

Effects of Booking Demand on the Selection Between the Resort Hotel and the City Hotel in Portugal

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Abstract: The tourism industry supports the economy of Portugal. The study on hospitality in Portugal is essential due to its correlation with tourism. The analysis of the hotel booking demand in Portugal is consequently quite significant. This paper conducts comparative analysis, regression analysis and factor analysis to compare the influence of hotel booking demand on the customers' choice between the resort hotel and the city hotel in Portugal, thus providing recommendations for both city hotels and resort hotels in Portugal.

Keywords: booking demand, resort hotel, city hotel, comparative analysis, regression analysis, factor analysis

1. Introduction

Tourism is one of the important industries in Portugal. Tourism contributes 18% of the Gross Domestic Product of Portugal in 2022 [1]. Therefore, the development of the tourism industry significantly affects the economic growth of Portugal. Hospitality is correlated with the tourism industry. Travellers usually choose hotels for temporary stays regardless of their travel intentions. The booking demand is one of the key drivers of the hotels' revenue. So, the study of the changes in booking demand is quite necessary for the hospitality industry. Hotels that serve various market segments could receive different expectations from their customers [2]. Given the differences between the resort hotel and the city hotel in terms of location, these two hotels do not share common customer expectations. So, the variation in the booking demands could affect the selection between the resort hotel and the city hotel. As Portugal has both resort hotels and city hotels, it is vital to study the diverse effects of booking demand on different hotels. This study uses two datasets implying booking demand information of a city hotel and a rest hotel in Portugal to conduct analysis. The study aims to show how varieties of booking demand indicators influence the customers' choice between the resort hotel and the city hotel and find factors that represent the changes in booking demand for further analysis.

2. Literature Review

Booking demand is a topic that is frequently discussed in the hospitality industry. Many researchers study the variations of hotel booking demand considering its relevance to revenue. Some scholars argue that the prediction of booking cancellations efficiently helps hotels manage their revenues [3]. Some researchers state that the demand price of online booking shall be adjusted dynamically to maximize hotel earnings [4]. And a few researchers mention that hotels shall adjust the number of their available rooms in correspondence with the booking demand for the growth of revenues [5]. Compared to the booking demand, the categories of hotels are paid less attention in the research of the hotel industry. Several authors compare the differences between resort hotels and other hotels in certain places. Several researchers contrast different service attributes of resort hotels and stand-alone hotels in Macau [6]. Scholars analyse the differences between Greek resort hotels and city hotels in the aspect of assessment criteria required on their booking websites [7]. Some researchers state that the operating environment of resort hotels is superior to city hotels in Taiwan [8]. But research on the comparison of the resort hotel and the city hotel in Portugal is limited. Moreover, most of the literature looking at this industry often uses models and factor analysis to predict future hotel booking. Lee forecast booking arrivals with Poisson mixture models [9]. Vives and Jacob use deterministic and stochastic dynamic models in the determination of the price to derive the maximum revenue [4]. However, comparative analysis and regression analysis are rarely used in the exploration of the impact of hotel booking demand. This paper focuses on the effect of booking demand on the selection between different hotels in Portugal using comparative analysis and regression analysis besides factor analysis, which bridges the gaps in the literature.

3. Materials and Methods

3.1. Research Instrument

In this study, the dataset consists of customer requests for two hotels, where each data represents a single reservation. The data recorded 31 representative indicators of customer booking demands, 40,060 from resort hotels and 79,330 from city hotels, for a total of 119,390 data. Customers' booking modifications and cancellations are relatively common in actual hotel bookings [10], so this data set records both actual arrivals and cancellations. The completeness of this data set is extremely strong [10], but it is critical to note that some data in various variables are represented as null. A null representation is not included in an established category instead of being a missing value.

3.2. Method

We process the data before conducting three analyses.

3.2.1. Data Classification

The initial classification of the data set is unsuitable for direct data analysis. Since the creator of a dataset usually chooses to represent variables from different types as character codes in the column, some variable types are recorded as strings. This representation is unsuitable for mathematical analysis, so we modify all categories represented by characters into different numerical representations for data analysis.

3.2.2. Data Alignment

Not all of the 31 items in the dataset are suitable variables in the analysis. Some could be less representative of the analysis results, and some require more work to collate. Therefore, we reduce

the number of variables to 28. The descriptive analysis of the determined data set is first carried out to judge whether there are other anomalies in the data, whether it conforms to intuition, and whether it meets the analysis requirements effectively [10].

