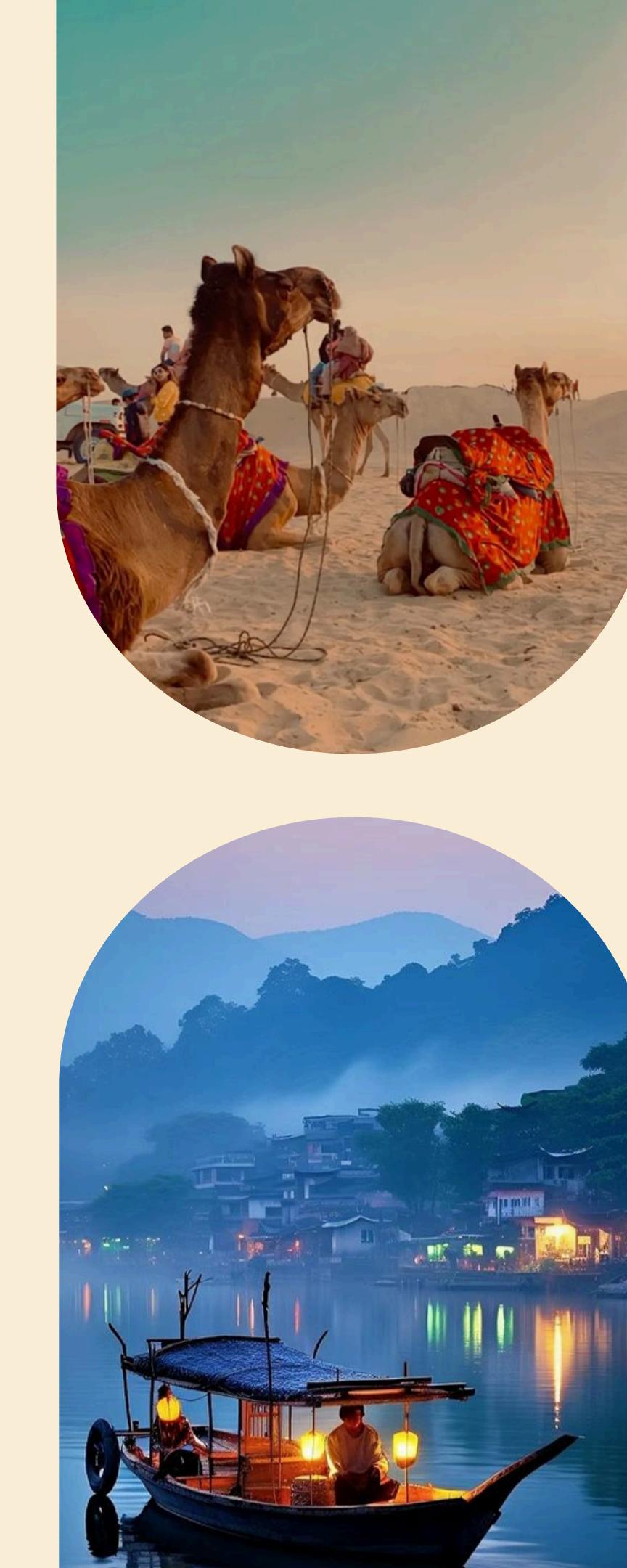




INNOVATION. AUTOMATION. ANALYTICS

EXCITING JOURNEY TO INDIA

YOLOconomy: A Data-Driven Approach to
Personalized Hotel Recommendations



ABOUT ME

My name is ShrutiKa Kapade, a recent graduate with a Bachelor of Technology (B.Tech) in Data Science.

I am deeply passionate about harnessing the power of data to develop innovative, data-driven solutions that address real-world problems.

I appreciate the opportunity to present my project and share my insights, and I am committed to continuous learning and meaningful contributions in the field of data science.



Github : <https://github.com/shrutikakapade>

LinkedIn: <https://www.linkedin.com/in/shrutikakapade/>

PROBLEM STATEMENT

User Challenge: Travelers often face challenges in finding accommodations that are both affordable and high quality, due to overwhelming choices, inconsistent pricing, and unclear value indicators.

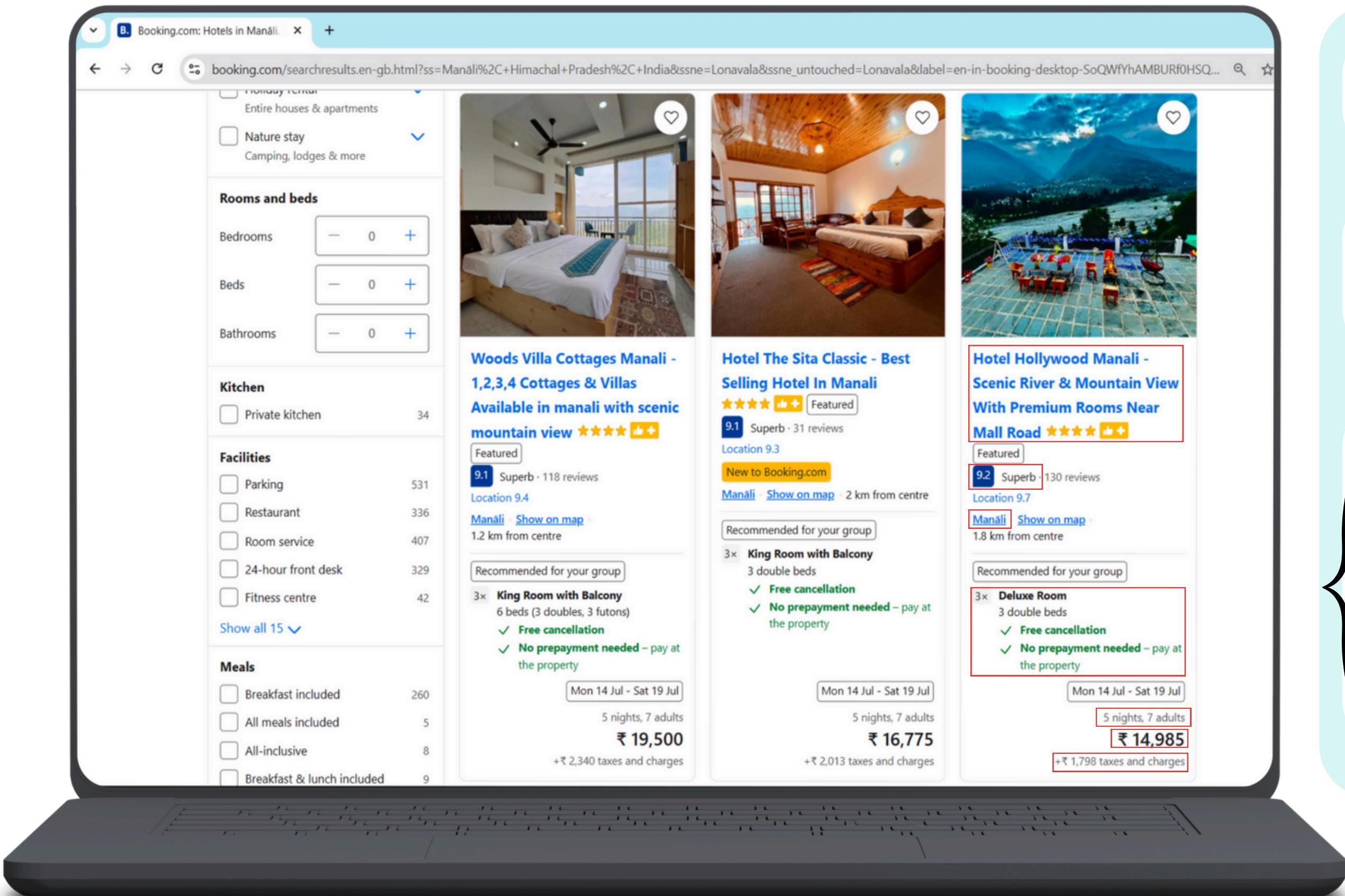


Approach: This project uses web-scraped data from Booking.com and applies exploratory data analysis (EDA) to uncover patterns in pricing, ratings, reviews, stay types, and group preferences.



Outcome: The analysis uncovers valuable patterns that help match traveler preferences—such as group type, budget, and location—with highly rated, cost-effective accommodations. This enables smarter, faster, and more personalized hotel selection.

DATA COLLECTION (SCRAPING PROCESS)



✓ The Booking.com website was scraped using Python's BeautifulSoup library for parsing HTML content.

✓ Regular Expressions (regex) were used to accurately extract patterns such as prices, taxes, and structured text within listings.

✓ Extracted valuable features include:

1. Property Name
2. Location
3. Rating & Review Labels
4. Type of Stay
5. Base Price
6. Taxes and Charges
7. Number of Adults/Children
8. Group Recommendation

B. Booking.com: Hotels in Manali. X +

booking.com/searchresults.en-gb.html?ss=Manali%2C+Himachal+Pradesh%2C+India&ssne=Lonavala&ssne_unouched=Lonavala&label=en-in-booking-desktop-SoQWfYhAMBURf0HSQ... 🔍 ⭐ 🗂️ 🌐 ⋮

Booking.com

INR 🇮🇳 ? List your property Register Sign in

Stays Flights Flight + Hotel Car rental Attractions Airport taxis

Manali A week in Jul, Aug (5 nights) 7 adults · 0 children · 3 rooms Search

Calendar I'm flexible

How long do you want to stay?
 A weekend A week A month Other

When do you want to go?
Select up to 3 months
Jun 2025 Jul 2025 Aug 2025 Sep 2025 Oct 2025 Nov 2025

A week in Jul, Aug (5 nights) Select dates

Adults 7 Children 2
3 years old 11 years old
To find you a place to stay that fits your entire group along with correct prices, we need to know how old your children will be at check-out

Rooms 5
Travelling with pets?
Assistance animals aren't considered pets.
Read more about travelling with assistance animals

Done



Blue arrow pointing to the 'Search' button.

INITIAL SCRAPED DATASET OVERVIEW

Numerical Columns

	Unnamed: 0	Rating
0	0	9.8
1	1	9.0
2	2	8.3
3	3	8.8
4	4	8.7
5	5	NaN
6	6	7.5
7	7	NaN
8	8	8.4
9	9	7.2
10	10	8.9
11	11	9.0

Categorical Columns

	Property_name	Location	Review	Type_of_stay	Stay_duration_and_group_size	price	Taxes_and_charges_inr
0	Olive Service Apartments Rohini	Rohini, New Delhi	Exceptional	1×Two-Bedroom ApartmentEntire apartment•2 bed...	5 nights, 10 adults	₹47,814	5,738
1	Olive Service Apartments - Greater Kailash	Greater Kailash 1, New Delhi	Superb	1×Standard Two-Bedroom ApartmentEntire apartme...	5 nights, 10 adults	₹149,629	26,933
2	Anara Service Apartments - Greater Kailash Par...	New Delhi	Very good	1×Studio with BalconyEntire studio•1 kitchen•1...	5 nights, 10 adults	₹152,620	NaN
3	Homlee-Excellency Large 4BHK-South Delhi- NFC	New Friends Colony, New Delhi	Fabulous	NaN	5 nights, 10 adults	₹67,250	13,305
4	BedChambers Serviced Apartments South Extension	New Delhi	Fabulous	2×Three-Bedroom Apartment2 entire apartments•6...	5 nights, 10 adults	₹144,982	NaN
5	Homlee-Green Luxury 3BHK-South DEL-NFC-Lift	New Friends Colony, New Delhi	Exceptional	NaN	5 nights, 10 adults	₹67,250	13,104
6	Olive Serviced Apartments - Defence Colony	New Delhi	Good	1×Standard StudioEntire studio•1 bathroom•36m ² ...	5 nights, 10 adults	₹192,026	34,565
7	Ideal 3bhk apartment!Downtown	New Delhi	NaN	1×Two-Bedroom ApartmentEntire apartment•2 bed...	5 nights, 10 adults	₹50,000	NaN
8	Vista Residences at GK 1 - Air Purifier and Co...	Greater Kailash 1, New Delhi	Very good	1×ApartmentEntire apartment•3 bedrooms•3 bathr...	5 nights, 10 adults	₹113,606	17,769
9	Homlee-Vintage 2BHK-Fort View-Bharat Mandapam-...	Central Delhi, New Delhi	Good	2×Two-Bedroom Apartment2 entire apartments•4 b...	5 nights, 10 adults	₹57,490	8,097
10	Homlee-Anupam 3BHK-Lift-Parking-Saket-Max Hosp...	South Delhi, New Delhi	Fabulous	NaN	5 nights, 10 adults	₹57,250	11,304

