Hotel Booking

Performance & Cancellation Intelligence Dashboard

Sector: Hospitality & Tourism Analytics

Newton School of Technology · Data Visualization & Analytics Capstone · 2026

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Context & Problem Statement

Industry Context

~1 in 3 bookings is cancelled before check-in.

This creates revenue instability, poor inventory planning, and inefficient pricing — across all hotel types, segments, and channels.

Problem Statement:

- **Frequent cancellations** and **volatile booking** patterns erode **revenue predictability**, distort pricing strategy, and destabilize capacity planning.
- Management lacks a unified, **data-driven system** to clearly identify risk segments, seasonal revenue shifts, and policy effectiveness.

Business Objective

Develop an **interactive decision-support** dashboard that quantifies cancellation risk, reveals revenue drivers, and enables data-backed pricing, channel, and booking policy decisions.

Data Engineering

Raw Data Metrics:

~119K	32+	2015-2017	32.6%
Records	Columns	Time Period	Overall Cancel Rate

Key Columns Used

- **Hotel Type · Market Segment**
- **Lead Time · Deposit Type · ADR**
- **Arrival Date · Cancellation Status**
- **Distribution Channel · Repeat Guest**

Cleaning Summary

- Missing values → imputed (0 / 'Unknown')
- Text standardised; country codes expanded
- Revenue derived: ADR × Total Stay Nights
- Redundant columns removed; formats unified

Source: Hotel Booking Demand Dataset — Kaggle · Cleaned in Google Sheets

DATASET LINK

KPI & Metrics Framework

Core Performance Metrics:

- **Total Bookings – 3,336.**
  Measures total demand inflow and booking volume baseline.
- **Average Revenue per Booking:₹34,461**
  Indicates pricing efficiency and revenue quality.
- **Total Revenue – ₹114.9M**
  Captures realized financial performance from stayed bookings.

Risk & Stability Metrics

- **Total Cancellations – 1,089.** Quantifies revenue leakage from booking instability
- **Cancellation Rate – 32.64%**
  Core risk indicator — 1 in 3 bookings does not convert.
- **Repeat Guest % (Stability Signal)**
  Measures loyalty-driven booking reliability.

These KPIs directly measure:

- **Revenue realization risk**
- **Segment-level instability**
- **Pricing effectiveness**
- **Behavioral booking patterns**

Key Insights & Analysis

Cancellation Exposure is Structurally High

32.6% of bookings **fail** to convert, materially **impacting revenue** realization and forecasting accuracy.

Booking Horizon Predicts Risk

Long lead-time reservations **(180+ days ~53%)** cancel more frequently, while short-**term bookings (~17%)** show higher commitment.

Group & OTA Segments Drive Instability

Group bookings (~54%) and **OTA channels (~36%)** significantly elevate **cancellation** risk compared to **Corporate/Direct (~16%)**.

Revenue is Seasonally Concentrated

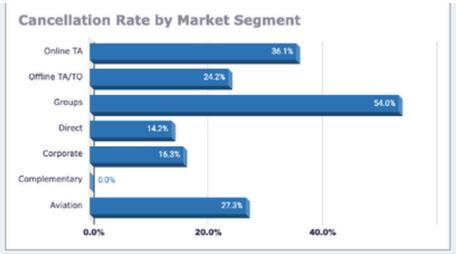
Mid-year months dominate revenue performance, indicating **strong demand** cyclicality **requiring dynamic pricing.**

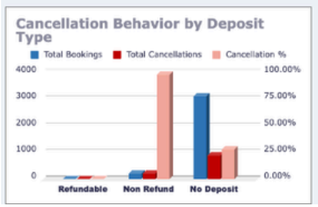
Deposit Policy Signals Structural Anomaly

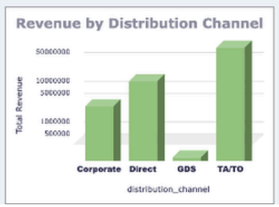
Non-Refund category **(~98% cancellation)** suggests policy misalignment or data classification risk.