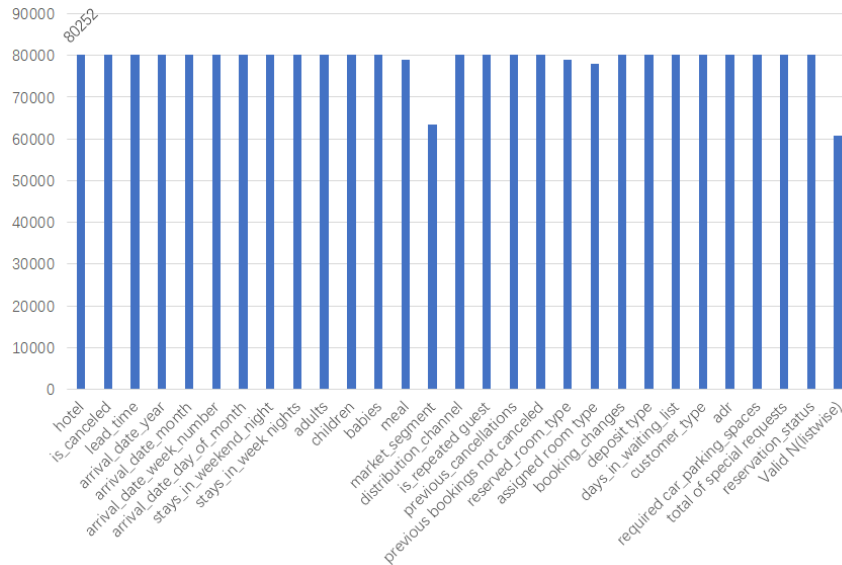


Figure 1: The sample numbers of different variables.

3.3. Comparative Analysis

Comparative analysis is one of the most commonly used basic analyses. Comparative analysis might be used to examine items with obvious differences or items with both differences and similarities [11]. We expect to find differences by comparing data from two different hotels. We use crosstabs and do chi-square tests to analyse different distributions of discrete variables in two hotels. After conducting the t-test of the hotel type and continuous variables, we find that all continuous variables are not normally distributed, so a non-parametric test is necessary for analysing the distribution of continuous variables in the resort hotel and the city hotel.

3.4. Regression Analysis

Regression analysis is a statistical method used to estimate the relationship between a dependent variable and one or more independent variables. In this data set, the independent variable Y-hotel type is a binary variable (0 represents the resort hotel and 1 represents the city hotel). Therefore, we choose binary logistic regression analysis.

3.5. Factor Analysis

Factor analysis is based on the idea of dimensionality reduction. Relatively complex variables are aggregated into a few independent factors in the circumstance that original data information is maximumly kept. When conducting the factor analysis, we select all the continuous variables as dependent variables. Firstly, Kaiser-Meyer-Olkin Measure and Bartlett's tests are first conducted to determine the feasibility of factor analysis. Since there are many dependent variables, the factor is rotated. The component matrix after rotation provides renamed factors, showing the correlation between original variables.

4. Results and Discussion

4.1. Comparative Analysis

4.1.1. Chi-square Test

Table 1: The value of pearson Chi-Square.

Variables	Value of Pearson Chi-Square
Whether the booking is cancelled	20883.641*
The arrival date of the month	1745.304*
Meal type	6975.409*
Whether is a repeated guest	10.333.444*
Deposit type	12.9038.785*
* Asymptotic Significance (2-sided) of Pearson Chi-Square value is 0.000.	

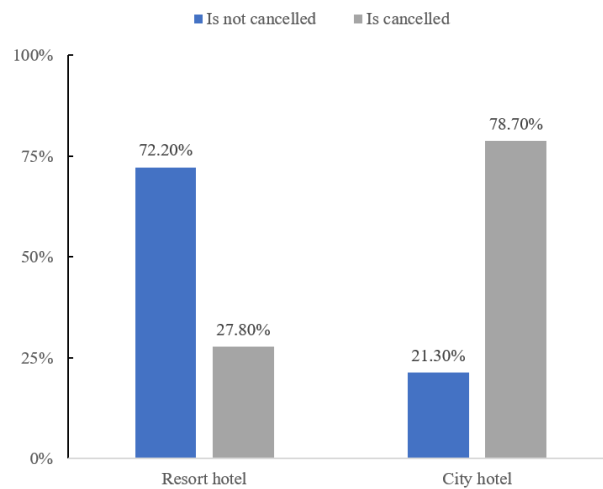


Figure 2: The distribution of cancelled bookings in different hotels.