PREPROCESSED DATA READY FOR ANALYSIS

Categorical Columns

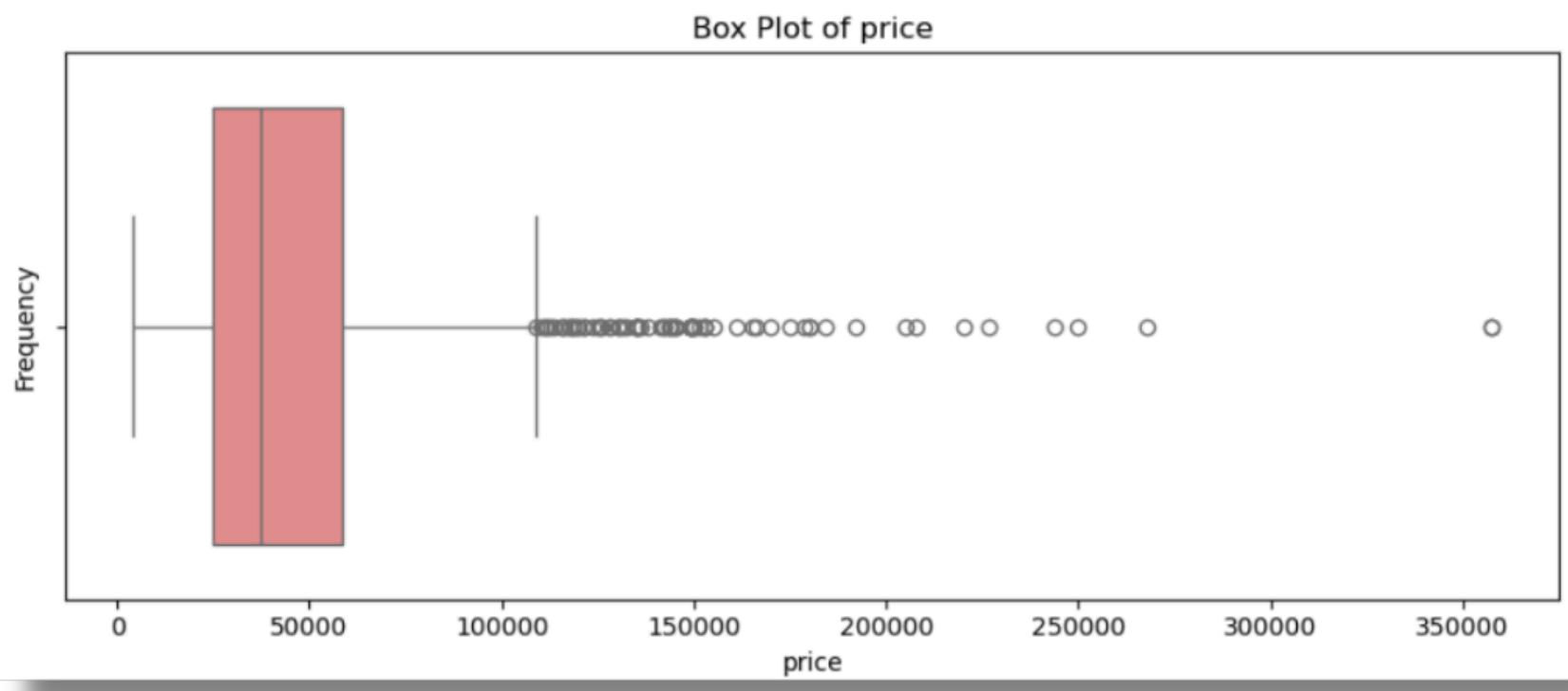
Property_name	Location	Review	Type_of_stay	City	Recommended for
zen studios - dlf cybercity gurgaon	dlf cyber city, gurgaon	very good	1×standard studioentire studio	gurgaon	recommended for family trip
joey's hostel agra	taj ganj, agra	No Review	1×deluxe double room1 large double bedfree can...	agra	recommended for family trip
super townhouse marol near mumbai airport	western suburbs, mumbai	review score	5×classic triple room15 beds (5 extra-large do...	mumbai	recommended for friends trip
7 malai munnar	munnar	No Review	5×double room with mountain view5 double beds...	munnar	recommended for family trip
the prime delhi, a luxury collection hotel	paharganj, new delhi	No Review	5×superior studio with airport pickup5 entire ...	new delhi	recommended for friends trip
the white canyon hotel	varanasi	good	2×deluxe double room2 extra-large double beds...	varanasi	recommended for family trip
ritchita beach way calangute	calangute beach, calangute	review score	1×family room with balcony2 beds (1 extra-larg...	calangute	recommended for friends trip
the hideout agra homestay near taj	taj ganj, agra	very good	1×deluxe triple room2 beds (1 extra-large doub...	agra	recommended for family trip
gulf hotel mumbai- the boutique hotel colaba m...	colaba, mumbai	review score	1×super deluxe room1 large double bedfree canc...	mumbai	recommended for family trip
hotel victoria city mumbai	south mumbai, mumbai	good	5×double room5 double bedsfree cancellationno ...	mumbai	recommended for friends trip

Numerical Columns

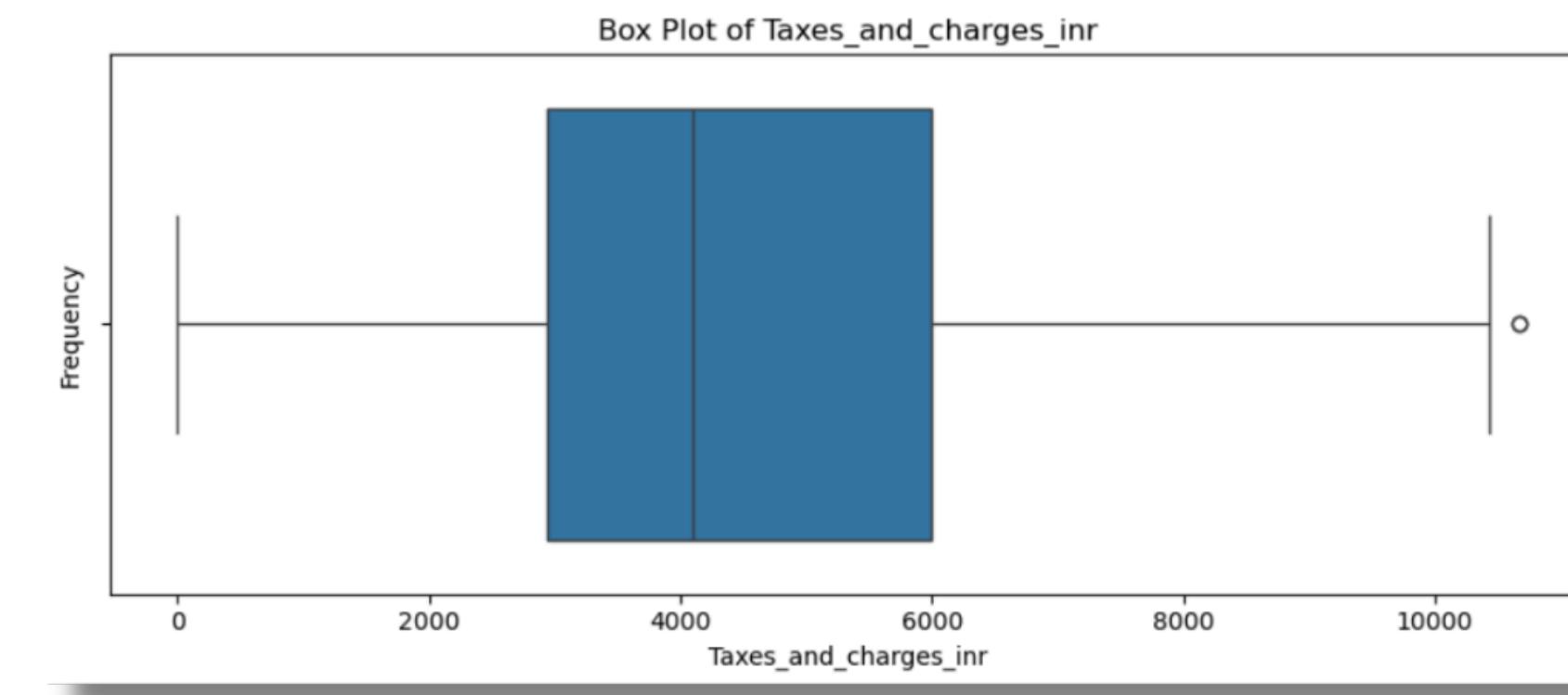
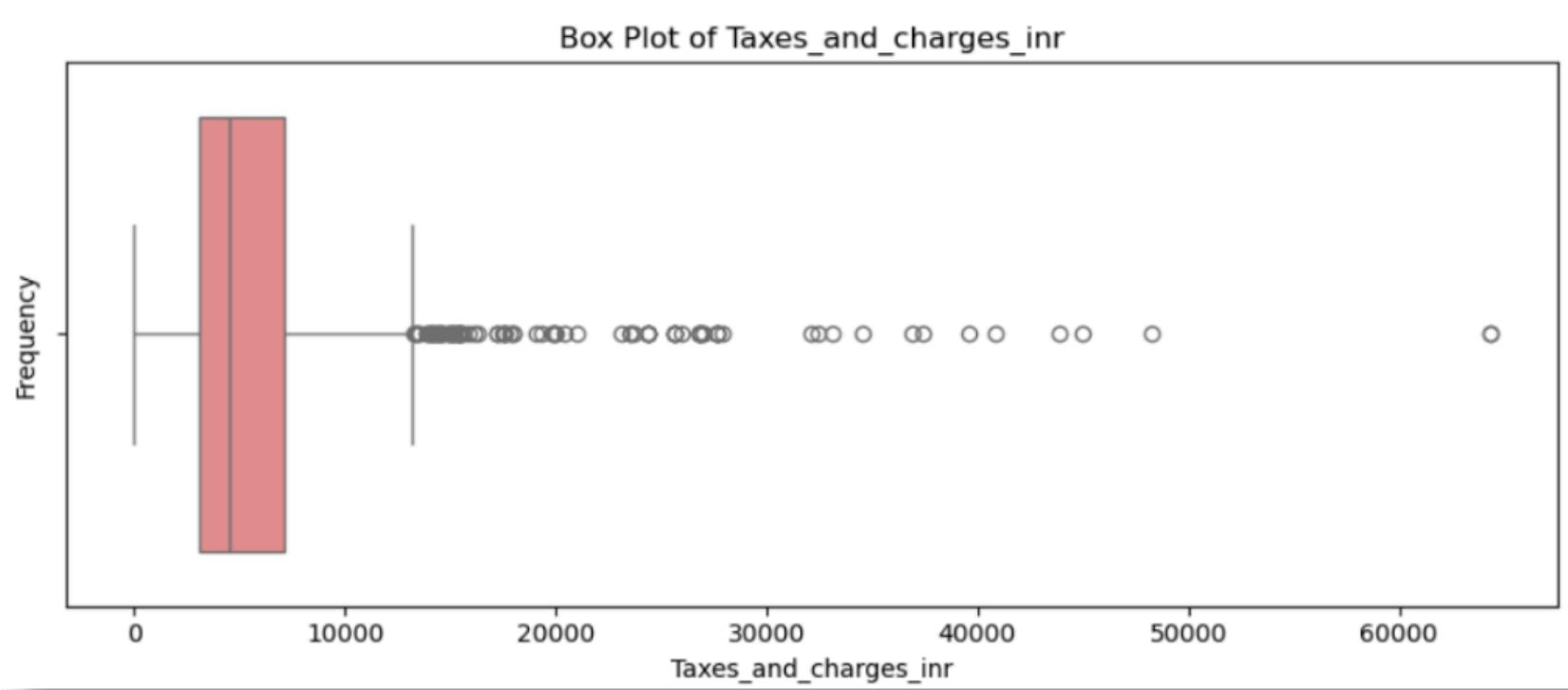
Rating	price	Taxes_and_charges_inr	No_Of_Adults	No_Of_Children	Final_Price
9.1	65200.0	7824.0	6	4	73024.0
8.3	98600.0	11832.0	6	4	110432.0
7.2	25515.0	3912.0	10	0	29427.0
9.3	15180.0	1822.0	6	4	17002.0
6.6	46000.0	5520.0	6	4	51520.0
9.3	15783.0	1894.0	10	0	17677.0
9.0	48000.0	5760.0	10	0	53760.0
8.4	54400.0	6528.0	10	0	60928.0
8.2	205000.0	36900.0	10	0	241900.0
8.4	54504.0	6540.0	10	0	61044.0

