Exploring Guest Reviews of Capsule Hotels: Identifying Concerns and Satisfaction Factors

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Capsule hotels are increasingly popular among travelers and operators due to their unique design and efficient use of space. However, limited research exists on guest satisfaction and concerns. This study analyzes online reviews, focusing on "Liked Comments" and "Disliked Comments," to identify factors shaping guest experiences. Five key themes emerge from positive reviews: capsule layout, amenities, location, comfort and cleanliness, and staff friendliness. Conversely, six concerns are highlighted in negative reviews: storage, noise, temperature control, night-time disturbances, staff interactions, and mattress comfort. These findings offer practical insights for managers to better meet guest expectations and enhance operations, while fostering research interest in this growing sector.

1. The Rise of Capsule Hotels

As the hospitality industry adapts to the evolving preferences of travelers, capsule hotels have emerged as a distinctive and increasingly popular accommodation option, particularly in urban centers such as Tokyo, Japan (Chen et al., 2019). These compact, affordable spaces provide guests with minimalistic, functional designs that offer a blend of cost efficiency and privacy (Chen & Wei, 2022). The growing appeal of capsule hotels lies in their ability to cater to a diverse range of travelers—including budget-conscious tourists, solo adventurers, and business professionals seeking convenience and simplicity—thereby solidifying their position within the hospitality market (Lee et al., 2018).

With the growing popularity of capsule hotels, analyzing guest experiences through online reviews is crucial for operators seeking to enhance services and meet travelers' evolving needs. However, limited research exists on the specific themes and sentiments in guest reviews. This study addresses this gap by analyzing online reviews of capsule hotels in Tokyo, using natural language processing (NLP) and topic modeling techniques to uncover key factors influencing satisfaction and dissatisfaction, providing actionable insights for the hospitality industry. The research aims to address two key questions: (1) Are there differences in sentiment between positive and negative comments within the same guest rating? (2) What are the primary concerns and discussion topics for guests staying in capsule hotels?

To answer these questions, the study utilizes a dataset of guest reviews from Booking.com, encompassing positive ("Liked Comments") and negative ("Disliked Comments") feedback. Through rigorous pre-processing and analysis, sentiment and topic modeling techniques extract latent themes from the data. This method provides a comprehensive understanding of guest perceptions, revealing five key topics associated with positive reviews—capsule layout, amenities, location, comfort and cleanliness, and staff friendliness—and six topics from negative reviews, including storage, noise, temperature control, night-time disturbances, staff interactions, and mattress comfort.

These findings offer significant implications for industry stakeholders. Hotel managers can leverage the identified themes to improve operational strategies, enhance service quality, and better align with guest expectations. Furthermore, prospective travelers gain a clearer

understanding of the unique features and challenges of capsule hotels, enabling more informed decision-making.

2. Understanding Capsule Hotels: from Design to Guest Satisfaction

Capsule hotels originated in Japan in 1979 as an innovative response to the demand for affordable lodging with compact, functional sleeping spaces and minimal amenities (Chen et al., 2019). Often categorized as budget accommodations, capsule hotels offer a unique blend of privacy and affordability, distinguishing themselves from hostels and other communal options (Chen et al., 2020). Their distinctive design—individual pod-like sleeping spaces arranged in rows and vertical stacks—provides guests with personal, tranquil environments within shared facilities, ensuring comfort and privacy (Yu & Akita, 2018; Yin et al., 2020).

Initially concentrated in Japan, capsule hotels have gained global popularity due to their cost-effectiveness and appeal to modern travelers seeking unique experiences (Chiang, 2018). Budget-conscious tourists, solo adventurers, and business travelers are drawn to the compact yet secure spaces these hotels provide (Yin et al., 2020). The compact design, efficient use of space, and emphasis on privacy align with the needs of travelers prioritizing affordability and functionality.

2.1. Research on capsule hotels

The rise of capsule hotels has spurred academic interest across various fields. Architectural studies focus on optimizing ventilation and lighting to enhance guest comfort (Yu & Akita, 2018; Yin et al., 2020), while marketing research highlights the importance of aligning branding strategies with the minimalist lifestyles of target audiences (Chen & Wei, 2022). Effective branding not only enhances customer engagement but also establishes capsule hotels as a lifestyle choice.

