

Leveraging Machine Learning for Enhanced Data Insights

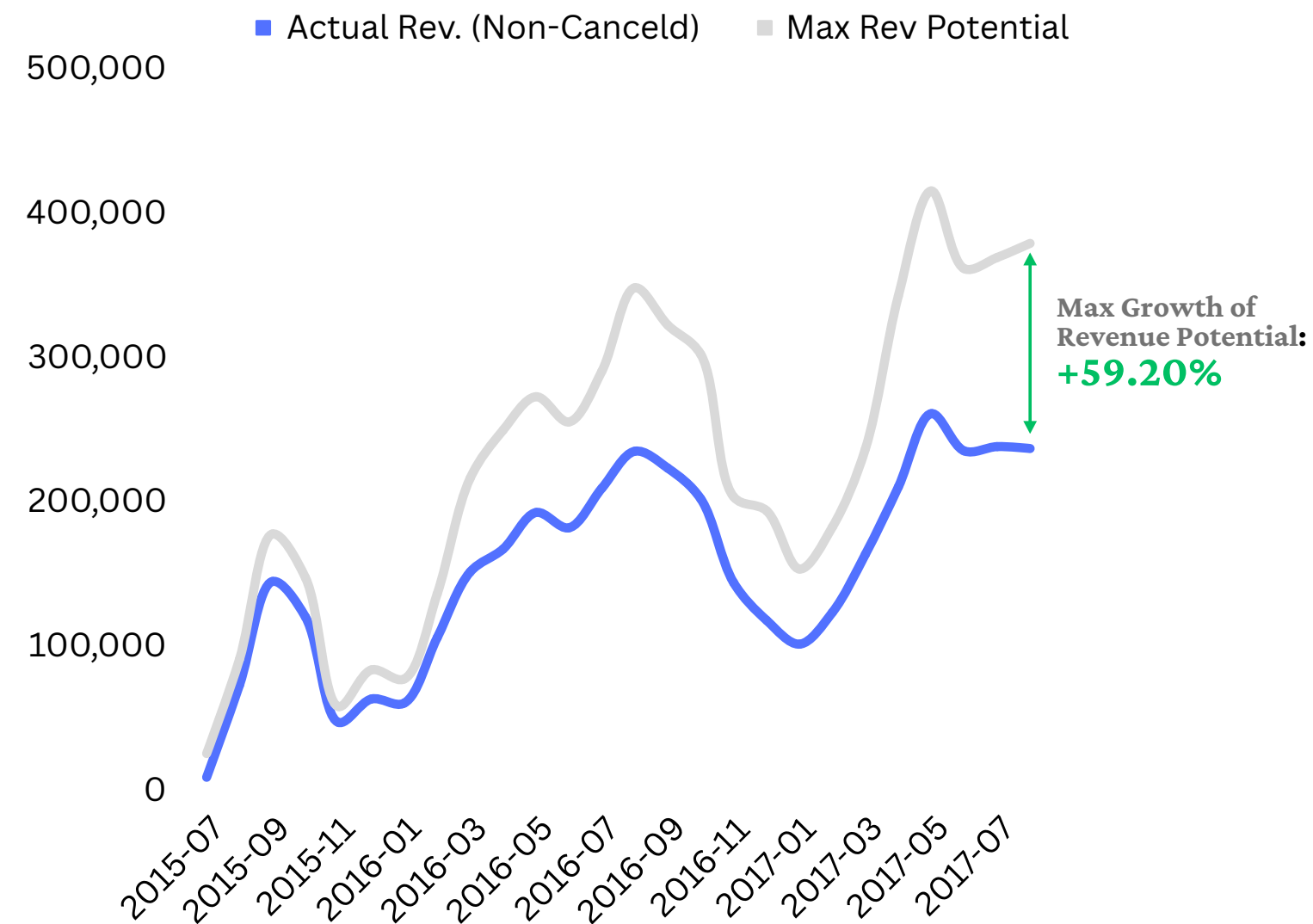
A Comprehensive Case Study on Maximizing Hotel Revenues

