Report On Hotel Booking

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1. Executive Summary

This report analyzes the hotel booking dataset to understand factors contributing to high cancellation rates in both City and Resort hotels. Key findings indicate that cancellations are significantly influenced by lead time, meal plans, and market segments. The analysis reveals that City hotels have a higher cancellation rate than Resort hotels. Recommendations include targeted marketing strategies for specific market segments and adjusting pricing or promotional offers for room types and meal plans associated with higher cancellations.

2. Objective

The primary objective of this analysis is to identify the factors leading to high cancellation rates in hotel bookings and to provide actionable insights that can help improve revenue management and reduce cancellations. The analysis seeks to answer the question: What are the key determinants of cancellation rates in City and Resort hotels, and how can hotel management utilize this information to enhance their business strategies?

3. Data Overview

3.1 Data Source

The dataset is sourced from Kaggle's hotel booking dataset, which contains information related to hotel reservations. The data covers bookings made from 2015 to 2019, encompassing various attributes related to the guests, bookings, and hotel characteristics.

3.2 Data Description

· hotel: Type of hotel (City or Resort)

· is_canceled: Cancellation status of the booking

· lead_time: Number of days between booking and arrival

· meal: Meal plan chosen by the guest

· market_segment: Source of the booking

· adr: Average Daily Rate

· reservation_status_date: Date when the reservation status was updated

Data cleaning steps Involved -

1]Handling missing values:

- For the country column, missing values were filled with the mode of country column

- For the children column, missing values were filled with the median

2] Converted the reservation_status_date from object type to datetime format to facilitate date-based analysis
3] Removed any irrelevant columns that do not contribute to the analysis.
4] Replace Undefined values of market segment and meal with there mode
5] In ADR column maximum value was too large I replaced it with median.

4. Methodology

The analysis was conducted using Python, leveraging libraries such as Pandas for data manipulation, Matplotlib, and Seaborn for visualization, and Scikit-learn for any clustering techniques applied to lead time. The methodology included:

1. **Exploratory Data Analysis (EDA)**: Conducting descriptive statistics and visualizations to understand the data distribution and identify patterns related to cancellations.

2. **Bivariate Analysis**: Exploring relationships between cancellation rates and other variables like lead time, meal plans, and market segments using visualizations and statistical tests.

3. **Multivariate Analysis**: Analyzing interactions among multiple variables to assess their collective impact on cancellation rates.

5.Analysis

## I]Overall cancellations of both hotels

Cancellation Percentage
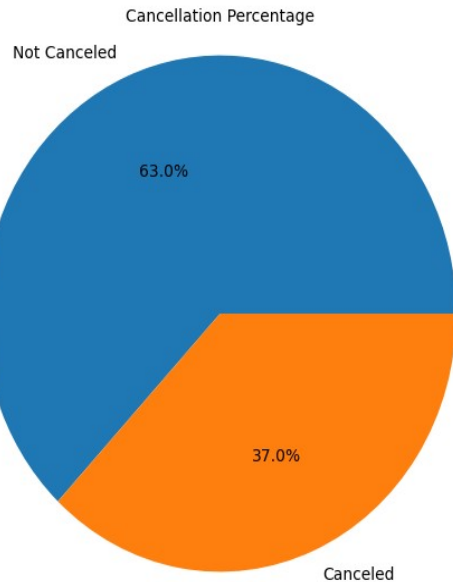
The above pie chart shows the percentage of reservations that are canceled and those that are not.It is obvious that there are still a significant number of reservations that have not been canceled.There are still 37% of clients who canceled their reservation,which has a significant impact on the hotels' earnings.

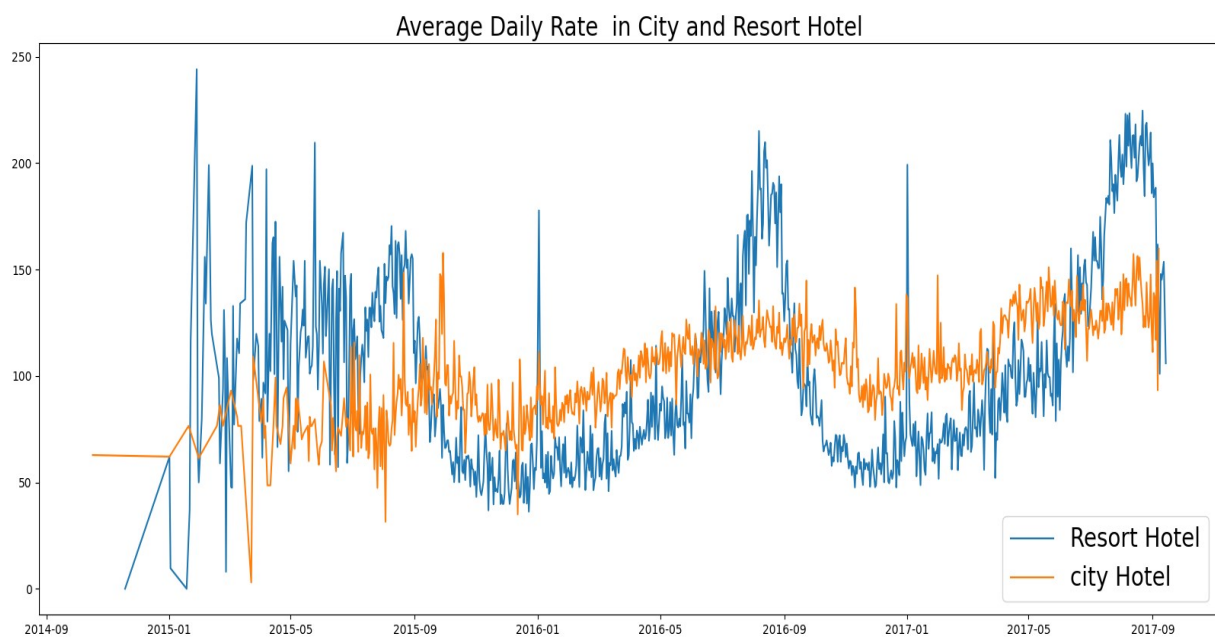| Hotel	Resort Hotel
Total Bookings	40060
Cancellations	11122
Cancellation Percentage	27.76%

