PRICE PATTERNS IN VIENNA'S HOSPITALITY: ANALYZING THE IMPACT OF RATINGS, REVIEWS, AND PROXIMITY ON HOTEL RATES

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This scientific paper presents an empirical research study that aims to investigate the relationships between various factors and room rates within the context of 346 hotels in Vienna listed on booking.com. The research utilized a combination of web content mining and multiple linear regression techniques to collect and analyze data. The variables extracted from the hotel listings included customer rating valence, amount of ratings, star category, distance to town center, and room rates. The statistical analysis employed multiple linear regression to examine the links between the variables and room rates. The results indicated significant links between star category and price, distance to town center and price, amount of customer ratings and price, and the valence of customer ratings and price. These findings provide valuable insights into the factors influencing room rates in the Vienna hotel market and contribute to the understanding of pricing strategies and customer preferences in the context of information systems and tourism.

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1 Introduction

The digital transformation within the hospitality sector, particularly through platforms like Booking.com, has reshaped the dynamics of hotel room pricing and consumer choices. This paper delves into how quantifiable hotel attributes like star rating, location relative to city center, and both the volume and sentiment of customer reviews, affect pricing strategies. Such a comprehensive analysis is vital in understanding the nuanced ways in which digital visibility and consumer feedback can influence hoteliers' pricing decisions (Abrate, Fraquelli, & Viglia, 2012). By integrating theories from e-commerce and consumer decision-making, this study aims to provide insights into the strategic adjustments hotel managers make in the digital era. The inclusion of customer review valence alongside volume offers a more detailed exploration of how consumer perceptions, reflected through reviews, play a crucial role in pricing mechanisms (Alabdullatif & Akram, 2018). This approach acknowledges the complexity of online consumer behavior, where decision-making is influenced not just by static hotel attributes but also by dynamic user-generated content (Aeknarajindawat, 2019). Riedl et al. and the exploration of online consumer behavior provides a foundational framework for understanding these interactions, suggesting that digital platforms offer both challenges and opportunities for pricing strategy optimization in the hospitality industry (Riedl, Brandstätter, & Roithmayr, 2008). The study's insights into the effects of customer reviews and location on hotel pricing strategies highlight a strategic approach for navigating economic fluctuations, underscoring its relevance to sustainable business practices in the hospitality sector. By emphasizing the critical role of strategic decision-making based on quantifiable data, the research underlines a pathway for hospitality businesses to navigate economic uncertainties while pursuing sustainable growth.

2 Theoretical Background / Literature Review

Decision-making on online platforms is a complex process influenced by various factors, with price being a significant determinant. Consumers employ different strategies to navigate the vast array of options available, relying on cognitive and emotional responses to make informed choices. Exploring the cognitive process involved in electronic commerce, it becomes evident, that price comparisons and perceived value affect consumer decisions (Riedl et al., 2008). Also delving into emotional aspects, it was found that aesthetic and functional website design elements

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can influence consumer preferences and decisions (Lux, Hawlitschek, Adam, & Pfeiffer, 2015). In addition, the role of online reviews and ratings, in conjunction with price, guide consumers in making purchasing decisions (Jiang & Benbasat, 2007). These studies underscore the complex nature of online decision-making, where price is interwoven with other informational cues to shape consumer behavior. The strategic presentation of price, coupled with user-friendly website design and credible reviews, can significantly influence consumer choices, underscoring the importance of a holistic approach to online retail and service platforms (Jiang & Benbasat, 2007).

Especially in the context of hotel room rates on booking platforms, pricing strategies are pivotal for balancing profitability with customer satisfaction and market competitiveness (Abrate et al., 2012). Traditionally, hotel pricing has been influenced by factors such as location, amenities, service quality, and seasonal demand. Revenue management in the hospitality sector plays an important role, emphasizing the importance of understanding customer price sensitivity and segmenting the market to optimize pricing strategies (Kimes, 2000). This approach allows hotels to maximize revenue through dynamic pricing, adjusting rates based on demand fluctuations (Abrate et al., 2012). The advent of online platforms has transformed hotel pricing strategies. With the increased transparency and ease of price comparison provided by online travel agencies (OTAs) and review sites, hotels are now more than ever focused on competitive pricing. To adapt, hotels have employed sophisticated revenue management systems that analyze vast amounts of data from various sources, including OTAs, competitor pricing, and booking patterns, to adjust their pricing in real-time (Altin, 2017). The role of online reviews and ratings in influencing pricing decisions was already often analyzed, noting that a positive online reputation can allow hotels to command higher prices (Gu & Ye, 2014). Moreover, the concept of perceived value plays a crucial role in online settings. Consumers often equate higher prices with superior quality or service, making price an integral part of the value proposition on digital platforms (Xiang, Magnini, & Fesenmaier, 2015). This perception underscores the need for hotels to strategically manage their online presence, ensuring that pricing is aligned with the value communicated through online content and customer feedback.

