

Consumers' Feedback in Mathematics and Psychology Proceeding

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Abstract

The aim of this study is to evaluate customer feedback using three distinct models: the Need model, Feedback model, and Network model. McClelland's (1985) motivation theory underlines that consumer feedback represents requirements, symbolizing a human drive at the tail of the vector. The action regulation theory (Frese & Zapf, 1994) characterizes consumer feedback as modifiers, resulting in its portrayal as a human adjective at the vector's tip. Finally, the actor-network theory (Latour, 2005) describes consumer feedback as an affect within a social network that dictates the vector's direction. Through the amalgamation of mathematical and psychological principles, a comprehensive model has been devised for hoteliers to implement effective strategies in meeting guest expectations. To formalize a vector consisting of a tail (need), a tip (goal), and a direction (network), the study has applied linear transformation to derive an integrated model from the three models. To analyse the data gathered from 1000 TripAdvisor comments from 2018 to 2023, Linguistic Inquiry Word Count was used to categorize the feedback into human drives and affect. Structure Equation Modelling was utilized to establish connections between consumer factors and marketing elements, resulting in the identification of three pairs: affect-pricing, adjectives-advertising, and drives-servicing. The practical implications of this research indicate that during the low season, hoteliers should emphasize pricing at the vector's tail. Conversely, in high season, they can shift their focus to advertising at the vector's tip. The vector's direction depends on servicing. This study underscores the integration of mathematics and psychology in comprehending consumer behaviour.

Keywords: Implicit, Explicit, Vector, Need Model, Feedback Model, Actor-Network Model, Linguistic Inquiry Word Count

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Introduction

Failure to effectively apply mathematical modelling to optimize hotel guest satisfaction results in two significant gaps for hoteliers, hindering revenue maximization. The first gap emerges between the overarching goals of hotels and the real-time feedback provided by contemporary customers. The second gap exists between the tangible determinants of perceived overall satisfaction and the underlying implicit factors of customer motivation and emotional expectations. Hotel revenue optimization has become increasingly challenging in meeting guest expectations amidst the advancements of the latest technological era.

In this study, a vector representing the position of the vector's tail during low season and its peak during high season comprises two numbers. These numbers delineate the interplay of implicit and explicit factors affecting hotel revenue within a linear system of two axes. The numerical values at the tails and tips of the vector reflect the respective impacts of implicit and explicit factors.

Seven explicit variables sourced from TripAdvisor, including overall satisfaction, location, value, room quality, service, sleep quality, and cleanliness, along with two implicit variables—consumer drives from the Need model and affect from the feedback model—were extracted from 1000 comments gathered from hotels in the southeast region of the United States using Linguistic Inquiry Word Count.

Literature

The dynamic interaction between consumers' feedback and hoteliers' actions reveals a notable discrepancy, a phenomenon highlighted by three academic theories. These theories shed light on the multifaceted nature of this gap and its implications for the dynamics of the hospitality industry.

Firstly, McClelland's (1985) motivation theory and Tran and Ralston (2006) underscore consumers' feedback as a pivotal driver of business needs. Within this framework, feedback acts as a catalyst, motivating hoteliers and shaping their strategic decisions. It serves as a reflective mirror, echoing the desires and expectations of consumers, thereby compelling hoteliers to align their endeavours with these insights.

Expanding on this foundation, the action regulation theory, advocated by Frese and Zapf (1994), Frese and Keith (2015), Frese, Kraus, Keith, Escher, Grabarkiewicz, Luneng, and Friedrich (2007), and Zacher and Frese (2018), portray consumers' feedback as an integral component of an ongoing process. Here, feedback operates as a dynamic mechanism regulating hoteliers' actions. This cyclical process ensures not only the receipt of feedback but also a responsive adjustment of strategies to bridge the gap between consumer expectations and service delivery.

Furthermore, Latour's (2005) Callon's (1998), and Akrich (2006) actor-network theory introduces a distinct perspective, emphasizing the network formed by hoteliers' actions. Within this framework, hoteliers' responses to consumer feedback serve as pivotal nodes within an intricate network. These actions intertwine with various elements, both internal and external, influencing the evolution of the service delivery ecosystem. The theory elucidates how the feedback-action loop is intricately connected within a broader network of actors and influences.