Hotel	City Hotel
Total Bookings	79330
Cancellations	33102
Cancellation Percentage	41.73%

**II]Depending on hotel which hotel has more cancellations**
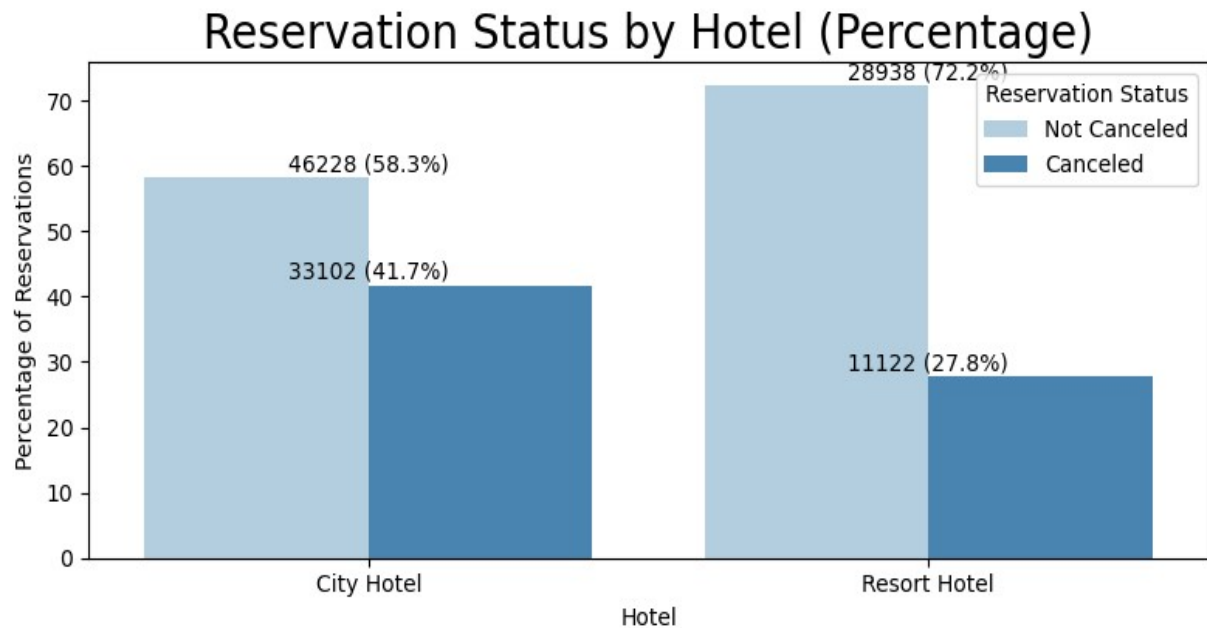
In comparison to resort hotels,city hotels have more bookings.It's possible that resort hotels are more expensive than those in cities.

III] In comparison to resort hotels, city hotels have more booking . its possible that resort hotels are more expensive that those in cities.

The line graph above shows that,on certain days, the average daily rate for a city hotel is less than that of a resort hotel, and on other days, it is even less. It goes without saying that weekends and holidays may see a rise in resort hotel rates.

IV] Is the cancellations vary with the ADR Or Not?
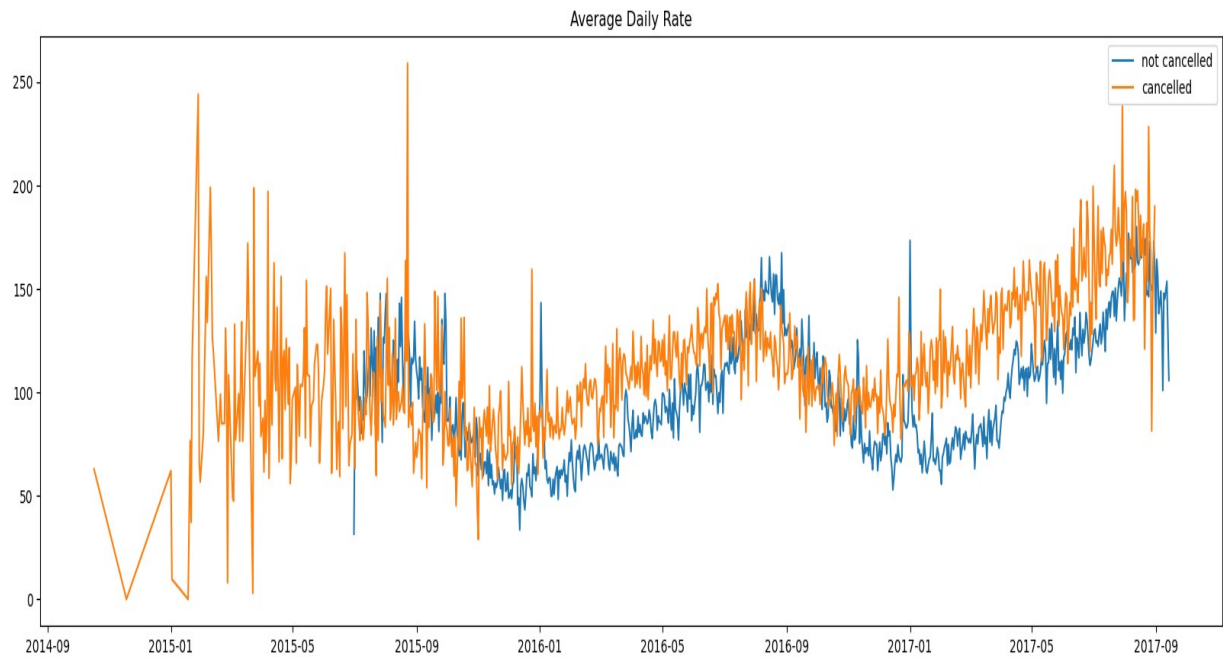
As seen in the graph, reservations are canceled when the average daily rate is higher than when it is not canceled.It clearly proves all the above analysis , that the higher price leads to higher cancellations.