OUTLIER DETECTION & DISTRIBUTION SPREAD

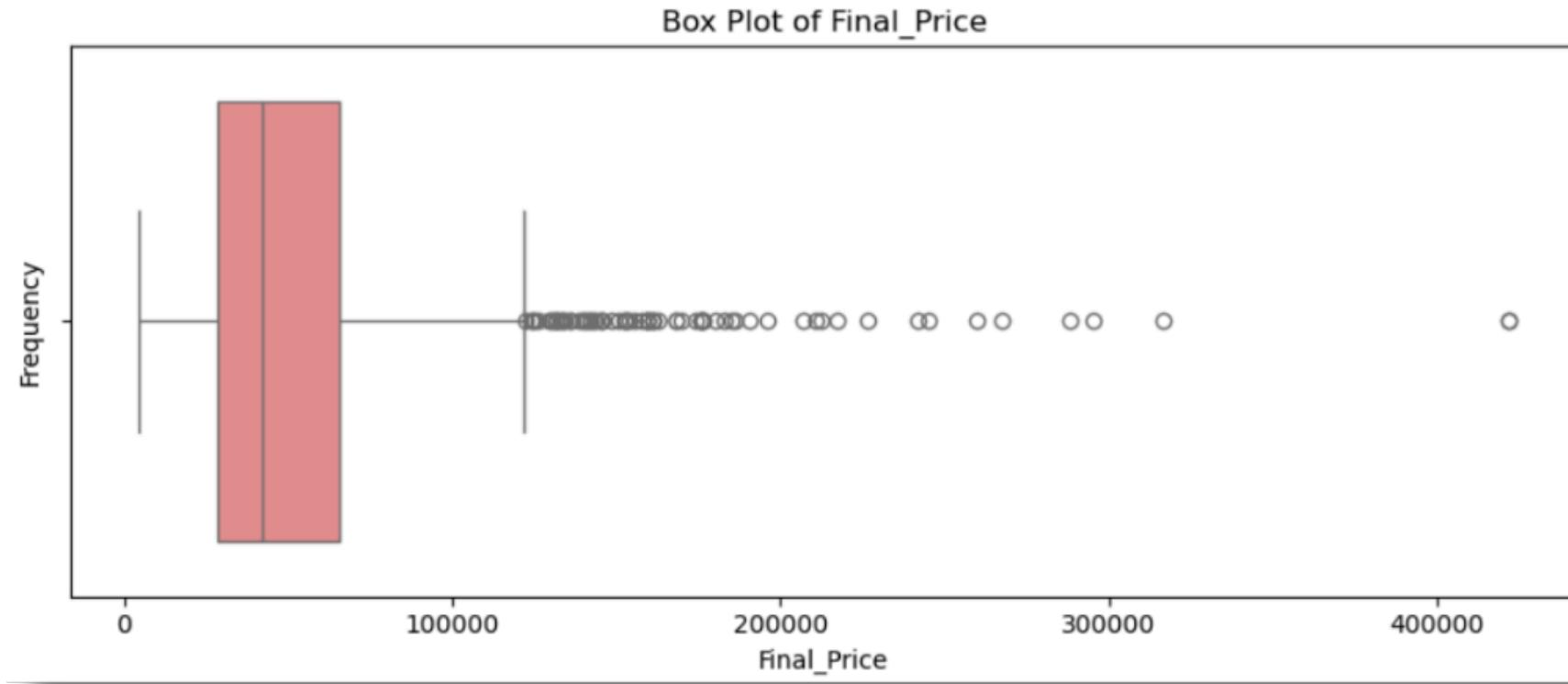
Before Outlier Handling



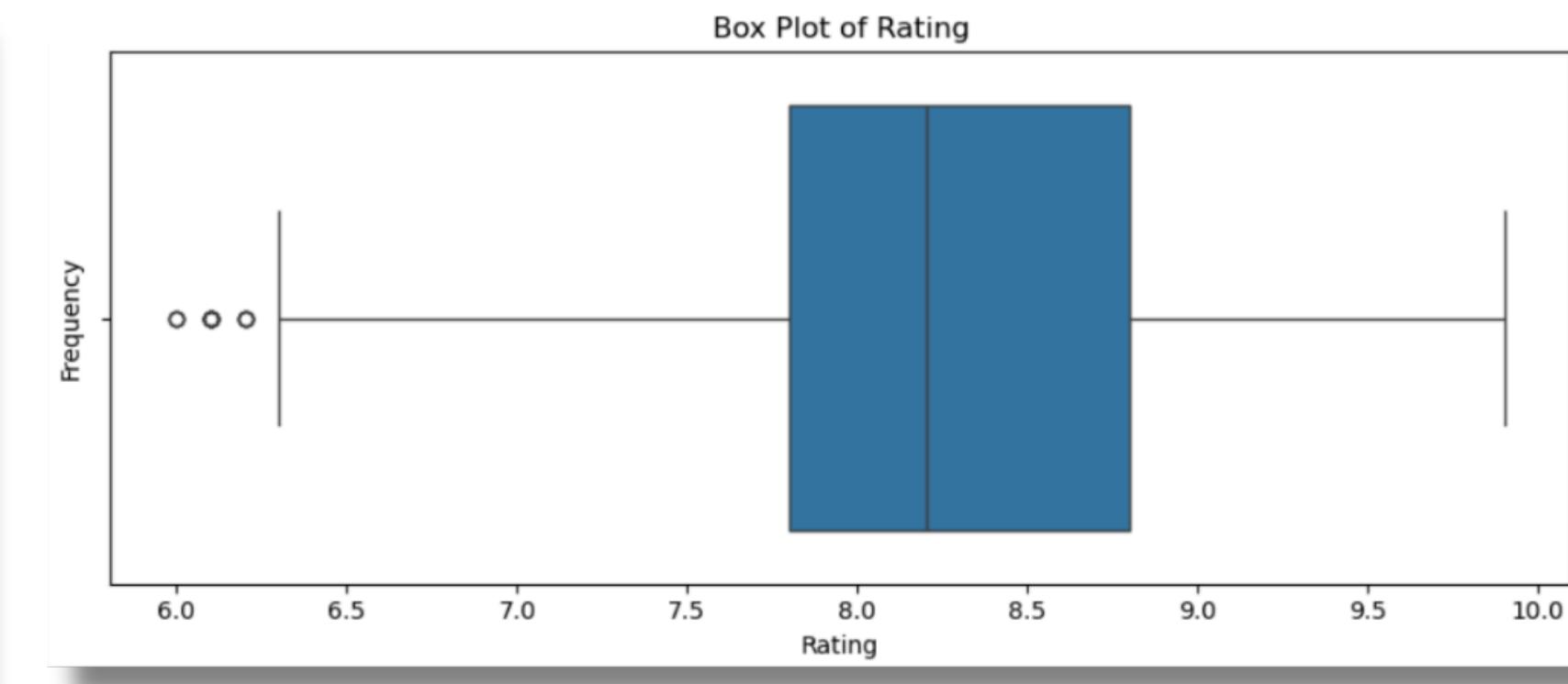
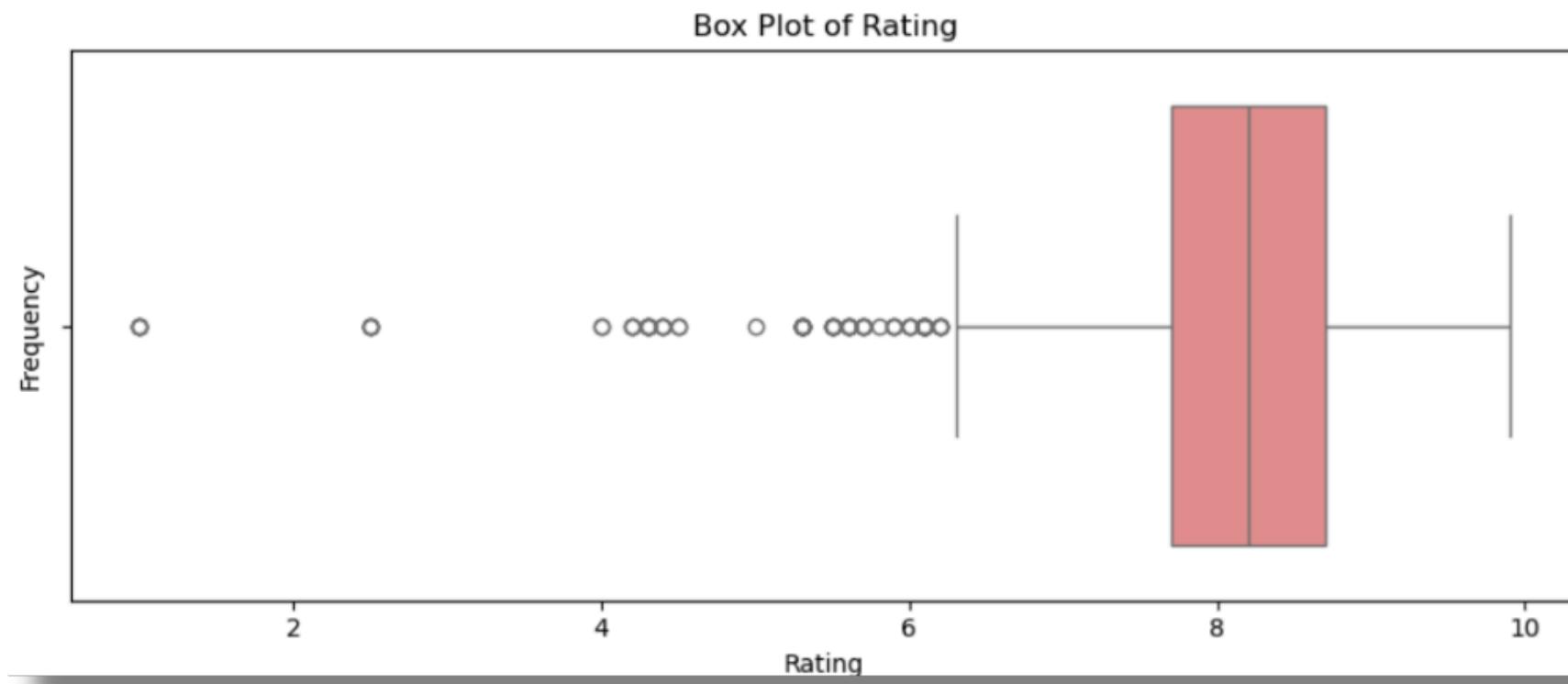
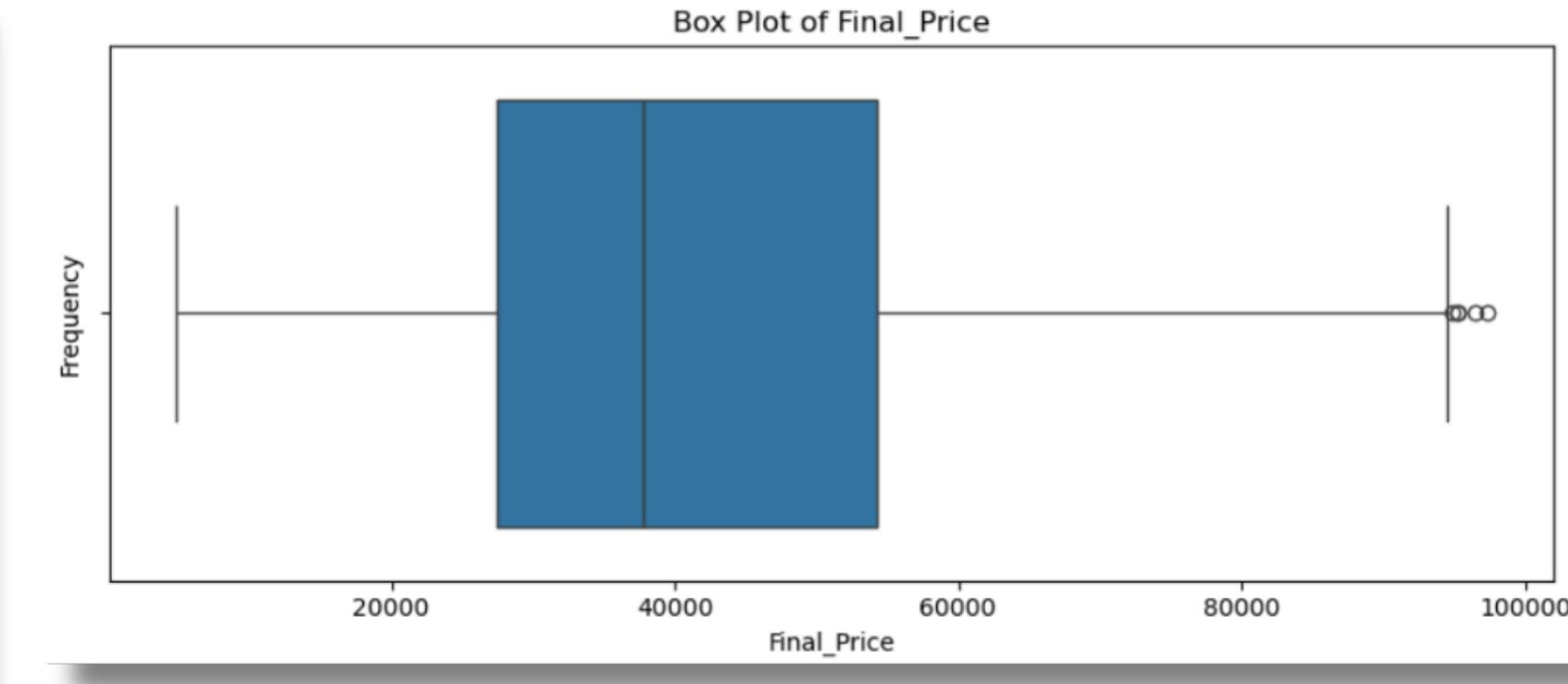
After Handling Outliers



