Hotel Cancellation Analysis

Insights to Reduce Cancellations & Improve Revenue

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Agenda: Navigating Towards Enhanced Revenue

01

Setting the Stage
Hotel Overview & Project Objectives

02

Identifying Challenges
Problems & Key Questions

03

Data at a Glance
Cleaning, Preparation & Dataset Overview

04

Visualizing Insights
Dashboard Overview & Key Findings

05

Strategic Recommendations
Actionable Steps for Revenue Optimization

Understanding Our Landscape: Hotel Overview

City Hotels

- Located in urban centers, catering primarily to business travelers and short-stay tourists.
- Higher room turnover, often with shorter lead times.

Resort Hotels

- Situated in leisure/tourist destinations, attracting families and couples for longer stays.
- Seasonal demand plays a significant role in booking patterns.

Our target customers span families, couples, and corporate travelers. The hotel industry's success hinges on accurate booking forecasts to manage inventory, dynamic pricing, and overall revenue management effectively.

Project Objectives: Driving Revenue Through Data

Identify Cancellation Patterns
Analyze historical booking data to pinpoint common trends and behaviors leading to cancellations.

Uncover Influencing Factors
Determine the key variables that significantly impact cancellation decisions, from lead time to market segment.

Formulate Actionable Recommendations
Translate data insights into practical strategies that directly reduce cancellation rates and boost occupancy.

Ultimately, our goal is to enhance revenue predictability and optimize operational efficiency through a data-driven approach.

Addressing Core Challenges: Our Problem Statement

1. **Hotel Type Disparity**
   Which hotel type, City or Resort, experiences a higher cancellation rate and why?

2. **Lead Time Impact**
   How does the duration between booking and check-in (lead time) correlate with cancellation likelihood?

3. **Channel & Segment Influence**
   Do specific market segments or distribution channels exhibit higher propensities for cancellations?

4. **Seasonal & Monthly Trends**
   Are there specific seasons or months that show a noticeable impact on booking and cancellation patterns?

Data Refinement: Cleaning & Preparation Process

Streamlining the Dataset

- **Column Removal:** Eliminated non-essential columns (meal, country, booking changes) to maintain analytical focus.
- **Data Correction:** Rectified errors in the "children" column (e.g., negative or invalid values).
- **Date Normalization:** Consolidated year, month, and day into a unified and correctly formatted "arrival_date" field.

Enhancing Insights

- **Customer Segmentation:** Categorized customers into "Family" (adults > 0 & children/babies > 0), "Couples" (2 adults, no children/babies), and "Single" for deeper analysis.
- **Room Mismatch Flag:** Introduced a "Reservation_Match" column to highlight discrepancies between reserved and assigned room types.

This meticulous preparation ensures the accuracy and relevance of our analytical findings.

Dataset Overview: Our Foundation for Analysis

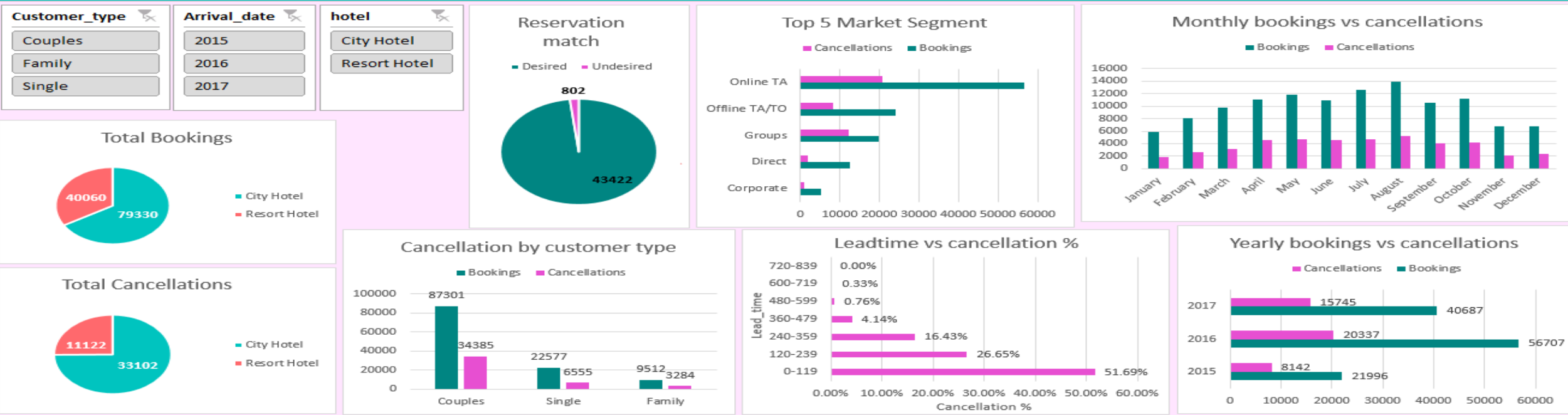**Source:** Comprehensive hotel booking dataset (CSV/Excel format).