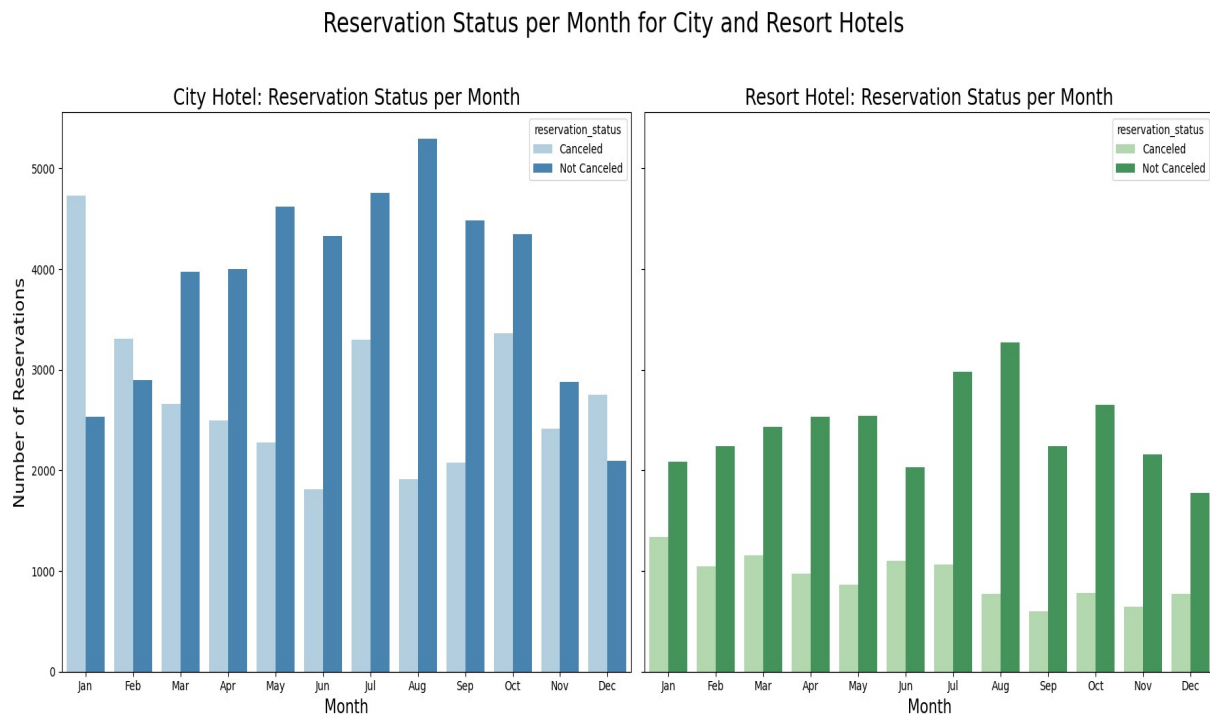**V] Reservation Status Per Month**

Reservation status per month

I have developed the grouped bar graph to analyze the months with the highest and lowest reservation levels according to reservation status.As can be seen, both the number of confirmed reservations are largest in the month of August whereas January is the month with the most canceled reservations.

VI] Is the cancellations vary with the ADR Or Not?

ADR per month for canceled bookings
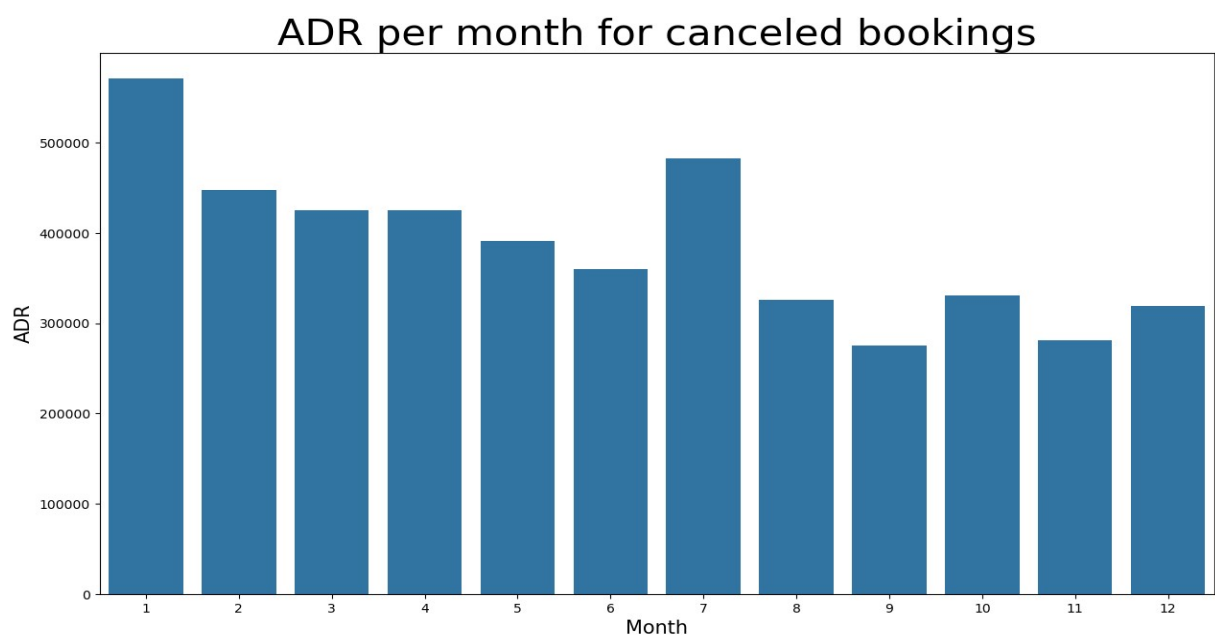
This bar graph demonstrates that cancellations are most common when prices are greatest and are least common when they are lowest.Therefore ,the cost of the accommodation is slowly responsible for the cancellations.

