IST 687 Project Report

Group 6

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INTRODUCTION

The European Hotels Group has always believed that the best way to maximize its revenue is to have a number of hotel properties, in a variety of settings, to accommodate a wide range of travelers. They currently have hotels located in cities and resort locations.

The new owners are not certain this is the correct business strategy for the future. Specifically, they would like to get a comparative analysis between the two properties. They are interested in understanding how each property is performing individually over time, and to compare how each property is performing compared to the other over time.

ABSTRACT

In this project, we are going to help the European Hotel Group find the directions to improve their business. Through exploring the data with R in diverse analysis, we identify the important features, which may impact the revenue of hotels. Then based on our analysis, we come out with some business advice, including both market improvement and promotion improvement. Future direction and limitations are discussed.

PROBLEM STATEMENTS

a) Improving the marketing strategy so as to streamline the focus for investments and increase the ADR with increased bookings.

b)The Hotel Group needs to understand the customer behavior, by understanding the bookings done by their customers in different seasons. So as to produce some strategy for targeted seasons to increase their ADR with increased inflow of customer bookings.

DATA CLEANING

A. Removing unhelpful columns for Analysis

    a. Babies: We removed this column and merged the values of babies with the children column to remove the redundancies.

    b. Agent: Not required for analysis

    c. Company: Since all the values were "NULL", hence eliminated the whole column.

    d. DaysInWaitingList: Not required for analysis

    e. ReservationDate

B. Tackling the NA

    a. Children Column NAs were replaced with 0

    b. Arrival Dates had also NAs in it but since NA in dates couldn't be replaced with some new ones and removing the whole row would have reduced the dataset to almost half hence the best option was to keep the NAs. We decided to not include the ArrivalDate in our Analysis.

C. Adding 3 New columns to support the Analysis

    a. We created month as a new column using ReservationDate provided in the data set to get the month for the reservations

    b. We created year as a new column using ReservationDate provided in the data set to get the year for the reservations

    c. We also created a season column using the ReservationDate to deduce the season of the year. (Winter, Spring, Summer, Fall)

    d. We also created a dummy variable column to determine if the customer's assigned room type equaled their reserved room type, with 1 meaning they were equal and 0 meaning they were not equal

APPROACH

We have streamlined our focus of increasing the revenue for the Hotel Group by shortlisting 3 target factors to focus on for improvements.

1) Market Improvements

Our Focus for Analysis will be understanding the "Market Segments" for the Resorts and cities, which were TA (Tour Agents) & TO (Tour Operators). It was important to understand which brought the most revenue. Along with the Market Segments we focused on the "Deposit Type" preferred by the customers while making their bookings. Lastly focusing on the Distribution Channels which contributes to producing the revenue.

2) Customer Service

For understanding the customer Service, we focused on Assigned Room and Reserved Room columns to understand the satisfaction of the customer with the bookings which would also help them in retaining the customer and thereby producing a recurring revenue.

3) Promotional Improvements

Using the new columns created (month, year, season), We would approach in finding the most optimum time or the best time for bringing out the festive trends or promotional sales for bookings. Understanding the peak time when the most cancelations or the booking happens would help the Hotel group to trigger the customers at the right time. This will help them in attracting the crowd and thereby increasing their revenue.

ANALYSIS

Market Improvements

We investigated which marketing strategy the European Hotel Group is able to generate the most ADR in each setting. In order to do this, we created boxplots with ADR on the y-axis and the categorical variable we were analyzing on the x-axis. We did this for each categorical variable in the dataset for both the city hotel and the resort and hotel and selected the most interesting results and included them below.
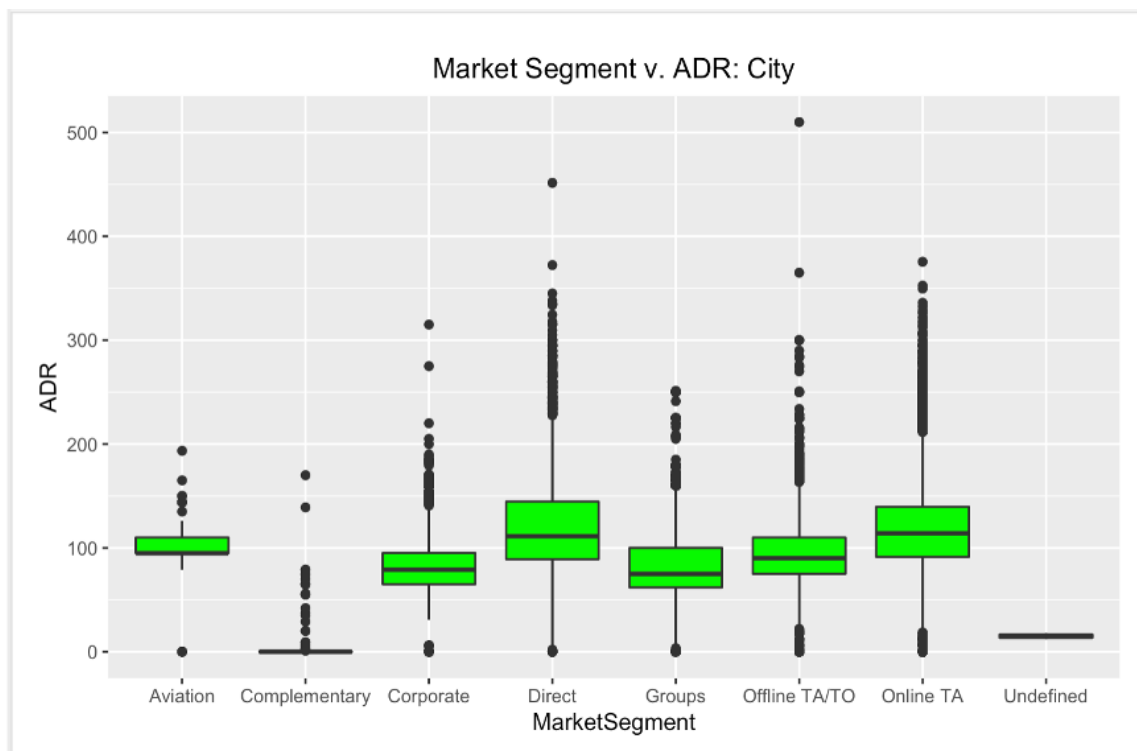
a)   Market Segments