As shown in Table 1, the significance of 0.000 shows that the distribution of whether the hotel booking is cancelled is significantly different for the resort and city hotels. From Figure 2, the majority of bookings are not cancelled for the resort hotel, whereas 78.7% of bookings are cancelled for the city hotel. This could be explained by the tourists that they tend to plan ahead for their trips to tourist attractions including resort hotel booking. In particular, long-distance travellers are more likely to book hotels via travel agencies instead of online platforms due to the complexity of their trips [12]. As a result, these travellers do not change their bookings unless extreme situations happen to avoid cancellation penalties. However, the bookings for the city hotel are frequently cancelled as business trips could change quickly. The possibility of sudden changes in business meetings is quite high, resulting in a high risk of hotel booking cancellations for business travellers [12].

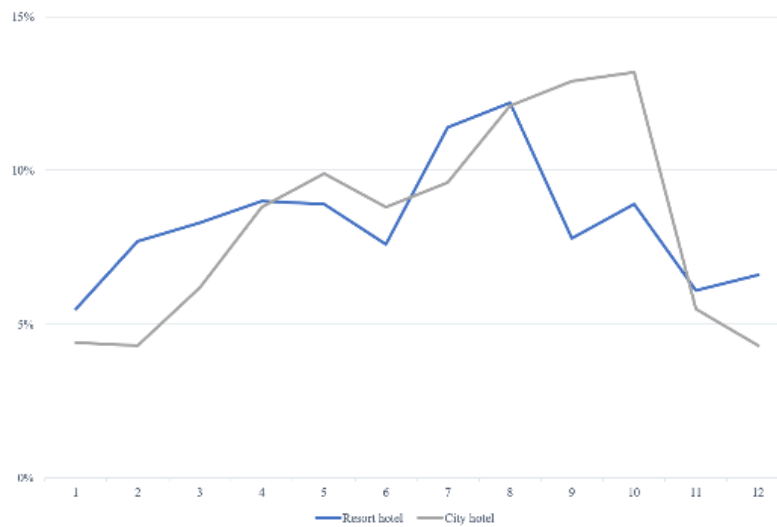


Figure 3: The distribution of arrival date of the month in two hotels.

From Figure 3, the number of bookings for both hotels is relatively small from November to March. The low season of tourism activities is from October to March [13]. This explains the low booking demands for both hotels. Moreover, the performance of the resort hotel is much better than that of the city hotel from November to February. This could be explained by the market pricing strategies set by resort hotels. Resort hotels may provide a lower price for customers in the low season to increase their booking demand [14]. As displayed in Figure 3, bookings in August are always higher than those in other months for both hotels. The summer vacation in Portugal is in July and August [15]. So, high bookings in August could be explained by the summer vacation, which promotes tourism demand.

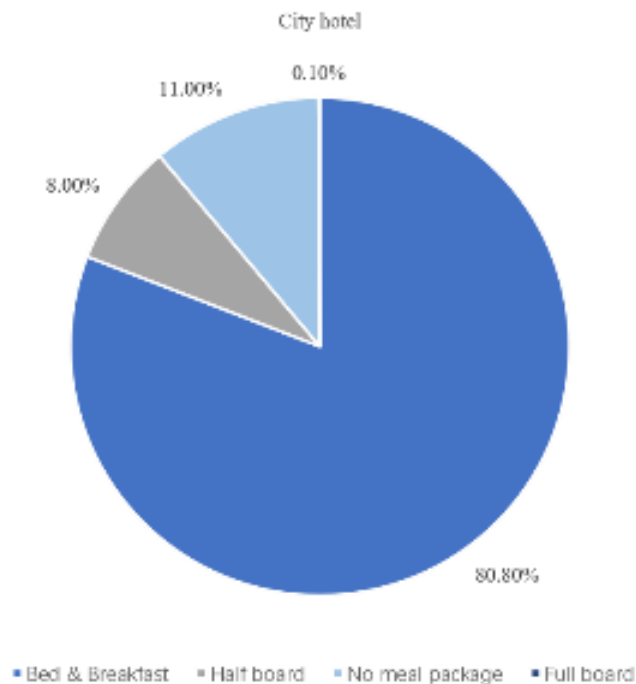


Figure 4: The distribution of different meal types in the city hotel.

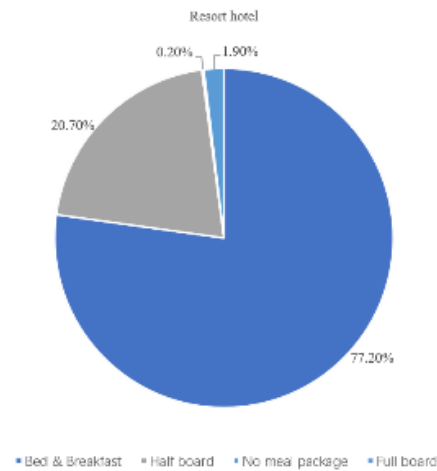


Figure 5: The distribution of different meal types in the resort hotel.

