

# ***Research on the Influencing Factors of Hotel Booking Cancellation and Coping Strategies***

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**Abstract:** With the rapid advancement of the hotel industry, studies on boosting operational efficiency have largely focused on employee productivity and human-centric policies, yet there is a noticeable lack of strategies aimed at enhancing room occupancy rates. This paper address this gap by examining factors influencing hotel reservation cancellations and proposing effective mitigation strategies. Utilizing a decision tree methodology, the research identifies key elements that contribute to cancellations. The significance of this study lies in its contribution to optimizing room occupancy within hotel management. Practical strategies, such as lowering booking security deposits, are suggested to decrease cancellation rates. These insights enhance not only operational efficiency and resource utilization but also offer actionable advice for improving guest satisfaction. By embracing data-driven decision-making, the study promotes modernized management practices and supports sustainable growth in hospitality. Three aspects for improvement are highlighted: internal operations, customer-related factors, and external influences. Recommendations include reducing security deposits at booking to lower cancellations and optimize occupancy.

**Keywords:** Hotle efficiency, booking cancellation, decision tree, customer orientation, deposit policy

## **1. Introduction**

Nowadays, research on hotel efficiency has covered a lot of details, such as improving staff efficiency and well-established humanisation policies. Many analytical methods such as Data Envelopment Analysis (DEA) are used. This study focuses on optimizing hotel efficiency by addressing guest occupancy rates, building on existing research that has extensively explored staff efficiency and humanization policies using methods like Data Envelopment Analysis (DEA). The innovation of this study lies in the employment of a decision tree approach to systematically identify and analyze factors influencing occupancy and cancellation rates [1]. By examining guest booking patterns, the study provides actionable solutions to enhance room occupancy.

Building on Kimes emphasis on dynamic pricing and customer segmentation, this paper identifies three key areas for improvement: internal hotel operations, customer-oriented policies, and external factors [2]. Policies like reducing security deposits at booking are proposed to increase occupancy rates and improve operational efficiency. By leveraging data analysis, this research addresses room booking issues and provides valuable insights on modernizing hotel management practices and achieving sustainable growth in the hospitality sector.

## 2. Methodology

The main databases utilized for this data cleansing are introduced first. Zhang et al. utilized machine learning techniques, such as decision trees and random forests, to predict hotel booking cancellations, demonstrating the relevance of advanced modeling in addressing similar challenges [3]. The database of this study originates from a large number of hotel booking records accumulated over three years on Kaggle [4]. These records show changes in demand for rooms over time for two different types of hotels. The two different types of hotels are city hotels in the booming metropolis of Lisbon and resort hotels in the vacation destination of the Algarve. The data spans 2015, 2016, and 2017, encompassing booking-related details such as guest headcount.

A box plot was utilized in the experiment to compare the relationship between average daily house prices, excluding unusually high values to ensure accuracy. The study also visualized booking and cancellation trends for both types of hotels. A decision tree was subsequently applied to categorize the research objectives into four primary factors [1].

## 3. Result

The first factor was where the customers came from. Guests from Portugal showed a high booking rate accompanied by a high cancellation rate, indicating a need for targeted policies to enhance efficiency. In contrast, guests from the UK, France, and Spain exhibited more reliable booking behavior.

The second factor highlighted differences between city and resort hotels. City hotels experienced significantly higher booking activity during the summer months, while resort hotels demonstrated year-round fluctuation with predictable peaks in summer [5]. The data reveals 71,806 bookings with 43,649 cancellations, indicating that while new guests frequently book, they also account for a high cancellation rate [3]. In contrast, returning guests exhibit more reliable behavior, with 3,205 stays and only 550 cancellations, suggesting they are less likely to cancel their reservations [6]. This highlights the importance of fostering guest loyalty to retain repeat customers.

Finally, both city hotels and resort hotels share similar guest profiles, with transient tourists comprising 69.86% and 71.87% of their clientele, respectively, reflecting a focus on short-term stays for work or leisure purposes.

The study also underscores the impact of deposit policies on cancellations. When hotels enforce a non-refundable deposit policy, the cancellation rate drops significantly to approximately 1% [2]. In comparison, hotels without advance deposit policies see a cancellation rate of 0.28, while refundable deposits further lower it to 0.22. This indicates that implementing flexible deposit policies is a straightforward yet effective strategy for reducing cancellations and improving operational efficiency.