Presented by Dooinn KIM

Revenue Overview

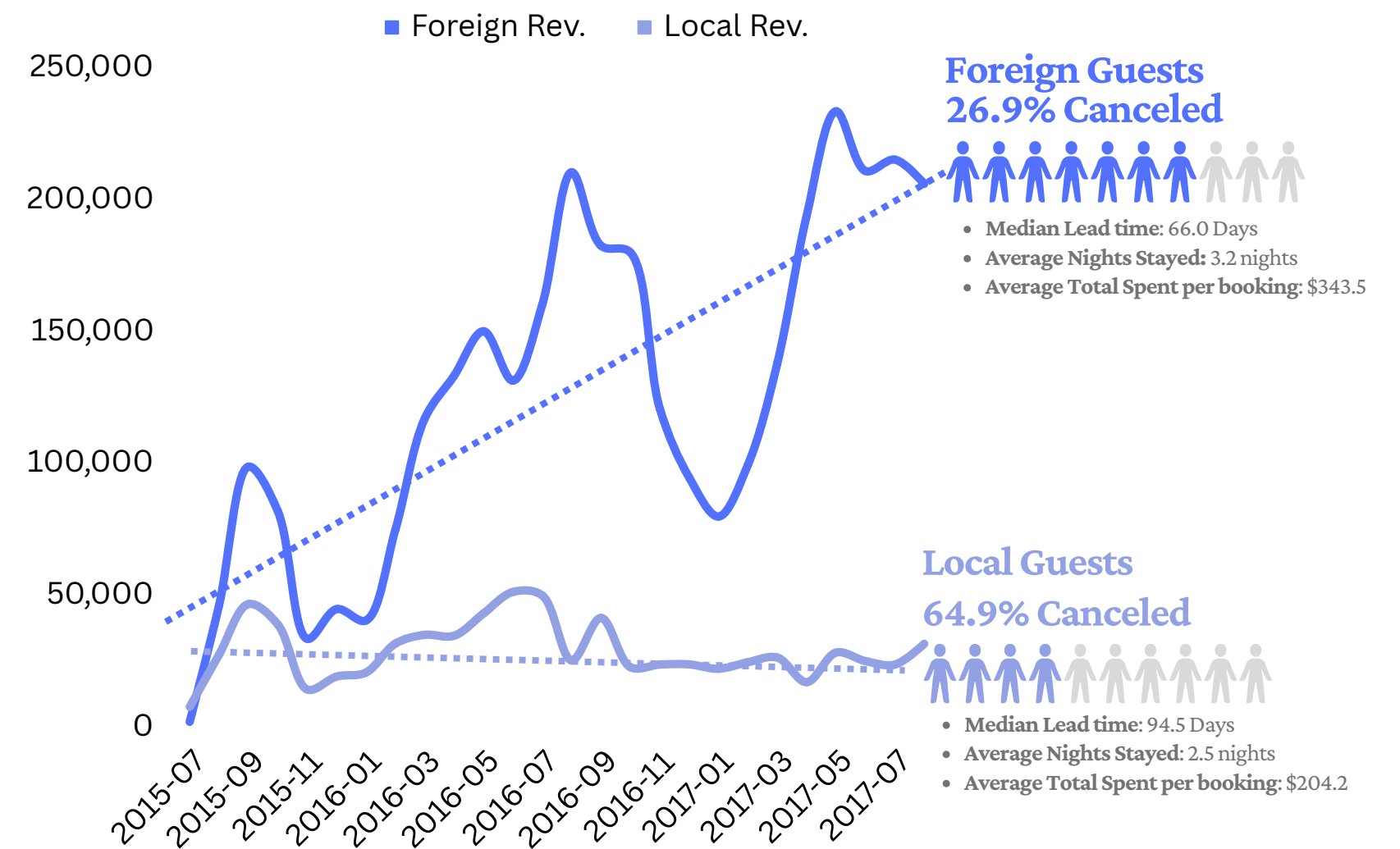
“Where do we stand?”

“Reduce Booking Cancellations!”



Revenue Trends - Actual vs. Maximum Revenue Potential: The booking cancellation status of guests serves as a significant indicator of their interest in a hotel. Reducing cancellations can lead to an increase in a hotel's revenue potential

“Foreign Guests = Cash Cow”