The majority of meal types are bed and breakfast for both hotels, shown in Figure 4 and Figure 5, as people usually regard a hotel as a place providing temporary accommodations. The customers tend not to have all the meals in a day at the hotel, corresponding to the statistic displayed in Figure 4 and Figure 5 that less than 2% of meals are full board (containing breakfast, lunch, and dinner) for both hotels. The half board meal comprises breakfast and one other meal, usually dinner. From Figure 4 and Figure 5, 20.7% of resort hotel meals are half board, whereas half board meal accounts for only 8% of city hotel meals. Moreover, the percentage of no meal package is 0.2% for the resort hotel and 11% for the city hotel. The different distribution of these two meal types in both hotels is because the main customers of the resort hotel, tourists, would like to spend more time staying at the hotel for entertainment and relaxation. The entertainment factor plays an important role in tourists' satisfaction with hotels [6]. Moreover, the dining facilities are of little importance in the selection of hotels considering nearby catering choices [16]. So, customers of the city hotel have more dining options surrounding the city hotel.

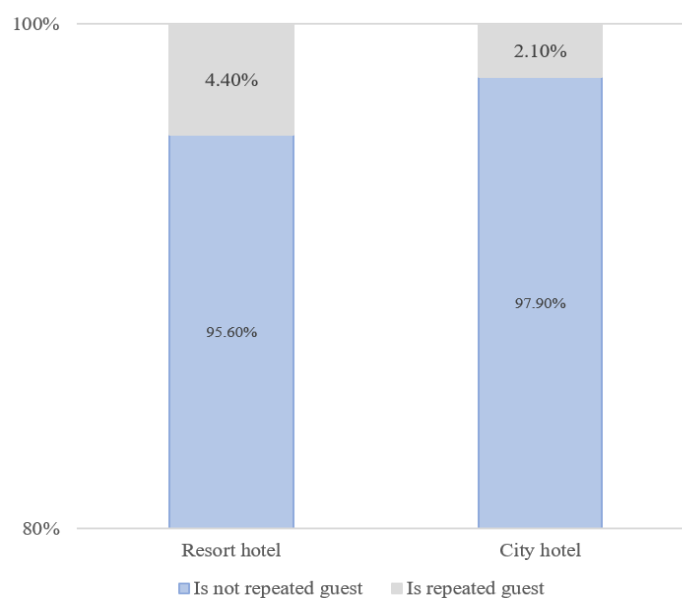


Figure 6: The distribution of repeated guests in two hotels.

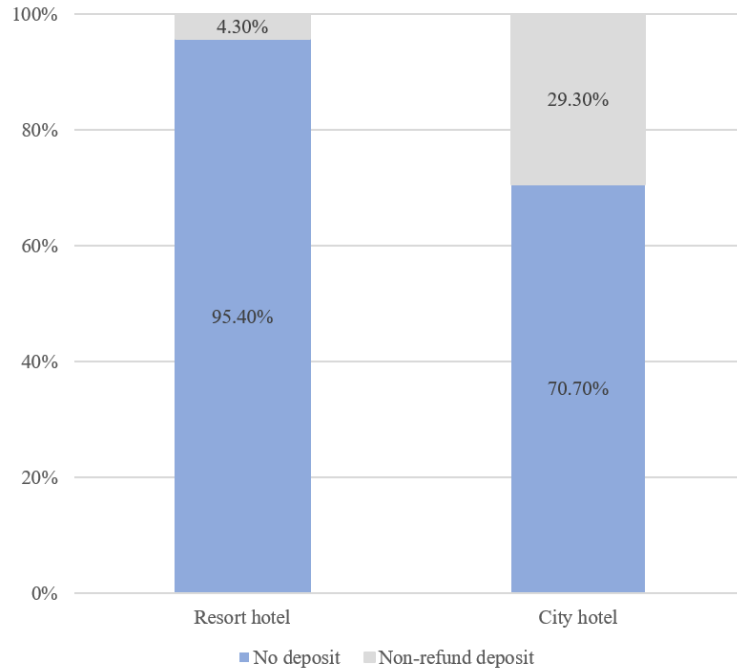


Figure 7: The distribution of deposit types in two hotels.

Most of the guests are not repeat guests for both hotels, which conforms to the attribute of hotels that customers book hotels for a brief stay at a strange place. From Figure 6, 4.4% of customers are repeated guests for the resort hotel, whereas 2.1% of guests are repeat customers for the city hotel. Destinations that allow for more tourist attractions and activities are more likely to appeal to repeat guests [17]. Consequently, tourist attractions surrounding the resort hotel promote the number of repeat guests.