VII]Reservation Status Per Month for both City and Resort Hotels

Reservation Status per Month for City and Resort Hotels

Now I have to check which month has high cancellations and also high ADR so we can say those months are responsible for the highest cancellations.I have developed the grouped bar graph to analyze the months with the highest and lowest reservation levels according to reservation status for both City and Resort Hotels.As can be seen, **In City hotel** the number of confirmed reservations are largest in the month of August whereas January is the month with the most canceled reservations.and **In Resort hotel January** ,June,July are the month where cancellations are high.

VII]ADR of both City and Resort Hotels

ADR per Month for Canceled Bookings in City and Resort Hotels

This bar graph demonstrates that In City Hotel the January Month has high cancellations where prices are greatest And In Resort hotel June has the month where cancellations are high when prices are greatest .Therefore ,these two months are slowly responsible for the cancellations.

Month	Total_Reservation	Cancellation	Cancellation Per%
Jan	7257	4727	65.137109
Feb	6211	3311	53.308646
March	6640	2664	40.120482
April	6497	2497	38.433123
May	6893	2273	32.975482
June	6146	1812	29.482590
July	8061	3301	40.950254
Aug	7208	1915	26.567703
Sept	6562	2073	31.590978
act	7715	3364	43.603370
Nov	5294	2412	45.561012
Dec	4846	2753	40.809740

Month	Total Reservation	Castellations	Cancellation Per%
Jan	3424	1334	38.960280
Feb	3287	1047	31.852753
March	3590	1156	32.200557
April	3502	973	27.784123
May	3411	865	25.359132
June	3132	1100	35.121328
July	4045	1068	26.402967
Aug	4041	773	19.128928
Sept	2841	603	21.224921
act	3428	781	22.782964
Nov	2805	648	23.101604
Dec	2554	774	50.305403

VIII]Market Segment cancellations Percentage By Both Hotel Types
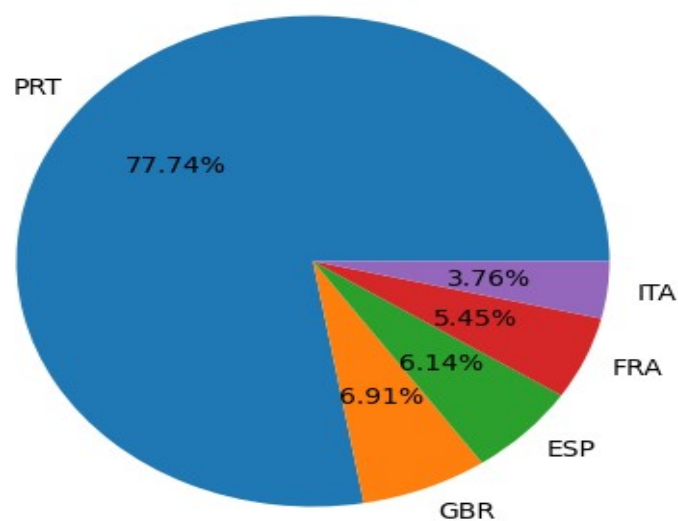

Cancellation Percentage by Market Segment and Hotel Type
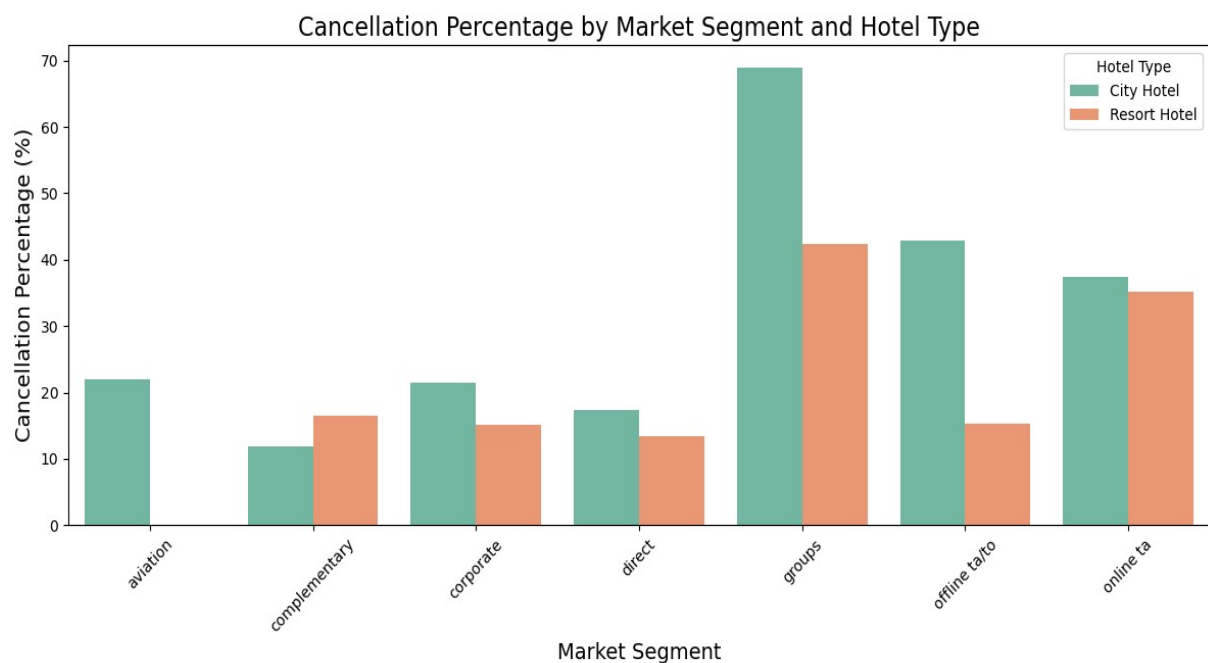
I have developed the grouped bar graph to analyze from Which market segment the cancellations are high for the both hotels.As can be seen both hotels has the high cancellations from **Groups** Market Segment.

IX] Which are the top 5 countries where cancellations are High


Top 5 Countries by Cancellations

I have developed the Pie chart to analyze the from 177 countries Which are the top five countries are there where cancellations are high.As can be seen PRT,GBR,ESP,FRA and ITA are five country where cancellations are High.Now from this five countries PRT is the country where almost 80 % cancellations are there ,the hotels which are in PRT country has the highest cancellations which has a significant impact on the hotels' earnings.