Collectively, these theories illuminate the nuanced dynamics between consumers' feedback and hoteliers' actions, offering insights into the ways in which the feedback-action nexus shapes the trajectory of the hospitality industry. Recognizing and addressing this gap becomes imperative for hoteliers aiming to thrive in an environment where consumer preferences and business strategies intertwine.

Additionally, the Linguistic Inquiry Word Count (LIWC, 2022) by Mehl, Gosling, and Pennebaker (2006), Pennebaker and King (1999) and Pennebaker, Boyd, Jordan, & Blackburn (2015) provide a comprehensive lens through which linguistic expressions are analysed, encompassing various elements such as pronouns, emotional facets, cognitive processes, and motivational drives. This multidimensional framework unveils how language reflects and interacts with personality traits, shedding light on the intricate interplay between communication patterns and individual disposition.

TripAdvisor's hotel criteria encompass six dimensions that relate to the underlying marketing elements, as proposed by Borden (1964), in the theories of motivation, action regulation, and actor-network. These criteria include location, cleanliness, rooms, value, sleep quality, and service. Each criterion reflects different facets of consumer expectations and preferences, influencing their overall satisfaction and perception of a hotel's quality.

The fluctuation in occupancy rates in Pensacola is closely linked to the different quarters of the year, reflecting trends observed in both 2015 and 2016. During these years, occupancy rates followed distinct patterns across the four quarters:

- Quarter 1: This period showed lower occupancy rates. In 2015, it was 54.9%, improving slightly to 58.4% in 2016.
- Quarter 2: The second quarter boasted the highest occupancy rates. In 2015, it reached 67.2%, increasing to 70.3% in 2016.
- Quarter 3: The third quarter displayed the second-highest occupancy rates. In 2015, it stood at 52.3%, rising significantly to 69.1% in 2016.
- Quarter 4: The final quarter marked the lowest occupancy rates. In 2015, it dropped to 58.4%, further decreasing to 55.9% in 2016.

These variations underscore the dynamic nature of Pensacola's occupancy rates throughout the year, with each quarter experiencing different levels of occupancy. Understanding these quarterly trends can offer valuable insights for planning and decision-making within the hospitality and tourism sectors.

In summary, this study is motivated by the design of needs/action, process/sequence, and theme/goal supported by the three theories of motivation, action regulation, and actor-network. The two hypotheses of the study posit that (1) implicit factors, such as drives and affect in guests' comments, significantly directly impact hotel average daily rate, while (2) explicit or self-report factors directly and indirectly affect average daily rate through these implicit factors.

Methodology

Study Sample

The study comprised 1076 hotel guests, with 509 females and 567 males, who posted their comments on social media platforms, including TripAdvisor, over a five-year period from 2019 to 2023. These guests stayed in five different hotel brands, namely Hampton Inn Pensacola Beach Gulf Front, Florida; Hilton Pensacola Beach Gulf Front, FL; Holiday Inn Resort Pensacola Beach Gulf Front, FL; Hyatt Place Pensacola Airport, FL; and Surf and Sand, Pensacola Beach, FL.

Structure Equation Modelling

To establish a model fit between comments, strategies, and yearly quarters, the present study employed Structural Equation Modelling (SEM). This analysis aimed to explore the relationship between customer feedback variables (location, rooms, cleanliness, service, value, and sleep quality) and marketing strategy variables (branding, physical handling, fact-finding, servicing, promotion, pricing, personal selling, distribution, advertising, display, product planning, and packaging) within specific yearly quarters.

