their cars are perceived as robust, strong, hard, stiff, and pleasant. The results demonstrated that participants could distinguish the physical properties of the keys and assigned them distinct subjective properties. Mazda can improve the entire user experience and happiness with the essential parts in their automobiles by implementing these design elements.

The study focused on the aesthetics of Mazda's speedometer and steering wheel are intended to elicit particular emotional reactions and satisfy the desired Kansei preferences of its target clients. Kansei Engineering places a strong emphasis on designing products with consumers' emotional requirements and preferences in mind.

The simple and easily readable structure of the Mazda speedometer is intended to give the driver a sense of clarity and assurance. The speedometer's visibility and ease of glance reading fit with Kansei preferences for security and use.

Mazda focuses on giving the driver an ergonomic and tactilely satisfying experience while designing the steering wheel. In keeping with Kansei inclinations for elegance and exclusivity, high-quality materials, such leather, and the meticulous sculpting of the steering wheel, are used to generate a sense of luxury and comfort.

Overall, Mazda's speedometer and steering wheel designs show how Kansei Engineering concepts may be applied and giving its consumers a gratifying and emotionally appealing driving experience.

The data collection phase was crucial in understanding customer preferences and emotions. Above mentioned research (Section 2) provided valuable insights into the specific emotional qualities customers desired in their cars. By examing this data, Mazda was able to gain a deep understanding of the emotional aspects of car ownership and identify key factors that contribute to customer satisfaction. Mazda's team of engineers and designers worked closely together to translate the identified Kansei into tangible design features, materials, colors, and technologies. This step required a deep understanding of both the emotional aspects and the technical capabilities of the manufacturing process. Mazda built prototypes of their cars to test and refine the design based on customer feedback. This iterative process allowed Mazda to fine-tune the design to effectively deliver the desired emotional impact to customers. Mazda ensured that the production line adhered to the technical specifications and quality standards defined in the previous steps. This emphasized the importance of consistency in delivering the intended emotional qualities across all vehicles produced.

V. CONCLUSION

In conclusion, the investigation of how Kansei Engineering concepts are applied in Mazda car design offers insightful information regarding the company's effective application of this methodology. It is clear from a thorough review that Kansei Engineering is essential to producing automobiles that emotionally connect with customers on a deep level.

Mazda's design process is built on their dedication to comprehending consumer preferences and emotions. Mazda acquires important insights into the psychological aspects of car ownership by doing comprehensive research and collecting information on consumer experiences, aspirations, and expectations. This customer-centric approach enables Mazda to design vehicles that evoke specific emotional responses, such as excitement, joy, comfort, and elegance.

Translating these emotional experiences into tangible design elements is a crucial step in Mazda's Kansei Engineering methodology. The integration of exterior styling, interior layout, color palettes, materials, and vehicle dynamics is carefully executed to create a coherent and harmonious design that resonates with customers. Mazda's attention to detail and the incorporation of advanced technologies further enhances the emotional connection between the driver and the vehicle, delivering an immersive and satisfying driving experience.

The iterative nature of Mazda's design process, coupled with continuous improvement efforts, ensures that the application of Kansei Engineering principles remains dynamic and responsive to changing customer preferences. By continuously gathering feedback and data from customers, dealers, and industry experts, Mazda can evaluate the emotional impact of their vehicles and identify areas for improvement. This commitment to refinement and enhancement reinforces Mazda's position as an innovative and customer-centric automotive manufacturer.

And identified about how certain colors make Mazda cars look beautiful based on their design philosophy called KODO. In the future, Mazda wants to improve their technology called Kansei to make even better colors that create specific feelings and make driving more enjoyable. They will use advanced materials and techniques to explore new colors that are different from the usual shiny metallic ones.

For example, in the future, Mazda cars might have special colors that can change or adapt to different types of light. This will make the cars look more interesting and exciting because the colors will appear to move and flow, just like the shapes of the cars themselves. (‘MAZDA’, 2021)

Mazda also wants to make their cars more personalized. They might create smart systems that let drivers choose their own colors for the car based on their mood or what they like. These systems will use sensors and computer programs to understand how the driver feels and what's happening around the car. Then, they will change the colors and lighting of the car to match the driver's mood and create a nice and comfortable driving experience.

In conclusion, future Mazda cars with Kansei technology will focus on creating new and advanced colors, coatings, and technologies that enhance the emotional impact of their KODO design. Mazda wants to provide their customers with a more engaging and enjoyable driving experience by using colors that evoke specific emotions in their cars.-

Overall, the review provides a thorough analysis of how Mazda successfully incorporates Kansei Engineering principles into the creation of their automobiles. In order to produce automobiles that forge deep emotional ties with clients, it emphasizes the importance of comprehending and incorporating human emotions into the design process. The effective application of Kansei Engineering principles by Mazda provides a useful standard for other automakers looking to design emotionally compelling automobiles that connect with consumers deeply.

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