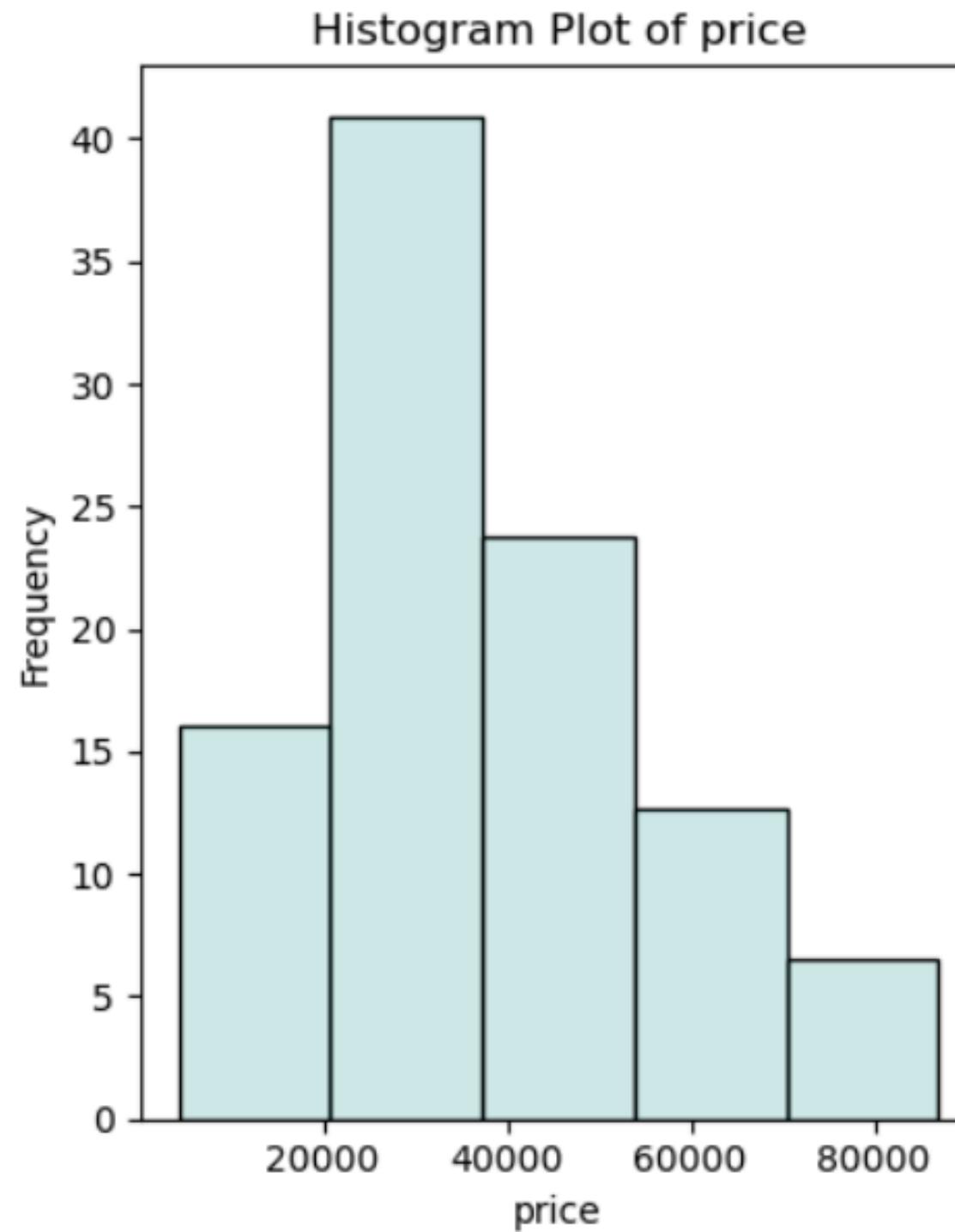
Before Outlier Handling



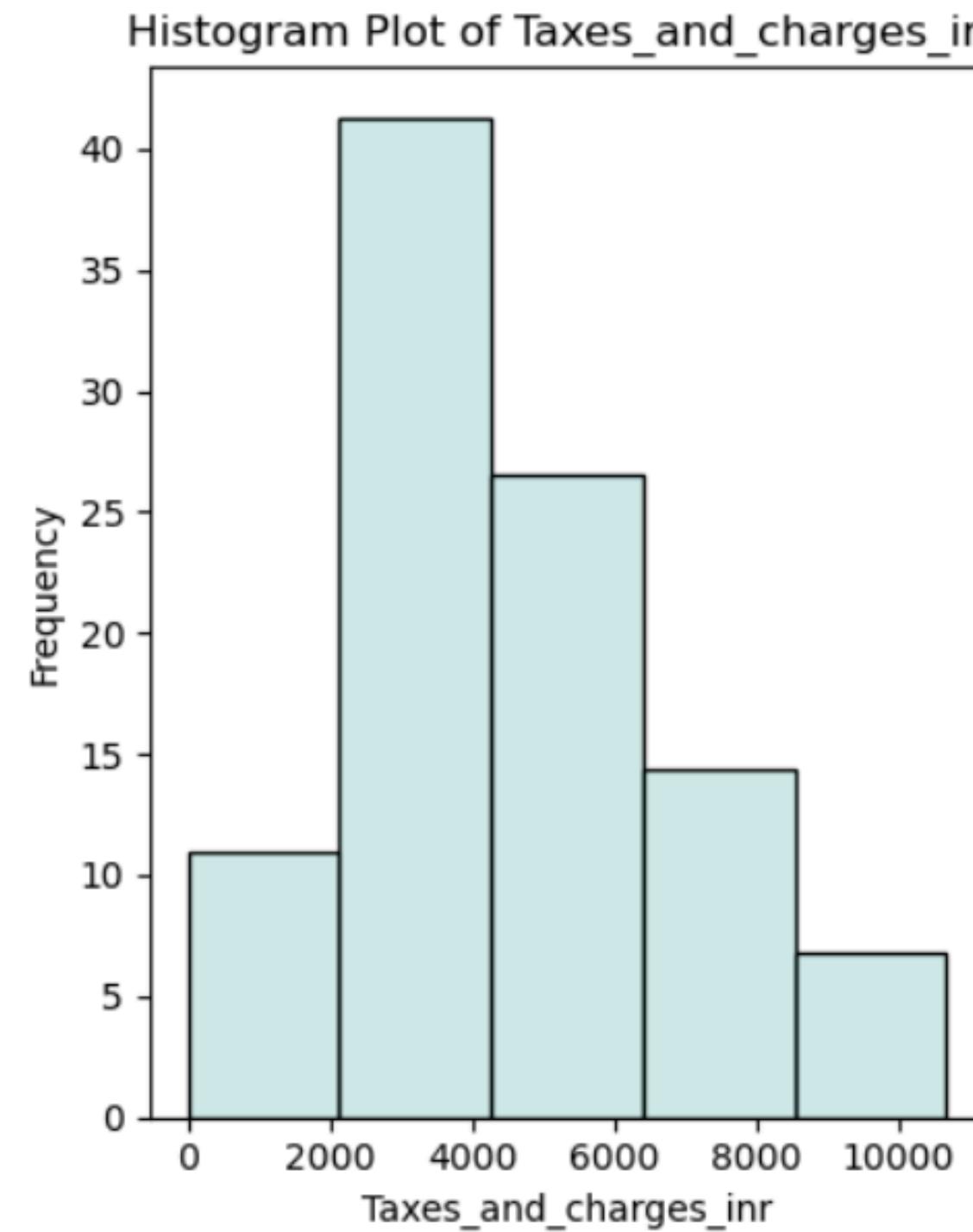
After Handling Outliers



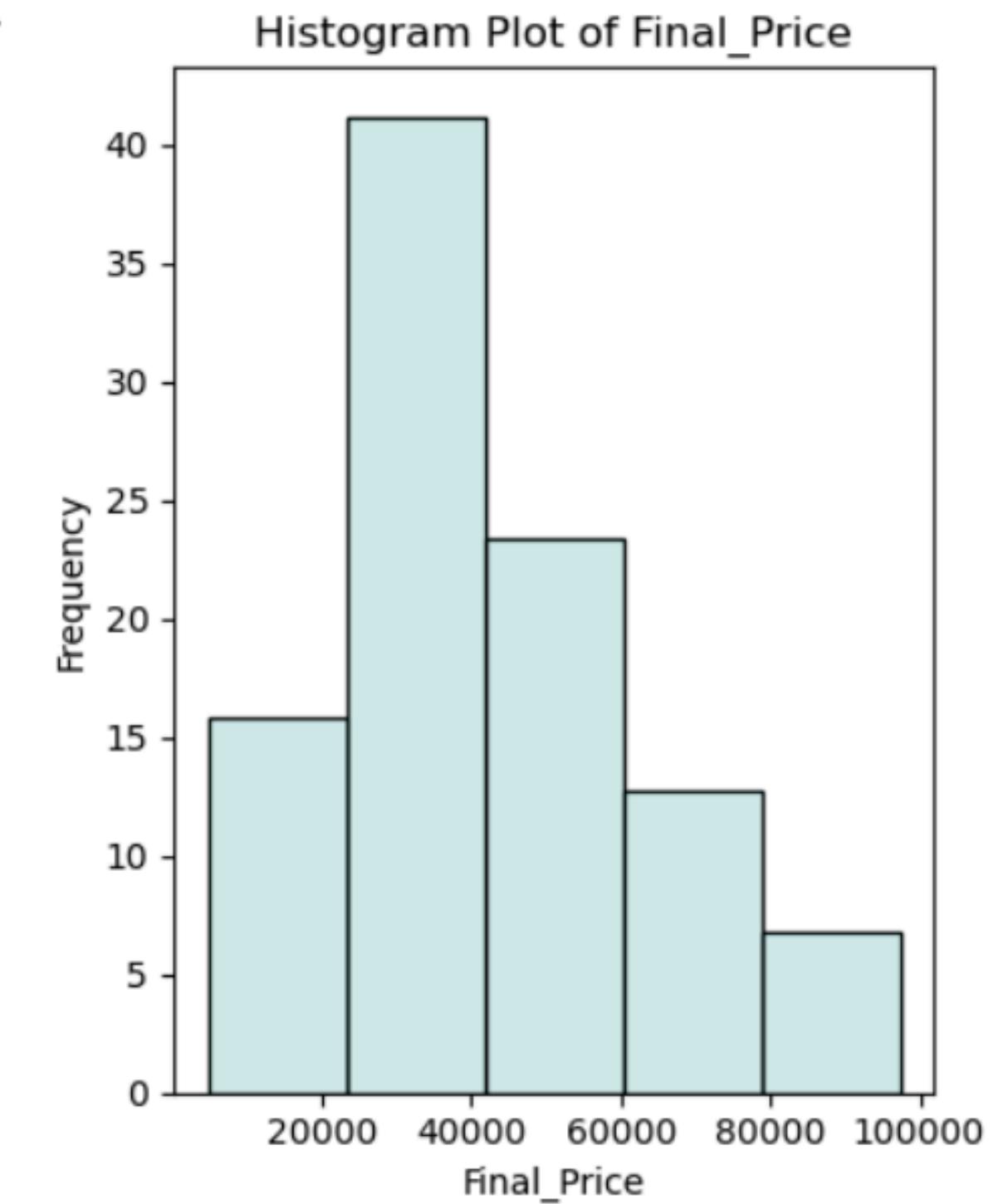
UNIVARIATE GRAPHS ON NUMERICAL COLUMNS



Interpretation: Most travelers can expect a decent property under ₹40,000 base price.



Taxes are typically reasonable and proportionate to the base price; travelers should expect ₹2K–₹5K as standard extra charges.



Overall, travelers are likely to pay less than ₹50,000 in total for most stays.

UNIVARIATE ANALYSIS - CATEGORICAL COLUMNS



Hotels



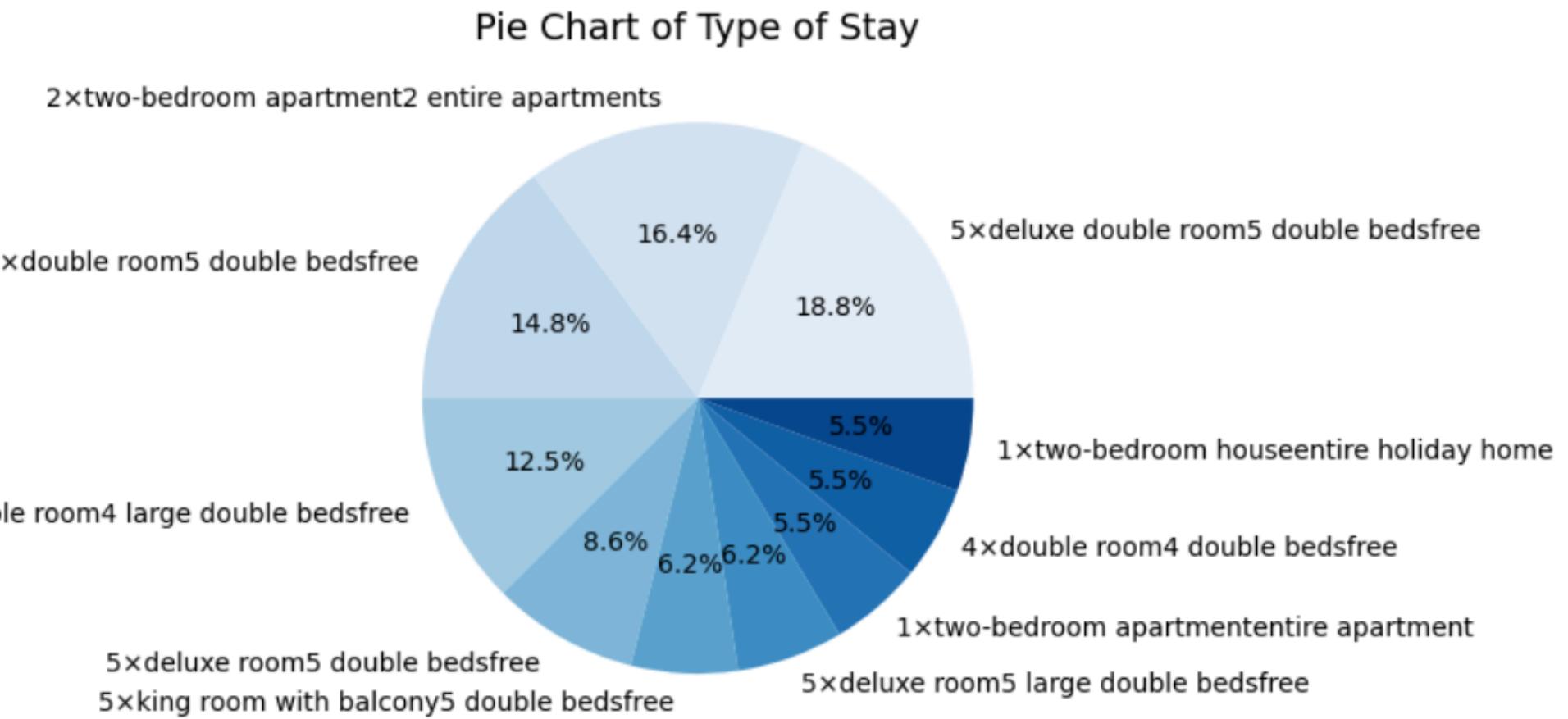
Apartments



Resorts

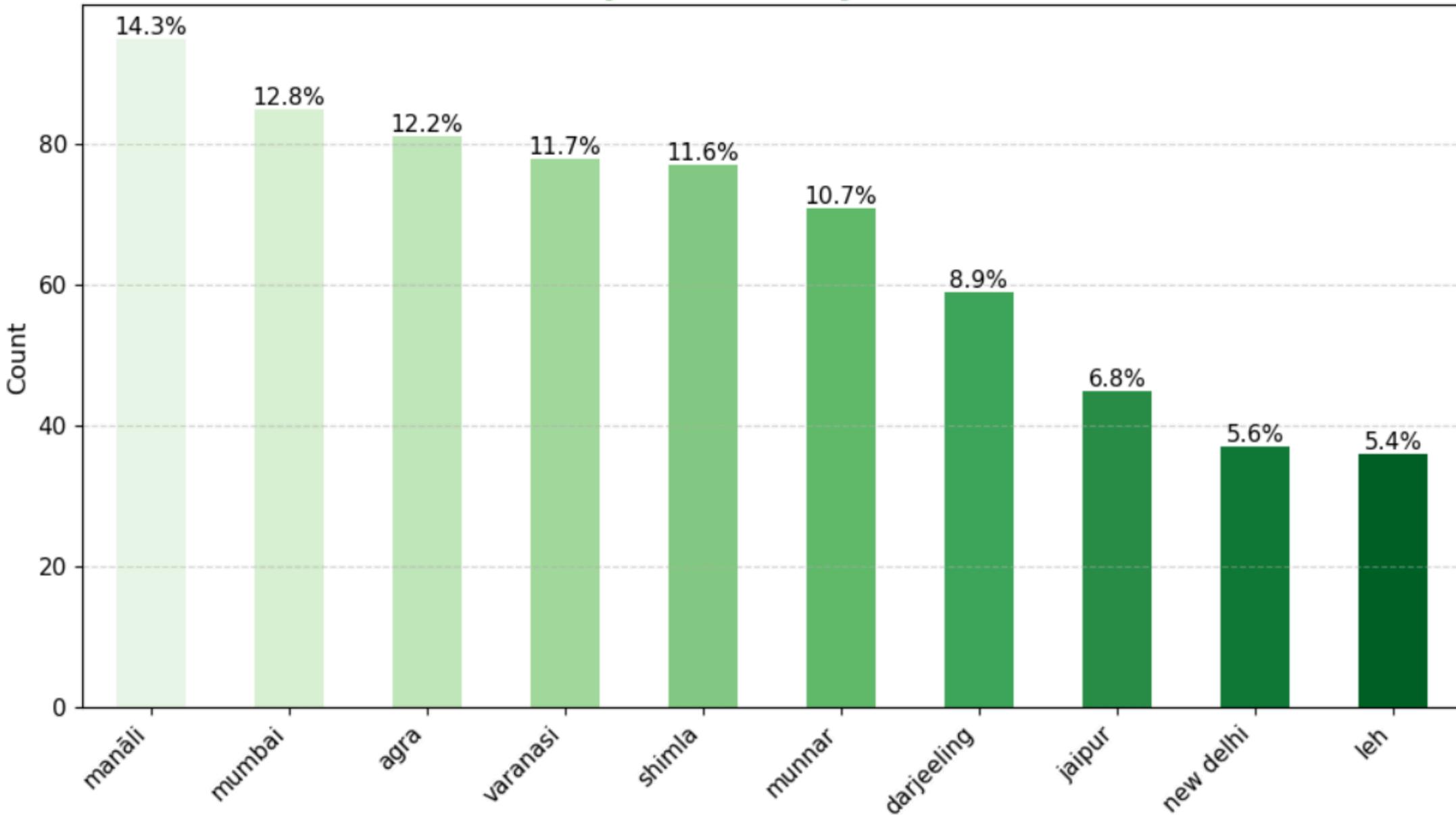


Villas



Insight: Even though our dataset didn't include an explicit `property_type` column, a closer look at the stay descriptions reveals that apartment-style and hotel-based accommodations dominate the listings. This, combined with the popularity of multi-room and group-sized stays, suggests that travelers prefer spacious, group-friendly options, especially families and groups.