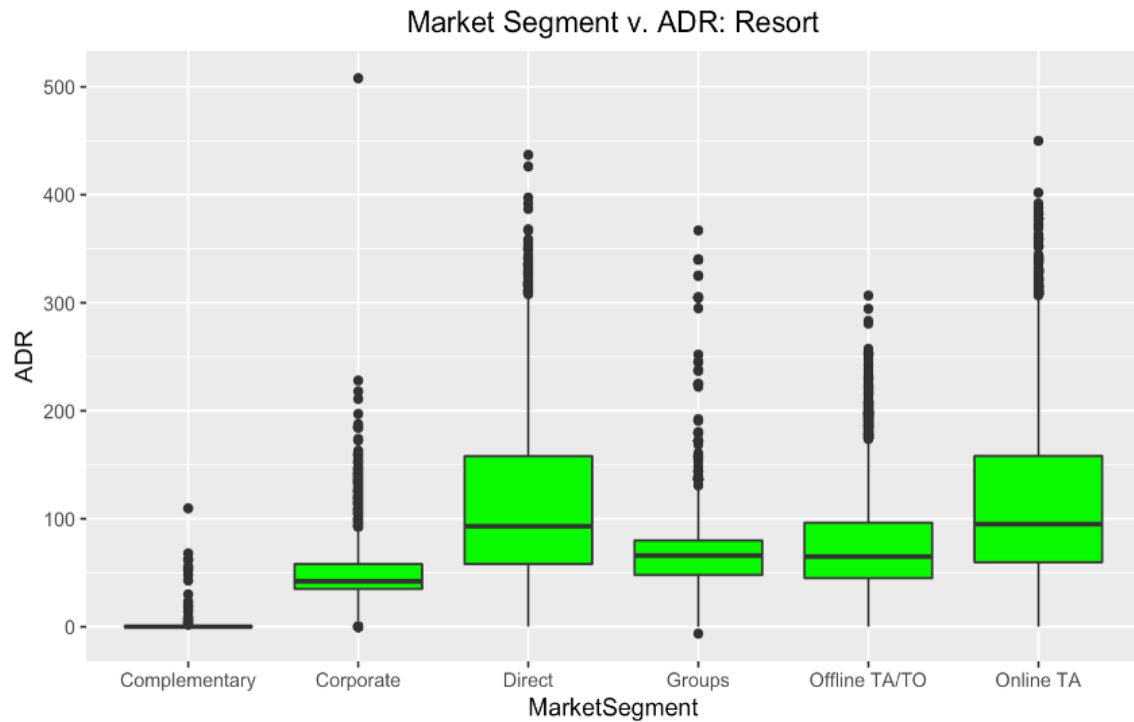Figure 1. Boxplot for market segment for a city hotel

Figure 2. Boxplot for market segment for the resort hotel

First, we looked at which market segments worked best in each setting for the hotel group. As observed in the two boxplots below, both the direct market segment and the online travel agent market segment generated more ADR in both the city and the resort. The median ADR value, as well as the 1st and 3rd quartile values, are higher for these two segments. The difference is slightly greater for the resort hotel, but the difference can still be seen with the city hotel. These observations describe that the European Hotel Group should focus more on "Direct marketing" for and "Online recommendations for travel agents", whether that be via social media or large group emails to past customers regarding travel agents.
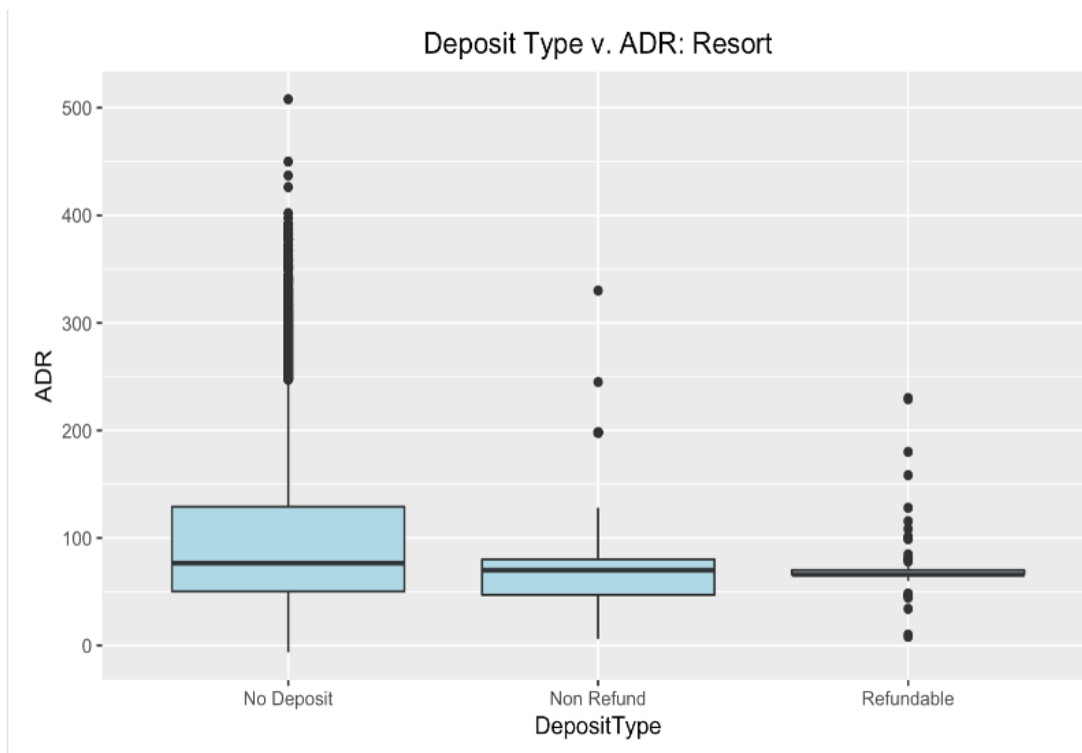
b)   Deposit Type

