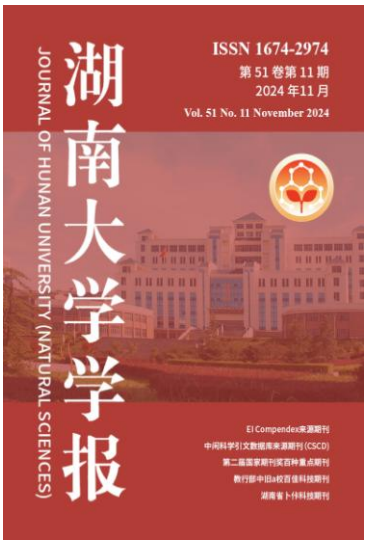

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The Analysis of Users' Emotional Feelings toward Kansei Based Design of Hotel's Website in Bali

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Abstract: One of the most important contributors to foreign exchange is tourism, and one type of accommodation that can help the tourism industry is hotels. Currently, the website is one of the elements that helps visitors obtain information about the hotel and make reservations for available rooms. One technique for attracting hotel customers is to create an eye-catching website. The process of translating human emotions and feelings into a design–in this case, the design of a website interface–is known as Kansei Engineering. The main goal of this study is to select the most critical emotional factors for redesigning the website of the Ocean View Tulamben Bali Hotel. This study contributes to the knowledge in the field of website interface design based on emotional factors by applying the multivariate method and Kansei Engineering. The related users' critical emotions were translated into

Kansei words in this study. Seven Kansei words related to the website interface were used and six hotel websites were used as samples. The 33 respondents were employees of the Ocean View Tulamben Bali Hotel. Multivariate statistical analysis, including Cronbach's alpha, coefficient correlation analysis, factor analysis, and partial least squares, were used to examine the respondents' questionnaire responses. Recommendations for redesigning the hotel website interface were derived from the average of all questionnaires. The results showed that the Kansei word "futuristic" was the most important user emotion.

Keywords: website; user interface; web design; emotional factor; Kansei Engineering

巴厘岛酒店网站感性设计的用户情感分析

摘要：旅游业是外汇收入最重要的贡献者之一，而酒店是可以帮助旅游业发展的住宿类型之一。目前，网站是帮助游客获取酒店信息并预订可用房间的元素之一。吸引酒店顾客的一种技巧是创建一个引人注目的网站。将人类的情感和感受转化为设计（在本例中为网站界面设计）的过程被称为感性工程。本研究的主要目标是选择最关键的情感因素来重新设计巴厘岛图兰本海景酒店的网站。本研究通过应用多元方法和感性工程，为基于情感因素的网站界面设计领域的知识做出了贡献。本研究将相关用户的关键情绪转化为感性词。使用了七个与网站界面相关的感性词，并使用六个酒店网站作为样本。33
名受访者是巴厘岛图兰本海景酒店的员工。多元统计分析，包括克隆巴赫系数、相关系数分析、因子分析和偏最小二乘法，用于检查受访者的问卷回答。重新设计酒店网站界面的建议来自所有问卷的平均值。结果显示，感性词"未来主义"是最重要的用户情感。

关键词：网站; 用户界面; 网页设计; 情感因素; 感性工程

1. Introduction

The tourism sector in Indonesia is a potential sector for 'income and foreign exchange. The Central Bureau of Statistics lists the ranking of sources of foreign exchange earnings for 2011-2015. Foreign exchange from tourism is among the top 12 contributors to a country's foreign exchange earnings [1]. Based on data from the Bali Central Bureau of Statistics, in the last five years (2018-2022), the hotel room occupancy rate in Bali in 2020 at the beginning of the COVID-19 pandemic in March (25.41%) immediately decreased in April (3.22%). This affects the average figure for 2020, which is 15.62%, indicating that it has fallen drastically compared to 2019, which was 59.57%. In 2021-2022, the TPK is still low; even in 2021, it has fallen again to 13.00%. In 2022, there was an increase of 22.76%. However, this figure was still below average for the years before the COVID-19 pandemic [2].

