

Data Visualization (Tableau and Power BI) by TalentLabs**Final Project (Total Marks 100)****Interactive Dashboard Link:**

<https://app.powerbi.com/view?r=eyJrIjoieYzdkYTAWZDQ0NzE1MS00ZTI3LTgyMzMtMjY5ZTM5NTUzNmE5liwidCI6ImRmODY3OWNkLWE4MGUtNDVhOC05OWFjLWM4M2VkN2ZmOTVhMCJ9>

Executive Summary

Airbnb brings investment opportunities through short-term rental properties, however major differences exist across neighborhoods in metrics like rental prices, demand, and guest satisfaction. How might investors identify and capitalize on the most lucrative opportunities to maximize their rental income?

1.0 Introduction

The dataset we're going to analyse is about the Airbnb listings in New York State. With this, our main analysis goal is to explore investment opportunities in Airbnb properties in different locations. The dataset includes key details like rental price per night, neighbourhood, and zip code, helping us figure out the best location for the Airbnb property investment.

The raw dataset of Airbnb contains 30,478 rows and 13 columns. The dataset contains information related to Airbnb listings, including:

Data Column	Data type	Description
Host Id	Integer	Identifier for the host on Airbnb
Host Since	Date	The date the host joined Airbnb
Name	String	Name of the listing
Neighborhood	String – Categorical	Neighborhood information
Property Type	String – Categorical	Type of property
Room Type	String – Categorical	Type of room
Zipcode	Integer	The zipcode of the property
Beds	Integer	Number of beds in the property
Number of Reviews	Integer	Total number of reviews
Price	Integer	Price of the property per night
Review Scores Rating	Integer	Rating of the property based on reviews
Review Scores Rating (bin)	String - Categorical	Bin rating scores for the reviews scores rating
Number of Records	Integer	Total number of records in the dataset

We'll focus our analysis on the 'Price,' 'Number of Reviews,' and 'Review Scores Rating' columns, crucial for investors eyeing potential returns and rental demand. Key performance indicators (KPIs) we'll extract include average price per night (indicative of rental prices), average review scores rating (a measure of guest satisfaction), and total number of reviews (a proxy for Airbnb's rental demand).

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The subsequent comparative analysis across categories like 'Neighbourhood,' 'Zipcode,' 'Property Type,' and 'Room Type' allows us to uncover trends and investment opportunities in Airbnb properties. This breakdown helps identify prime locations, understand guest preferences, and optimize property offerings to meet increasing demand. This approach aims to enhance the potential return on investment for Airbnb property investors.

2.0 Data Cleaning and Transformation

For this data analysis project, Power BI is chosen because it's easy to start, especially if you know Microsoft Excel. It connects to lots of data sources like databases, cloud services, and spreadsheets. Besides, it has data transformation capabilities with Power Query that lets us clean up data before analysis for accuracy. Furthermore, Power BI's Data Analysis Expressions (DAX) language is powerful for creating custom calculations. Plus, we can make live interactive dashboards that update automatically when we import new data.

The dataset we selected for this analysis contains information on Airbnb listings and properties. The raw data has 30,478 rows and 13 columns covering details like neighborhood, property type, price, reviews, and ratings. After cleaning the data, we can analyze this Airbnb information to uncover trends and opportunities for investing in short-term rental properties.

During data cleaning, we handled issues like missing values, incorrect data types, and redundant columns:

(i) Handling Missing Values: Certain columns have missing entries as below.

Column	Row Counts of Missing Entries	How to solve?
Review Scores Rating (bin)	8,309	Create separate columns to categorize the rows where their values are missing. Then, replace those missing entries as zero.
Review Scores Rating	8,309	
Beds	85	
Host Since	3	Remove those 3 rows
Property	3	Replace it with the value "Other"

(ii) Unsuitable Data Types: Power BI handled some data types incorrectly when we imported the CSV file. If we don't fix it, there might be problems when we try to add up, average, or count things in Power BI.