Records: Approximately 119,390 rows, providing a robust sample size.

Time Period: Data spans from 2015 to 2017, offering a historical perspective.

Key Columns for Analysis:

- **Booking Details:** hotel, is_canceled, lead_time, arrival_date_month, adr (Average Daily Rate).
- **Customer Information:** market_segment, distribution_channel, country.
- **Stay Information:** stays_in_weekend_nights, stays_in_week_nights, reserved_room_type.

Interactive Dashboard: Visualizing Key Metrics

This dashboard provides a comprehensive, interactive view of our hotel booking data. It allows us to drill down into various metrics, offering real-time insights into cancellation patterns, lead times, market segments, and more.
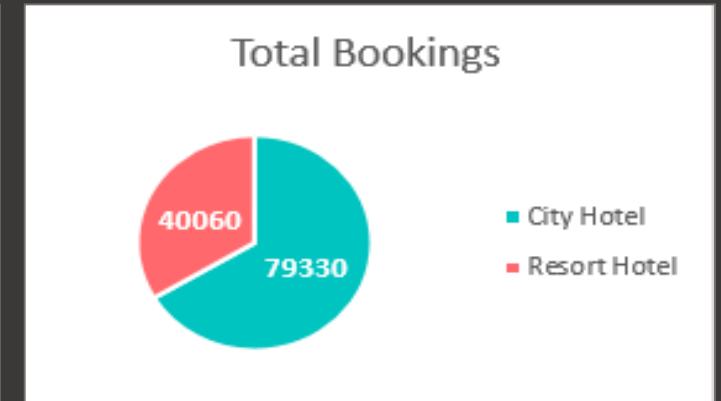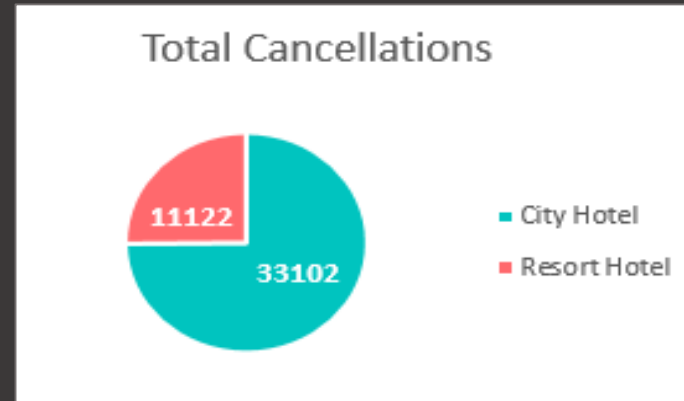
Cancellation Rate by Hotel Type

- **City Hotel**
  - Total Bookings: **79,330**
  - Total Cancellations: **33,102**
  - **Cancellation Rate:** **41.7%**
- **Resort Hotel**
  - Total Bookings: **40,060**
  - Total Cancellations: **11,122**
  - **Cancellation Rate: 27.8%**

Total Cancellations

11122
33102

- City Hotel
- Resort Hotel

Total Bookings

40060
79330

- City Hotel
- Resort Hotel

Insight: City Hotel has a significantly higher cancellation rate compared to Resort Hotel, indicating possible issues with customer commitment or booking policies.