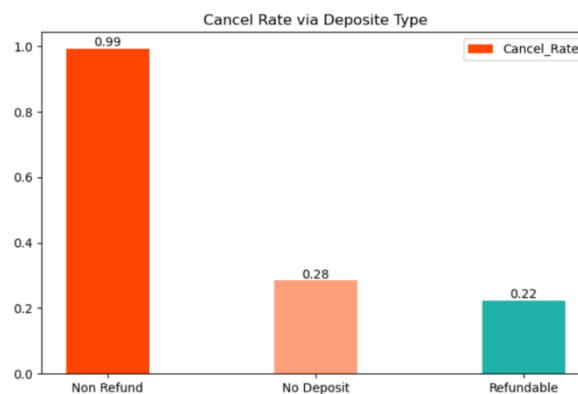


Figure 1: The Cancel Rate via Deposite Type

#### 4. Discussion

Through the data analysis, this article concludes that there are 4 areas that hotels can improve if they want to be more efficient. And one of the easiest things to change is the hotel's deposit policy. This is also the most obvious point of the data. The paper “An Evolutionary Game Study of Hotel Cancellation Policy Choice Considering Booking Cancellation Rate” by Lu analyzed this issue using the Hotelling modeling framework [7]. The study highlighted that lenient policy can increase customer satisfaction, and the revenue from the word-of-mouth effect can compensate to some extent for the loss of vacancies due to canceled bookings.

Lu's research provides a more detailed analysis, dividing the experimental framework into three steps. The first step is to set up a situation where both hotels tend to choose a lenient cancellation policy when customer sensitivity to hotel level differences is high and the difference in booking cancellation rates between the two hotels is small. In this case, the lenient policy can increase customer satisfaction, and the gains from word-of-mouth effects can compensate to some extent for the loss of availability due to canceled bookings. The second step is to set that when customers are more sensitive to the difference in hotel class but the booking cancellation rates of the two hotels differ greatly, the hotel with higher cancellation rate is more inclined to choose a strict check-out policy, while the hotel with lower cancellation rate is inclined to choose a lenient policy. In a more moderately competitive market environment, a strict policy helps to constrain customers' booking cancellation behavior, while a hotel with a lower cancellation rate is more likely to choose a lenient policy in order to attract customers due to relatively small losses. The third step is to set that when customers are less sensitive to the difference in hotel levels and the difference in booking cancellation rates between the two hotels is small, there may be two evolutionary stabilization strategies for the system: one is that one of the hotels chooses a lenient policy and the other chooses a strict policy, and vice versa [7]. In this case, the hotels need to choose a different strategy from their competitors in order to maximize their returns.

The paper highlights that hotels with lower cancellation rates tend to choose a lenient policy, and therefore the system is more likely to converge to this strategy, which is consistent with reality. According to Figure 1, this proves that in most cases a lenient refund policy will result in higher revenue for the hotel [7].

In addition to analysing through new and existing guests as well as deposit policies, there are three other factors that contribute to the research. The first is where the guests are from. In a database provided by kaggle, the data reflects that the country the guest is from also has some impact [4]. Portugal (PRT) had the highest number of reservations and cancellations with 48,483 and 27,506 guests respectively. This indicates that more than half of the reservations made by Portuguese guests were canceled [3]. British travelers (GBR) made 12,120 reservations, but only 2,452 were reserved. France (FRA) had 10,401 bookings and Spain (ESP) had 8,560 bookings, with 1,933 and 2,177 cancellations.

Although fewer in numbers, so were German (DEU), Italian (ITA) and Irish (IRL) passengers: 7,285 bookings (1,218 cancellations), 3,761 bookings (1,333 cancellations) and 3,374 bookings (832 cancellations). This paper finds it interesting that Italian guests cancel their reservations more often than their friends from other countries [3].

Lu et al. constructed a game theory model to study the impact of booking cancellation rates on hotel cancellation policy choices [7]. Their findings suggested that hotels with higher cancellation rates should adopt stricter policies, while those with lower cancellation rates could opt for more lenient policies, providing theoretical support for policy optimization.

Moreover, ABin used data from city and resort hotels, highlighting that city hotels have higher cancellation rates than resort hotels, with guest nationality significantly affecting cancellation

behavior [8]. This provides empirical evidence for hotels to tailor their policies based on customer demographics.

Guests in Belgium (BEL), the Netherlands (NLD) and Brazil (BRA) had minimum bookings of 2,342, 2,103 and 2,222, respectively. Their cancellations stood at 474 for Belgium, 387 for the Netherlands, and 830 for Brazil [8]. The higher cancellation rate for Brazil reflects regional behavioral patterns. Portugal and Brazil may have higher cancellation rates, guests from the UK, France and Spain are more likely to keep their reservations [6]. Hotel managers can use this information to create targeted advertisements, decide how much of a deposit is needed, and set cancellation rules.