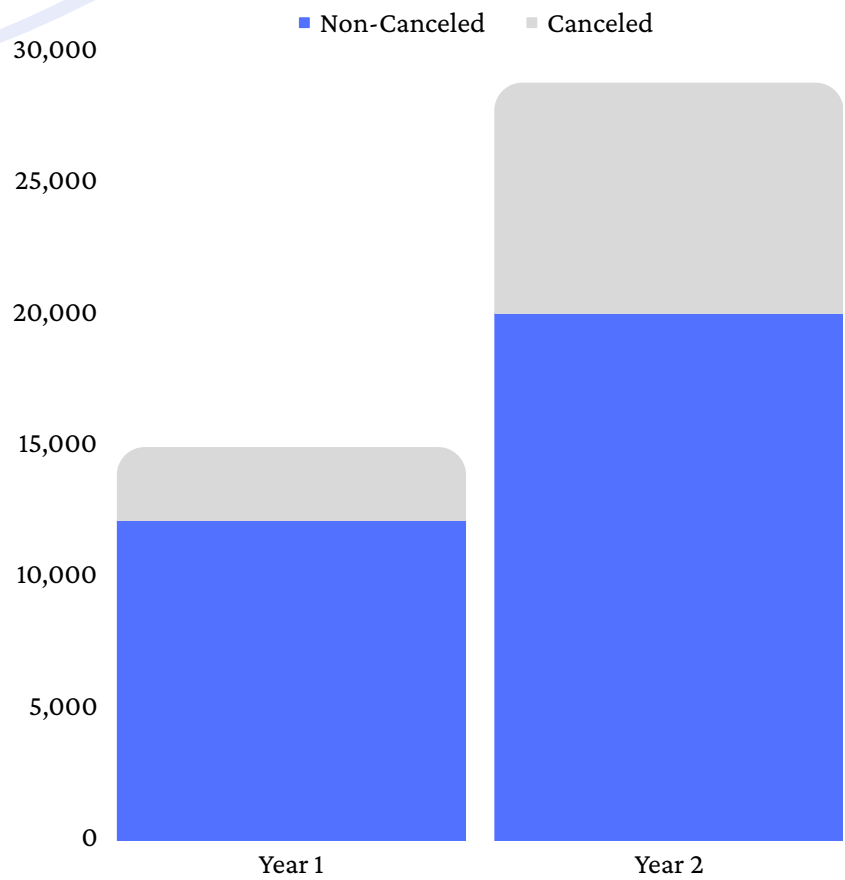
A Comparative Overview of Foreign and Local Bookings and Revenues: The revenue generated from foreign guests is predominantly higher than that from local guests. Focusing on the most lucrative segment is a strategic approach to maximize revenues.

Zomming In: Foreign Guests

A deep dive into a key customer segment to target.

Note: The number of bookings from foreign guests has nearly doubled over the past year. However, a deeper dive into the data shows that the guest groups "Couples" and "Family" have experienced a significant rise in cancellation rates. Additionally, while online travel agencies (TAs) like Bookings.com and Agoda are the predominant booking channels, they too have seen a notable surge in cancellations, despite the overall increase in bookings."