The Journal of Tourism states that the most important factor in the field of tourism is not only the tourist attraction, which is the main destination, but also the means of accommodation as a place to rest, which also needs attention. A hotel is a business entity that provides accommodation and other services at a fee. Therefore, the improvement in the quality of accommodation facilities, such as hotels, is directly proportional to the increase in tourism in Indonesia. In line with the technological advancements in this era, people around the world have used the Internet to obtain various types of information. According to [4], about 65% of tourists with tourism purposes and 67% of tourists with business purposes seek information about their destination through the Internet, especially websites. Based on the results of this study, many hotel managers take advantage of this to promote hotels through websites. The hotel website is not only a promotional medium but is also used by hotel managers as a means of selling rooms by adding features about the hotel's facilities. The website is often chosen by hotel managers because they can fully control the design of the hotel website [3-4].

Kansei Engineering was first coined by Nagamachi [5-6]. This method is a technique to create a product, including software, by considering the needs of users, especially from an emotional aspect. Products produced using the Kansei approach satisfy the users [7-11]. In the software world, the user interface plays an important role as an intermediary between the user and system. Therefore, it is very important that the software has a user interface as desired by the user, so that the user can be more comfortable running the software [12-15].

Websites are widely used as software user interfaces. Therefore, it must be designed in accordance with the needs of users from both functional and emotional aspects. Kansei Engineering can be used to explore user' emotional factors and translate them into the design elements of a website [16-17]. The hotel website is an important tool for promoting hotels widely. Therefore, it is crucial for

hotel websites to be designed with careful consideration of user emotions to motivate users to further explore hotel facilities through an appealing website interface [18]. and directly increases the percentage of room occupancy rate through hotel website improvements. Using Kansei Engineering, this research attempts to analyze hotel websites in Bali, specifically Hotel Ocean View Tulamben, and recommends a redesign based on the user's emotional preferences toward the hotel website.

2. Research Method

The research methodology shown in Figure 1 is based on Kansei Engineering Type I [19-22]. It consists of several steps, as shown in Figure 1. There were eight steps in the process of formulating a recommendation for redesigning the display of a website based on user' emotions.

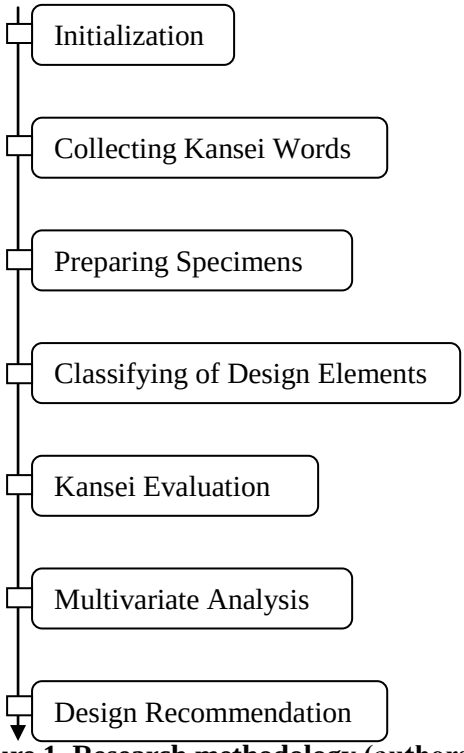

Figure 1. Research methodology (authors' design)

2.1. Initialization

The first step involved identifying the data domain to be processed. The outcome of this domain identification influences the selection of Kansei words. This stage entailed conducting a survey of the research subject and reviewing the relevant literature. During this process, it was verified that the research was centered on middle-class hotels in the Bali area, specifically the Ocean View Tulamben Bali Hotel.

2.2. Collecting Kansei Words

This step involves collecting and determining Kansei words related to and representing the website interface design of the Ocean View Tulamben Bali Hotel. Kansei words were gathered from the results of a literature review and selected based on the research object. The research identified seven Kansei words that had a strong relationship with the research object.

The results of the Kansei word collection in the previous stage were translated into a five-point Semantic Differential (SD) scale structure. The description of the five scales can be interpreted as follows.

5 = strongly agree or very interesting
4 = agree or interesting
3 = neutral
2 = disagree or not interesting
1 = strongly disagree or very uninteresting

The average of each Kansei word is calculated based on a value scale. If the Kansei words have a large value, it means that they correspond to what users feel when exploring the website's designs. However, if the average value of the Kansei words is small, this means that users do not feel good when looking at the website's interface.

2.3. Preparing Specimens

During the research process, a thorough exploration and collection of several related hotel website designs were carried out. Each of these websites offers unique insights into different hotel website designs and user interfaces and will be used as samples or specimens in the Kansei evaluation process. To capture a broad spectrum of website design approaches, these samples covered a wide range of styles, from minimalist and clean designs to more intricate and detailed interfaces.

