

Hotel Booking Analysis

Assignment Report

Business Analyst Intern Position

Submitted to:

TravClan

Prepared by:

Vijay Bhushan Singh

Email: vijay3420blw@gmail.com

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1 Executive Summary

This report analyzes 30,000 hotel booking transactions from January 2024 to December 2025, focusing on cancellation patterns, revenue distribution, and strategic recommendations.

1.1 Key Findings

• Overall Performance:

- Total Bookings: **30,000**
- Total Revenue: **INR 89,22,37,325.39**
- Average Booking Value: **INR 25,080.53**
- Average Profit Margin: **31.00%**
- Cancellation Rate: **19.26%**
- Refund Rate: **77.27%**

• Critical Insights:

- Travel Agent bookings: 26.29% cancellation (highest)
- Web bookings: 15.33% cancellation (lowest)
- Weekend check-ins: 4.46% cancellation vs Weekday: 27.20%
- Standard rooms: 22.12% cancellation vs Premium: 15.7%

• Top Revenue Contributors:

- Web channel: INR 44,94,55,600 (50.4% of total)
- Mobile App: INR 35,41,45,900 (39.7%)
- Travel Agent: INR 8,86,35,820 (9.9%)
- Top city - Chicago: INR 9,15,23,337

1.2 Strategic Recommendations

1. **Reduce Travel Agent Cancellations:** Implement 20% non-refundable deposit requirement
2. **Optimize Weekday Bookings:** Introduce flexible change policies instead of cancellations
3. **Leverage Premium Rooms:** Use upgrade incentives to shift Standard bookings

2 Introduction

2.1 Dataset Overview

Table 1: Dataset Summary

Attribute	Value
Total Records	30,000
Date Range	Jan 2024 - Dec 2025
Unique Customers	499
Properties	4
Cities	10
Booking Channels	3 (Web, Mobile App, Travel Agent)
Room Types	3 (Standard, Deluxe, Suite)
Complete Date Records	24,532 (81.77%)
Missing Check-in/Check-out	5,468 (18.23%)

2.2 Analysis Objectives

1. Identify key booking and cancellation patterns across channels and room types
2. Analyze revenue distribution and profitability drivers
3. Understand temporal trends (daily, monthly, seasonal)
4. Provide data-driven actionable recommendations

2.3 Methodology

- **Excel:** Data cleaning and validation
- **Python:** Statistical analysis using pandas, matplotlib, seaborn
- **Power BI:** Interactive dashboards
- **SQL:** Complex multi-dimensional queries

3 Key Observations

3.1 Observation 1: Channel-Based Cancellation Disparity

3.1.1 Finding

Travel Agent bookings exhibit a significantly higher cancellation rate of 26.29% compared to Mobile App (22.42%) and Web bookings (15.33%). This 10.96 percentage point difference between Travel Agent and Web bookings represents a 71% higher cancellation rate, translating to approximately INR 2,33,00,000 in annual lost revenue (786 cancellations \times INR 29,644 average booking value).

3.1.2 Supporting Data

Table 2: Cancellation Rate by Booking Channel

Channel	Bookings	Cancelled	Rate (%)
Travel Agent	2,990	786	26.29
Mobile App	12,009	2,693	22.42
Web	15,001	2,300	15.33
Total	30,000	5,779	19.26



Figure 1: Cancellation Rates Across Booking Channels

3.1.3 Business Impact

- **Revenue Loss:** INR 2,33,00,000 annually from Travel Agent cancellations alone
- **Mobile App:** 2,693 cancellations represent INR 7,94,00,000 in lost opportunities
- **Web Channel:** Demonstrates superior booking quality with 41.7% lower cancellation rate
- **Channel Mix:** Web generates 50.4% of revenue with lowest cancellation risk

3.2 Observation 2: Weekend vs Weekday Booking Behavior

3.2.1 Finding

Weekend check-ins demonstrate exceptional commitment with only 4.46% cancellation rate (467 cancellations from 10,471 bookings), while weekday check-ins show 27.20% cancellation rate (5,312 cancellations from 19,529 bookings). This represents an 83.6% difference and a 6.1x higher cancellation rate for weekday bookings.

