

Airbnb Price Optimization Strategy

Maximizing Revenue Through Data-Driven Pricing

Members

Pratiti Paul - 2401010347

Jatin Kumar Singh - 2401010199

Chirag Lalwani - 2401020093

Priyansh Satija - 2401010355

Shane Joseph - 2401020062

Anuradha Raghwanshi - 2401010087

Team

G-18

Sector

Travel

The Pricing Challenge in NYC's Competitive Airbnb Market

A data-driven pricing framework for NYC host

Market Reality

- 🏡 48,000+ listings (2019)
- 〽️ High price variability
- ⬇️ Overpricing reduces occupancy
- 💲 Underpricing reduces revenue

KEY BUSINESS QUESTION

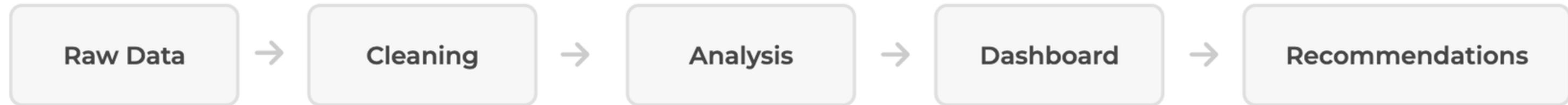
What is the optimal pricing band by location and room type to maximize revenue without losing demand?

Decision Maker

Airbnb Hosts

Goal: Balance revenue & occupancy
maximize long-term profitability

From Raw Data to Actionable Insights



Source

- NYC Airbnb Open Dataset
- 48K listings
- 16 attributes
- 2019 snapshot

Cleaning

- Handle missing reviews_per_month
- Remove extreme price outliers
- Convert price to numeric
- Standardize dates

Key Variables

- Price
- Availability_365
- Room Type
- Reviews
- Neighbourhood Group

Revenue Optimization Measurement Framework



Estimated Revenue

Formula: Price × Occupied Days



Occupancy Rate

Formula: $365 - \text{Availability} / 365$



Average Price

Mean nightly rate



Reviews per Month

Trust & market traction

Why These KPIs?

• **Revenue** = Profitability

• **Occupancy** = Demand

• **Reviews** = Market trust

• **Price** = Strategy lever

What Drives Airbnb Revenue in NYC?

1 Private Rooms show strongest revenue stability

Consistent occupancy at fair price points drives predictable revenue streams

2 Manhattan supports premium pricing but faces saturation

High willingness to pay meets tighter demand elasticity in competitive markets

3 Mid-price bands achieve best revenue-demand balance

Optimal trade-off between nightly rate and occupancy rate maximizes total revenue