Also, the dynamics of online hotel booking intention is complex, influenced by a range of factors critical in the digital booking environment. Notably, online reviews stand out as a pivotal element affecting decisions, where their quality, sentiment, and freshness are a key (Aeknarajindawat, 2019; Alabdullatif & Akram, 2018; Chan, Lam, Chow, Fong, & Law, 2017; Eibl & Auinger, 2023; Hu & Yang, 2019). Review recency and valence particularly have an evident positive impact on booking choices (Alabdullatif & Akram, 2018; E. L. Kim & Tanford, 2021; Vinzenz, 2019). The authenticity perceived in online reviews, shaped by their quality and the consistency of user experiences, is crucial (Chakraborty, 2019). Moreover, the interaction between hotel room rates and reviews plays a vital role, where attractive pricing may be contradicted by negative reviews, highlighting the nuanced relationship between cost and perceived value (Hu & Yang, 2019). The influence of a hotel's popularity, including its brand and the scarcity of available rooms, also significantly affects decisions (D. Kim & Park, 2017; Park, Yin, & Son, 2019). Attributes such as amenity descriptions, cancellation policies, and facilities enhance perceived value, influencing preferences (Chaw & Tang, 2019; Chowdhury & Deshpande, 2020). The hotel's star rating serves as a credibility indicator, affecting booking intentions (Lee & Kim, 2020), while visual elements and loyalty rewards play into the decision-making process (Aeknarajindawat, 2019; Chaw & Tang, 2019).

3   Methodology

This section outlines the methodological approach employed in the empirical research conducted to investigate the relationships between quantitative hotel attributes and room rates within the context of 346 hotels in Vienna. The study utilized a combination of web content mining and statistical analysis techniques to analyze the collected data. To obtain the necessary data, a web content mining tool called Octoparse was utilized. This tool allowed for the systematic extraction of information from the listings of the 346 hotels in Vienna. The following quantitative variables were identified and hence collected for each hotel: customer rating valence, amount of ratings, star category, distance to town center, and room rates. To explore the links between the collected quantitative variables and room rates, the study employed multiple linear regression. Multiple linear regression is a statistical technique suitable for analyzing complex models with multiple independent and, in this case, one dependent variable. It enables the identification and assessment of relationships between variables (Cohen, Cohen, West, & Aiken, 2013). Given the

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inherent diversity in the measurement scales of the extracted variables, ranging from ordinal scales like the star category (1 to 5 stars) to continuous scales such as distance measured in kilometers, a standardization process was imperative to ensure comparability across variables. This necessitated the application of z-standardization, a statistical normalization technique that recalibrates each data point to a unified scale by subtracting the mean and dividing by the standard deviation, thereby aligning the data with a mean of zero and a standard deviation of one. Such a transformation is crucial for the integrity of multiple linear regression analysis (Field, 2013). It enables a direct comparison and integration of diverse variables into a coherent model, ensuring the reliability and validity of the findings by normalizing measurement units (Tabachnick, Fidell, & Ullman, 2013). The analysis involved constructing a model to examine the extent to which the independent variables (customer rating, amount of ratings, star category, and distance to town center) could explain the variations in the dependent variable (room rates). By evaluating the strength and significance of the relationships, the analysis determined whether there were any significant correlations between the variables.

4   Results

Analyzing the results from the multiple linear regression model provides a compelling insight into the factors affecting hotel prices on online travel agencies (OTA) listings. This model's statistics and correlation matrix indicate the relationships between the defined independent variables and the dependent variable, price. The standardized data reveal that the "Star Category" has a positive relationship with price, as seen by a coefficient of 0.264 and a statistically significant p-value ($p < 0.0001$). This suggests that hotels with higher star ratings are typically priced higher, a finding that is consistent with expectations and previous literature on hotel pricing strategies (Agušaj, Bazdan, & Lujak, 2017). "Distance to Town Center" has a negative coefficient of -0.353, with a highly significant p-value ($p < 0.0001$), indicating that hotels closer to the town center of Vienna tend to have higher prices. This aligns with the concept that location is a key determinant in the valuation of hotel properties (Zhang, Ye, & Law, 2011). The "Customer Rating" variable has a positive coefficient of 0.169 ($p = 0.014$), suggesting that better customer ratings are associated with higher prices, highlighting the impact of customer perceptions on pricing (Xie, Zhang, & Zhang, 2014). The "Amount of Ratings" variable shows a negative coefficient of -0.260 with a highly significant p-

value ($p < 0.0001$), indicating that a larger number of reviews does not necessarily correspond to higher prices, which could be due to various reasons such as the presence of more reviews for budget hotels (Mellinas & Martín-Fuentes, 2018).