3.2.2 Supporting Data

Table 3: Weekend vs Weekday Cancellation Analysis

Check-in Type	Bookings	Cancelled	Rate (%)
Weekday	19,529	5,312	27.20
Weekend	10,471	467	4.46
Difference	—	4,845	22.74 pp

Additional Context:

- Weekend bookings: 34.9% of total volume, only 8.1% of cancellations
- Both Business and Leisure travelers show identical 35% weekend booking rates
- Average stay length consistent: Weekend (4.0 days) vs Weekday (4.03 days)

3.2.3 Business Impact

- **Lost Revenue:** 5,312 weekday cancellations INR 15,75,00,000 annually
- **Opportunity:** Shift bookings to weekends or improve weekday retention policies
- **Pattern:** Weekend travelers show stronger commitment regardless of stay type

3.3 Observation 3: Room Type Drives Cancellation Behavior

3.3.1 Finding

Standard rooms represent 55.2% of bookings (16,552) but exhibit 22.12% cancellation rate, compared to Deluxe (15.70%) and Suite (15.89%) rooms which show approximately 29% lower cancellation rates. This inverse relationship between room premium and cancellation suggests higher-value customers demonstrate stronger booking commitment.

3.3.2 Supporting Data

Table 4: Room Type Performance Analysis

Room Type	Bookings	Cancelled	Rate (%)
Standard	16,552	3,662	22.12
Deluxe	10,478	1,645	15.70
Suite	2,970	472	15.89

Volume Impact:

- Standard rooms: 63.4% of all cancellations (3,662 out of 5,779)
- Premium rooms (Deluxe + Suite): 44.8% of bookings but only 36.6% of cancellations
- Profit margin consistent at 31% across all room types

3.3.3 Business Impact

- Standard room cancellations: 3,662 bookings INR 10,89,00,000 lost revenue
- Upgrade strategy could prevent 1,063 excess cancellations annually
- Premium rooms attract more committed customer segment

4 Root Cause Analysis

4.1 Travel Agent Channel - Why 71% Higher Cancellation?

1. Lower Customer Commitment Due to Intermediation:

- Customers booking through agents feel less personally invested
- Agent bookings may include speculative reservations for undecided travelers
- Delayed payment collection creates lower financial commitment

2. Customer Demographics:

- Small volume (9.97% of bookings) suggests niche segment
- May include group bookings with coordination challenges
- Potentially higher corporate travel with scheduling uncertainty

3. Payment Method Impact:

- Web bookings require immediate payment (psychological commitment)
- Agent bookings allow delayed payment or invoicing
- Refund rate consistent at 77% across channels (ease not the differentiator)

4.2 Weekday Bookings - Why 6.1x Higher Cancellation?

1. Booking Intent and Purpose:

- Weekend: Planned leisure activities, family vacations, celebrations
- Weekday: Business travel with higher scheduling flexibility
- Social/family pressure maintains weekend plans vs flexible solo business travel

2. Alternative Options:

- Business travelers can easily reschedule weekday trips
- Weekend travelers face work constraints limiting alternative dates
- Monday bookings show 19% cancellation (weekend extension effect)

3. Financial Commitment:

- Average revenue consistent across days (INR 29,400-30,018)
- Weekend bookings may involve coordinated travel (families, groups)
- Higher coordination increases commitment to maintain plans

4.3 Standard Rooms - Why 41% Higher Cancellation?

1. Price-Commitment Correlation:

- Higher sunk cost in premium rooms creates disincentive to cancel
- Standard rooms attract price-sensitive customers with lower switching costs
- Premium bookings likely for special occasions (stronger commitment)

2. Customer Segmentation:

- Premium room customers: higher income, more stable travel plans
- Standard room customers: more speculative or flexible travelers
- Different risk profiles across room type segments

5 Business Recommendations

5.1 Recommendation 1: Channel-Specific Cancellation Strategy

Problem Statement: Travel Agent bookings show 26.29% cancellation rate (786 cancellations, INR 2,33,00,000 loss). Mobile App shows 22.42% rate (2,693 cancellations, INR 7,94,00,000 loss). Combined, these represent INR 10,27,00,000 in annual lost revenue.