4 Higher review frequency correlates with lower availability

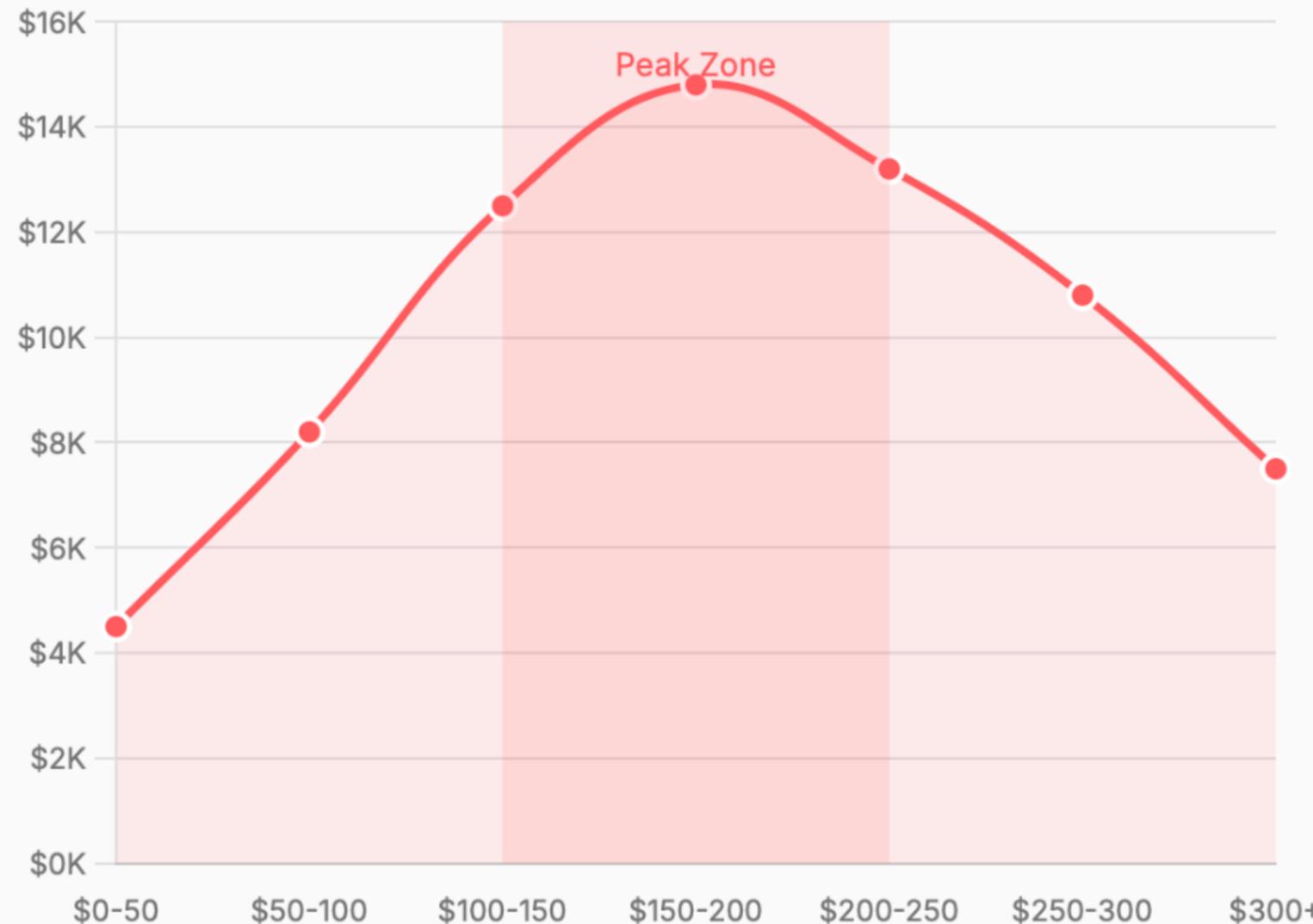
Bookings concentrate where trust is high, driving down available days