Table 1: Variable statistics multiple linear regression

Variable	Value	Standard error	t	Pr > (t)
Star category	0.264	0.049	5.411	<0.0001
Distance to center	-0.353	0.046	-7.729	<0.0001
Customer rating	0.169	0.069	2.462	0.014
Amount of ratings	-0.260	0.047	-5.493	<0.0001

The model's goodness-of-fit statistics are also telling, with an R^2 value of 0.374, indicating that approximately 37.4% of the variance in hotel prices is explained by the model. Which also indicates that there are several other factors influence hotel pricing strategies which are not displayed within quantitative data on online hotel booking platforms but rather qualitative data or strategic decision by the respective hotels management board or other micro- or macro- economic factors. The f^2 effect size of 0.598 is considerable, indicating a strong effect size (Cohen, 2013). The analysis of variance further supports the model's strength with an F-statistic of 44.280, which is highly significant ($p < 0.0001$), suggesting that the model is a good fit for the data.

5   Discussion

The positive relationship between star category and room rates is consistent with the literature that suggests higher-rated hotels tend to command higher prices due to perceived quality and service standards (Agušaj, Bazdan, & Lujak, 2017). This finding underscores the importance of star categories as a signal of quality that consumers rely on when making booking decisions, supported by Riedl et al. (2008) who emphasize how consumers use price and quality indicators in e-commerce settings.

The negative correlation between distance to the town center and room rates highlights the premium placed on location, as proximity to central areas is highly valued by travelers for convenience (Zhang, Ye, & Law, 2011). This insight into

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consumer preferences for location over price reflects the decision-making strategies where consumers weigh the trade-offs between cost and convenience, as discussed by Jiang & Benbasat (2007).

Surprisingly, the amount of customer ratings showed a negative correlation with room rates, suggesting that hotels with more reviews do not necessarily charge higher prices. This could indicate that a higher number of reviews may be associated with more budget-friendly hotels, which align with Mellinas & Martín-Fuentes (2018) observation that hotel size might influence the number of reviews. This finding diverges from the expectation that more reviews would correlate with higher prices due to increased popularity or perceived quality.

The significant positive relationship between review valence and hotel room rates indicates that customer feedback directly influences pricing strategies, alongside other critical factors such as star category and location. This finding underscores the importance of online reputation management, highlighting how hotels leverage positive customer reviews to justify higher prices while maintaining competitive positioning in the market. (Gu & Ye, 2014).

6   Conclusions

The study provides a nuanced exploration into how quantifiable hotel attributes on Booking.com influence room pricing strategies, specifically within the Vienna hotel market. It conclusively demonstrates that higher star categories and closer proximity to the city center significantly increase room rates, affirming the value placed on quality and location by consumers. Unexpectedly, the analysis reveals that a higher volume of customer reviews correlates with lower prices, challenging conventional beliefs that popularity, as indicated by the number of reviews, would elevate room rates. This surprising outcome suggests a complex interplay between visibility and pricing strategies, where increased reviews may not solely represent higher quality but also reflect broader accessibility or affordability.

This finding invites further investigation into the dynamics between customer reviews and hotel pricing, highlighting a potential area for future research. Future studies could explore the impact of review sentiment analysis on pricing strategies or examine how different types of hotels (luxury vs. budget) leverage reviews in their

pricing mechanisms. Additionally, the relationship between the actual content of reviews and pricing strategies presents another interesting way for exploration, considering the qualitative aspects of customer feedback beyond mere volume.

The paper's limitations include its focus on a single online platform and a specific geographic location, suggesting that findings might vary across different platforms or locations. Further research could extend this analysis to other cities or booking platforms to validate the generalizability of the results. Additionally, incorporating qualitative data or exploring the strategic decisions made by hotel management could enrich the understanding of pricing strategies beyond the quantitative attributes analyzed.

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