More than half of the booking orders don't include the deposit for both hotels as people consider it unnecessary to guarantee the booking by making deposits in most circumstances. As shown in Figure 7, the percentages of non-refund deposits are 4.3% for the resort hotel and 29.3% for the city hotel, which are quite different. Tourists tend to plan ahead for their trips, but they are more flexible with the following decisions relevant to their trips [18]. Therefore, tourists incline not to pay deposits to secure their bookings. However, around 30% of city hotel bookings are secured by on-refund deposits. Business trips lack flexibility in terms of the date and the location [19]. Therefore, bookings for the city hotel related to business trips shall be guaranteed in advance compared with the resort hotel.

4.1.2. Nonparametric Test

Table 2: The significance of independent-samples mann-whitney U test for different variables.

Variables	Significance of Independent-Samples Mann-Whitney U Test
Lead time	.000
Stays in weekend nights	.000
Required car parking spaces	.762
Adults	.000

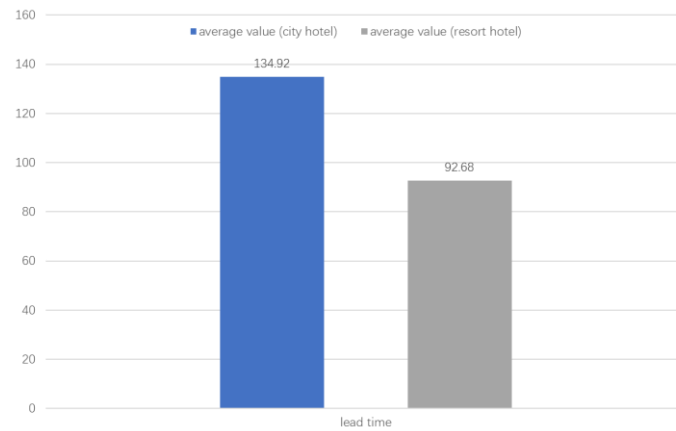


Figure 8: The comparison of average lead time in two hotels.

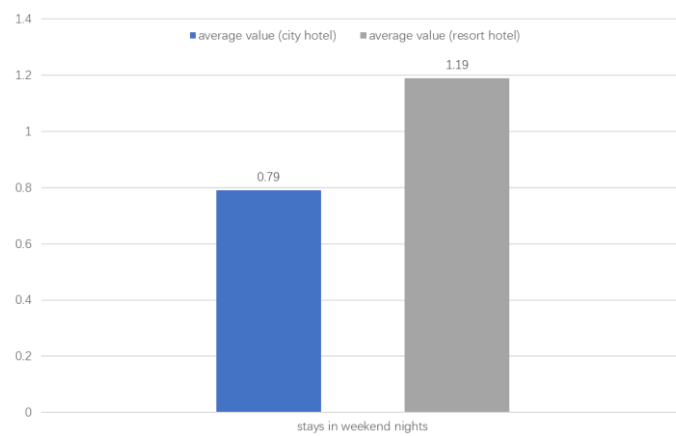


Figure 9: The comparison of average stays on weekend nights in two hotels.

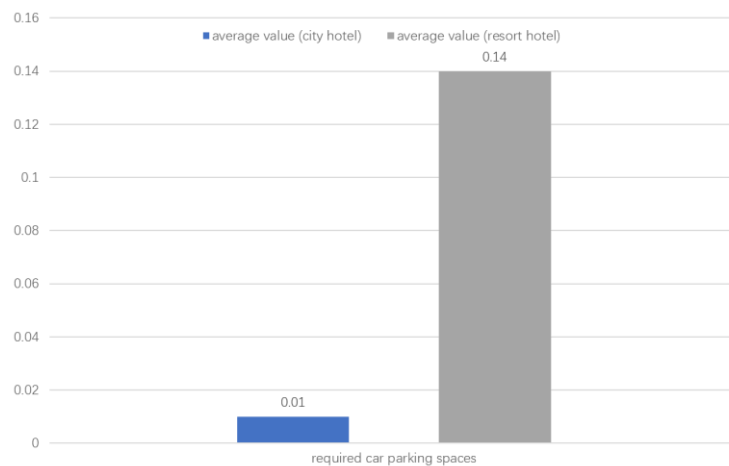


Figure 10: The comparison of average required car parking spaces in two hotels.