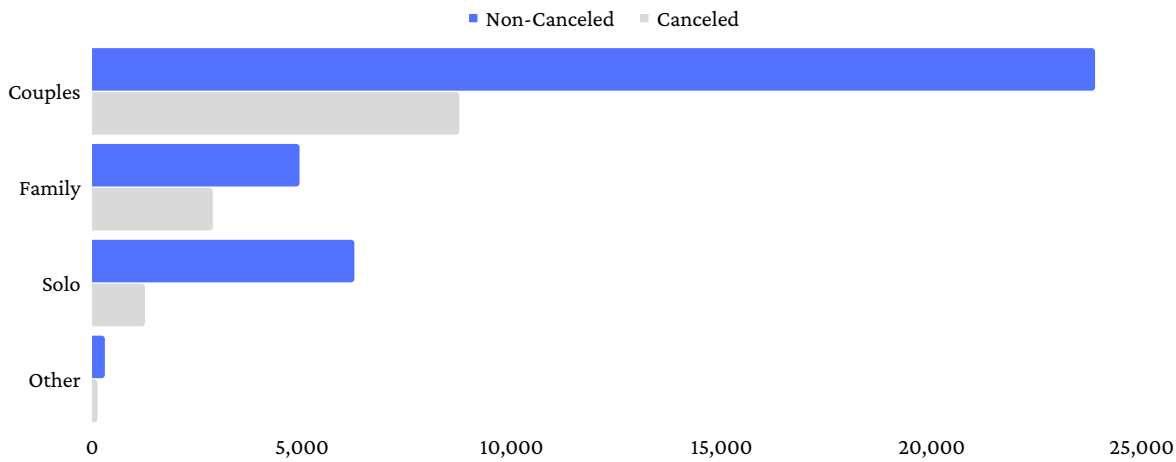
Foreign Guests



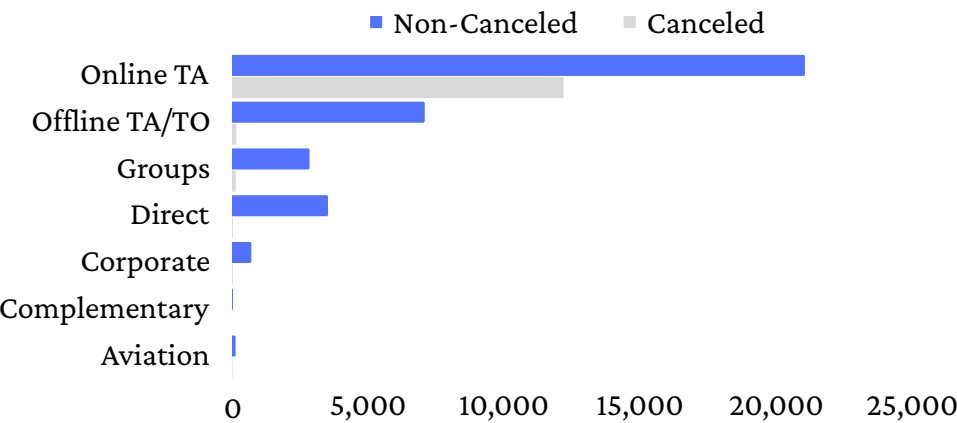
Cancellation Rates:

- **Year1:** 18.77%
- **Year2:** 30.50%

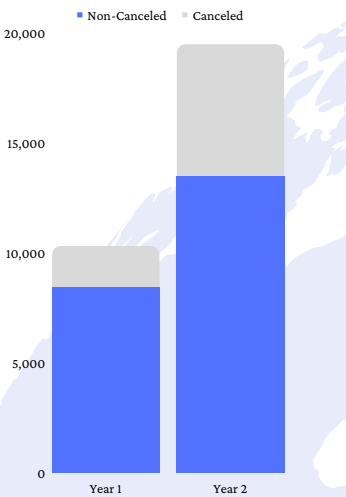
Guest Group Type



Booking Channels



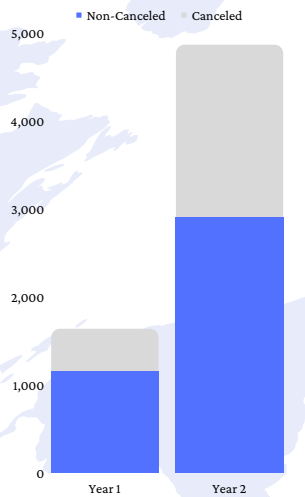
Guest Group Type = Couples



Cancellation Rates:

- **Year1:** 18.16%
- **Year2:** 30.75%

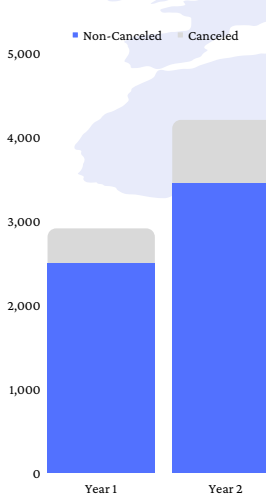
Guest Group Type = Family



Cancellation Rates:

- **Year1:** 29.57%
- **Year2:** 40.22%

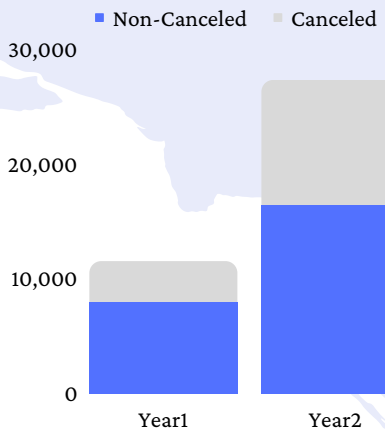
Guest Group Type = Solo



Cancellation Rates:

- **Year1:** 14.56%
- **Year2:** 17.91%

Booking Channels = Online TA



Cancellation Rates:

- **Year1:** 27.83%
- **Year2:** 39.80%

Predicting Cancellations

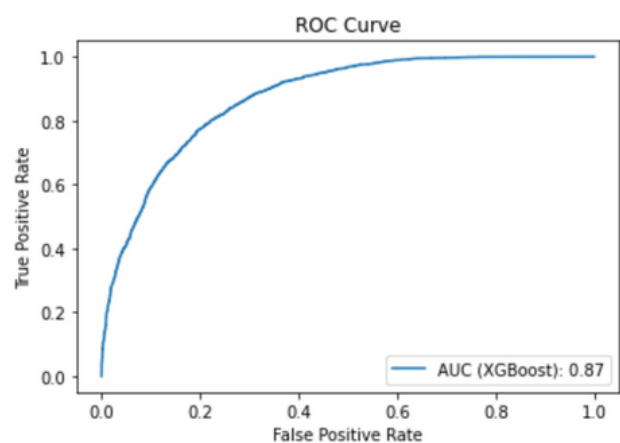
“Which customer is most likely to cancel their bookings?”