Below are some important columns we need to change them to appropriate data type:

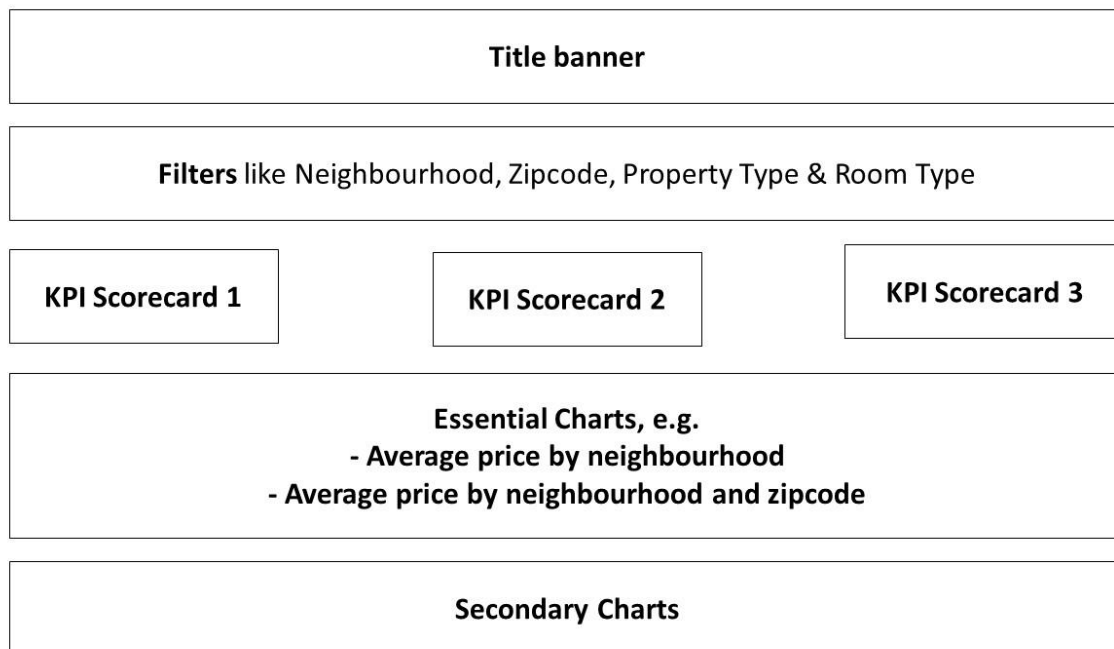
Column	Correct Data Type	Reason to change
Review Scores Rating	Integer	To deal with aggregation like SUM, AVERAGE, MIN, MAX, etc
Beds	Integer	
Price	Integer	
Zipcode	string - categorical	
Neighborhood	string – categorical	

Property Type	string – categorical	To be treated as categorical variable
Room Type	string – categorical	

(iii) Redundant or Irrelevant Column.

- The 'Number of Records' column contains only the value 1 for all entries, making it redundant for any analysis. And that's why we will remove this column.
- The 'Host since', 'Review Scores Rating (bin)' and 'name' columns are considered irrelevant and insignificant for our data analysis goal, which is to identify the opportunities for owning AirBnB investment property.

3.0 Dashboard Design



This dashboard is designed for investors looking to invest in Airbnb properties. It helps them spot top-performing areas with high rental potential and strong demand.

First, the key metrics like Average Price Per Night, Average Score Rating, and Total Number of Reviews will be placed at KPI scorecard sections.