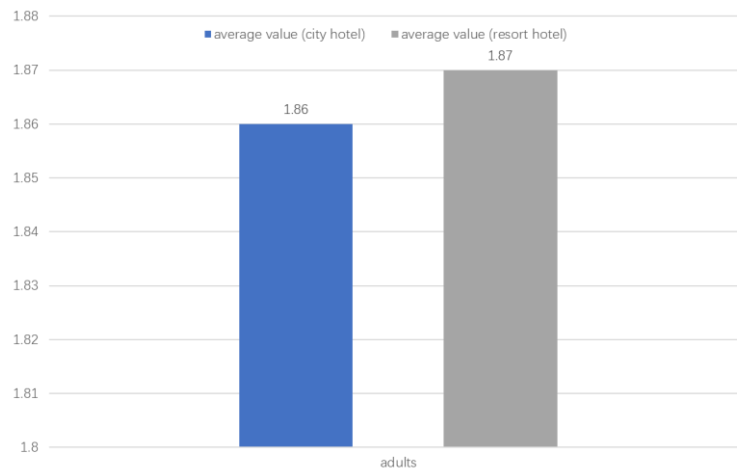


Figure 11: The comparison of the average number of adults in two hotels.

As seen from Figure 8, Figure 9, Figure 10 and Figure 11, the average lead time of resort hotels is 93 days, shorter than 135 days for city hotels. The longer average lead time indicates that the proportion of guests in city hotels who tend to book in advance is higher than that in resort hotels. Urban areas serve a more significant commercial function than resort areas. Consequently, city hotels host more businessmen who have long-term, rigorous schedules, which may explain the difference in lead times between city hotels and resort hotels.

The little significance shown in Table 2 shows that the distribution of weekend nights guests stayed in both hotels significantly differs. Customers of the resort hotel spend 0.4 more weekend nights on average than those of the city hotel. This might arise from the fact that the number of tourists on weekends is enormous.

The distributions of the required car parking spaces are different for these two hotels significantly. The average number of car parking spaces is 0.01 for the city hotel and 0.14 for the resort hotel. This shows that the resort hotel serves more customers who travel by private motor vehicles than the city hotel. City hotels need fewer parking spaces because the public transport system in urban areas is more developed and convenient than that in resort areas. As a result, driving a private car to stay at a city hotel is unnecessary. City hotel travellers are more likely to choose taxis or subways during their travel.

From Table 2, the significance is greater than 0.05, meaning that the distributions of the number of adults are not significantly different for both hotels. The average number of adults is 1.86 and 1.87 respectively for the city hotel and the resort hotel. Most of the hotel customers are adults except for the case of family travel. Adults have enough free time and financial independence in their selection of hotels. Given the similar capacity of these two hotels to treat travellers, the numbers of treated customers for both hotels do not vary significantly. Therefore, the numbers of adult guests are similar for two hotels.

4.2. Regression Analysis

4.2.1. Binary Logistic Regression Analysis

The regression analysis is conducted to find a model that predicts the type of hotel using several variables.

Table 3: Classification table of binary logistic analysis.

Observed	Predicted hotel type		% Correct
	Resort	City	
Resort hotel	28253	4433	86.4
City hotel	4455	23728	84.2
Overall Percentage			85.4
The cut-off value is 0.500.			

$$F1 \text{ Score} = \frac{2}{\frac{1}{Precision} + \frac{1}{Recall}} \quad (1)$$

Given the cut-off value of 0.5, the precision and recall are respectively 86.4% and 84.2% as shown in Table 3. The precision means 86.4% of the true positive items in all of the items that are predicted as positive, while the recall of 84.2% is the fraction of predicted true positives among all of the true positives. Moreover, the trade-off between precision and recall is required to measure the accuracy of the model. According to Equation (1), the F1 score is the harmonic mean between the precision and the recall. F1 score is thus calculated as 0.85 given the values of the precision and the recall. This means that the model's ability to both capture positive cases and be accurate with the cases it does capture is 0.85, which is commonly seen as a good value. Therefore, this regression model can predict whether the hotel is a resort hotel or a city hotel well.

Table 4: Correlations between different variables and the hotel type.

Significantly Positively correlated variables	Significantly Negatively correlated variables	Insignificantly correlated variables	
Lead time*	Is cancelled*	Variables	Significance
Arrival date year (1)-(2) *	Arrival date week number (1)-(52)	Distribution channel	0.168
Arrival date month (1)-(11) *	Stays on weekend nights*	Adults	0.466
Arrival date day of the month (1)-(29)	Stays in weekday nights*	Babies	0.365
Children*	Market segment (1)-(4) *	Booking changes	0.449
Meal (1)-(3) *	Are repeated guests (1)		
Previous bookings not cancelled*	Previous cancellations*		
Reserved room type (1)-(4) *	Deposit type (1)		
Assigned room type (1)-(5) *	Customer type (1)		
Deposit type (2)	Required car parking spaces*		
Days on the waiting list*	Total of special requests*		
Customer type (2)-(3)	Reservation status (2) *		
Average daily rate*			
*The significance is 0.000.			