Top 10 Cities by Count



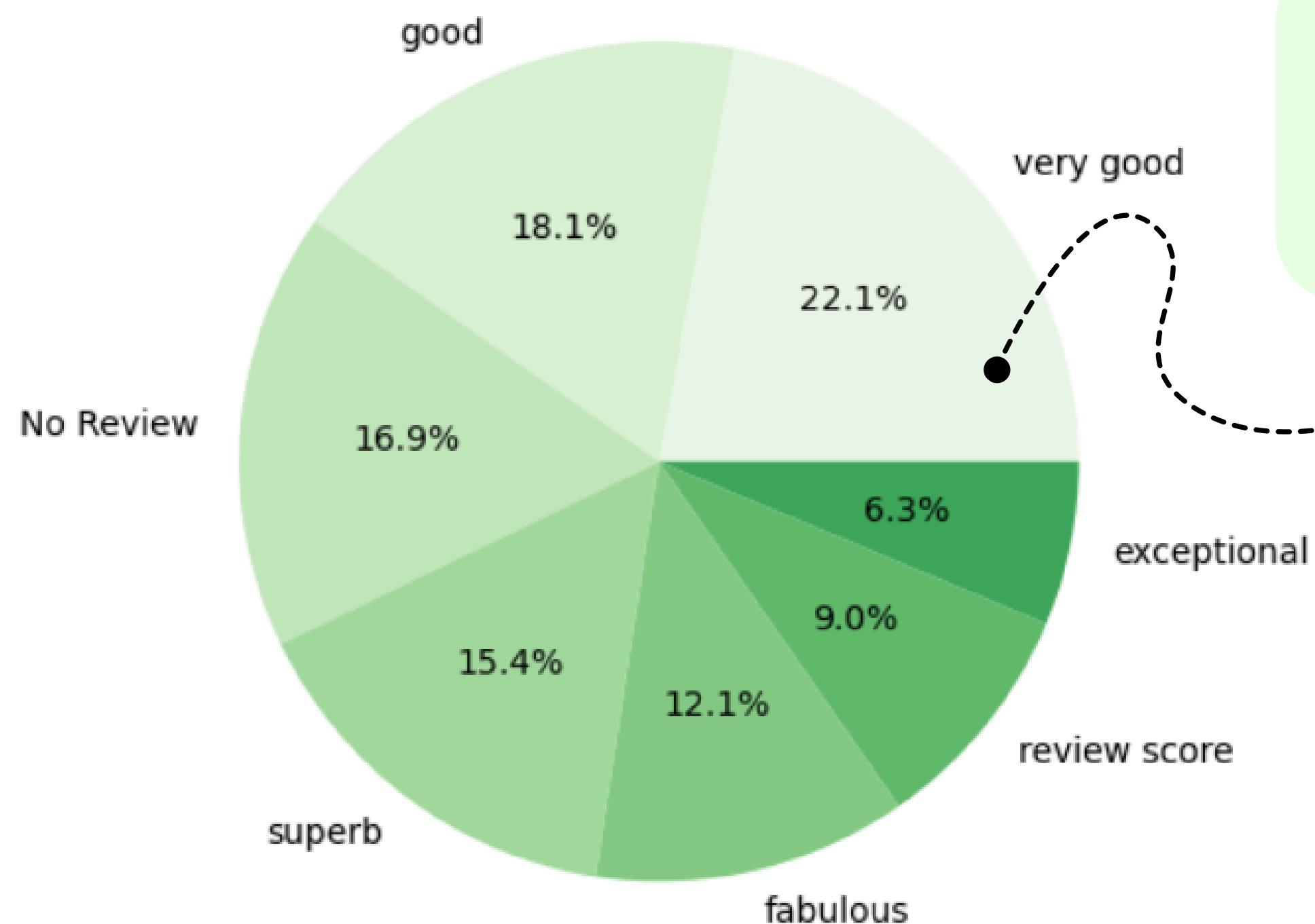
Key Observations:

- Manali (14.3%), Mumbai (12.8%), and Agra (12.2%) have the highest number of listings, reflecting strong accommodation availability.
- Other frequently listed cities include Varanasi, Shimla, Munnar, Darjeeling, Jaipur, and New Delhi, many of which are well-known tourist or religious destinations.

Insight:

Booking.com has more hotel listings in popular tourist places, especially hill stations and cultural cities. This shows that these spots are more in demand by travelers, and can help both tourists and property owners focus on the most visited locations.

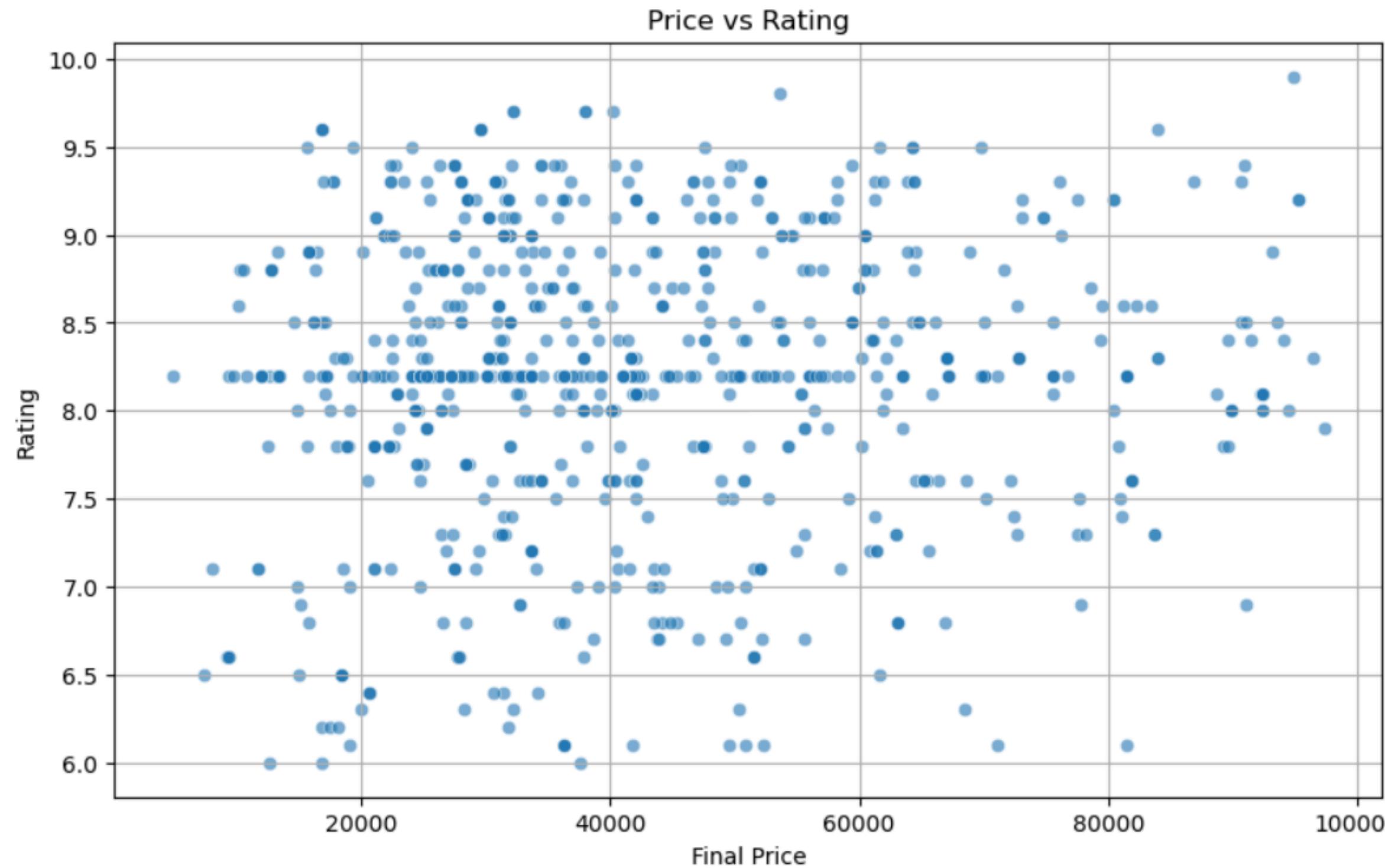
Pie Chart of Review



Insight:

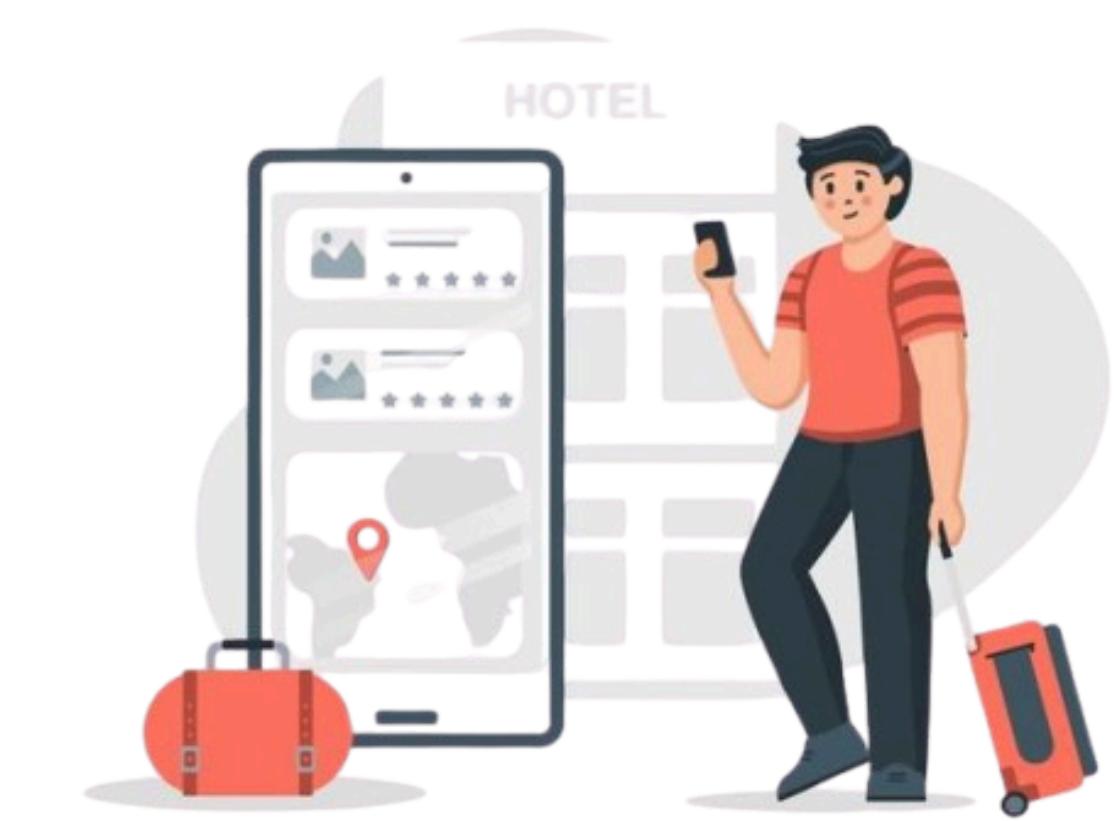
Most properties receive positive reviews, indicating a generally satisfactory customer experience. However, the high percentage of listings without reviews highlights the presence of new or less-discovered options on the platform.

NUMERICAL VS. NUMERICAL (SCATTERPLOT : PRICE VS RATING)

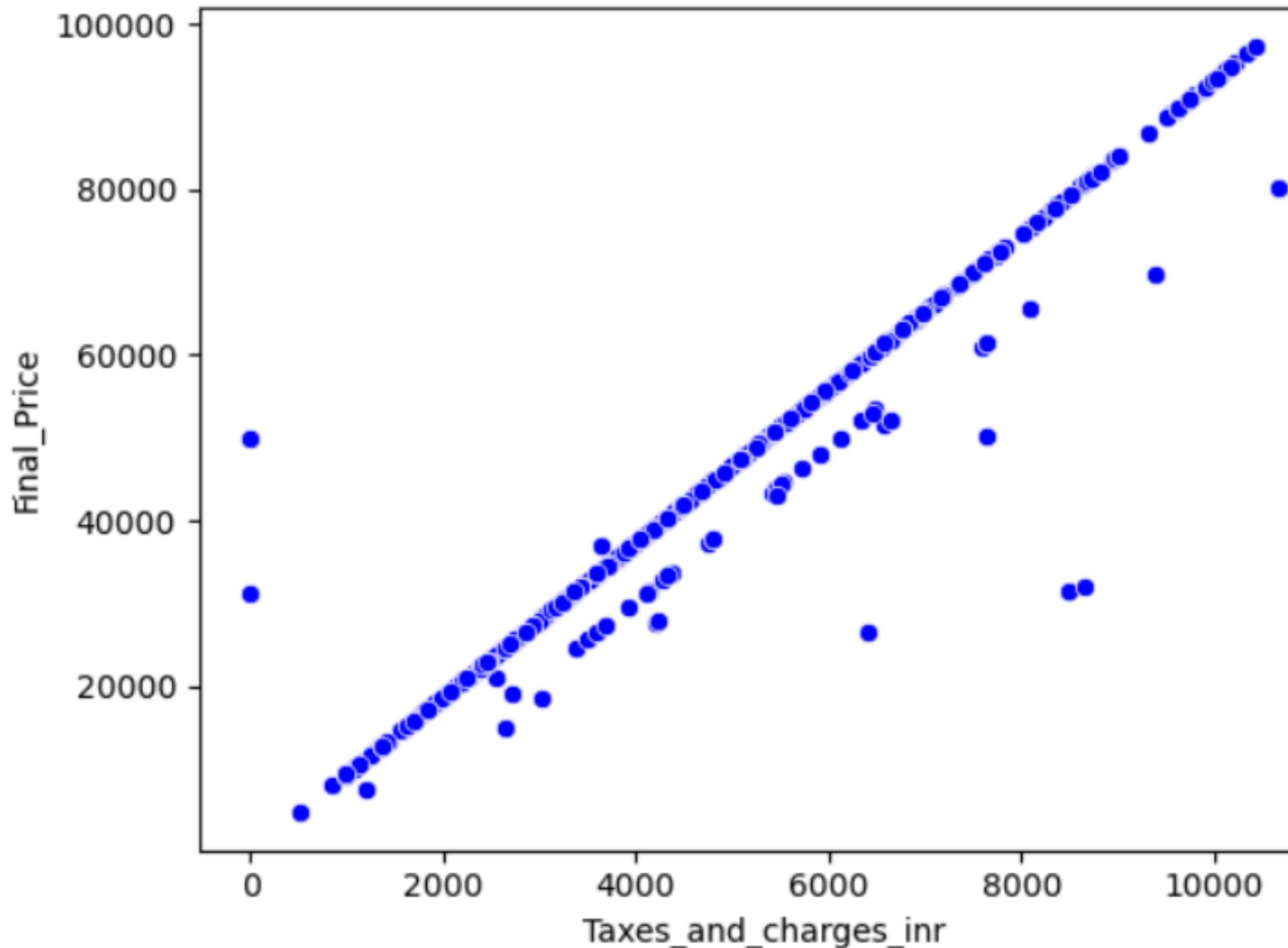


Insight:

There is no strong relationship between price and guest satisfaction. Many budget-friendly hotels offer high ratings, suggesting travelers can find great experiences without overspending.