Lead Time vs Cancellation

Our analysis reveals that nearly **50% of all cancellations** originate from bookings made within **0-120 days** prior to arrival.

- **Short-term bookings** (**0-120 days** **lead time)** are inherently riskier, suggesting last-minute changes or price shopping.

- **Very early bookings** **(beyond 120 days)** show greater reliability, indicating more committed travel plans

Leadtime vs cancellation %
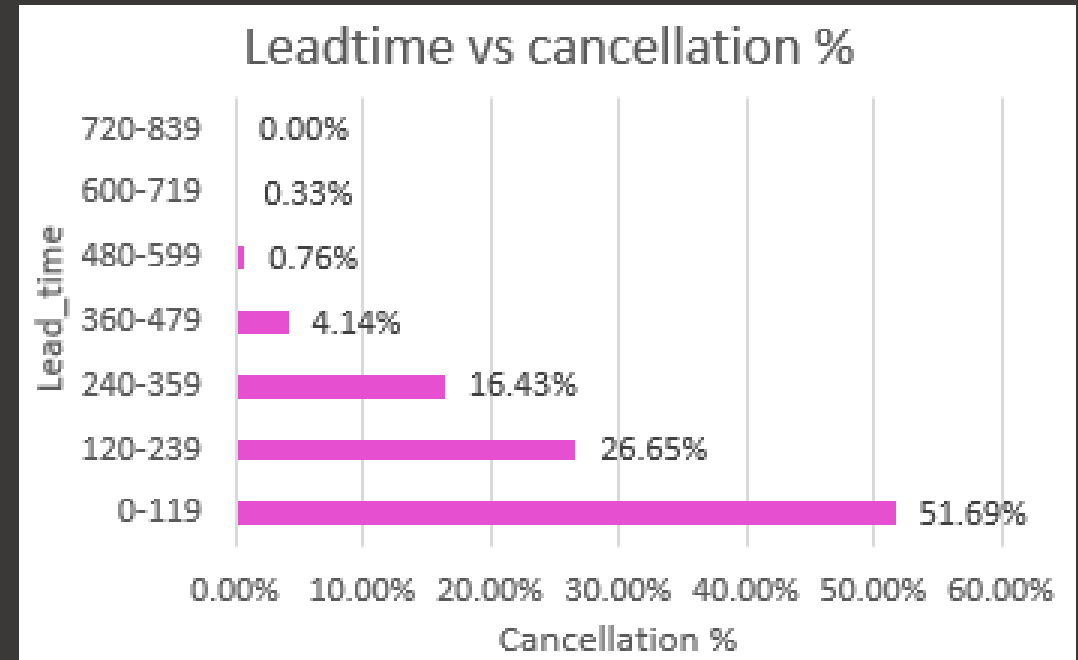
Market Segment & Distribution Channel

- **Groups →** Highest cancellations (**61%**)

- **Online TA →** High volume but risky (**37%**)

- **Offline TA/TO →** Moderate cancellations (**34%**)

- **Direct →** Most reliable (**15%**)