Guest satisfaction is another critical area of research. Olorunsola et al. (2023) identified nine themes influencing guest satisfaction, including staff interactions, location, and noise levels. This thematic analysis underscores the significance of addressing guest concerns to improve service delivery and maintain competitiveness. Chiang (2018) further explored the factors shaping guest loyalty, emphasizing the role of pricing, service convenience, and social environments in fostering repeat visits.

Studies by Lee et al. (2018) revealed that price competitiveness and central locations are key factors influencing guest preferences, with service levels playing a secondary role. Such insights are instrumental for operators seeking to attract budget-conscious travelers while meeting evolving expectations. Collectively, these studies provide valuable frameworks for improving the operational, architectural, and branding strategies of capsule hotels.

2.2 Online review and sentiment analysis

Analyzing online reviews has emerged as a pivotal method for understanding customer sentiments and experiences. Compared to traditional feedback tools such as surveys and comment cards, online user-generated content (UGC) provides unfiltered, real-time insights into guest perceptions (Hou et al., 2019). This approach allows hotel managers to identify recurring themes, address shortcomings, and amplify factors contributing to positive experiences (Stringam & Gerdes, 2010). Online reviews serve as rich data sources, offering nuanced feedback often missed in structured surveys (Xiang et al., 2014). This data provides actionable insights, enabling hotels to enhance guest satisfaction and adapt to market trends efficiently (Chang et al., 2020). The public nature of UGC further allows for benchmarking against competitors, providing a broader perspective on guest expectations (Calheiros et al., 2017).

Sentiment analysis has become a cornerstone of hospitality research, leveraging natural language processing to evaluate sentiments and emotions expressed in online reviews (Gu & Ye, 2013). It enables businesses to extract actionable insights, monitor customer opinions, and identify emerging trends (Picasso et al., 2019). Applications in tourism include analyzing public sentiment, predicting market trends, and enhancing guest experiences through targeted interventions (Geetha et al., 2017). Ravi and Ravi (2015) categorize sentiment analysis approaches into machine learning, lexicon-based, and hybrid methods. Machine learning, the dominant approach, enables automatic sentiment classification by learning patterns from large datasets, offering high accuracy and deeper insights (Yadav & Roychoudhury, 2019). Hybrid models, which combine machine learning with lexicon-based techniques, further enhance the precision and context awareness of sentiment analysis (Sánchez-Rada & Iglesias, 2019).

In the hospitality context, sentiment analysis has been instrumental in uncovering themes in online reviews, helping businesses understand guest preferences and optimize

service delivery. By systematically analyzing large datasets, researchers can identify recurring patterns and sentiments, providing valuable guidance for improving guest experiences (Guo et al., 2016).

3. Methodology

This study utilized publicly available user-generated data from Booking.com, a leading online travel platform with over 28 million accommodation listings in 43 languages. The platform's global reach and review process, which removes reviews older than 36 months, ensure the dataset reflects recent guest experiences. Data was collected on March 3, 2024, using Python Scrapy, a web crawling framework for extracting structured data. Reviews from 49 capsule hotels in Tokyo were retrieved, capturing details such as hotel name, guest name, nationality, traveler type, stay duration, review date, rating, and comments. The initial dataset comprised 40,800 reviews, averaging approximately 800 per hotel. A rigorous data cleaning process ensured the dataset's accuracy and relevance. Extraneous characters were removed, dates standardized, and reviews without text-based comments excluded, focusing the analysis on qualitative feedback. This resulted in a final dataset of 8,133 reviews, offering a robust foundation for exploring guest experiences.

Descriptive analysis revealed that guest ratings skewed toward the higher end of the scale, with 24.92% scoring 10, indicating strong satisfaction. Solo travelers constituted the majority at 74.89%, reflecting the affordability and privacy features of capsule hotels that appeal to budget-conscious individuals. Text pre-processing was performed using the Natural Language Toolkit (NLTK) (Elhadad, 2010). This process enhanced the quality and relevance of the text, preparing it for sentiment and topic analysis.

4. Understanding Guest Feedback

Sentiment analysis was conducted using NLTK's SentimentIntensityAnalyzer, which assigns sentiment scores to text, categorizing it as positive, negative, neutral, or compound (Hutto & Gilbert, 2014). This analysis leveraged the unique structure of Booking.com reviews, which separate "Liked Comments" and "Disliked Comments." A total of 7,821 "Liked Comments" and 6,587 "Disliked Comments" were analyzed.