X] Market segment Cancellations in five countries where cancellations are high


Cancellation Rate by Market Segment for Top 5 Countries
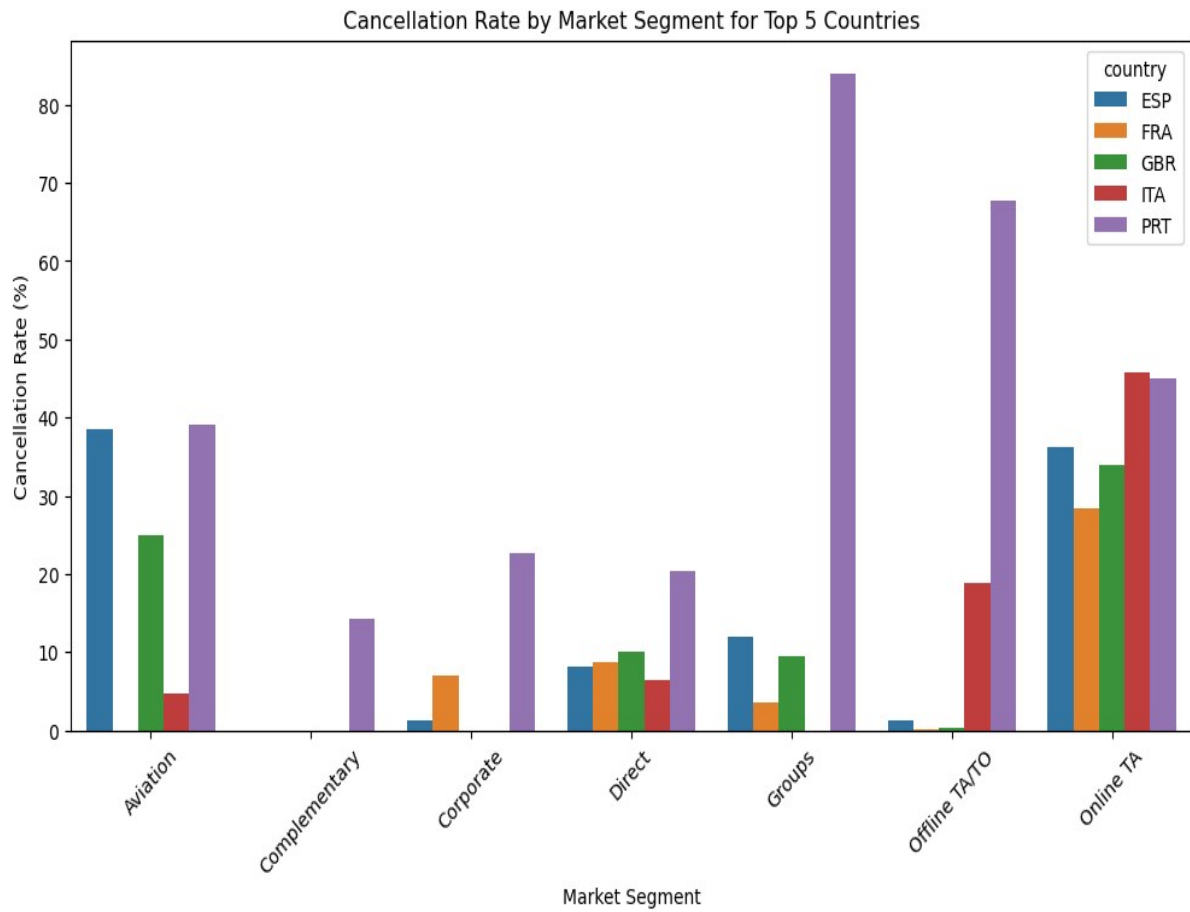
I have developed the grouped bar graph to analyze from which market segment has the high cancellations percentage in this five country.As can be seen Groups market segment has the high cancellations percentage but also From Online TA the cancellations percentage are high from all the Five Countries.

XI] Market segment Cancellations for Portugal in Percentage
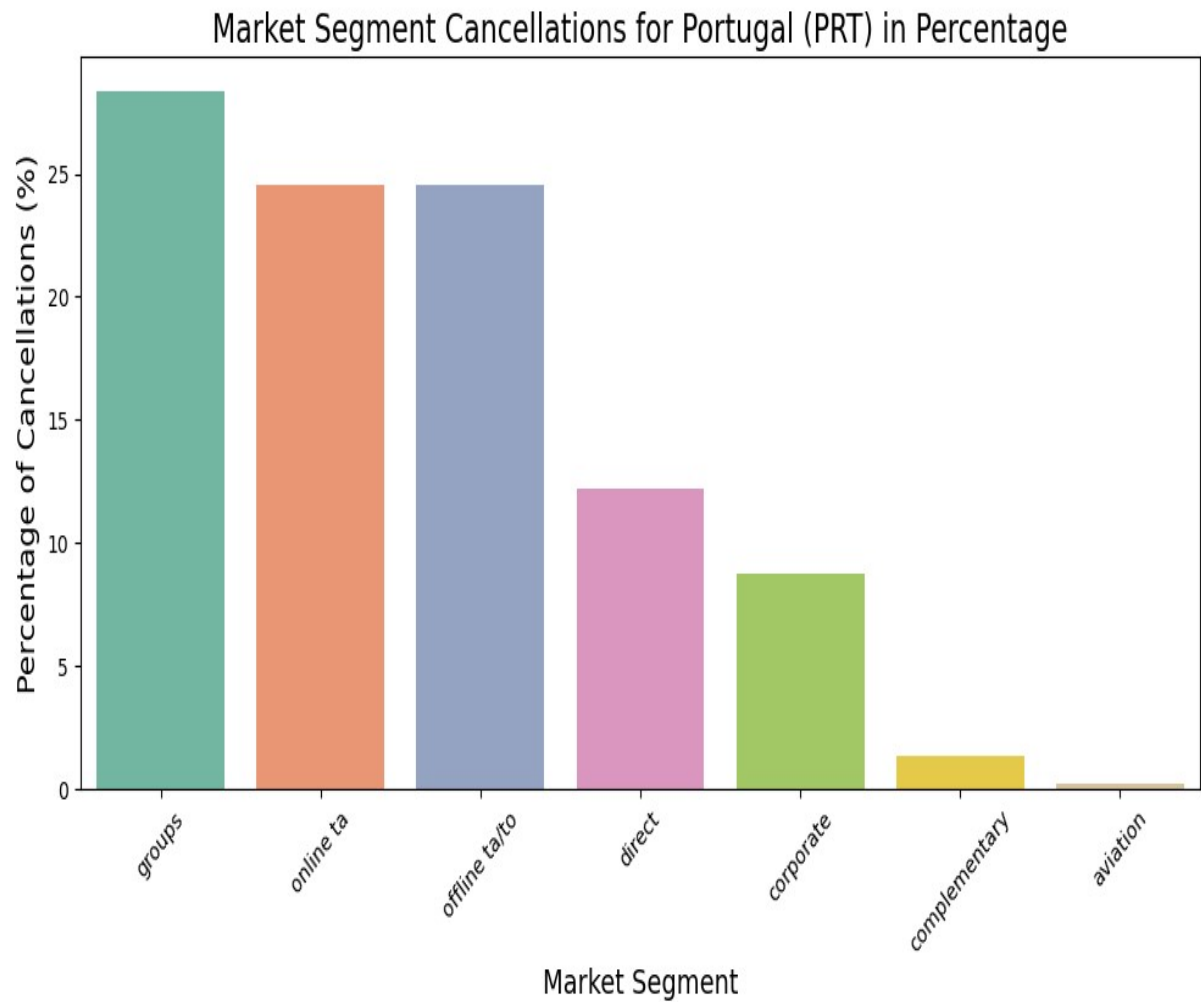
I have developed the bar graph to analyze the cancellations percentage through market segment for the PRT country where cancellations are very High.As can be seen Groups market has the high cancellations Percentage.