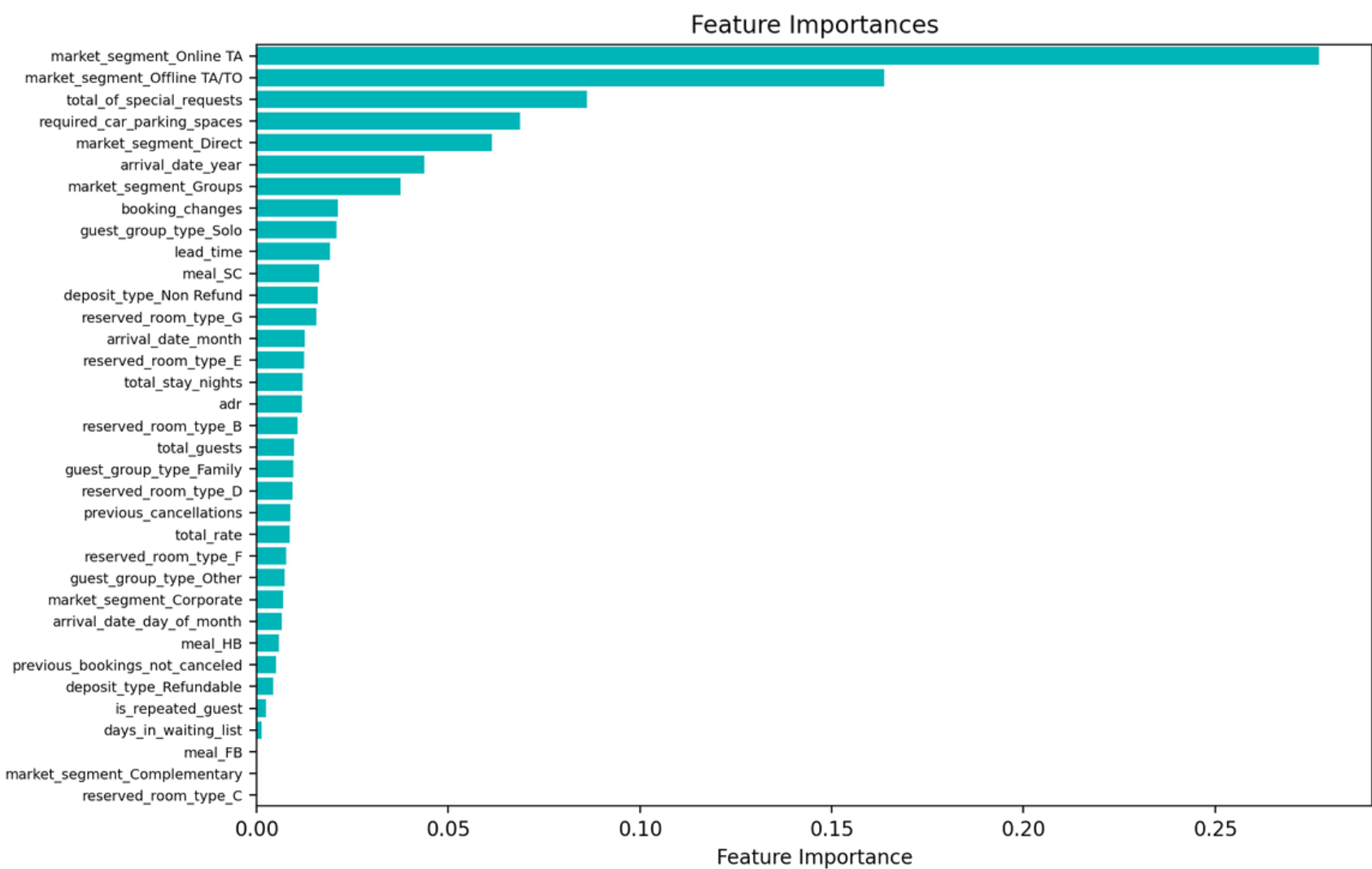
Predicting Cancellations

“Which customer is most likely to cancel their bookings?”

Train Classification Report:					
	precision	recall	f1-score	support	
0	0.88	0.93	0.90	23228	
1	0.78	0.66	0.72	8924	
accuracy			0.85	32152	
macro avg	0.83	0.79	0.81	32152	
weighted avg	0.85	0.85	0.85	32152	
Test Classification Report:					
	precision	recall	f1-score	support	
0	0.85	0.90	0.88	5807	
1	0.70	0.59	0.64	2231	
accuracy			0.81	8038	
macro avg	0.77	0.75	0.76	8038	
weighted avg	0.81	0.81	0.81	8038	
Test Confusion Matrix:					
[[5231 576]					
[914 1317]]					



Classification Report (XGBoost)



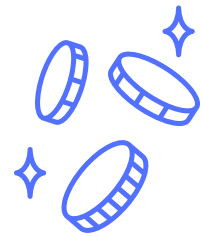
Feature Importances (XGBoost)

Note: The present classification model used for predicting booking cancellations is **encountering issues with overfitting**. Additionally, its performance in accurately predicting cancellations is not yet optimal, as indicated by the training F1-score of 0.72 and the test F1-score of 0.64. To enhance the model's effectiveness, it is essential to gather more relevant and specific data features that significantly influence booking cancellations. **Therefore, a manual investigation into the factors driving cancellations is necessary**, along with a systematic approach to storing this data in a structured manner.