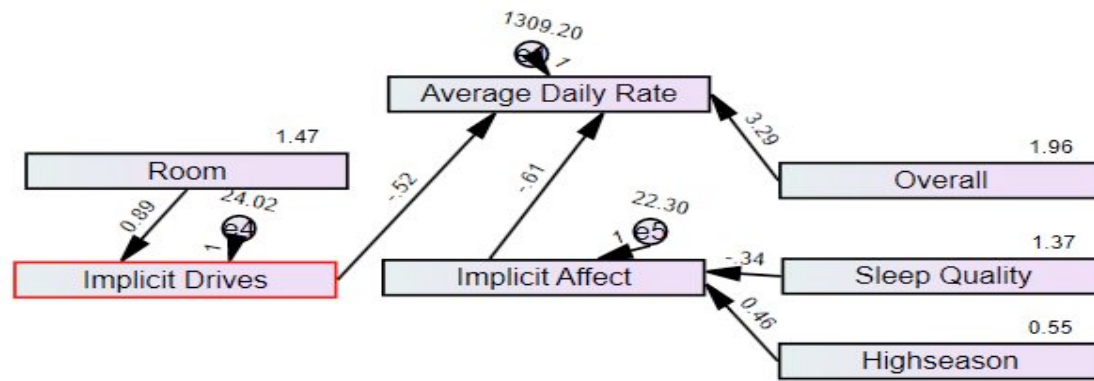
Structural Equation Modelling (SEM) is a statistical approach used to examine relationships between observed variables (such as 12 marketing strategies, 6 hotel demand criteria, and 4 quarter dummies) and latent variables, which represent the errors of the strategies.

SEM models were evaluated based on various goodness-of-fit indices, including the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). Additionally, the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) were used for model selection.

Results

The reliability of the variables in the study was confirmed with a Cronbach's Alpha of 0.7. The model demonstrated a good fit, with composite reliability of .92 and variance extracted of 70%. The fit indices (CMINs/df = 1.01; GFIs = .95; CFIs = .97; RMSEAs = .02, AICs = 45.1) supported this conclusion.

Figure 1 illustrates the implicit drives and implicit affect in guests' comments significantly impact hotel average daily rate, while the explicit factors directly and indirectly affect average daily rate through these implicit factors. Specifically, the explicit variable of room indirectly affects average daily rate through implicit drives. Additionally, the explicit variable of sleep quality in the high season indirectly affects average daily rate through the implicit variable of affect. Hypotheses 1 and 2 were confirmed based on these findings.



Source: Author's calculation

Figure 1: Model fit of hotel revenue (ADR) determined by (1) implicit drives supported by room, (2) implicit affect characterized by sleep quality and high season, and (3) explicit overall.

Discussion and Conclusion

In this study, the vector represents a pair of numbers denoting a specific position along the vector's tail for the low season and its tip for the high season within a linear system characterized by two axes: implicit and explicit factors. Seven explicit variables, obtained from TripAdvisor, including overall satisfaction, location, value, room quality, service, sleep quality, and cleanliness, were utilized. Additionally, two implicit variables, derived from the Need model and the affect component of the feedback model, were integrated. Despite the relatively small sample size of 1000 consumers in the US, the study addressed the gap in understanding the vector and its association with hotel revenue by establishing the vector's positions for both low and high seasons across the two axes of implicit and explicit factors. These numerical representations reflect the impact of implicit and explicit factors on hotel revenue.

McClelland's (1985) Need model highlights how consumers' drives expressed in their comments influence their decision to stay at a hotel, thus affecting hotel revenue. Similarly, Frese and Zapf's (1994) feedback model emphasizes how consumers' affect in their feedback influences their choice to stay at a hotel, thereby impacting hotel revenue. Finally, Latour's (1996) actor-network model depicts consumers' overall self-report as a human factor intertwined with the non-human aspect of hotel revenue, resulting in an actor-network between overall satisfaction and hotel revenue.

The societal implications of this research on optimizing hotel revenue underscore how guest feedback shapes the trajectory of a vector. Positive feedback steepens the vector, indicating increased resilience to price changes, leading to higher room rates and hotel revenue. Conversely, negative feedback flattens the vector, resulting in reduced room rates and ultimately decreased revenue. The study suggests strategies for hotel revenue optimization, such as emphasizing reduced room rates and advertising sleep quality during the high season, while promoting room availability for guests with affective comments during the low season to enhance overall guest satisfaction.

This study highlights the integration of mathematics and psychology in understanding consumer behaviour.

A limitation of the study is the relatively small sample size of 1000 comments, which may impact the generalizability of the findings. Nonetheless, the study's identification of implicit and explicit relationships affecting hotel revenue contributes to the literature and practice in hospitality and tourism research. Future research will focus on the north and central regions of the US to broaden the study's scope.

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