5 Extreme high pricing reduces booking efficiency

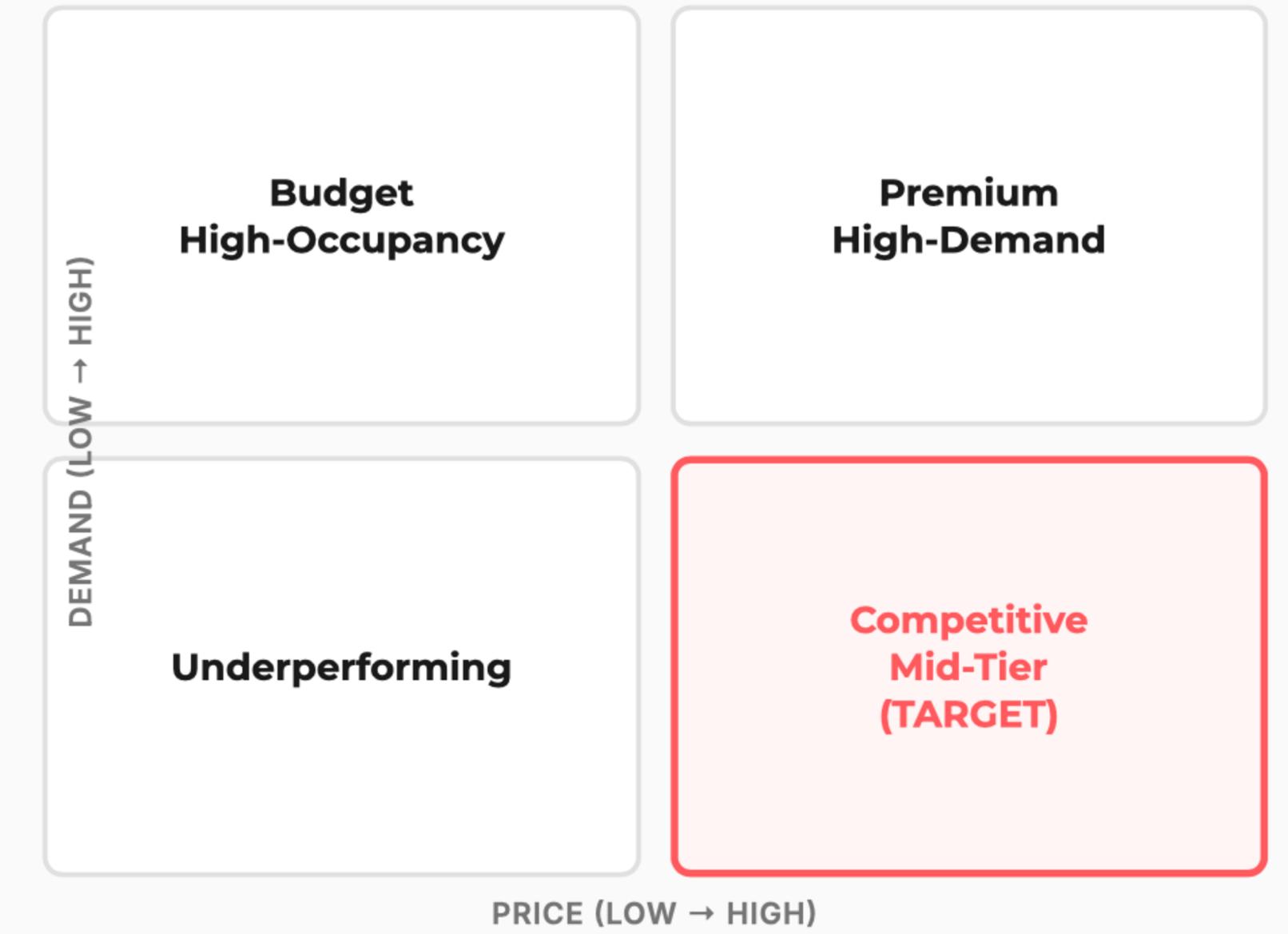
Sharp drop in occupied days above 95th percentile pricing threshold