STRONG POSITIVE CORRELATION BETWEEN TAXES AND FINAL HOTEL PRICE

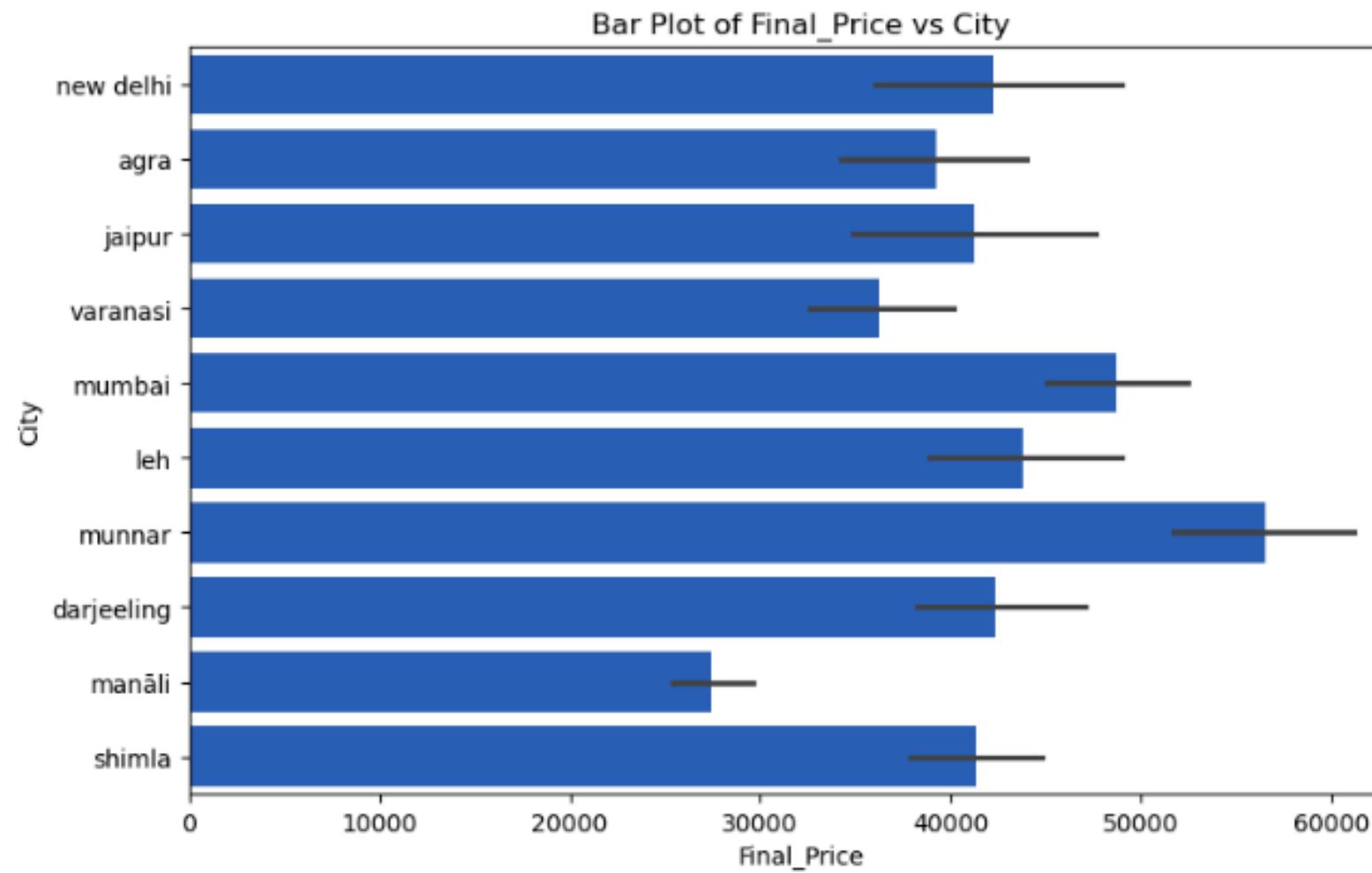


Insight:

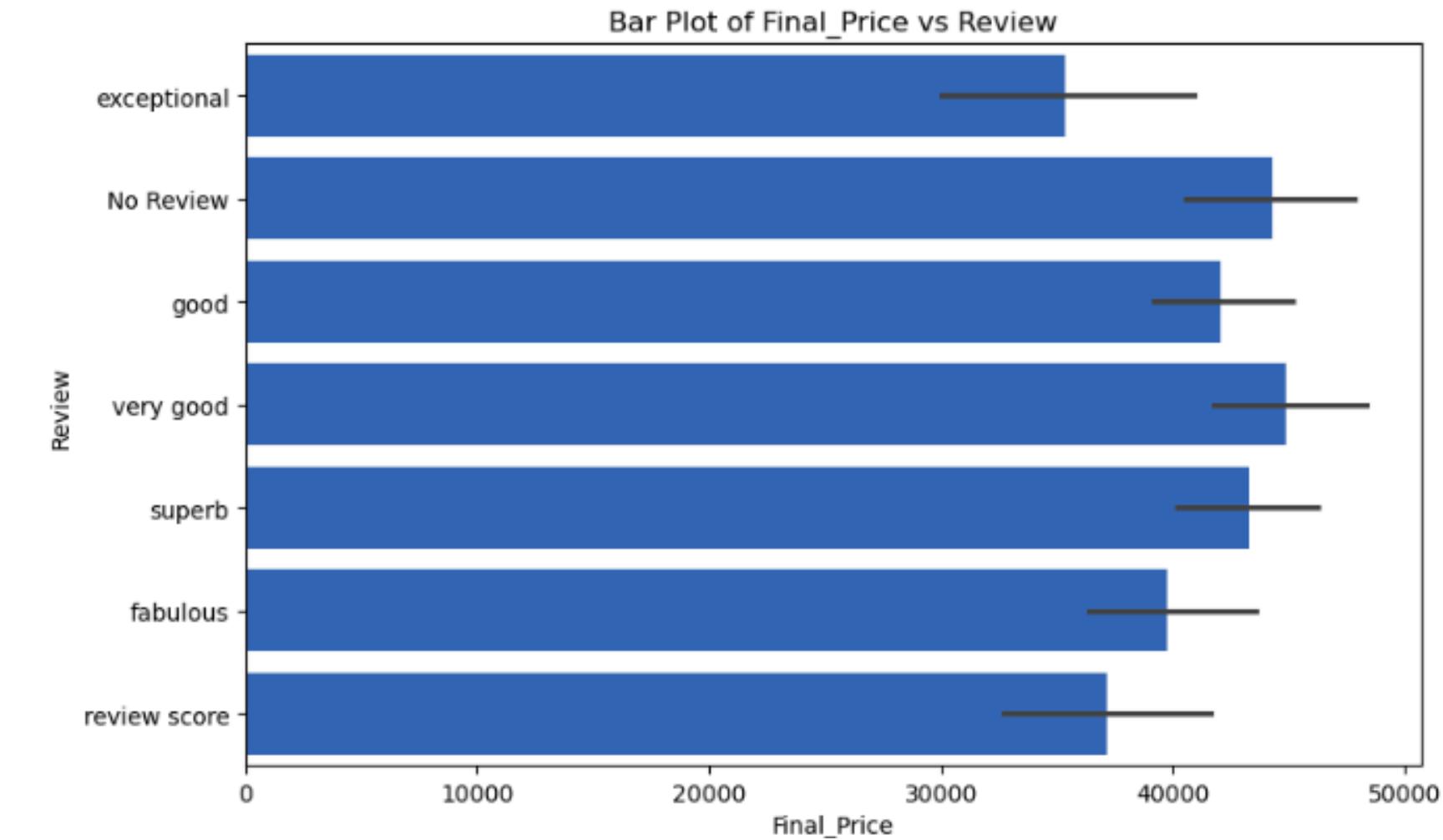
“It’s important for travelers to understand that high-end hotels don’t just charge more for the room – they also have higher taxes and additional fees, which can significantly increase the final amount paid.”

NUMERICAL VS. CATEGORICAL

city-wise pricing



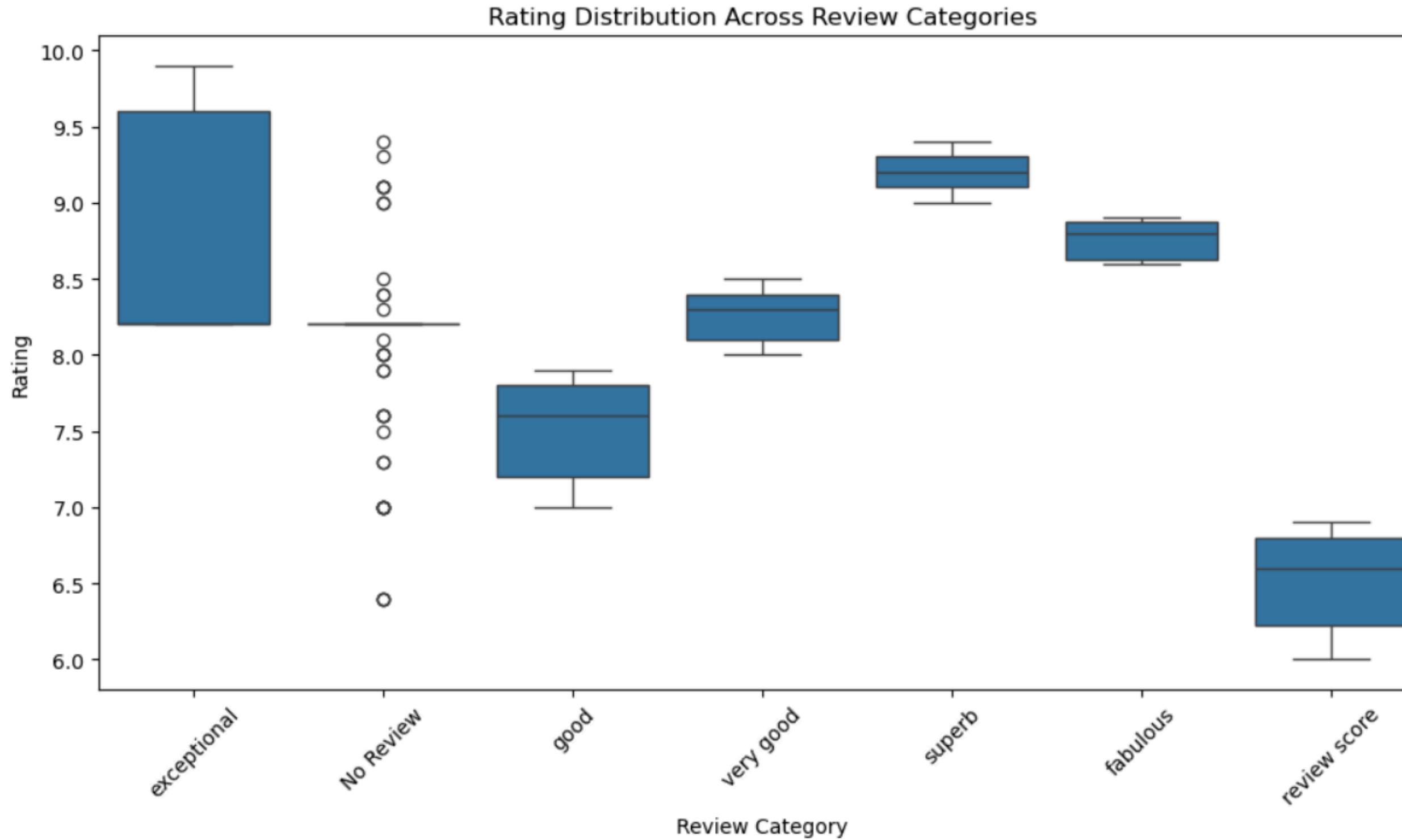
quality-wise pricing



This graph reveals that hotel prices differ drastically across cities. While some destinations like Munnar and Mumbai demand higher prices, others like Manali and Agra offer more affordable accommodation options, making destination choice a key factor in budget planning.