Figure 3. Boxplot for deposit type for the resort hotel
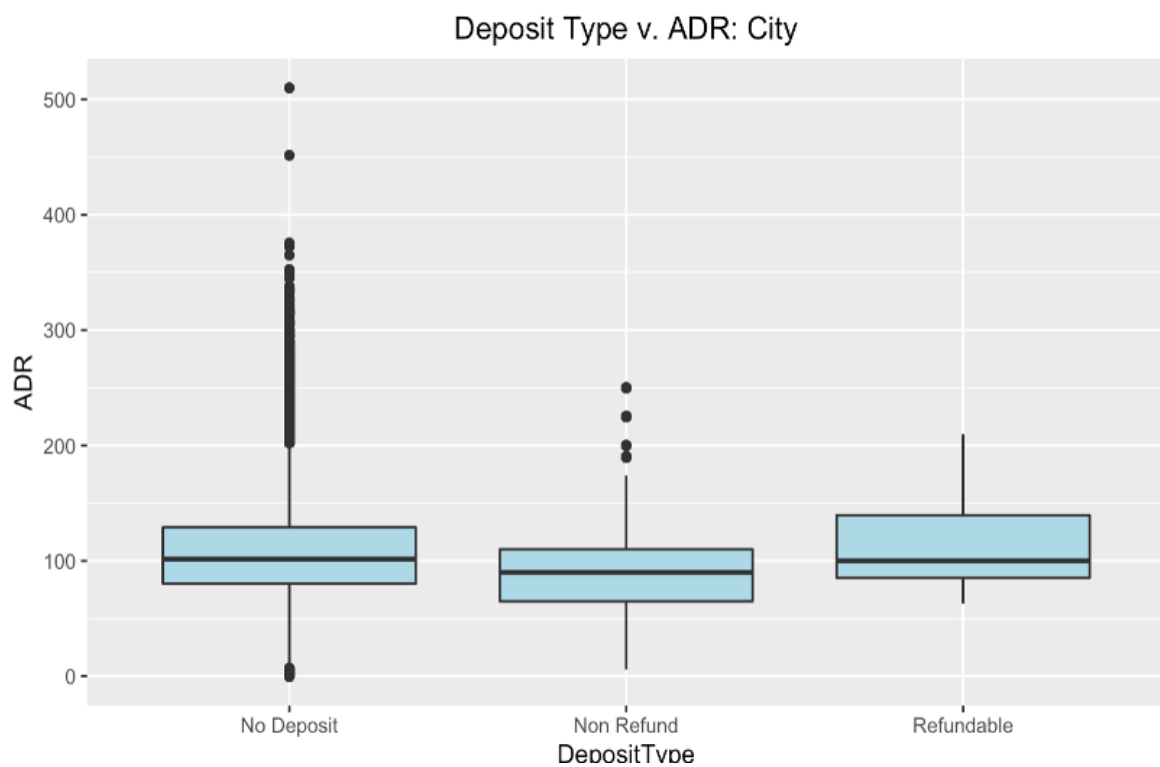

Figure 4. Boxplot for deposit type for the city hotel

Deposit Type is the parameter that has 3 categories: No deposit, Non-Refund, Refundable. Here using a box plot where the x-axis has Deposit Type categorical values and Y-axis as ADR values, we analyzed that with the resort, the booking which requires no deposit generated a higher ADR, both in terms of the median and 3rd quartile value. With the city, there is a less noticeable