Conclusion & Recommendations

"What's our takeaway?"

1. Focus on the Most Lucrative Target



Our primary objective in the revenue optimization strategy is to **lower the cancellation rate**, particularly among foreign guests, who are considered the most lucrative segment.

2. Target Key Segments Among Foreign Guests



It is crucial to **understand the reasons behind cancellations**, especially among couples and families, as well as those who book through online travel agencies, which have shown higher cancellation rates in the second year.

3. Enhance Targeting with a Machine Learning Model



We can collectively target the segments mentioned in previous slides. However, our **targeting can be refined and prioritized with the aid of our machine learning model**.

4. Conduct Targeted Marketing Campaigns



We will **launch marketing campaigns focused on these priority groups**, which are also identified by the machine learning model as having a high likelihood of cancellation.

5. Monitor and Evaluate Campaign Performance



The effectiveness of the marketing campaign will be evaluated by monitoring changes in cancellation rates and comparing them with previous years.

Booking Dashboard

Main Stakeholder:
Business Development Team,
Marketing Team



CITY HOTEL
Lisboa

FILTERS

Year of Arrival Date

(All)

2015

2016

2017

Month, Year of Arrival Date

(All)

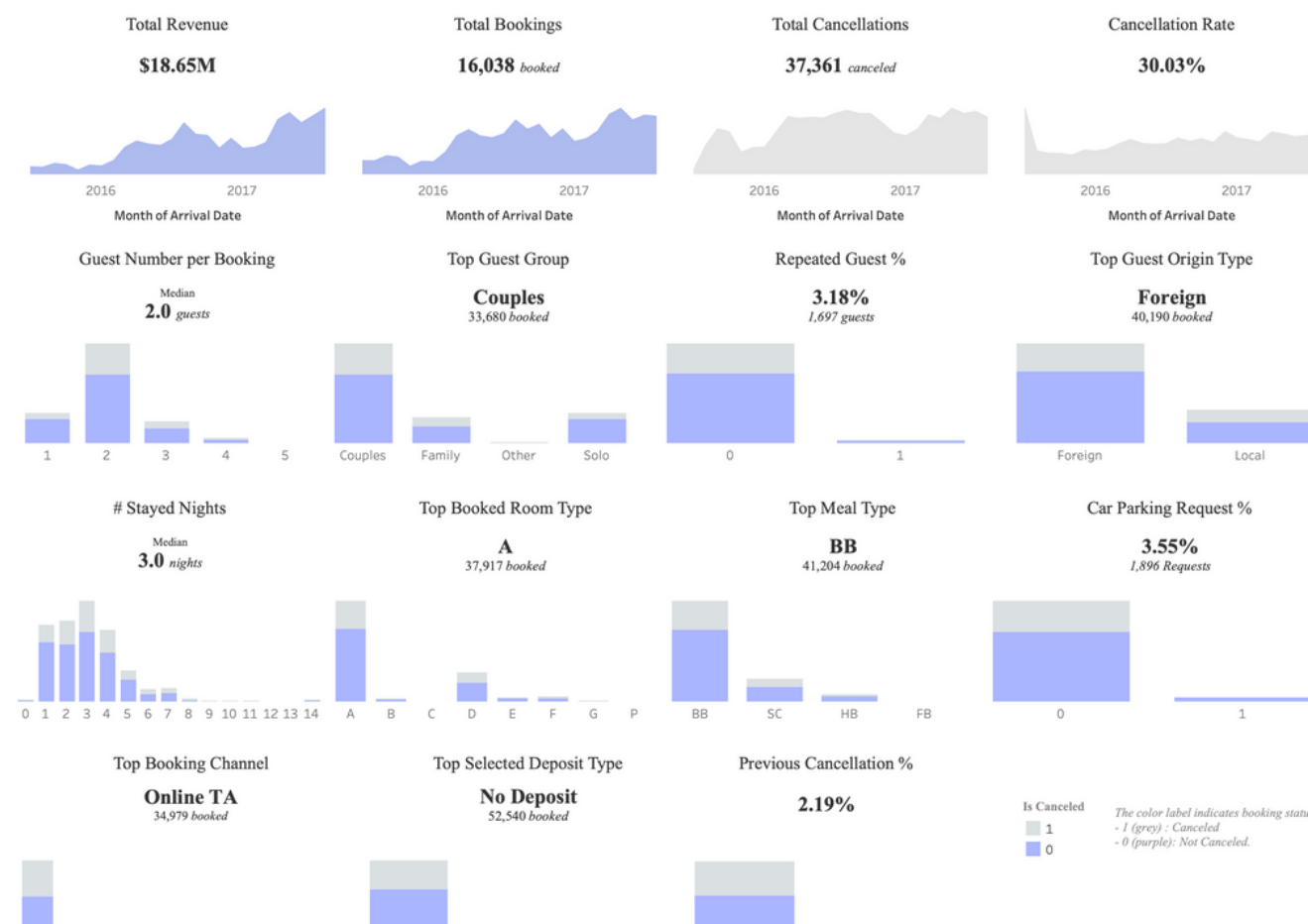
Country

(All)

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DASHBOARD | HOTEL BOOKINGS

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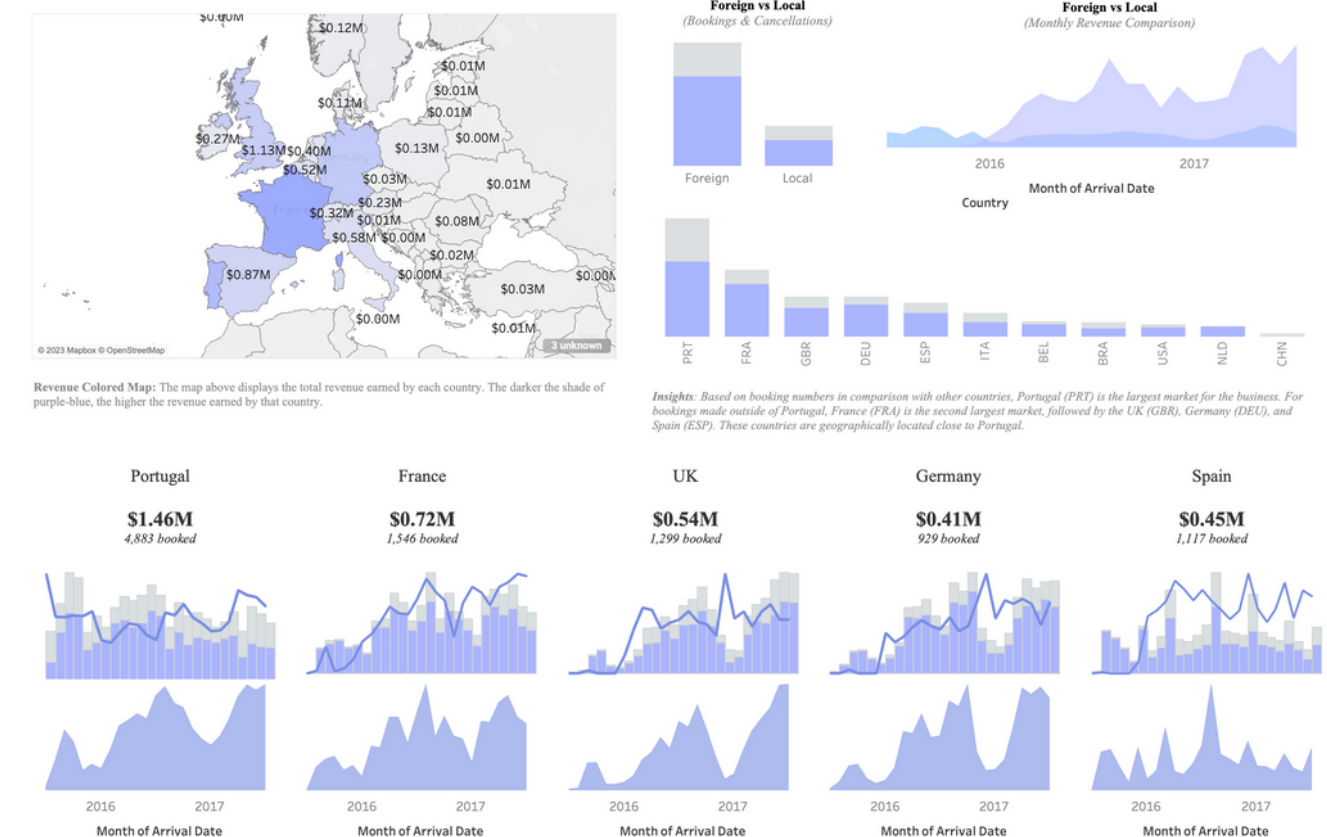
Hotel Booking Dashboard