XII] Cancellations Of Meal Plan in PRT

Meal Cancellations in Portugal (PRT)
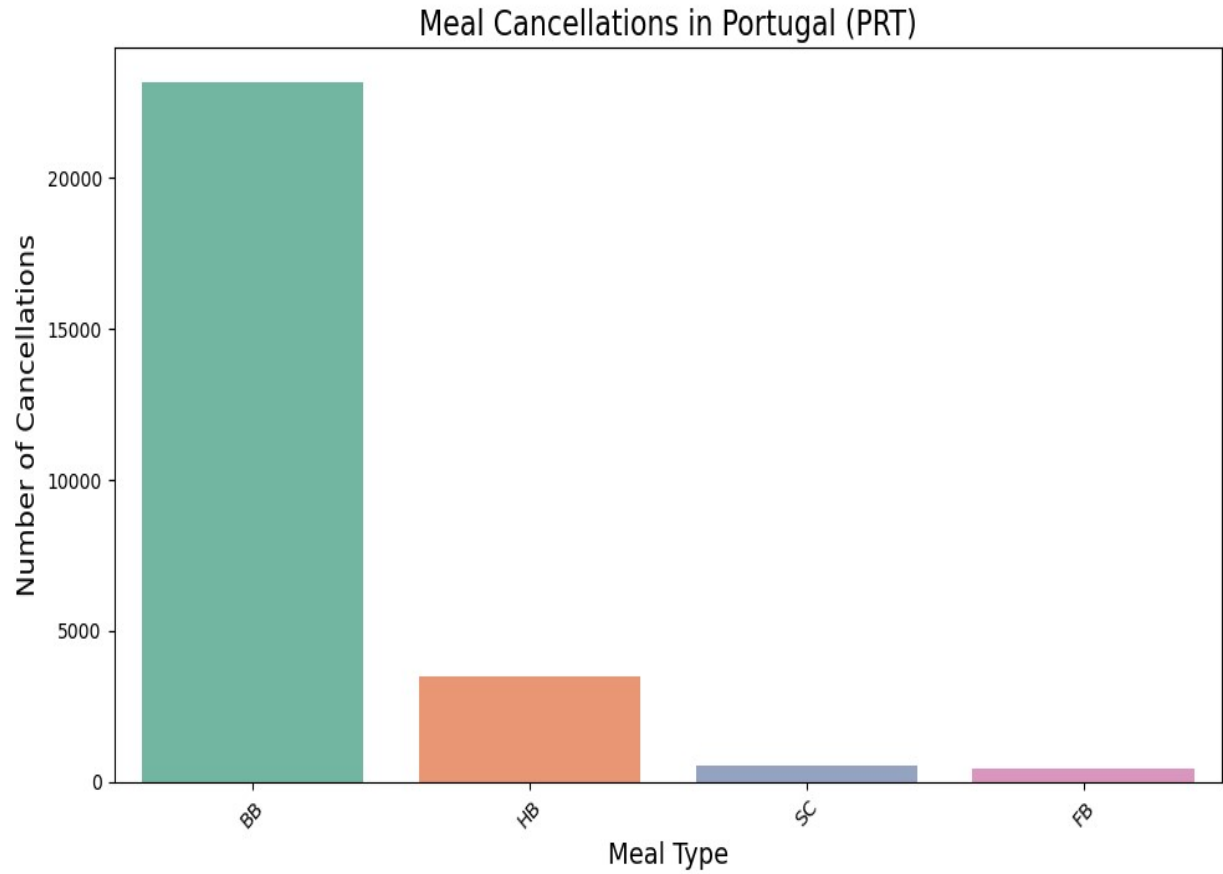
I have developed the bar graph to analyze the Number of Meal cancellations in the PRT country where cancellations are very High.As can be seen BB(Bed + Breakfast) has the high cancellations.

XIII] Is meal plan factor responsible for the cancellations through Market segment?