From Table 4, changes in the number of adults, number of babies, type of distribution channel, and number of booking changes could not significantly affect the changes in the hotel type as each of their significances is larger than 0.05. However, as shown in Table 4, variations of whether the hotel is cancelled or not, lead time, arrival date, numbers of weekend nights and weekday nights guests stayed, number of children, type of meals, type of market segment, whether is a repeated guest, number of previous cancellations, type of assigned room type, deposit type, days in the waiting list,

customer type, average daily rate, required car parking spaces, total special requests, and reservation status could significantly impact the type of booked hotel.

Table 5: Beta value of variables.

Variables	Beta
Stays in weekend nights	-0.183
Stays on weekday nights	-0.225
Arrival date month (1)	10.721
Arrival date month (2)	9.129
Arrival date month (3)	8.511
Arrival date month (4)	7.742
Arrival date month (5)	6.901
Arrival date month (6)	5.632
Arrival date month (7)	4.511
Arrival date month (8)	3.687
Arrival date month (9)	3.008
Arrival date month (10)	2.327
Arrival date month (11)	1.221

As shown in Table 5, the negative beta of weekend nights customers stayed shows that more stayed weekend nights could result in resort hotel booking. This shows that people would be willing to stay more weekends in the resort hotel instead of the city hotel. This is because people have enough time to stay at a tourist resort for relaxation during weekends. The opening of resort attractions increases the booking demand for nearby hotels on weekends [20]. From Table 5, the positive beta of arrival month indicates that people the possibility of booking the city hotel rather than the resort hotel becomes higher as the arrival time is closer to the year's end. This could be explained that people are likely to take a break by going on a trip to other places during Christmas and New Year.

4.3. Factor Analysis

Table 6: The value of pearson Chi-Square.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	Significance of Bartlett's Test
0.537	0.000

From Table 6, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy is 0.537, which is over 0.5. This indicates strong partial correlations between the variables and the appropriateness of conducting the factor analysis. Moreover, as shown in Table 6, the significance of Bartlett's Test is less than 0.05, indicating that the null hypothesis that variables in the population correlation matrix are uncorrelated shall be rejected. Therefore, it is possible to find factors representing the hotel booking demand.