Some of the gathered samples were distinguished by their unique and innovative interface designs. These designs diverged from common norms and presented fresh perspectives on how hotel websites can be structured and presented. These samples stood out not only because of their aesthetic appeal but also because of their ability to deliver information in a user-friendly manner. This uniqueness in the presentation and design interface became a deciding factor, leading to their selection as specimens for further study.

The chosen specimens played a crucial role in the research, serving as reference points for the evaluation of user emotional factors in relation to hotel website design. By analyzing these unique and varied specimens, this research aimed to gain a deeper understanding of how different design elements could evoke specific emotional responses from users, with the ultimate goal of informing a more effective hotel website redesign strategy.

2.4. Classifying Design Elements

During the evaluation process, all the selected hotel websites were thoroughly examined and categorized into a classification of design elements. These design

elements are then rated according to various categories. Some of the primary categories considered were color, shape, font, and size.

Color was assessed for its psychological impact on users, its role in creating visual harmony, and its contribution to the overall branding of the hotel. The shape is evaluated based on how it is used to draw attention, convey information, and affect the overall aesthetics of a website. Fonts are examined for readability, mood setting, and how well they align with the hotel's branding. The size of different elements on the website is assessed for their role in establishing a visual hierarchy and guiding users' attention.

The aesthetic appeal of the website is a crucial factor in the Kansei analysis process. It focuses on the overall visual design, use of images and graphics, and whether the design aligns with the taste of its target audience. Each of these factors was carefully examined and rated to provide a comprehensive evaluation of each selected hotel website. The results from this evaluation process will then inform strategies for redesigning hotel websites, with the goal of creating a design that is not only visually pleasing but also winning the hearts and minds of visitors.

2.5. Kansei Evaluation

In the data collection phase, the internal staff of the Ocean View Tulamben Bali Hotel played a pivotal role. The staff are tasked with exploring samples from the hotel's website, meticulously examining each section and feature, to gain a comprehensive understanding of its current state. This process is integral to identifying the areas of the website that elicit specific emotional responses, represented by Kansei words.

Staff recorded their evaluations using a five-point Semantic Differential (SD) scale. This scale ranged from strongly disagree or very uninteresting at the lower end (1) to strongly agree or very interesting at the higher end (5). Each staff member was asked to fill in the value that best represented their emotional feeling for each Kansei word, providing a quantifiable measure of their emotional responses. Multiple staff members are encouraged to participate, providing a diverse range of perspectives and reducing individual bias. This diversity ensures that the data collected are representative of a broad spectrum of user experiences.

After data collection, the research team calculated the average value of each Kansei word. This involved summing the assigned scores for each Kansei word and dividing it by the number of respondents. These average values provide a useful metric for understanding how a website's design resonates emotionally with its users. Large values indicate that the design element associated with a particular Kansei word is successful in evoking the desired emotional response, whereas small values suggest areas that may need improvement. The data collection process is not only about gathering numbers but also about understanding the human emotions behind these numbers. The insights derived from this process will be invaluable in crafting a user-centered website redesign that caters to the emotional needs and preferences of its users.

2.6. Multivariate Analysis

The next phase of research involved the application of multivariate statistical analysis methods. The methods shown in Table 1 were used to calculate the averages of Kansei words [23-25]. These methods comprised four main statistical methods, each serving a unique purpose in the research process.

Table 1 Multivariate Analysis Used (compiled by the authors)

No	Methods	Description
1	Cronbach's Alpha	Calculate the average of the questionnaire results and Kansei words.
2	Correlation Coefficient Analysis	Identify the correlation between Kansei words
3	Factor Analysis	Identify the strength of each Kansei word
4	Partial Least Square	Translate each Kansei Word into design elements

Cronbach's alpha was used to calculate the average of the questionnaire results and Kansei words. Cronbach's Alpha is a reliability test that calculates the internal consistency and reliability of a test or scale. It assesses whether multiple questionnaire items contribute to a single construct, or measure the same general concept. This is an essential step as it ensures the reliability of the gathered data and the validity of the subsequent analysis.

Correlation Coefficient Analysis was used to identify the correlation between the Kansei words. It measures the strength and direction of the linear relationship between two variables. In this context, it helps understand how different Kansei words (and the emotional responses they represent) are related to each other. This understanding can offer insight into how different design elements interact to influence a user's overall emotional response.