Cancellations by Market Segment and Meal Plan in Portugal (PRT)
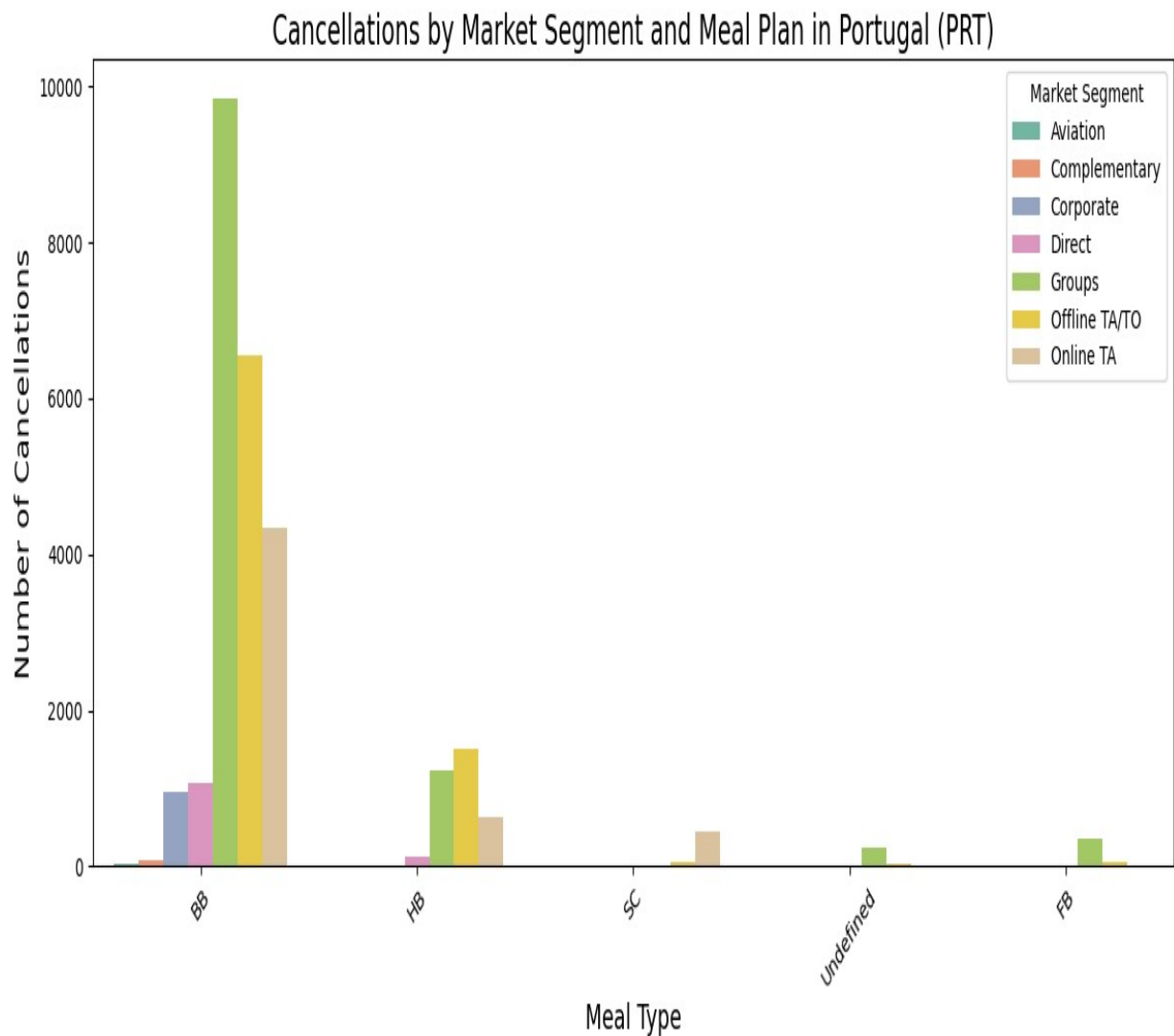
I have developed the grouped bar graph to analyze that is meal plan is responsible for the cancellations through particular market segment.As we have seen in Above Graphs Groups market segment has the highest cancellations and BB meal plan also has the highest cancellations in Groups market segment so BB meal plan is slowely responsible for the Hotels cancellations.

market_segment	meal	cancellation	Cancellation %
Aviation	BB	41	0.148626

market_segment	meal	cancellation	cancellation %
complimentary	BB	79	0.286377
complementary	HB	4	0.014500
complementary	SC	11	0.039875

market_segment	meal	cancellation	Cancellation %
Direct	BB	1059	3.480026
Direct	FB	13	0.047125
Direct	HB	128	0.464003
Direct	SC	12	0.043500

market_seg	meal	cancellation	Cancellation %
Groups	BB	9855	35.724643
Groups	FB	355	1.286885
Groups	HB	1225	4.440658
Groups	SC	2	0.007250

market_segment	meal	cancellation	Cancellation %
Online TA	BB	4339	15.728993
Online TA	FB	11	0.039875
Online TA	HB	631	2.287392
Online TA	SC	441	1.598637

market_segment	meal	cancellation	Cancellation %
Offline TA/TO	BB	6545	23.725803
Offline TA/TO	FB	43	0.155876
Offline TA/TO	HB	1496	5.423041
Offline TA/TO	SC	47	0.170376