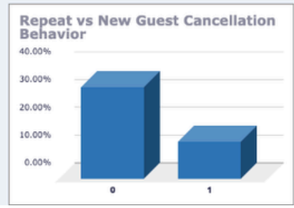
Loyalty Reduces Volatility

Repeat guests exhibit **lower cancellation behavior**, reinforcing the strategic value of retention programs.

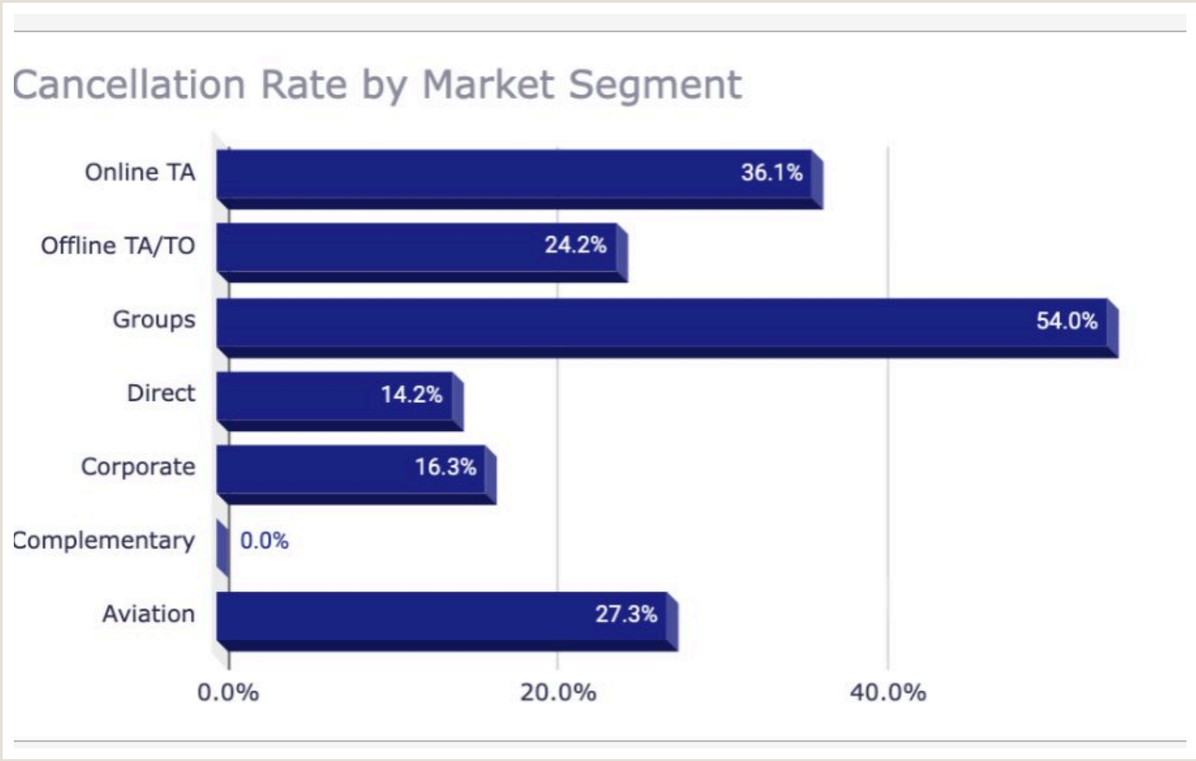


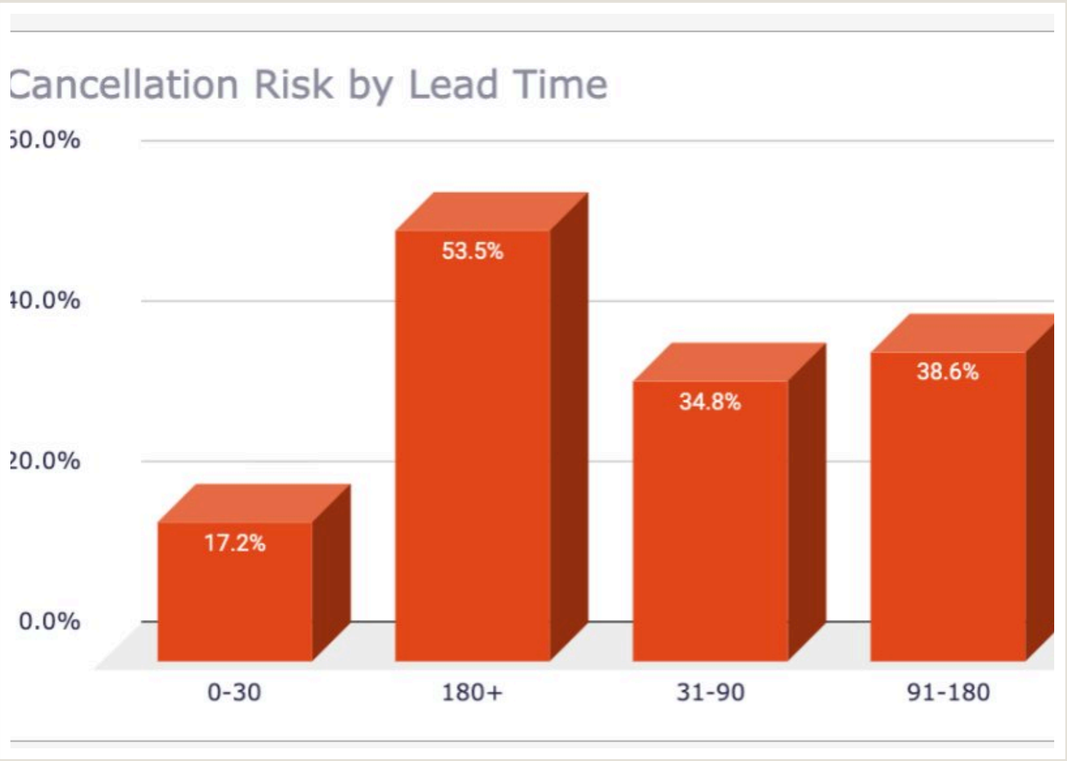






Risk Diagnostics





HIGH RISK

Groups 54% · Online TA 36% · 180+ day lead 53%

LOW RISK

Direct 14% · Corporate 16% · 0–30 day lead 17%

Dashboard Walkthrough

What's on the Dashboard

KPI Cards

Bookings · Cancellations
Rate · Revenue · Avg/Booking

Revenue Trend

Monthly line chart —seasonality peaks visible
important for revenue

Segment Risk

Cancellation rate by
market segment (bar chart)

Lead Time Risk

Cancellation % by
booking horizon

Built in Google Sheets with interactive slicers(dynamic)

Recommendations & Impact

01	**Stricter Group Booking Policies** Mandatory deposits for group bookings	↓ Revenue Leakage
02	**Reconfirmation for Long Lead-Times** Automated reminders + mid-point payment (180+ days)	↑ Booking Stability
03	**Dynamic Pricing in Peak Months** Surge pricing in months 7–8; promotions off-peak	↑ Revenue. 8–12%
04	**Incentivise Direct & Corporate Channels** Exclusive rates to reduce OTA dependency	↑ Margin
05	**Audit Non-Refund Deposit Policy** Investigate ~98% cancellation anomaly; fix POS capture	↓ Risk

Limitations & Next Steps

Current Limitations

- Revenue is ADR-based — not actual realized revenue
- No competitor benchmarking available
- No macroeconomic or external market controls
- Single source: 2015–2017 dataset only

Future Scope

- Predictive cancellation ML model
- Dynamic pricing simulation engine
- Customer lifetime value analysis
- Real-time system integration

Conclusion

Small changes, measurable impact.

→ Converted raw booking data into clean structured, formated dataset.

→ Identified root causes driving the **32.6**% overall **cancellation rate**

→ Built an interactive executive decision-support dashboard in Google Sheets

→ Delivered 5 actionable recommendations for pricing, policy & channel strategy