difference between the three types, with all of the medians at similar values as well as the quartiles. Hence, we can observe that at the resort, the bookings made by the customers with a no deposit have generated higher ADR (Average Daily Revenue). Therefore, the hotel group should be encouraged to have no deposit booking options, as such customers have shown more response towards ADR.

b)   Distribution Channel

Distribution Channel v. ADR: City
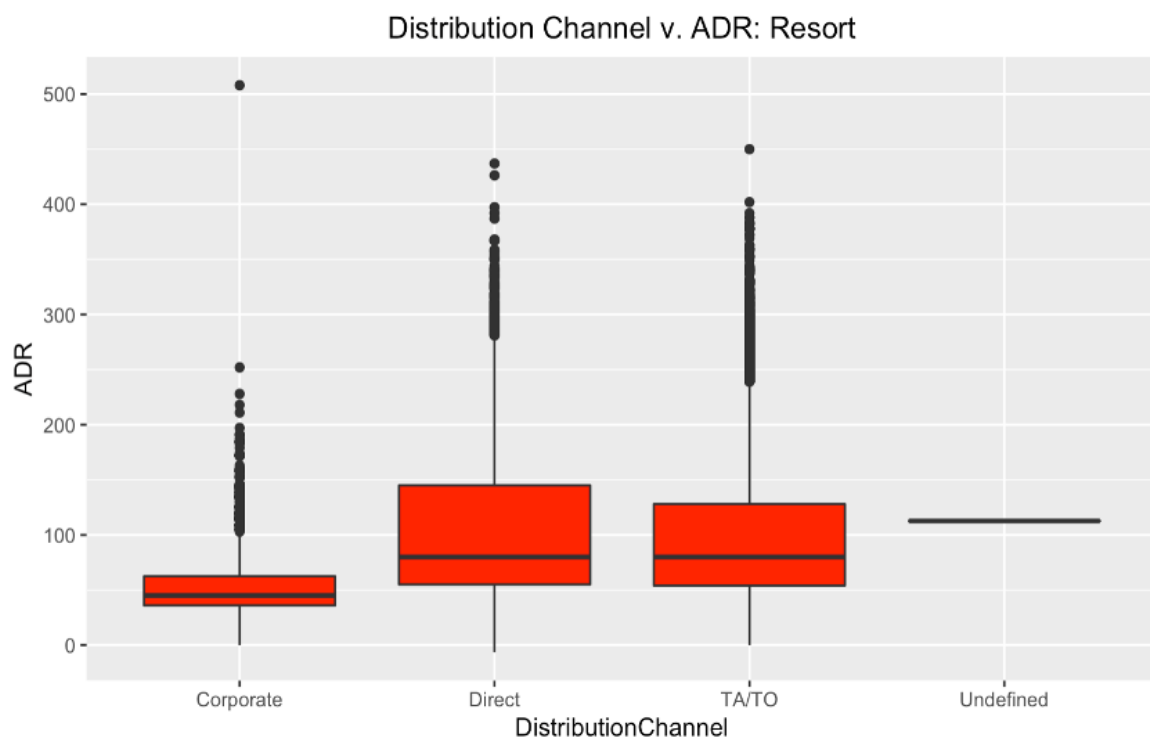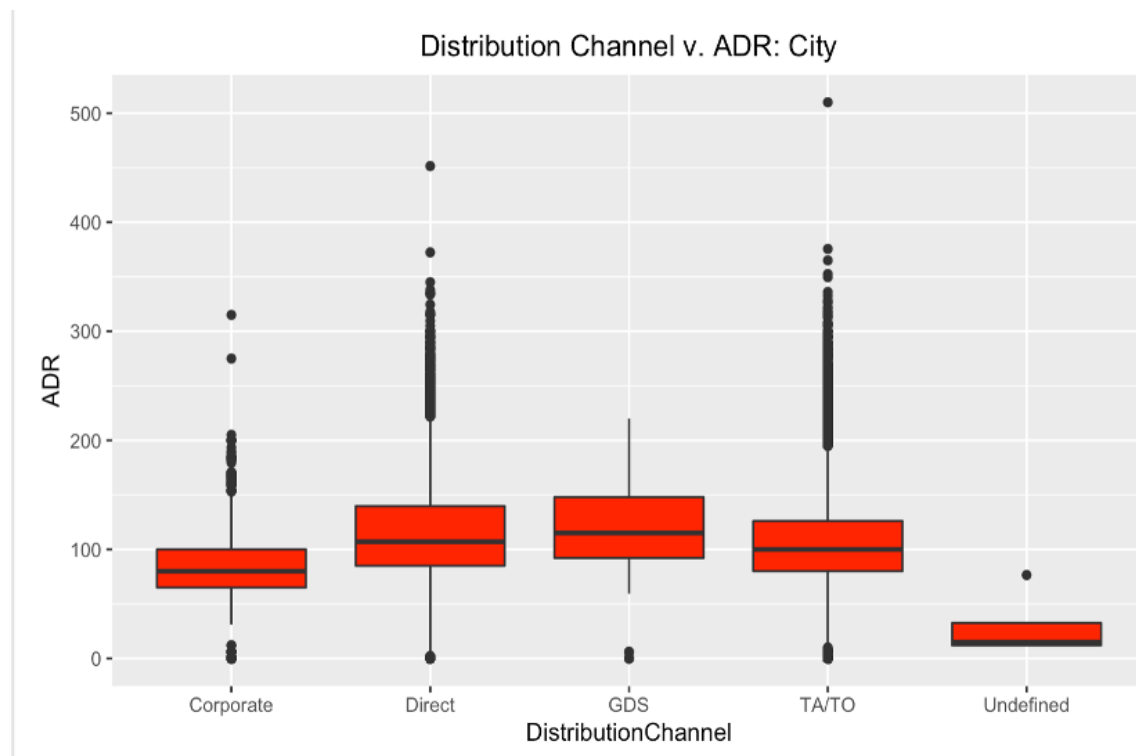