A factor Analysis was used to identify the strength of each Kansei word. Factor Analysis is a data reduction technique used to reduce a large number of variables into a smaller set of factors. This can help identify underlying dimensions, or factors, that explain the correlations among a set of Kansei words. This research helps to identify the most influential Kansei words, and by extension, the most impactful design

elements in evoking specific emotional responses.

Partial Least Square Analysis was used to analyze the relationships between emotion and design elements. Partial least squares (PLS) analysis is a statistical method that allows the analysis of multiple correlations. It is commonly used when there are multiple dependent and independent variables. In this context, it helps examine how different design elements (independent variables) are related to different emotional responses (dependent variables). The results are used as the foundation for new design recommendations for targeted emotional evocative website design.

2.7. Design Recommendation

Based on the results of the partial least squares (PLS) analysis, the research proposes recommendations for the new concept of website interface design for the Ocean View Tulamben Bali Hotel. The PLS analysis provides valuable insights into the relationships between different emotional responses and design elements. This analysis enables the identification of design elements that evoke positive emotional responses from users. Each design element was assigned a value based on its impact on the users' emotions. The elements with the highest values were those that had the most positive influence on users' feelings and, thereby, their overall experience on the website.

These high-value design elements are prioritized in the process of proposing recommendations. For instance, if the 'color' element has the highest value, it indicates that the choice and use of color on the website strongly influence users' emotions. Therefore, a recommendation is to focus on utilizing colors that evoke positive emotions in the new website design.

Similarly, other design elements, such as shape, font, and size, were evaluated, and recommendations were made accordingly. If 'font' has a high value, it suggests that users have a strong emotional response to the type of font used. In such a scenario, the recommendation would be to carefully select fonts that are not only aesthetically pleasing, but also easy to read and align with the hotel's branding.

These recommendations provide a roadmap for the redesign of the website, focusing on enhancing elements that users find appealing, and improving or eliminating those that users do not resonate with. This user-centered design approach ensures that the redesigned website is not only visually pleasing but also emotionally engaging, thereby providing a superior user experience.

3. Results and Discussion

The data collection survey involved 33 hotel employees as respondents. Six related hotel websites were considered appropriate samples.

Table 2 shows the average of all Kansei words from all respondents. The Cronbach's alpha of the collected surveys was 0.984, indicating that the data were reliable to continue with the following analysis.

Table 2 The average of Kansei words (developed by the authors)

	Hotel 1	Hotel 2	Hotel 3	Hotel 4	Hotel 5	Hotel 6
Elegant	2.576	2.030	2.758	2.758	2.546	1.849
Futuristic	2.455	2.152	2.606	2.515	2.364	1.788
Informative	2.606	2.273	2.788	2.606	2.576	2.242
Complete	2.576	2.242	2.636	2.576	2.667	1.970
Modern	2.788	2.242	2.788	2.788	2.424	2.121
Professional	2.606	2364	2.546	2.788	2.576	2.152
Up-to-date	2.727	2.394	2.728	2.728	2.455	2.212

3.1. Coefficient Correlation Analysis

Using the average of the data questionnaires in Table 2, we calculated it to determine the relationship between Kansei words, as shown in Table 3. Table 3 shows that, in general, there was a strong relationship between all Kansei words, since they had a value greater than 0.8.

The weakest Kansei words relationship was between "modern" and "informative," with a value of 0.820. On the other hand, the strongest Kansei word relationship was between the emotion of "modern" and "up-to-date," with a value of 0.99. Thus, if users feel that the website's appearance is "modern" they tend to also feel it is "up-to-date." In other words, the emotion of "up-to-date" was the alternative of "modern" and vice versa. The Kansei word "futuristic" has a very strong emotional relationship with "informative", "professional", "up-to-date", and "elegant", respectively. Whereas "futuristic" has a less strong emotional relationship with "modern" and "complete".