- **Corporate →** Stable (**19%**)
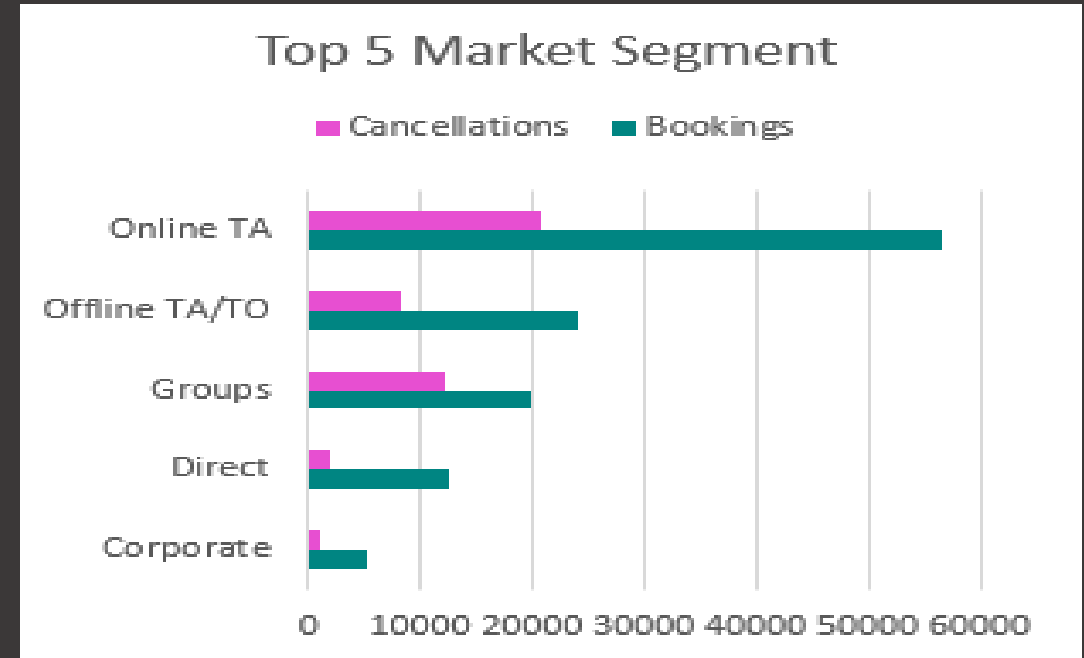
Insight: **Groups** have the **highest** cancellation rate (**61%**), followed by **Online TA** (**37%**). **Direct** and **Corporate** customers are the most **reliable** with low cancellations, suggesting potential for **loyalty-building** strategies.

Monthly Bookings vs Cancellations

- **Peak Bookings:**
  - August (**14K**) → highest demand
  - July & May also strong (**12K–13K**)
- **Lowest Bookings:**
  - December & January (**6K–7K**)
- **Cancellations:**
  - Relatively stable across months (**3K–5K**)
  - Peak seen in **July–August**, aligning with booking surge

Monthly bookings vs cancellations
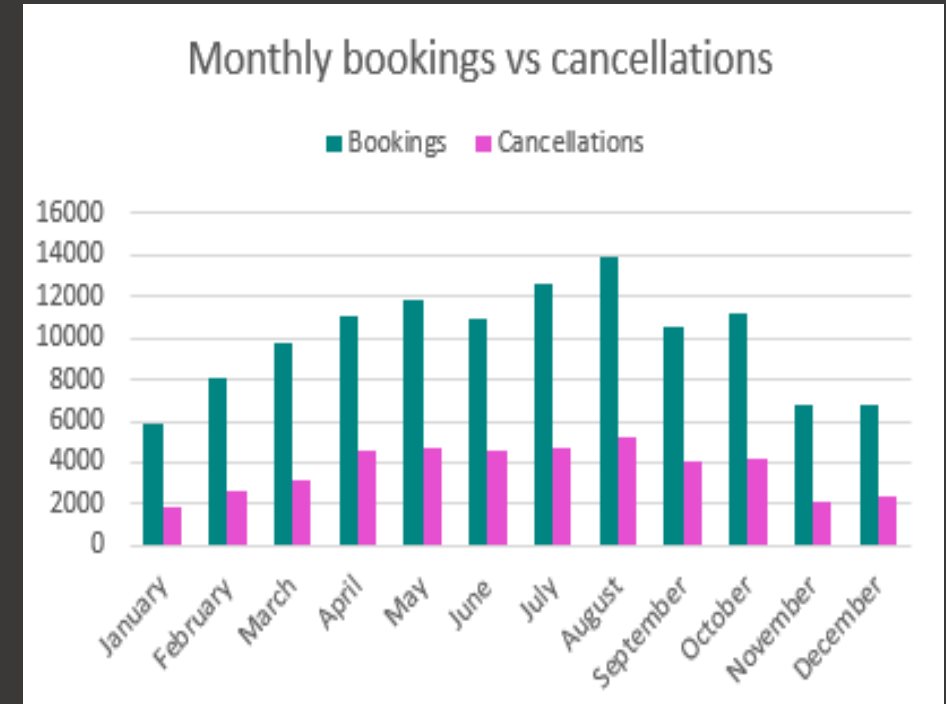
Insight: Cancellations remain fairly steady, but surge slightly during peak booking months (**July–August**). This indicates that **higher booking** volume naturally drives **higher cancellations**. Seasonal demand patterns (**summer peak vs winter low**) play a major role in booking trends.