Proposed Solutions:

1. Travel Agent Channel Reforms:

- Require 20% non-refundable deposit (currently 0%)
- Implement 48-hour booking confirmation window
- Create agent performance scorecards tracking cancellation rates
- Offer 2-3% commission bonus for agents maintaining <15% cancellation rate

2. Mobile App Experience Optimization:

- Streamline booking flow to reduce steps
- Add commitment prompts: "Why are you traveling?" selection
- Immediate confirmation notification + calendar integration (within 5 minutes)
- Enable quick rebooking with 10% discount if cancelled within 24 hours

3. Replicate Web Channel Success:

- Analyze Web booking flow for commitment-driving elements
- Apply successful Web UI/UX patterns to Mobile App
- Create "Web-exclusive" promotions to shift high-value bookings

Expected Impact:

Table 5: Projected Channel Optimization Results

Channel	Current Rate	Target Rate	Revenue Recovery
Travel Agent	26.29%	18.0%	INR 2,47,00,000
Mobile App	22.42%	17.0%	INR 6,51,00,000
Total	—	—	INR 8,98,00,000

Implementation Timeline: 8-10 weeks

5.2 Recommendation 2: Weekday Booking Optimization

Problem Statement: Weekday check-ins show 27.20% cancellation rate with 5,312 cancellations representing INR 15,75,00,000 in lost booking value. This is the single largest cancellation opportunity.

Proposed Solutions:

1. Flexible Change Policies (Not Cancellations):

- Allow free date changes up to 7 days before check-in
- Offer 90-day booking credit instead of cash refunds

- Tiered refund: 100% credit if cancelled 30+ days, 75% if 7-30 days, 50% if <7 days

2. Weekday Commitment Incentives:

- 5% discount for weekday bookings with non-refundable deposit
- "Weekday Warrior" loyalty program: 2x points for Mon-Thu check-ins
- Free room upgrade (Standard → Deluxe) for committed weekday bookings

3. Business Traveler Programs:

- Identify frequent business travelers (weekday bookings + Business stay type)
- Offer corporate rates with 15% deposit requirement
- Multi-booking discounts: Book 3 weekday trips, get 10% off
- Dedicated account management for corporate partners

Expected Impact:

- Weekday cancellation reduction: 27.20% → 15.0% (12.2 percentage points)
- Prevented cancellations: 2,384 bookings
- Revenue recovery: INR 7,10,00,000 annually
- Additional revenue from flexible rate tier: INR 1,20,00,000 (15% adoption at 10% premium)

5.3 Recommendation 3: Room Type Strategy

Problem Statement: Standard rooms show 22.12% cancellation rate with 3,662 cancellations representing 63.4% of all cancellations, despite premium rooms demonstrating 29% lower cancellation rates.

Proposed Solutions:

1. Differential Deposit Policies by Room Type:

- Standard: 25% non-refundable deposit
- Deluxe: 15% non-refundable deposit
- Suite: 10% non-refundable deposit
- All tiers: Booking credits instead of cash refunds

2. Upgrade Incentive Programs:

- Automatic Deluxe upgrade for Standard bookings made 30+ days in advance
- Allow upgrade to Deluxe for 20% fee up to 48 hours before check-in
- Package deals: Standard + amenities at Deluxe-comparable price

3. Strategic Room Mix Adjustment:

- Reduce Standard inventory by 10-15%
- Convert to Deluxe rooms (lower cancellation risk)
- Create mid-tier "Standard Plus" category with added amenities

Expected Impact:

- Standard cancellation reduction: 22.12% → 17.0% (5.12 percentage points)
- Prevented cancellations: 848 bookings annually
- Revenue retention: INR 2,52,00,000
- Average booking value increase: 8-12% through upgrade incentives

6 Additional Analysis

6.1 Revenue Distribution by Channel

Table 6: Channel Revenue Performance

Channel	Bookings	Revenue (INR)	Avg Revenue	Cancel %
Web	15,001	44,94,55,600	29,962	15.33
Mobile App	12,009	35,41,45,900	29,490	22.42
Travel Agent	2,990	8,86,35,820	29,644	26.29
Total	30,000	89,22,37,320	29,741	19.26

6.2 Top Cities by Revenue

Table 7: Top 10 Cities Performance

City	Bookings	Revenue (INR)	Avg Revenue
Chicago	3,059	9,15,23,337	29,919
Los Angeles	3,040	9,12,22,898	30,008
San Francisco	3,032	9,05,49,893	29,865
Las Vegas	3,035	9,00,35,551	29,666
Orlando	3,015	8,96,25,582	29,727
New York	2,993	8,91,36,957	29,782
Boston	2,992	8,88,41,286	29,693
Miami	2,959	8,79,58,175	29,726
Seattle	2,940	8,70,91,937	29,623
Dallas	2,935	8,62,51,710	29,387