Table 3. Kansei Words' Relationship (developed by the authors)

	Futuristic	Elegant	Up-to-date	Modern	Informative	Complete	Professional
Futuristic	1	0.947	0.951	0.843	**0.977**	0.800	0.972
Elegant		1	0.925	**0.944**	0.921	0.894	0.941

Continuation of Table 3					
Up-to-date	1	**0.903**	0.902	0.771	0.873
Modern		1	0.820	0.884	0.822
Informative			1	0.861	**0.990**
Complete				1	0.869
Professional					1

The weakest Kansei words relationship was between "modern" and "informative," with a value of 0.820. On the other hand, the strongest Kansei word relationship was between the emotion of "modern" and "up-to-date," with a value of 0.99. Thus, if users feel that the website's appearance is "modern" they tend to also feel it is "up-to-date." In other words, the emotion of "up-to-date" was the alternative of "modern" and vice versa. The Kansei word "futuristic" has a very strong emotional relationship with "informative", "professional", "up-to-date", and "elegant", respectively. Whereas "futuristic" has a less strong emotional relationship with "modern" and "complete".

3.2. Factor Analysis

A factor analysis was used to determine the Kansei words that should be considered. This consideration was based on the biggest emotional effect on the appearance of the hotel website. According to the experiments, the results of the factor analysis had coefficient values, as shown in Table 4.

Table 4. Factor analysis (developed by the authors)

Kansei Words	F1
Futuristic	0.989
Elegant	0.979
Up-to-date	0.975
Modern	0.967
Informative	0.942
Complete	0.916
Professional	0.889

Table 4 shows that in general, all Kansei words had a big impact on the appearance of the website, except Kansei word "professional" because its value was less than 0.9. Therefore, there were alternative Kansei words to be considered when redesigning the hotel website. However, we found that the biggest impact value of Kansei Word was 0.989 for "futuristic". It means the hotel website is strongly recommended to be redesigned based on the emotional feeling of "futuristic" in order to attract visitors to come and stay for a couple days in the hotel. In addition, as an alternative, the website design can also be selected based on "elegant", "up-to-date", and "informative" because their factor analysis and correlation coefficient analysis results are greater than 0.9.

3.3. Partial Least Square

Partial Least Squares (PLS) was used to analyze the relationship between emotion (a Kansei word) and an item or category. Using the data from questionnaires and the design elements of each sample, the research explored the design element in three categories (header, body, and footer) to redesign hotel websites based on the strongest impact of the Kansei word "futuristic". Using PLS we translated the emotion of "futuristic" into matrix of design elements which consists of three categories, and the results of PLS was the general recommendation for developing a new Hotel website based on users' emotional preferences as shown in Table 5.

Table 5. The matrix of recommendations (developed by the authors)

Item/Category	Value
Header Background Color	: White
Header Logo Size	: Medium
Body Background Color	: White
Body Title Size	: Small
Body Booking Tool Position	: Top
Footer Background Color	: White Grey

4. Conclusion

Kansei Engineering was implemented to evaluate and analyze the website of Hotel Ocean View Tulamben Bali based on users' emotional preferences. This method involves a series of stages, including multivariate statistical analysis, consisting of Cronbach's alpha, correlation coefficient analysis, factor analysis, and partial least squares analysis. Seven Kansei words were identified to represent user emotional preferences, and six hotel websites were used as samples.

While most website designs focus on functional aspects, this study emphasizes the emotional aspect of recommending a hotel website that suits users' emotions. We found that the most significant finding from this research is the prominence of the Kansei word "futuristic." According to the respondents, this word most effectively embodied the emotional factors associated with a hotel's website. Therefore, the implication of this study leads to the formulation of recommendations based on users' emotional factors for the redesign of the Hotel Ocean View Tulamben Bali's website, especially by focusing on "futuristic" concept. This recommendation is beneficial to Hotel Ocean View Tulamben Bali and provides valuable insights for other hotels seeking to improve their online presence.

Further research is needed to conduct a more

detailed analysis of these design elements. Therefore, the research needs to collect more samples of websites and related Kansei Words in order to explore design elements deeply for more detailed recommendations and offer comprehensive guidance for website design development.

Declarations

Author Contributions

Conceptualization, A.H.; methodology, A.H., N.N. and S.R.; formal analysis, A.H., D.P. and A.M.L.; data curation, A.H. and A.M.L.; writing—original draft preparation, all authors contributed equally; writing—review and editing, A.H.; supervision, A.H. and A.M.L.; project administration, A.H. All authors have read and agreed to the published version of the manuscript.

Data Availability Statement

The data presented in this study are available on request from the corresponding author.

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Institutional Review Board Statement

The animal study protocol was approved by the Ethics Committee of Herbion Pak. Pvt. Ltd.

Conflicts of Interest

The authors declare that there is no conflict of interests regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

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