City hotels generally saw a steady rise in bookings from March, peaking in August with 5,367 bookings due to increased summer travel demand [4]. However, bookings dropped sharply in September and remained low throughout the rest of the year. January marked the lowest booking month with 1,866 reservations. Resort hotels followed a different pattern, with bookings peaking at 4,568 in August. Bookings rose early in the year, dropped slightly in July, and peaked again in August. However, by September, bookings fell to 2,037, the second-lowest of the year, with November recording the lowest at 1,975 reservations.

Overall, city hotels were booked more than resorts throughout the year, which may be attribute to the fact that city hotels are better suited to year-round uninterrupted lodging needs, while resort hotels are more oriented towards seasonal vacation use.

City hotels, despite higher annual bookings, face a significantly higher cancellation rate of 0.72 compared to 0.38 for resort hotels [3]. This indicates greater booking instability in urban accommodations, necessitating policy adjustments like overbooking strategies to offset potential losses. Conversely, resort hotels, while experiencing fewer cancellations, should focus on minimizing their impact on occupancy rates through strategic marketing.

To improve efficiency, hotels should adapt to the distinct needs of their customer base. City hotel patrons often prioritize business-friendly features, such as executive lounges and document printing services. On the other hand, resort hotels should focus on recreational amenities, including family rooms and entertainment options. Advanced technology and innovative partnerships can help both types of hotels cater effectively to their clientele. For instance, city hotels could collaborate with travel platforms to offer fixed-discount packages, while resort hotels could leverage social media campaigns for promotions.

Another promising strategy is overselling. As outlined by Zhou, both static and dynamic overselling models have proven effective in other industries, such as airline ticketing [9]. However, overselling requires precise execution to account for fluctuating market demand and competitor strategies. Zhou's experiment emphasized the importance of dynamic pricing adjustments and timely decision-making to manage uncertainty. While eliminating deposit mechanisms might appear risky, it could be a bold strategy for underperforming hotels to attract more guests.

This study highlights the importance of data analysis in optimizing hotel strategies [8]. By examining booking trends, guest preferences, and cancellation behaviors, hotels can identify actionable patterns. Liu and Mattila emphasized the pivotal role of customer satisfaction in reducing cancellations, reinforcing the importance of service quality. Advanced analytics and machine learning integrated into Revenue Management Systems (RMS) can further streamline operations and enhance customer experiences [6].

Research by Guo and Li found that online reviews significantly influence booking cancellations [10]. Negative reviews correlate with higher cancellations, while positive feedback reduces them. Given that over 50% of bookings and 70% of short-stay guests come through online platforms, maintaining a strong digital presence is crucial [11].

Non-refundable deposits result in a bounce rate of 45%, compared to 20% for refundable bookings. Reassessing deposit policies can strike a balance between securing revenue and retaining potential guests.

Dynamic price adjustments, based on room availability and real-time demand, can maximize revenue. For instance, as booking dates approach, price variations can reflect changes in demand, encouraging early reservations while optimizing revenue closer to check-in dates.

By adopting these strategies, hotels can not only improve operational efficiency but also enhance customer satisfaction and financial performance.

## 5. Conclusion

This study confirms that flexible deposit policies, such as allowing refunds, significantly reduce cancellation rates. Utilizing a decision tree model, this study identifies key strategies to improve operational efficiency: optimizing internal management, providing customer-focused services, and adapting to external market changes.

Hotels can enhance customer satisfaction and loyalty through high-quality services, personalized offerings, and effective relationship management. For instance, business travelers benefit from office amenities, while leisure travelers value entertainment facilities. Such tailored services reduce cancellations and promote repeat bookings. Leveraging online travel platforms, social media, and collaborations with OTAs (Online Travel Agencies) can also boost visibility and attract new customers through targeted promotions.

The findings emphasize practical applications for hotel management, such as improving service quality, implementing flexible booking policies, and enhancing marketing strategies. These efforts collectively increase occupancy rates, minimize financial losses, and strengthen brand image. Furthermore, integrating advanced technologies like big data and machine learning can help predict customer behavior, manage reservations more effectively, and optimize inventory.

Future research should explore dynamic pricing, overselling strategies, and predictive analytics to address uncertainties and enhance decision-making. Dynamic pricing helps adjust room rates based on demand, while overselling strategies maximize revenue without compromising customer satisfaction. Machine learning models offer precise tools to predict high-risk bookings, reduce cancellations, and improve competitiveness.

In conclusion, this study provides actionable insights for hotels to balance internal operations, customer needs, and market dynamics, improving efficiency and competitiveness.

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