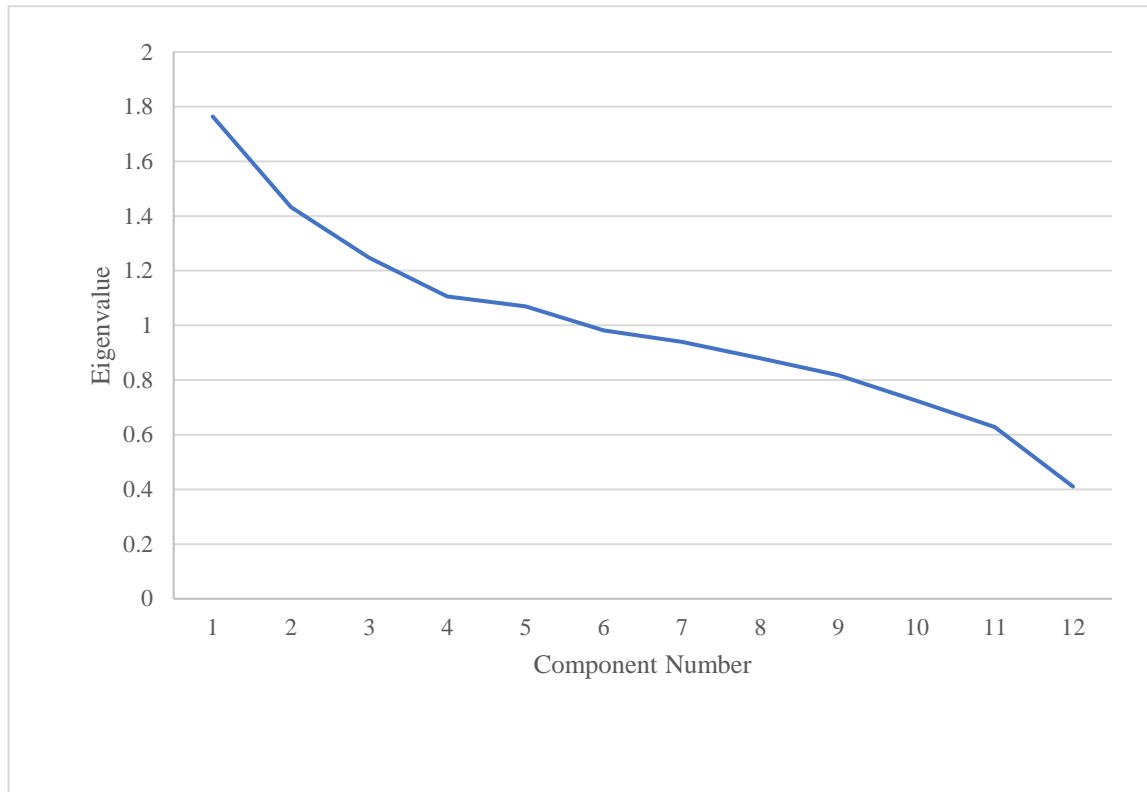


Figure 12: The scree plot.

Table 7: Cumulative percentage and extraction rate of each component.

Component	Cumulative percentage	Extraction rate
1 lead time	14.697	0.648
2 stays in weekend nights	26.636	0.793
3 stays in weekday nights	37.028	0.790
4 children	46.247	0.767
5 previous cancellations	55.158	0.889
6 previous bookings not cancelled	63.340	0.942
7 average daily rates	71.173	0.673
8 days in the waiting list	78.503	0.883
9 adults	85.315	0.909
10 babies	91.346	0.998
11 booking changes	96.580	0.987
12 required car parking spaces	100.000	0.959

From the Scree Plot shown in Figure 12, the eigenvalues of the first nine factors are more than 0.75. Consequently, we choose the first nine factors to explain all the variables. Table 7 shows that the cumulative percentage of rotation sums of squared loadings is 85.315 for the nine factors. As a result, the first nine principal components explain the difference in hotel booking demands between the resort hotel and the city hotel well. As displayed in Table 7, all variables' extraction ratios are above 0.65. In addition, the extraction ratios of most variables are above 0.8. Hence, the selected factors give a sufficient explanation of each variable.

Table 8: Rotated component matrix.

	Component								
	1	2	3	4	5	6	7	8	9
Stays in weekend nights	0.887								
Stays in weekday nights	0.882								
Children		0.857							
Average daily rates		0.748							
Days in the waiting list			0.928						
Lead time			0.497						
Adults				0.948					
Previous cancellations					0.930				
Required car parking spaces						0.977			
Previous bookings not cancelled							0.962		
Booking changes								0.988	
Babies									0.998

From Table 8, “stays in weekend nights” and “stays in weeknights” have a high load on the first factor, which mainly explains these questions and is interpreted as the number of stay days. “Children” and “average daily rates” are located on the second factor with a higher load, indicating that the second factor mainly explains these items as consumer groups. “Days in the waiting list” and “lead time” are located on the third factor with a high load. Therefore, the third factor mainly explains these questions, which is explained as the number of scheduled days in advance. The remaining factors each explain only one item, named “adults”, “previous cancellation”, “required car parking spaces”, “previous booking not cancelled”, “booking changes”, and “babies”. Thus, the meaning of the factor is evident.

5. Conclusion

For resort hotels and city hotels, increasingly fierce industry competition is inevitable. The key to the success of a hotel is to analyze the hotel's positioning according to the specific environment and to provide services that are different from other hotels [21]. By identifying the needs and expectations of travellers, hoteliers could better arrange tasks, allocate resources more reasonably, and develop more specific and advanced marketing strategies [21]. Hotels not only need to make feedback control to customers' dissatisfaction but also to predict customers' demands and carry out feedforward control can make hotels gain more competitive advantages [21]. Based on the results of analysis, several recommendations are offered to resort hotels and city hotels in Portugal. First, customers' cost of cancellation shall be increased by hotels. Booking cancellation penalties shall be more applied by city hotels to reduce the possibility that customers will cancel the booking in the future. Thus, the decreased booking cancellations help reduce the administrative and management costs for the hotel. Second, the resort hotel could properly plan the car parking spaces to enhance the customers' satisfaction with their accommodation experience. So, the resort hotel builds up its reputation to

attract new customers and increase repeat guests. Furthermore, despite the high volume of customers in the city hotel, the large number of city hotels mean that customers have many alternative choices, resulting in possible booking cancellations. Therefore, the city hotel should figure out its own market segmentation and develop marketing strategies including advertisement design targeting on specific customers to increase its operating efficiency.

Acknowledgements

Cong Wang and Zechu Xie contributed equally to this work and should be considered co-first authors.

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