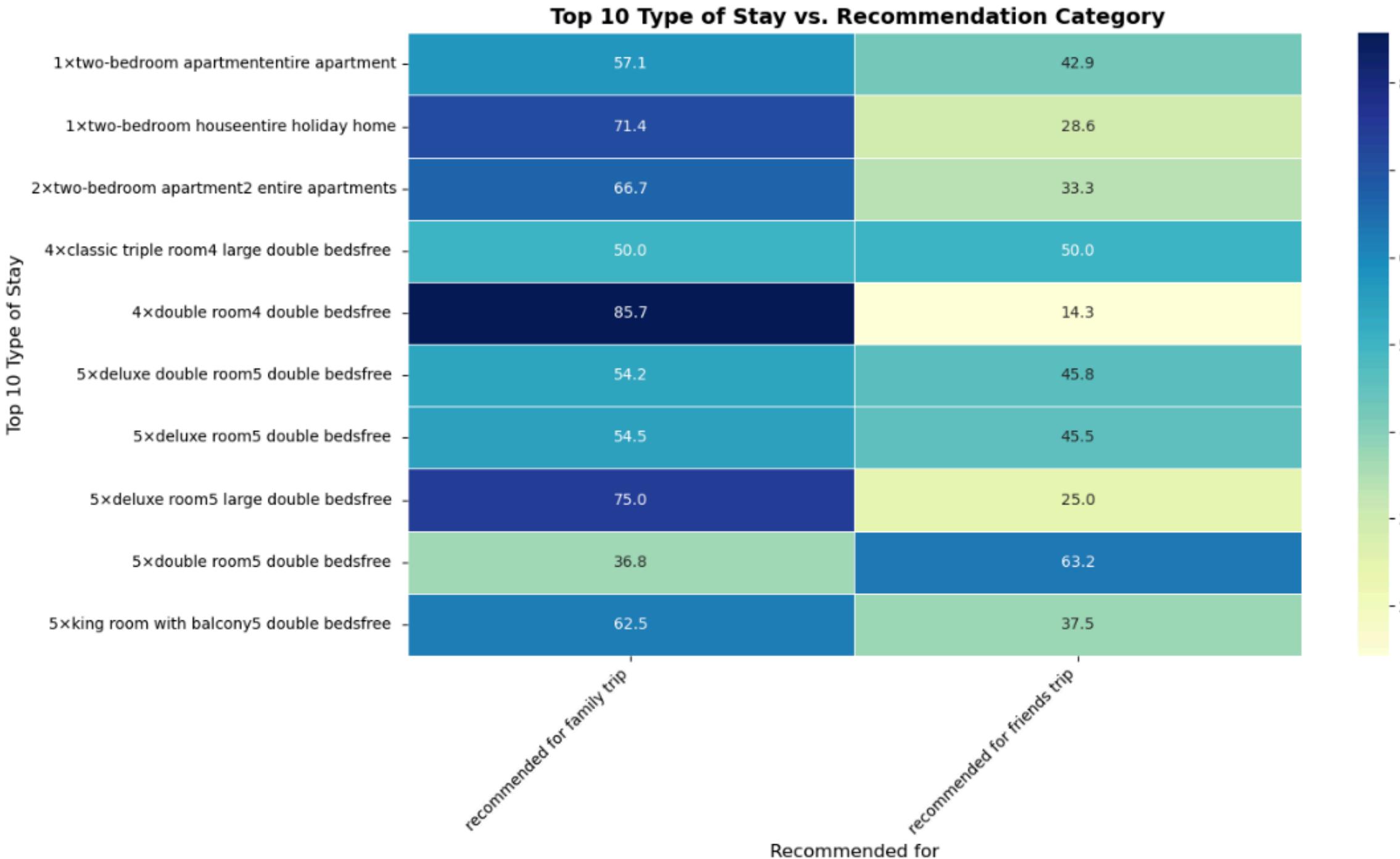
“Higher price does not always mean higher satisfaction.”
Travelers can find exceptionally rated hotels at reasonable prices, and some average-rated hotels may be overpriced.

RATING DISTRIBUTION ACROSS REVIEW CATEGORIES



Insight: Review categories accurately reflect their rating levels. "Exceptional", "Superb", and "Fabulous" represent consistently high-quality stays. "Review Score" and "No Review" indicate lower or uncertain quality and should be treated with caution when making booking decisions.

CATEGORICAL VS. CATEGORICAL (HEATMAPS & GROUPED BAR)



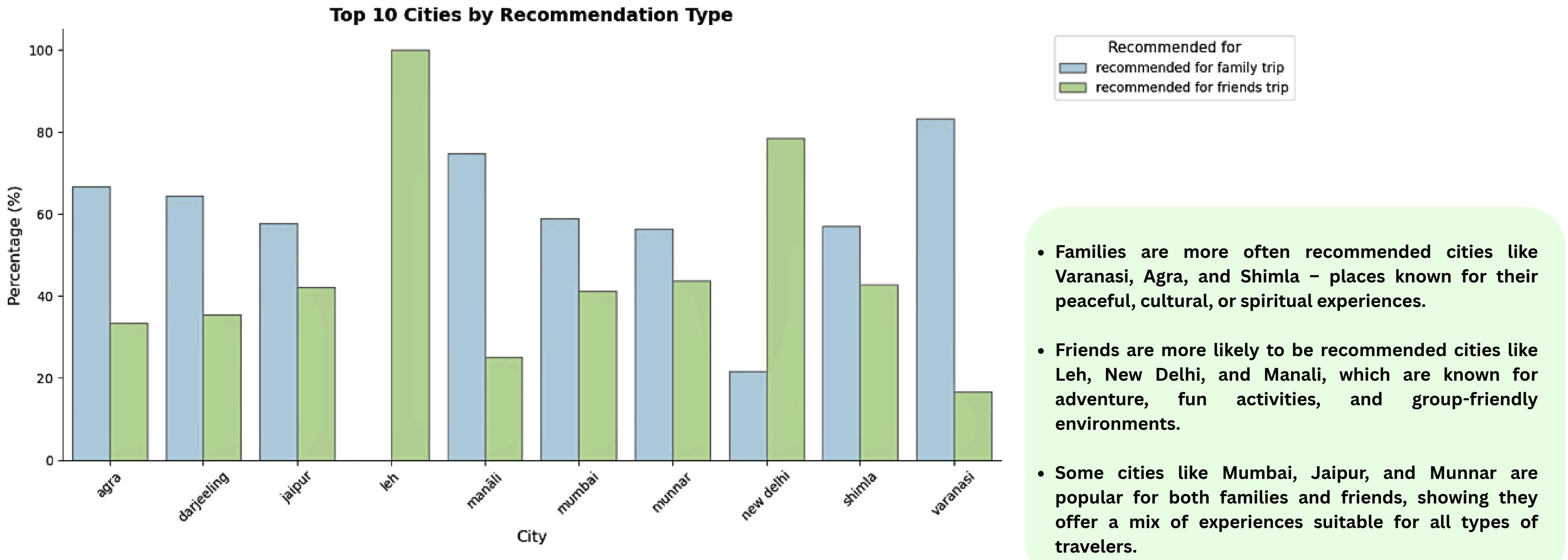
- ✓ Family trips are mostly recommended for spacious stays like:
 - Double rooms with multiple beds
 - Holiday homes and entire apartments

- ✓ Friends trips lean toward:
 - Shared or multi-bed room setups
 - Flexible and cost-effective options

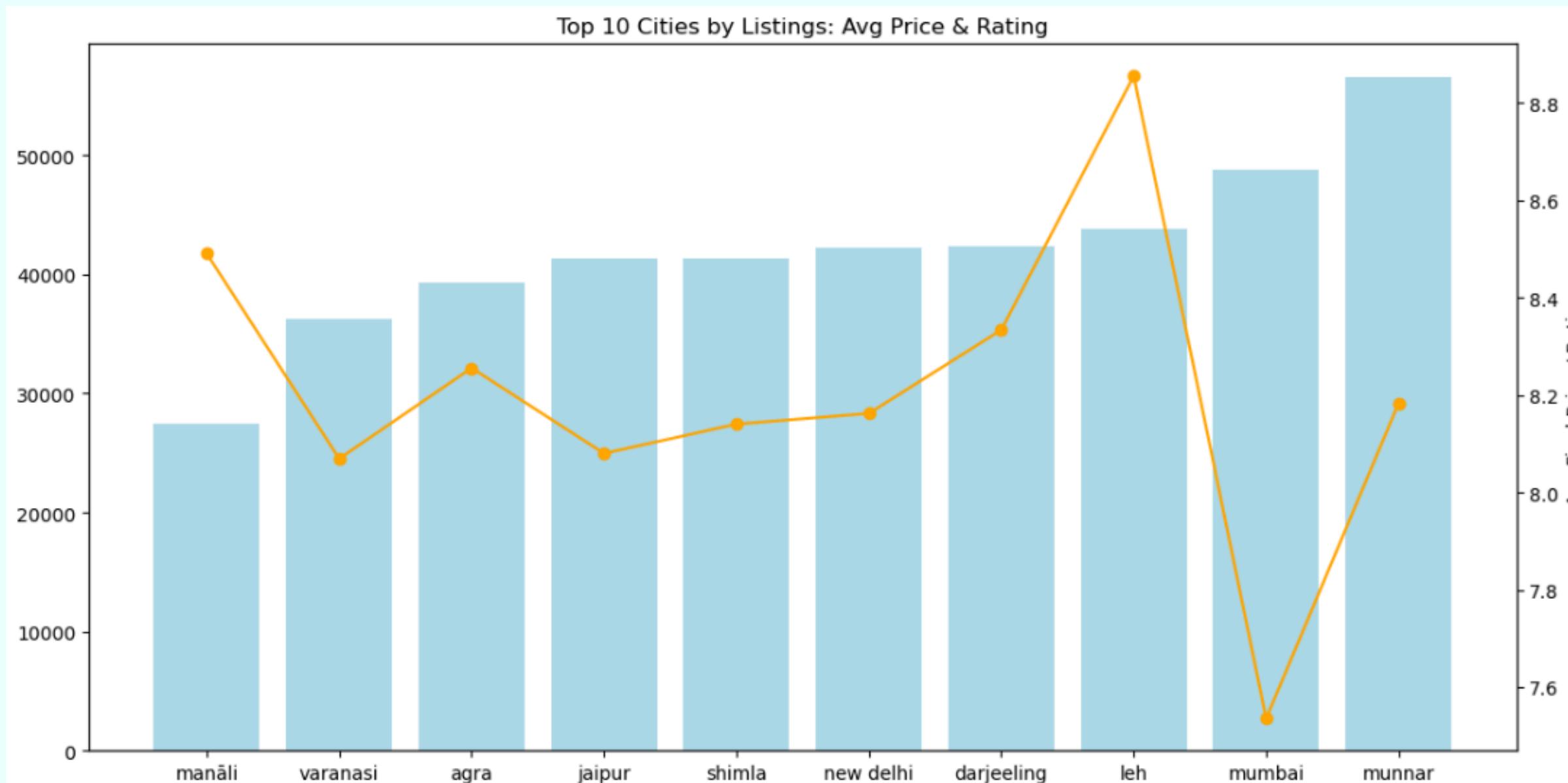
- ✓ Certain room types (e.g., triple rooms) are suitable for both family and friends

- ✓ Preferences reflect practical needs: space and privacy for families vs. affordability and flexibility for friends