Cancellation by customer type

- Couples had a **39.4% cancellation rate**, making them the most volatile segment.

- Singles recorded a **29.0% cancellation rate**, the lowest among all customer types.

- Families had a **34.5% cancellation rate**, showing a moderate level of cancellations.

Cancellation by customer type

■ Bookings ■ Cancellations

29105
8540
3942
1399
7013
1183

Couples   Family   Single
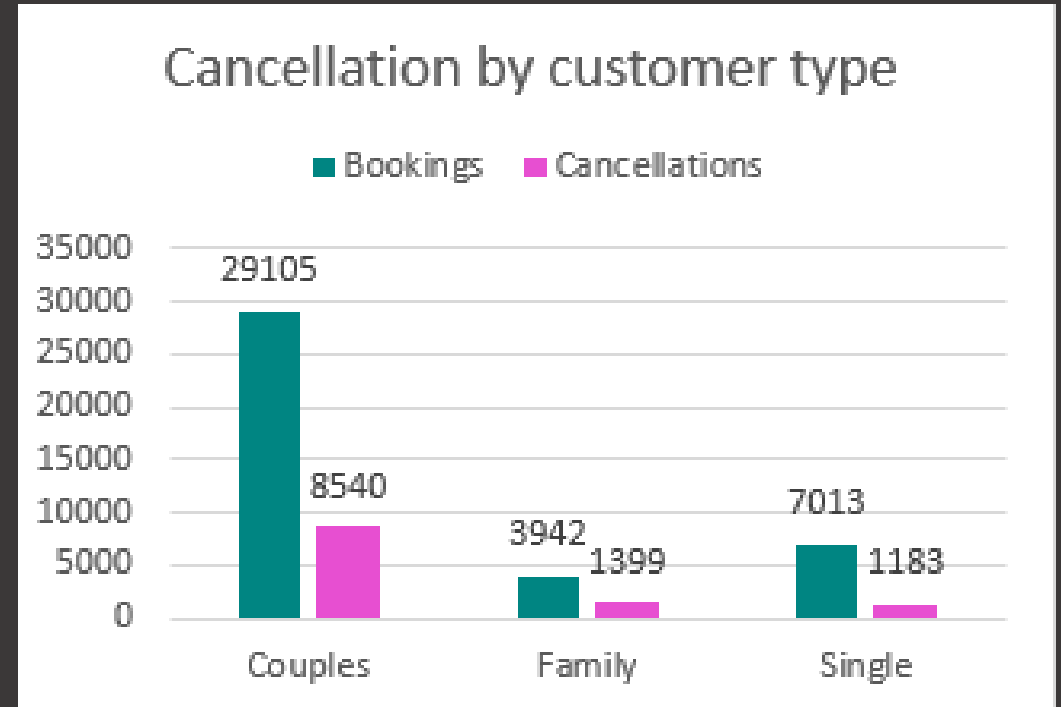
Insight: Couples account for the **majority** of cancellations, mainly due to their significantly **higher booking volume** compared to other customer types.

Recommendations

1. Cancellation by Hotel Type

- **City Hotels → stricter deposits, loyalty discounts, retention campaigns.**

2. Lead Time vs Cancellation

- **Partial prepayment for short bookings.**
- **Non-refundable discounts for early bookings.**
- **Reminder emails near check-in.**

3. Market Segment & Channels

- **Incentivize direct bookings (loyalty rewards).**
- **Review group booking terms (penalties if canceled).**
- **Build long-term contracts with corporates.**

Recommendations

4. Seasonality Trends

- **Peak months → stricter cancellation & dynamic pricing.**
- **Low-demand months → promos, advance offers, bundles.**

5. Customer Type Insights

- **Couples → perks (early check-in/late check-out).**
- **Families → flexible rebooking + family packages.**
- **Singles → loyalty benefits, solo-travel discounts.**