XIV] Is Lead time the factor for the cancellations through Market Segment in PRT country?
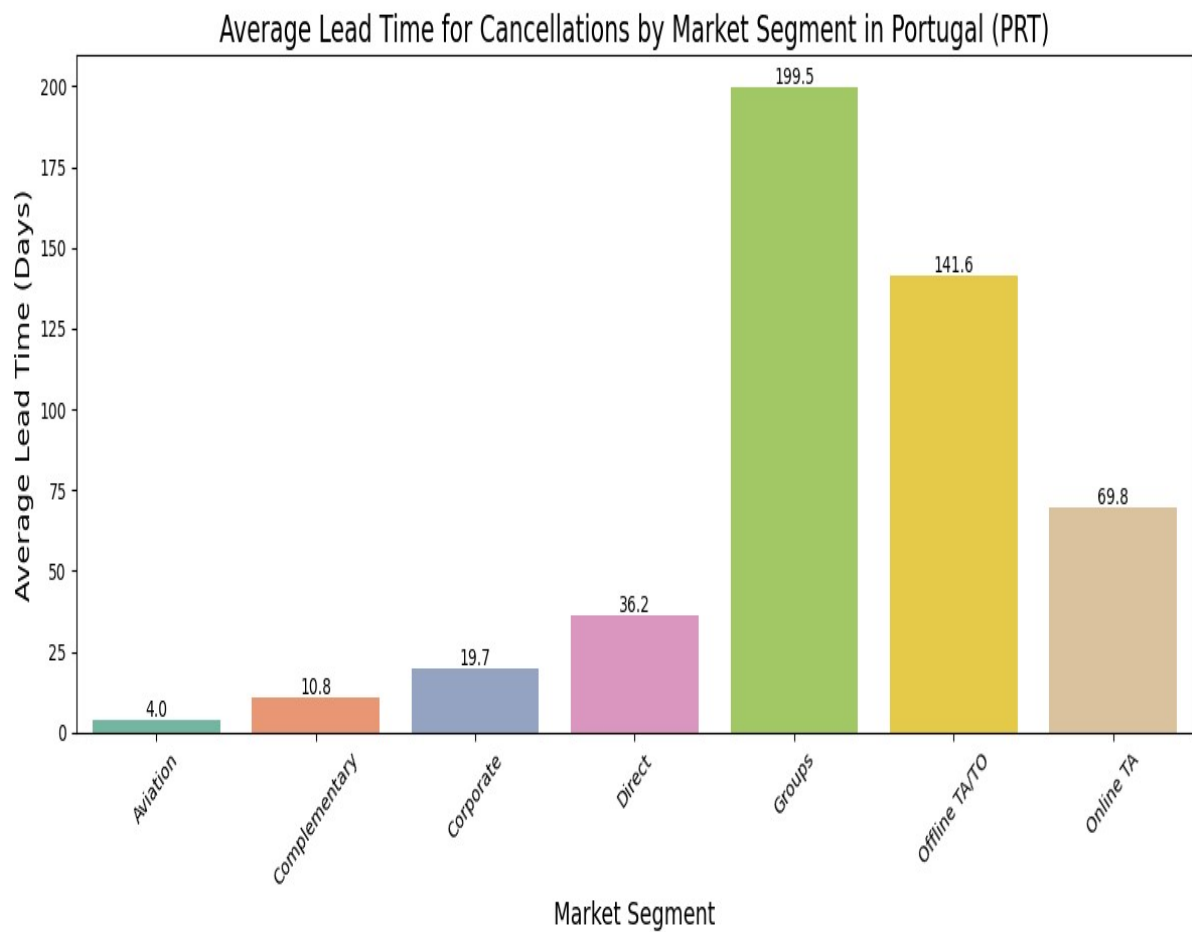
I have developed the bar graph to analyze that is lead time responsible for the cancellations through particular market segment.As we have seen in Above Graphs Groups market segment has the highest cancellations or where the cancellations are high lead time is also high so lead time is also slowely responsible for the Hotels cancellations.

6. Key Insights

Higher ADR Leads to More Cancellations

Hotels may be losing revenue due to higher cancellation rates when room prices increase. This suggests the need for more balanced pricing strategies, especially during peak seasons.

Group Segment Has the Highest Cancellation Rates

The "Groups" market segment is a major contributor to cancellations, indicating that large group bookings are more volatile.

Cancellations Peak in Certain Months

Cancellations are highest in months with elevated ADR s, such as January for city hotels and June for resort hotels, showing a direct link between pricing and cancellations.

High Cancellations in Key Countries (PRT, GBR, ESP)

Countries like Portugal (PRT) show extremely high cancellation rates (up to 80%), which significantly affects hotel earnings from these regions.

Online Travel Agencies (OTAs) and Group Cancellations

High cancellation rates are prevalent among bookings made through OTAs and the Groups segment, suggesting the need for improved management of third-party bookings.

Lead Time and Cancellations Correlation

Longer lead times are associated with higher cancellation rates, indicating that customers booking well in advance are more likely to cancel.

7.Recommendations

Cancellation rates rise as the price dose, in order to prevent cancellations of reservations , hotels could work on their pricing strategies and try to lower the rates for specific hotels on locations. They can also provide some discounts to the consumers.

In the month of Jan , hotels can start campaigns or marketing with a reasonable amount to increase their revenue as the cancellation is the highest in this month.

Offer discounts or flexible rates during months with high ADR and cancellations (e.g., January for city hotels, June for resort hotels).

Develop marketing strategies to reduce high cancellations in PRT, They can also increase the quality of their hotels and their services mainly in Portugal to reduce the cancellation rate.

Evaluate BB Offerings: Investigate the reasons behind the high cancellation rate for the BB meal plan. This could involve enhancing breakfast options enhancing quality or offering more appealing pricing packages.

Promote Alternative Meal Plans: Highlight the advantages of alternative meal plans (HB, SC) in marketing campaigns, emphasizing their perceived value and how they may reduce the likelihood of cancellations.

Set Minimum Lead Times for Different Market Segments: Consider implementing minimum lead times for specific market segments. For example, Group segments show a significantly higher average lead time and subsequent cancellations, you can enforce a longer lead time for those bookings to ensure better planning and commitment from guests.

8. Conclusion

The analysis of hotel bookings and cancellations reveals several key patterns. Both city and resort hotels show high cancellations during periods of higher Average Daily Rates (ADR), indicating that increased prices are a major factor in cancellations. Specifically, January sees the highest cancellations in city hotels, while June and July have the most cancellations for resort hotels.

Market segment analysis shows that cancellations are particularly high for the "Groups" segment across both hotel types, with the "Online TA" segment also contributing significantly. Additionally, in PRT (Portugal), almost 80% of cancellations occur, severely affecting hotel revenues. The "Groups" market segment has the highest cancellation rates in PRT, and the Bed + Breakfast (BB) meal plan is often linked to these cancellations.

Furthermore, the analysis suggests that longer lead times are associated with higher cancellation rates, especially in the "Groups" market segment. This highlights the importance of adjusting pricing strategies, market targeting, and booking policies to reduce cancellations.

Overall, the project concludes that high ADR, specific market segments (especially Groups), meal plans, and longer lead times are key contributors to hotel cancellations. By addressing these factors, hotels can reduce cancellations and improve revenue stability.