GROUP-BASED TRAVEL RECOMMENDATIONS ACROSS TOP 10 INDIAN CITIES



HOTEL VALUE ANALYSIS ACROSS TOP CITIES: PRICE VS RATING

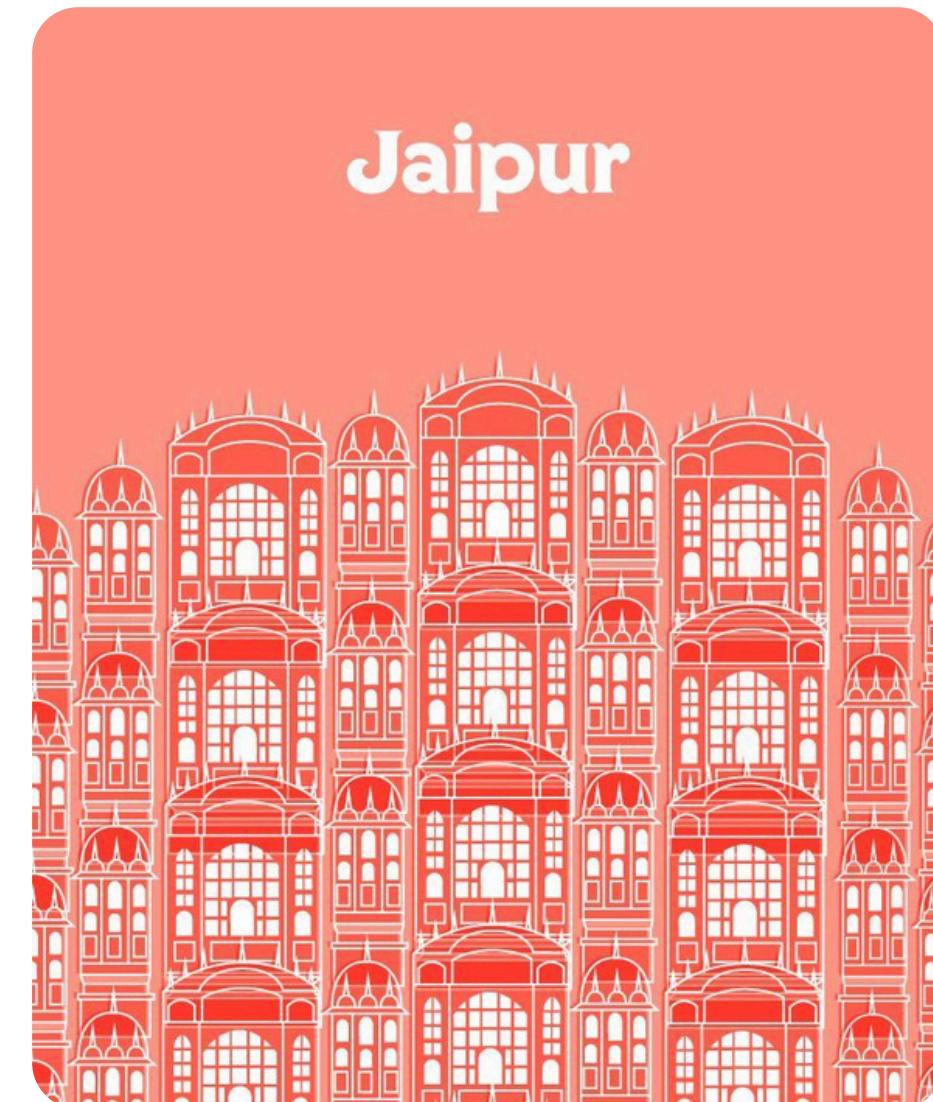
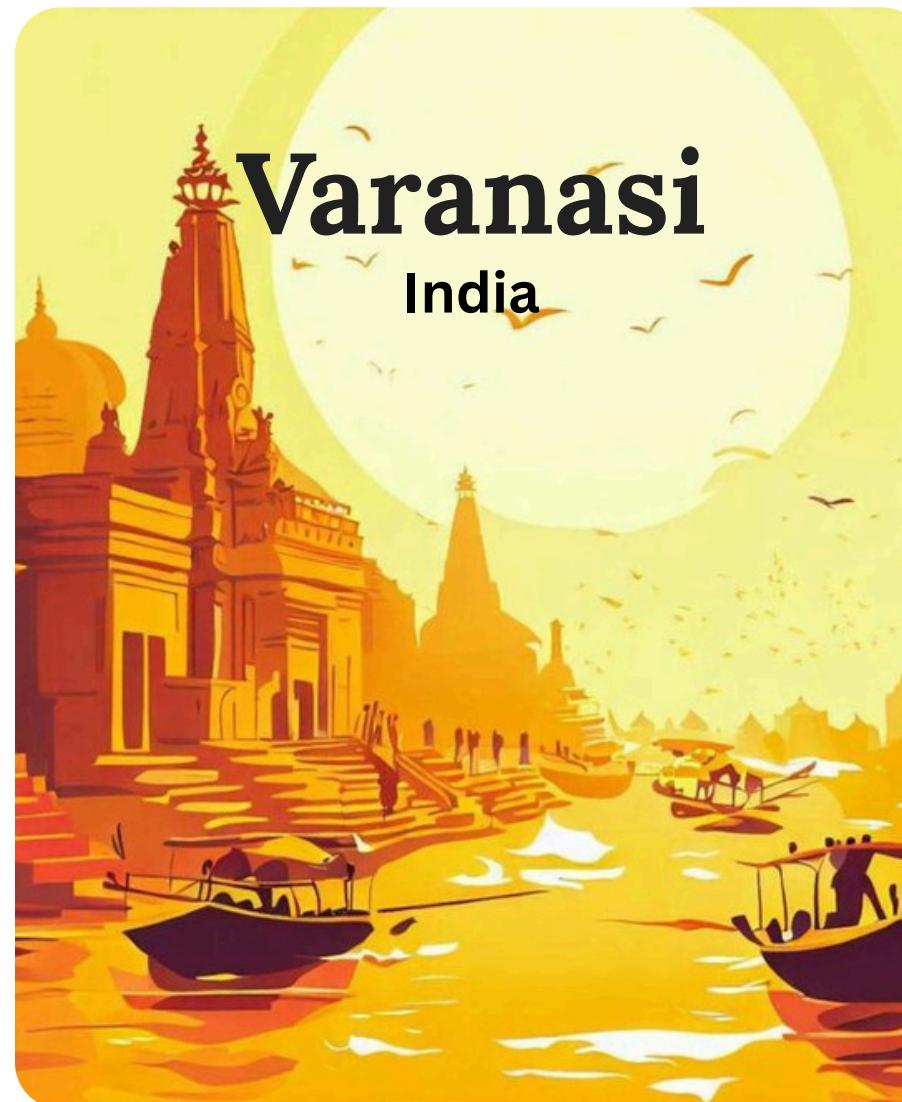
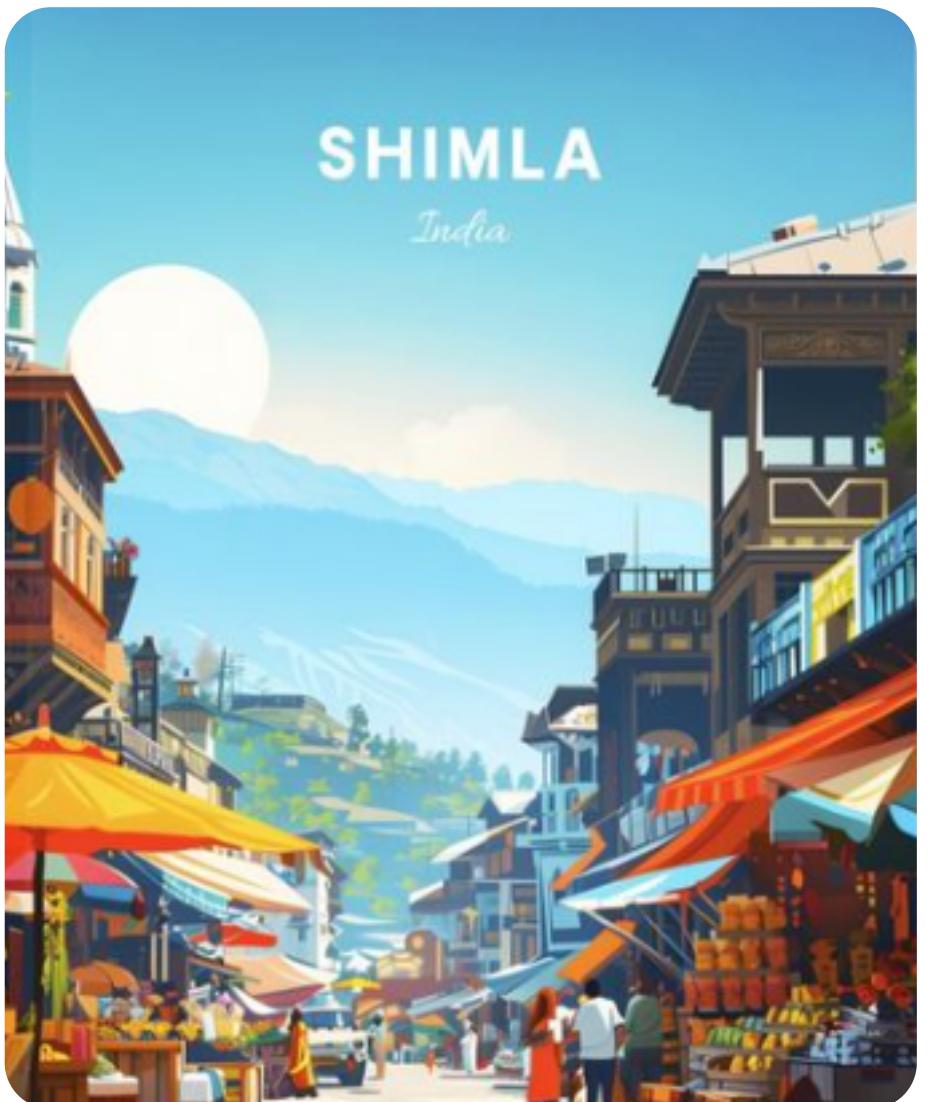


Insight:

Cities like Leh and Manali offer strong value combining high guest satisfaction with reasonable to good pricing. In contrast, Mumbai shows a mismatch between price and satisfaction, potentially indicating lower perceived value.

This analysis helps travelers prioritize cities that offer a better balance between cost and experience.

RECOMMENDED CITIES WITH AFFORDABLE PRICE RANGE (RECOMMENDED FOR FAMILY TRIP)



₹30,000–₹40,000

~8.3

₹25,000–₹35,000

~8.2

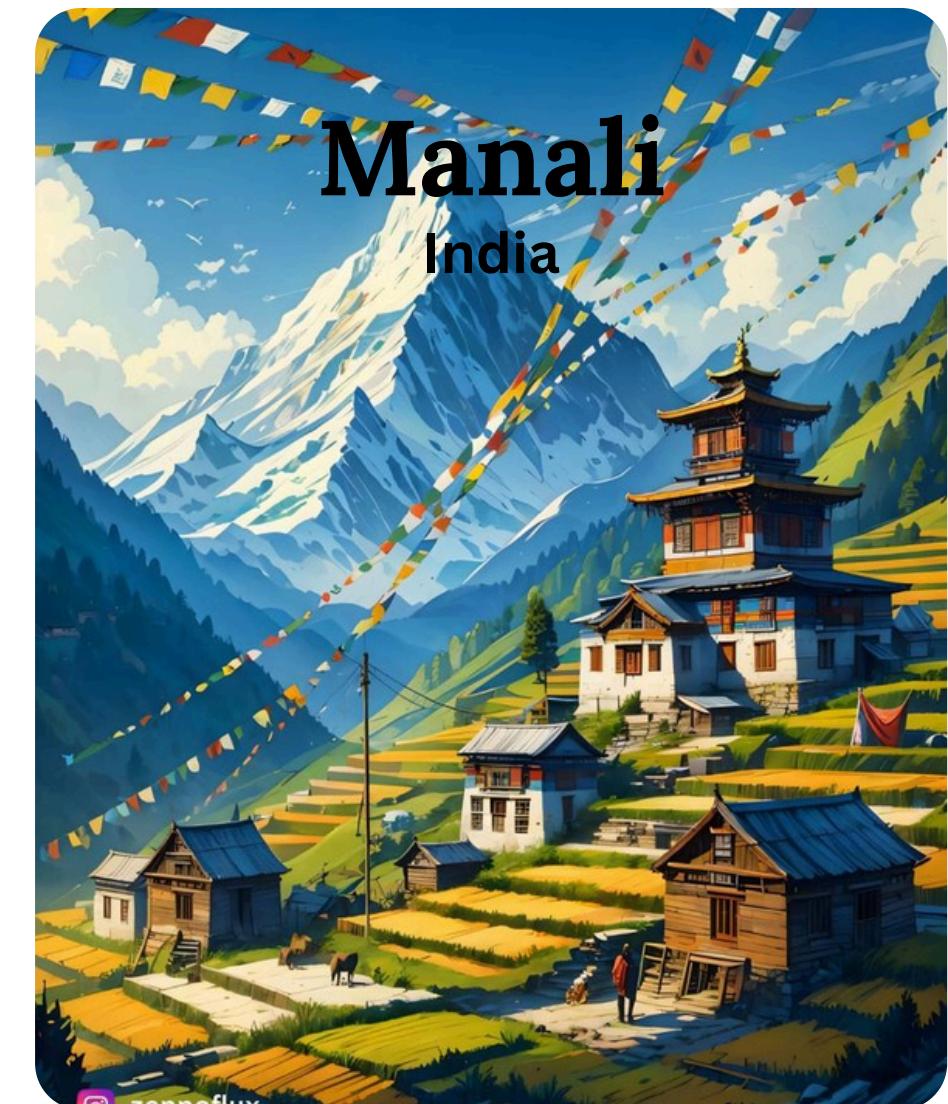
₹20,000–₹30,000

~8.4

₹28,000–₹38,000

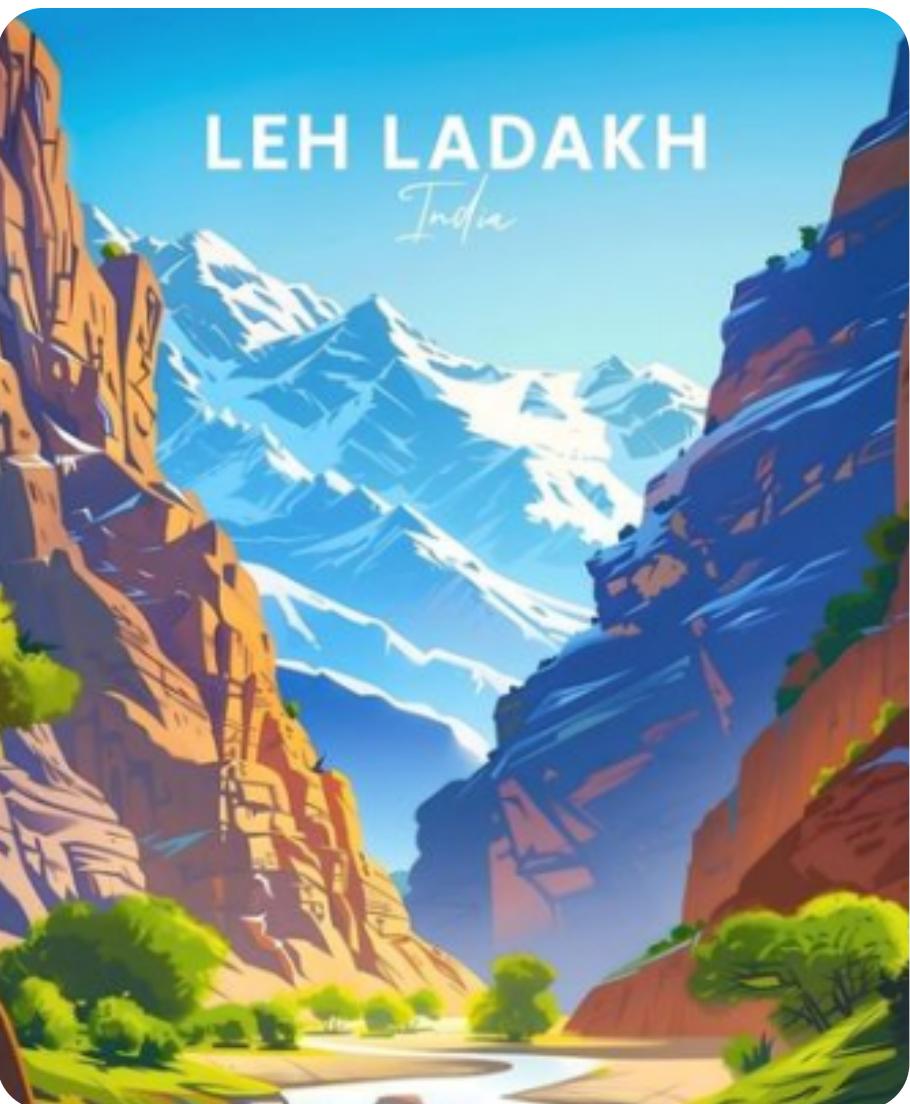
~8.3

(RECOMMENDED FOR FRIENDS TRIP)



₹25,000–₹35,000

~8.6



₹30,000–₹40,000

~8.9



₹30,000–₹40,000

~8.1



₹28,000–₹35,000

~8.2

TRAVELER-SPECIFIC ACCOMMODATION OPTIONS ACROSS POPULAR INDIAN CITIES

City	Property Name	Price (₹)	Rating	Recommended For
Shimla	Hotel Shingar Regency	34000	8.4	Family
Shimla	Woodville Palace Hotel	37500	8.2	Family
Shimla	Welcomhotel By ITC	39000	8.6	Family
Leh	The Grand Dragon Ladakh	42000	9.1	Friends
Leh	Zostel Leh	28000	8.9	Friends
Leh	Heschuk Guest House	30000	8.7	Friends
Manali	The Orchard Greens Resort	31000	8.5	Friends
Manali	Backpacker Panda	22000	8.8	Friends
Manali	Johnson Lodge & Spa	35000	8.6	Friends
Agra	Trident Agra	33000	8.7	Family
Agra	The Grand Imperial	31000	8.4	Family
Agra	Hotel Taj Resorts	29500	8.1	Family
Varanasi	BrijRama Palace	38000	8.8	Family
Varanasi	Ganpati Guest House	26000	8.5	Family
Varanasi	Hotel Alka	24000	8.2	Family

CONCLUSION

This project successfully addressed the core challenge faced by travelers: navigating overwhelming hotel options to find stays that align with their group type, preferences, and budget.

By leveraging data scraped from Booking.com and conducting comprehensive exploratory data analysis (EDA), we uncovered key insights that enable more intelligent, targeted, and user-centric accommodation recommendations.



THANK
YOU