Distribution Channel v. ADR: Resort

Figure 5. Boxplot for distribution channel for both city and resort hotel

Additionally, we investigated which distribution channels were able to generate the most ADR. Similar to the market segment, the direct distribution channel was one of the most effective strategies, especially for the resort. The travel agent/tour operator strategy also worked very well on both properties. Moreover, the global distribution system that was used for the city property generated the highest median ADR value for that group. We definitely recommend, if possible, that they expand this system to the resort property distribution channels and see if they have the same amount of success. In both properties, corporate ADR was lower than the other channels, so we recommend the hotel group to not focus on the corporate distribution channel.

Promotional Improvements
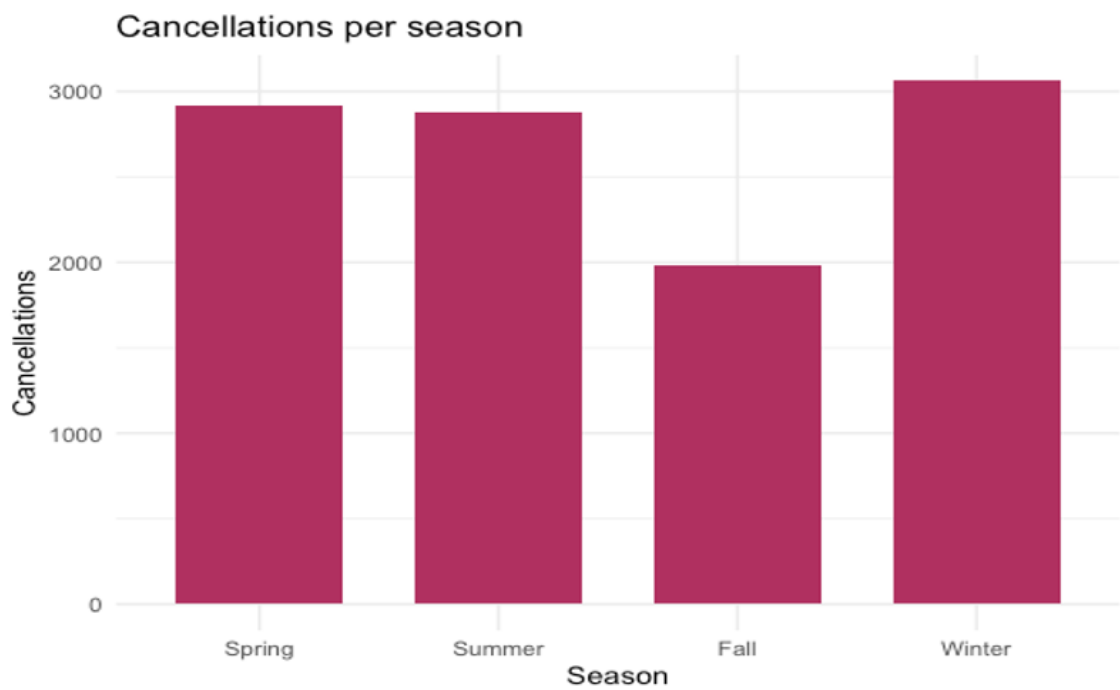
a) Per Season

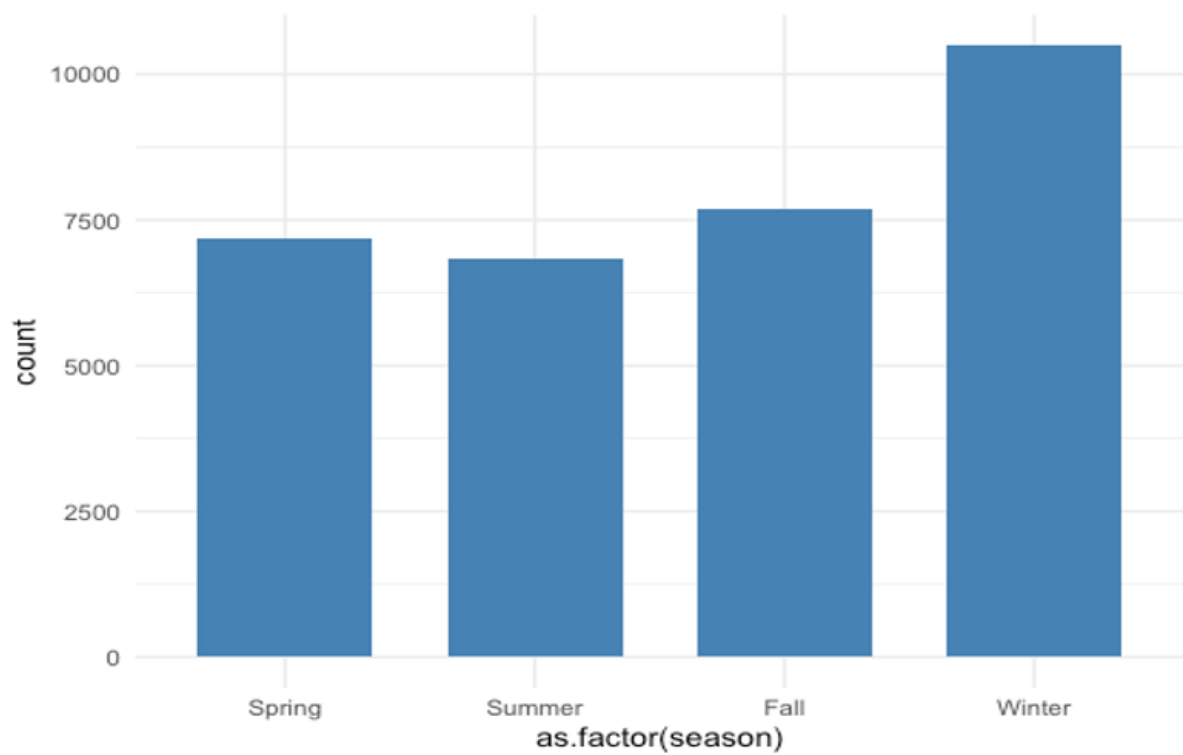Figure 6. Bar plot for cancellation per season in the resort hotel

Figure 7. Bar plot for cancellation per season in the city hotel
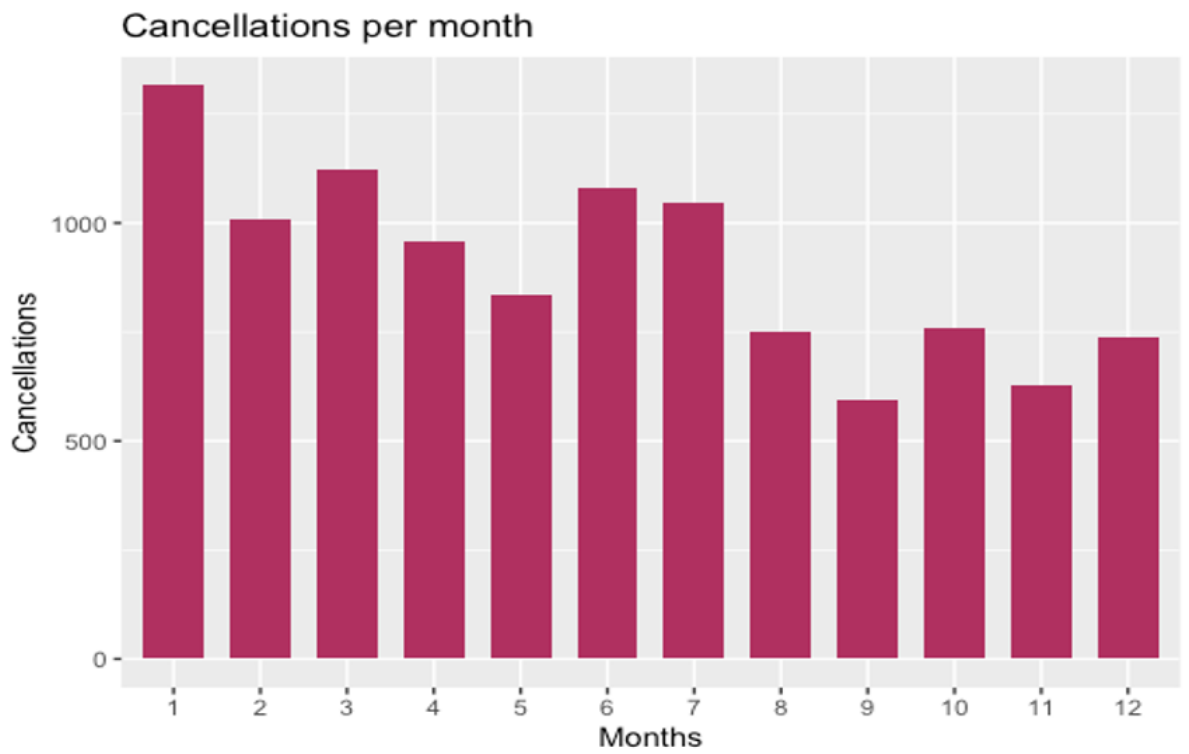
a) Per Month