For "Liked Comments," sentiment scores indicated a predominantly positive tone, with a mean compound score of 0.61 (SD: 0.37). Conversely, "Disliked Comments" had a

lower mean compound score of 0.01 (SD: 0.36), reflecting guest dissatisfaction. Notably, high ratings correlated with more positive sentiments in "Liked Comments," while low ratings aligned with stronger negative sentiments in "Disliked Comments." This contrast highlights the dual sentiment nature of guest feedback. To uncover key themes, Latent Dirichlet Allocation (LDA) was employed. Coherence scores determined the optimal number of topics for each review category: five for "Liked Comments" (coherence score: 0.586) and six for "Disliked Comments" (coherence score: 0.59) (Blei, Ng, & Jordan, 2003).

The analysis of "Liked Comments" highlighted several positive aspects of guests' experiences. The unique capsule design, including efficient layouts, luggage storage, and space utilization, emerged as a key satisfaction driver. Guests also appreciated amenities like complimentary towels and well-maintained facilities. The convenient location of capsule hotels, often near transportation hubs, was another significant factor. Comfort and cleanliness were frequently praised, along with positive interactions with staff, described as "friendly" and "helpful."

Conversely, "Disliked Comments" revealed six areas of concern. Limited storage space, particularly inadequate lockers and luggage organization, was a common issue. Noise disturbances, including guest disruptions and poor soundproofing, were frequently mentioned. Complaints about temperature control, reflected in terms like "air" and "hot," pointed to ventilation issues. General dissatisfaction with aspects of the stay, including overall experience and duration, was also noted. Suggestions for better facilities and improved staff interactions were common, while sleeping arrangements, particularly hard mattresses, were a recurring concern.

5. Key Insights and Future Directions for Capsule Hotel Operations

This study provides an in-depth analysis of guest sentiments and experiences in capsule hotels, focusing on 49 establishments in Tokyo and 8,133 guest reviews from Booking.com. The findings highlight both positive and negative aspects of guest experiences, offering opportunities to enhance operations and reinforce successful strategies. Sentiment analysis reveals that guests giving high ratings often include constructive criticism in the "Disliked" section. Despite occasional negative feedback, the overall sentiment of these reviews remains positive, indicating that satisfied guests value opportunities for improvement.

Additionally, "Liked Comments" consistently show higher sentiment scores across all ratings, underscoring the importance of enhancing appreciated elements to boost overall satisfaction.

Topic modeling identified five themes from "Liked Comments"—capsule layout, amenities, location, comfort and cleanliness, and staff friendliness—indicating areas where capsule hotels excel. Conversely, six themes emerged from "Disliked Comments"—storage, noise, temperature control, night-time disturbances, staff interactions, and mattress comfort. These themes provide a clear framework for addressing operational challenges and improving guest experiences.

The findings offer actionable recommendations for operators. Managers should enhance positive aspects highlighted in "Liked Comments," such as investing in ergonomic capsule designs to maximize space and privacy, providing high-quality amenities like toiletries, secure storage, and reliable Wi-Fi, and ensuring prime locations near transportation hubs or attractions. Maintaining high cleanliness standards further enhances guest satisfaction. Additionally, developing staff through targeted training programs in customer service, communication, and problem-solving can create memorable guest experiences.

Addressing concerns from "Disliked Comments" is equally vital. Storage solutions, such as lockable drawers or compartments, can alleviate space constraints. Soundproofing measures, including capsule doors and corridor carpets, can minimize noise disturbances. Temperature control systems allowing guests to adjust their environment would address comfort issues, while policies such as quiet hours and providing earplugs can reduce night-time disturbances. Finally, upgrading mattresses and offering additional bedding options can resolve comfort-related complaints, ensuring restful stays and fostering guest loyalty.

Despite its contributions, this study has limitations. The dataset, exclusively from Booking.com and limited to English-language reviews, may not fully represent the diverse spectrum of capsule hotel guests. Moreover, the lack of segmentation among solo travelers by trip purpose (e.g., leisure or business) restricts insights into their specific preferences.

Future research should incorporate data from multiple platforms and languages to capture a broader range of perspectives. Examining solo travelers by trip purpose could provide deeper insights into their unique needs. Additionally, qualitative methods like

interviews or in-depth surveys could uncover more nuanced dimensions of guest satisfaction. Addressing these limitations would extend the findings, offering a more comprehensive understanding of guest experiences in capsule hotels.

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