6.3 Star Rating Performance

Table 8: Performance by Hotel Star Rating

Rating	Bookings	Revenue (INR)	Avg Revenue	Cancel %
5-Star	4,511	13,32,96,500	29,549	19.11
4-Star	12,034	35,91,66,200	29,846	18.14
3-Star	10,460	31,10,43,100	29,736	20.42
2-Star	2,995	8,87,31,500	29,627	19.97

6.4 Payment Method Analysis

Table 9: Payment Method Performance

Payment Method	Bookings	Revenue (INR)	Cancel %
Debit Card	7,603	22,64,06,500	19.0
PayPal	7,584	22,51,50,000	20.0
Credit Card	7,492	22,24,25,100	20.0
Bank Transfer	7,321	21,82,55,700	18.0

6.5 Monthly Trends

Key Seasonal Patterns:

- Consistent booking volume: 684-686 bookings per month
- December 2024: Highest cancellation rate (23%)
- October 2024: Lowest cancellation rate (15%)
- Average monthly revenue: INR 2,00,00,000-2,10,00,000
- No significant seasonal revenue variation

7 Conclusion

7.1 Summary of Key Findings

Analysis of 30,000 hotel booking transactions reveals three critical revenue optimization opportunities:

1. **Channel Optimization:** Travel Agent (26.29%) and Mobile App (22.42%) cancellation rates significantly exceed Web (15.33%)
2. **Weekday Challenge:** 27.20% weekday cancellation rate vs 4.46% weekend rate represents largest opportunity
3. **Room Type Pattern:** Standard rooms (22.12%) show 41% higher cancellation than premium rooms (15.7%)

7.2 Total Business Impact

Table 10: Projected Financial Impact of Recommendations

Recommendation	Annual Revenue Recovery (INR)
Channel-Specific Strategy	8,98,00,000
Weekday Optimization	8,30,00,000
Room Type Strategy	2,52,00,000
Total Potential	19,80,00,000

Additional Benefits:

- Cancellation rate reduction: 19.26% → 12-13% (targeted 35-40% improvement)
- Customer retention through booking credits vs cash refunds
- Operational efficiency: 25% reduction in cancellation processing
- Improved revenue forecasting accuracy

7.3 Implementation Roadmap

Table 11: Recommended Implementation Timeline

Phase	Timeline	Action
Phase 1	Weeks 1-2	Travel Agent deposit policy
Phase 2	Weeks 3-6	Mobile App UX optimization
Phase 3	Weeks 7-10	Weekday incentive programs
Phase 4	Weeks 11-14	Room type policy rollout
Phase 5	Week 15+	Monitoring and optimization

7.4 Success Metrics

Track Monthly:

- Cancellation rate by channel (target: <18% all channels)
- Weekend vs weekday booking mix
- Room type distribution and upgrade adoption
- Revenue per booking
- Customer retention and repeat booking rate
- Booking credit redemption rate

7.5 Risk Mitigation

Potential Risks:

- Customer resistance to stricter cancellation policies
- Travel Agent volume decline if policies too restrictive
- Technology implementation delays

Mitigation:

- Grandfather existing bookings (6-month transition period)
- Offer compensatory benefits (loyalty points, upgrades)
- Phased rollout with performance monitoring
- Emphasize flexibility (date changes) vs restrictions

A Data Quality Assessment

- Total records: 30,000 (100% complete for revenue and cancellation fields)
- Missing check-in/check-out dates: 5,468 records (18.23%)
- No duplicate records identified
- All monetary values validated and consistent
- Profit margin consistent at 31% across all segments

B Methodology and Tools

Analysis Tools:

- **Microsoft Excel:** Data cleaning, validation, calculated columns
- **Python 3.11:** Statistical analysis (pandas, matplotlib, seaborn, scipy)
- **Power BI Desktop:** Interactive dashboards and visualizations
- **SQL:** Complex multi-dimensional queries
- **LaTeX:** Professional report compilation

Statistical Methods:

- Descriptive statistics (mean, median, standard deviation)
- Group-by aggregations across multiple dimensions
- Comparative analysis and cross-tabulation
- Time series trend analysis
- Quantile-based customer segmentation

Analysis Period: January 2024 - December 2025 (24 months)

See the entire code and files here: <https://github.com/vijaysingh091/Travclan>