Figure 8. Bar plot for cancellation per month in the resort hotel
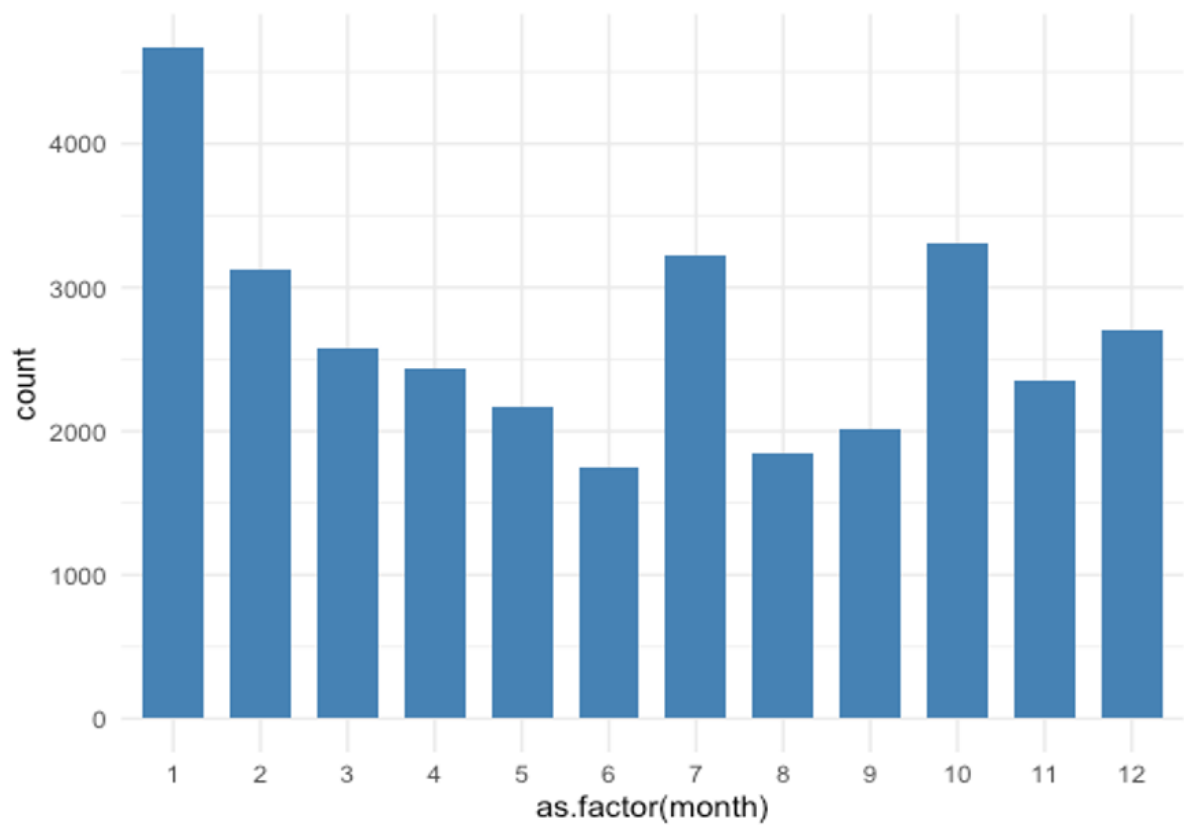

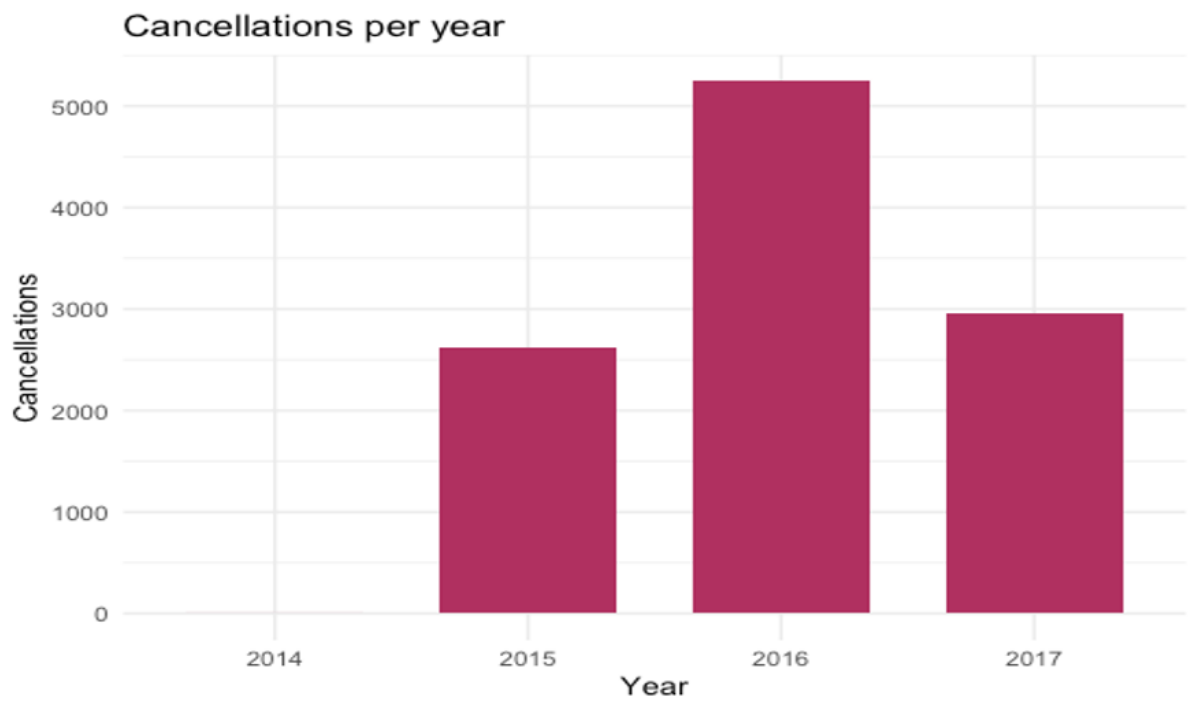Figure 9. Bar plot for cancellation per month in the city hotel

b) Per Year

Figure 10. Bar plot for cancellation per year in the resort hotel
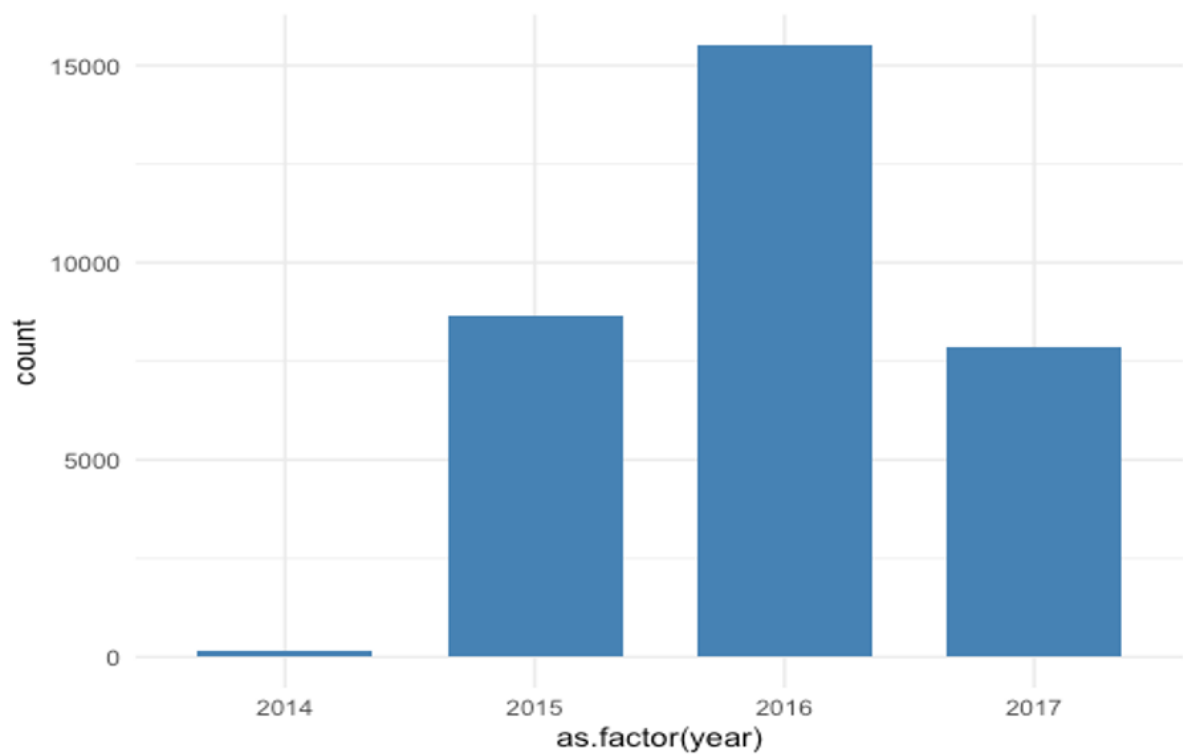