MARKET SEGMENTAION | COUNTRY

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Total Revenue & Bookings by Country

(Top 5 by # of Bookings)



Market Segmentation

Available at: <https://public.tableau.com/app/profile/dooinn/viz/HotelBookingFinal/MarketSegmentation-Country>



CITY HOTEL

Est. 1998

FILTERS

Year of Arrival Date

☐ (All)

☐ 2015

☐ 2016

☐ 2017


Month, Year of Arrival Date

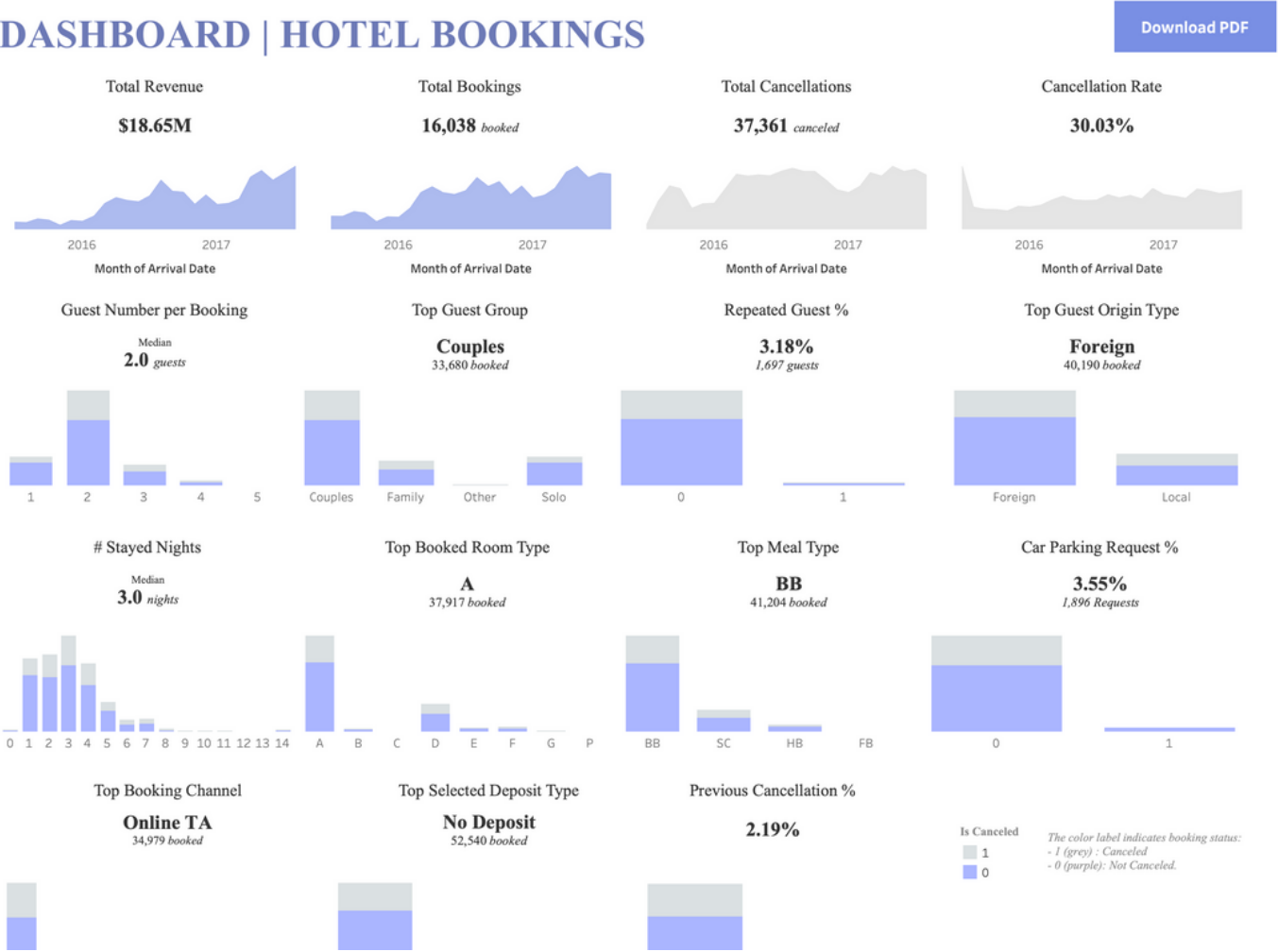
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Country

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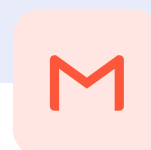


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