Identifying the Optimal Pricing Zone

Revenue vs Price Band Curve



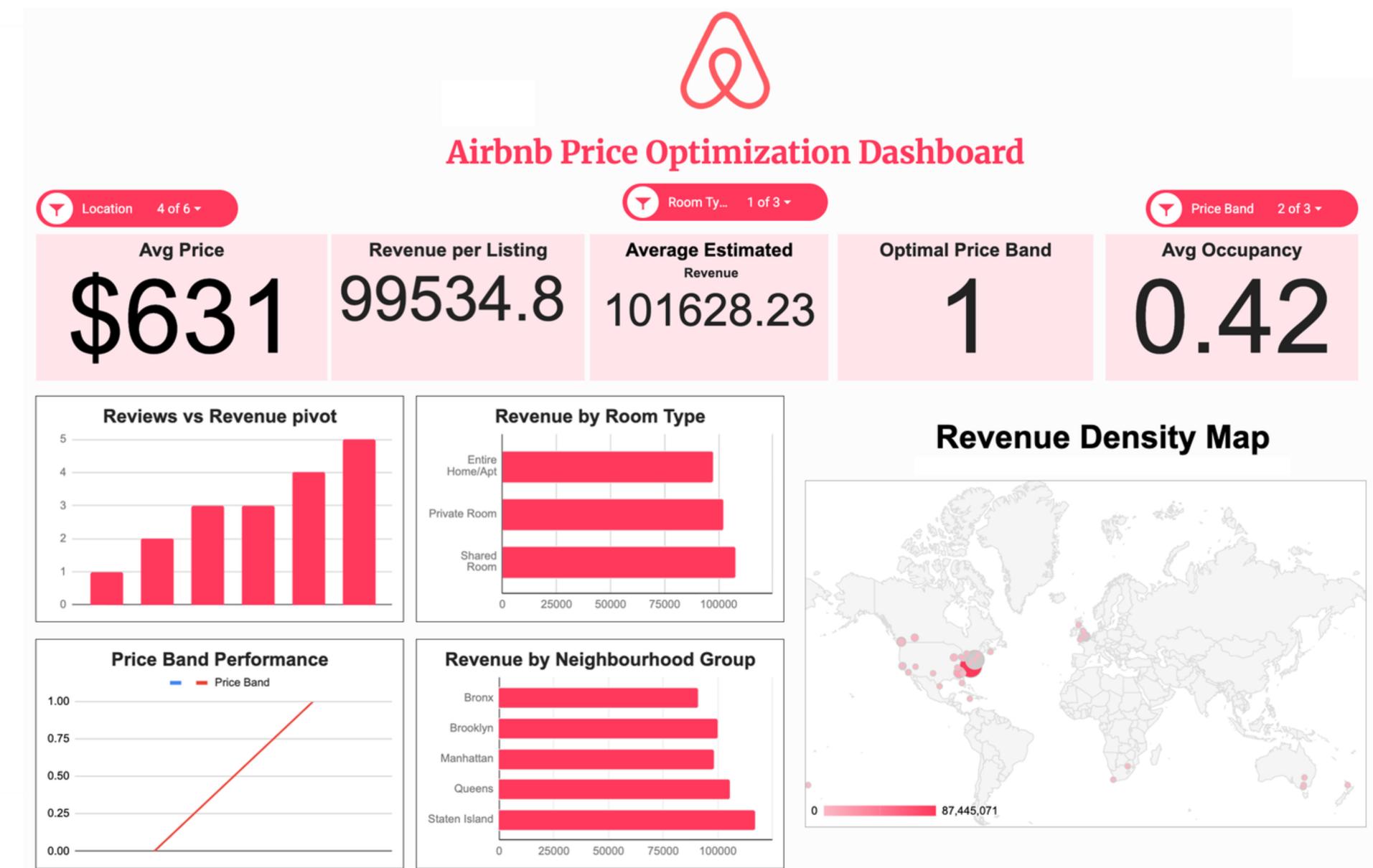
Price × Demand Segmentation



STRATEGIC INSIGHT

Revenue maximization occurs in the mid-to-upper pricing band where occupancy elasticity remains favorable.

Interactive Pricing Intelligence Dashboard



Executive View

- Avg Estimated Revenue
- Avg Occupancy
- Avg Price
- Best Performing Room Type



Operational View

- Revenue by Borough
- Revenue by Room Type
- Price Band Performance
- Reviews vs Revenue



Filters

- Location (Borough/Neighborhood)
- Room Type
- Price Band

Actionable Pricing Strategies

1

Adopt borough-specific pricing strategy

Capture willingness-to-pay differences across Manhattan, Brooklyn, Queens—maximize revenue per market segment

2

Price within optimal mid-to-upper band

Maximize revenue without sharp occupancy loss—target the sweet spot where demand elasticity remains favorable

3

Avoid pricing above 95th percentile

Prevent demand cliff and search rank penalties—extreme pricing reduces booking efficiency and platform visibility

4

Optimize minimum nights below 7

Expand booking pool and raise occupied days—flexible minimum stays attract broader traveler segments

5

Accelerate early reviews through targeted incentives

Boost trust and conversion velocity—discounts or premium amenities drive initial reviews, creating momentum for bookings

Projected Business Impact



5–15%

Revenue Optimization Potential

Per listing annual revenue increase through data-driven pricing strategies



Reduced Vacancy Risk

Steady occupancy rates through optimal pricing positioning



Improved Competitive Positioning

Enhanced search ranking and conversion rates through strategic pricing



Scalable Pricing Framework

Repeatable methodology deployable across all boroughs and property types

Limitations & Next Steps



Limitations



No seasonality data

Static 2019 snapshot lacks temporal patterns across quarters and holidays



Revenue is estimated proxy

Calculated metric does not reflect actual net profit or booking confirmations



Static historical dataset

Point-in-time analysis without real-time market dynamics or trend evolution



Future Enhancements



Time-series forecasting

Predict demand patterns and optimal pricing across seasons and events



Dynamic pricing engine

Real-time algorithmic adjustments based on market conditions and competitor moves



Seasonal demand modeling

Capture quarterly trends, holiday peaks, and event-driven booking surges



Real-time dashboard deployment

Live monitoring and instant pricing recommendations for hosts