Figure 11. Bar plot for cancellation per year in the city hotel

To understand the cancellations of the two properties, they have been compared using different factors like season, month, and year. It can be observed that the seasonal and monthly cancellations are a bit different for both the properties. In the city, the cancellations are more in the winter compared to other seasons, while in the resort, the cancellations are lesser in the fall compared to other seasons, which decreases the ADR for these seasons. To combat these cancellations and thereby to increase the ADR, special discounts can be arranged in these seasons so as to increase the number of bookings. Another solution is to introduce a conditional cancellation fee. The fee can be waived off for repeat customers. This can be a good way to incentivize customer loyalty and reduce potential cancellations at the same time. There should be follow-up research by the hotels so that the reasons for cancellation can be understood better

Association rules

```
[1]  {MarketSegment=Groups,
      CustomerType=Transient}      => {ReservationStatus=Canceled} 0.03592112  0.8910217 0.04031453 3.295571  1439
[2]  {Country=PRT,
      MarketSegment=Groups,
      AssignedRoomType=A}          => {ReservationStatus=Canceled} 0.04403395  0.8062157 0.05461807 2.981904  1764
[3]  {MarketSegment=Groups,
      AssignedRoomType=A,
      CustomerType=Transient}      => {ReservationStatus=Canceled} 0.03015477  0.9292308 0.03245132 3.436893  1208
[4]  {Country=PRT,
      MarketSegment=Groups,
      CustomerType=Transient}      => {ReservationStatus=Canceled} 0.03057913  0.9365443 0.03265102 3.463943  1225
[5]  {Adults=[2,55],
      Country=PRT,
      MarketSegment=Groups}        => {ReservationStatus=Canceled} 0.04815277  0.8135808 0.05918622 3.009145  1929
[6]  {MarketSegment=Groups,
      CustomerType=Transient,
      TotalOfSpecialRequests=0}    => {ReservationStatus=Canceled} 0.03592112  0.9090335 0.03951573 3.362190  1439
[7]  {MarketSegment=Groups,
      ReservedRoomType=A,
      CustomerType=Transient}      => {ReservationStatus=Canceled} 0.03082876  0.8994902 0.03427359 3.326893  1235
[8]  {Adults=[2,55],
      MarketSegment=Groups,
      CustomerType=Transient}      => {ReservationStatus=Canceled} 0.03150275  0.9046595 0.03482277 3.346012  1262
[9]  {MarketSegment=Groups,
      CustomerType=Transient,
      RequiredCarParkingSpaces=0}  => {ReservationStatus=Canceled} 0.03592112  0.9067423 0.03961558 3.353716  1439
[10] {MarketSegment=Groups,
      IsRepeatedGuest=0,
      CustomerType=Transient}      => {ReservationStatus=Canceled} 0.03592112  0.8926799 0.04023964 3.301704  1439
> |
```

Association rules for the Resort dataset

After looking at the association rules, it can be seen that some characteristics get repeated among the cancellations. Most of the cancellations are from new customers.

Many of the bookings are transient. Transient bookings are last-minute bookings for a short duration of stay. These are strong reasons for introducing a cancellation fee. Also, for some reason, most cancellations are from Portugal. The reason for this must be examined further so that special considerations can be made during future bookings as per the regions from where these bookings are being made. Most cancellations are being done by groups – therefore there is a high chance that there are certain last-minute complications that are arising which cause these groups to cancel their plans, therefore groups, in general, are a risky category, especially when the bookings are last minute. As such cancellations cannot be predicted, there needs to be a mechanism to penalize the cancellations or there should be a mechanism to reduce the bookings that are likely to get canceled. Furthermore, transient bookings for groups can be made more expensive so that customers that are likely to cancel will not book the rooms in the first place.

d)   Customer Service (Trying to make sure assigned room type equals reserved)
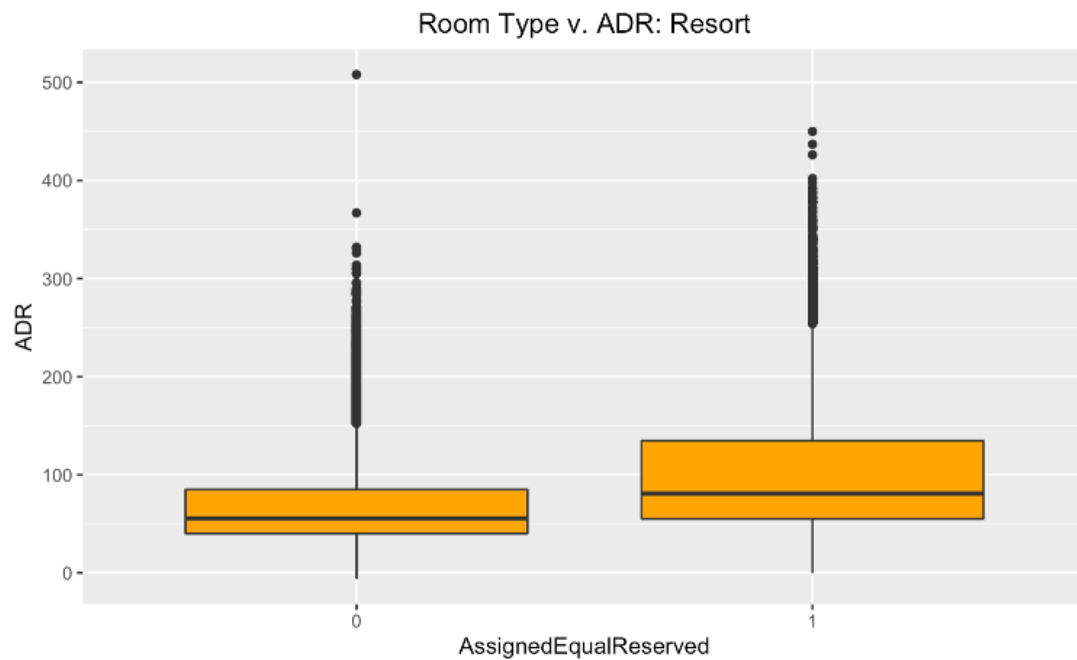
Room Type v. ADR: Resort

Figure 12. Boxplot for room type in the resort hotel
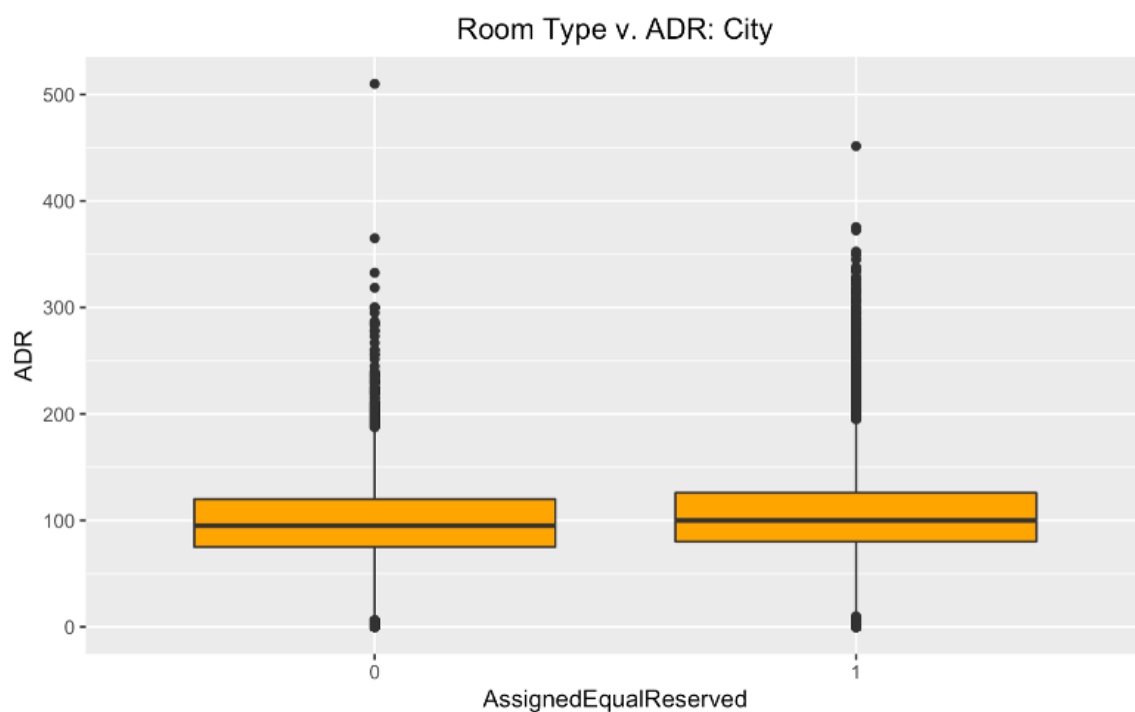
Room Type v. ADR: City

Figure 12. Boxplot for room type in the city hotel

 *1 means their reserved room type was their assigned room type, 0 means that it was

not the same

The hotels must ensure that customers are assigned the rooms that they had booked. For this, an efficient and reliable booking system must be set up. This will considerably reduce the cancellations that can occur due to incorrect room allotment. If for any reason the same rooms cannot be provided, discounts must be given in order to prevent cancellations. If the customers are canceling because they have not been assigned their desired rooms, no cancellation fee must be charged. Also, the hotel must reach out to the customers well ahead of their date of travel to inform them regarding the status and details of their booking.

Business Analysis Recommendation

1.   As analyzed, direct market strategies generated the most ADR in both properties so we should try to push more direct marketing for the hotels by placing ads on social media, travel magazines, sending out flyers and brochures to local events, sending promotional emails to the past and current customers. The second segment which generated the second-highest ADR is the online travel agent. We can start partnering up with more online travel agents, third-party booking websites, paying them a small incentive to put up our ads on their websites, and show our properties as one of the top choices for when a customer is looking for a place to stay.

2.   It is observed that for both the resort and city, cancellations are high during the winter months which can be caused by weather conditions, flight cancellations, delays, etc. In order to help reduce this, we can offer free rescheduling for customers so that they can come back at a later time, rather than having them cancel their trips which gives us 0 on revenue. By letting them reschedule their trips for free means that we will eventually make money. We can also create appealing promotions during the wintertime to attract customers to come to our properties to increase the number of bookings. We can also offer free shuttles services in the winter season to accommodate customers so that travel arrangements won't be a reason for the customers to cancel their bookings.

3.   As analyzed above, customers who don't make deposits for the resort are willing to pay more money when they are actually at the resort. This could be because typically when people want to stay at the resort, they want a relaxing experience and they don't mind paying money when they're there to relax. Taking advantage of this,

resort properties shouldn't require a deposit when customers are booking, but instead, we can upgrade the amenities and activities at the resort such as more luxurious spa/ massage packages, yoga classes, family activities, etc in order to generate more revenue for the resort while the customers are staying there.

4.   If there is no loyalty program in place, we should create one. By having a loyalty program, we can keep track of our customers' bookings, their history, their past activities on the properties. This way, we can accommodate them better each stay. We can also use this loyalty program to attract new customers and convince current customers to keep coming back to us. The loyalty program should have different statuses such as silver, gold, diamond and each status will have its own benefits and discounted rates.

5.   We also have to improve our database so that when a customer is booking and they are asking for a certain room type, we have to match the room type to what room we have available on that date. If the room a customer is asking for isn't available, it shouldn't be shown as an option at booking. This way, we can increase customer satisfaction by making sure that the type of room they're asking for is available.