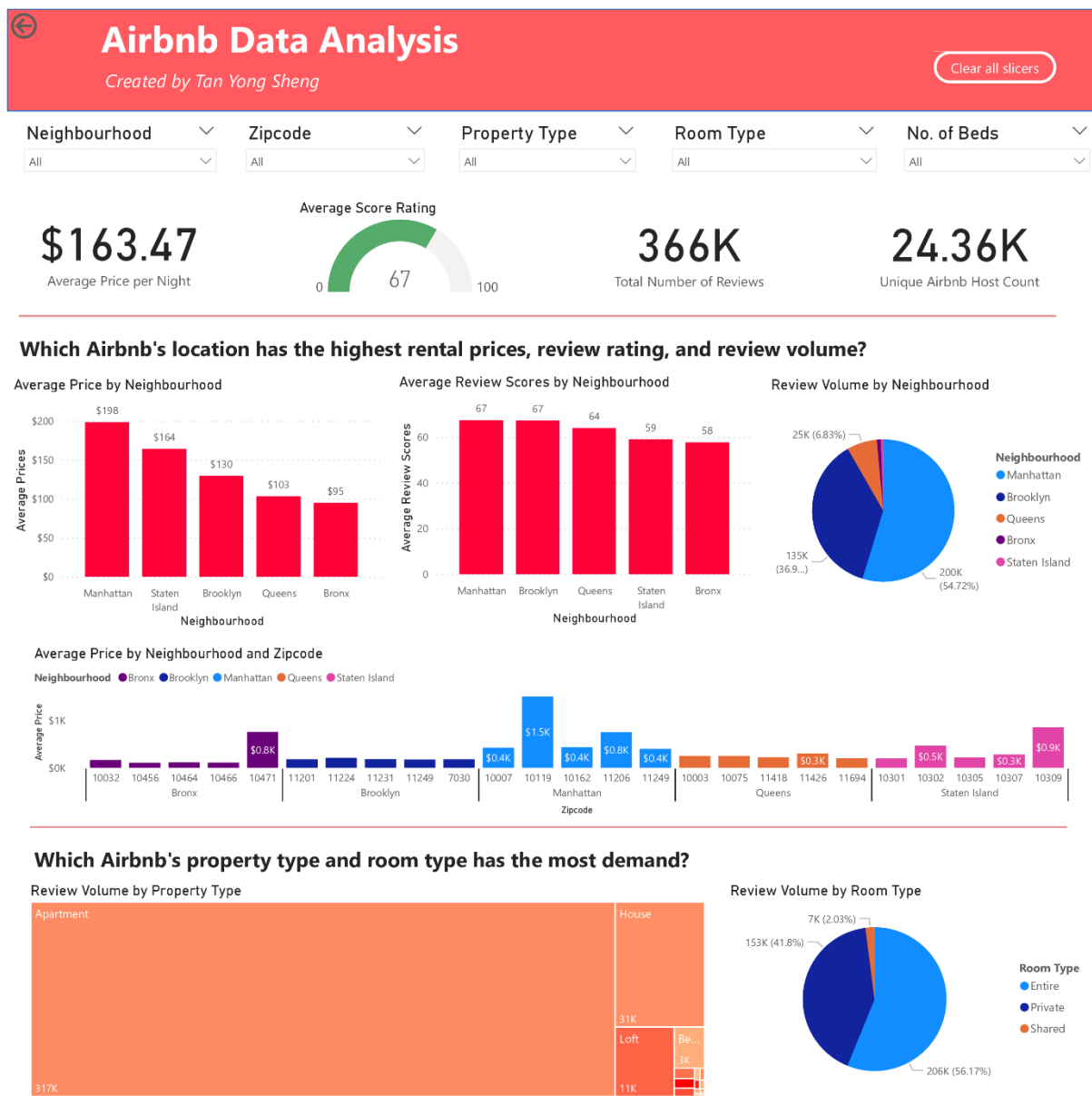
Then, those key metrics will be divided into categories like 'Neighbourhood,' 'Zipcode,' 'Property Type,' and 'Room Type' and those charts will be placed on the Essential Charts parts. This way, investors can quickly focus on potential returns they could obtain from their invested Airbnb properties, with visuals highlighting average rental prices at the dashboard.

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To make the presentation more interactive, we can add customizable filters on our dashboard, so the users can customize their view by applying filters for neighbourhood, zipcode, property type, room type, and number of beds, ensuring a personalized and insightful experience.

To build this dashboard, I would utilize formulas such as Average and Sum, along with visuals like KPI scorecards, bar charts and heatmap to aggregate data for clarity. As a double check, I also need to verify these formulas via Excel or tables in Power BI to ensure accurate and reliable insights.

4.0 Interpreting Insights from Dashboard



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The Airbnb visual shows some interesting opportunities for potential investors to capitalize on New York's short term rental market. With average rental prices per night of \$163 and over 366k reviews, this shows strong demand from renters.

However, not all areas in New York State are the same. Investors should look at specific neighbourhoods, such as:

- Manhattan is the top area, with 200k+ reviews. It also has the highest average price at \$198 per night. This makes it a good option for investors to focus on.
- Although Brooklyn has an average price 26% lower than Manhattan, its 135k+ reviews signify major market share. Savvy investors can target undervalued Brooklyn neighbourhoods primed for price growth.

So, with this dashboard, investors could identify hot spots for potential investments. However, it's also important to consider property costs (which its data is not inside the dashboard) before making any property investments, as a seemingly good property might be too expensive to buy in.

Furthermore, investors who use these insights could rent their properties at a better rate, as they have a better overview of the Airbnb market price.

5.0 Conclusion

In summary, the analysis uncovered investment opportunities in New York City's Airbnb market. The key factors boosting returns include:

- Choosing locations in high-demand neighbourhoods like Manhattan, which commands premium prices (highest at \$198).
- Focusing on positive reviews and high review scores, with Manhattan boasting 200k+ reviews and a score of 67.

To maximize returns, investors should target entire home listings in top neighbourhoods such as Manhattan, Brooklyn, and Queens. Improving properties. Addressing these factors can help investors make the most of the highest potential short-term rental opportunities.

6.0 Challenges and Reflection

Personally, I faced a few challenges in this data analysis project involves cleaning and transforming the data, ensuring accuracy in formulas, and creating effective dashboards to take actions. Addressing issues like missing values and creating user-friendly visuals can be hurdles.

In the journey of data analysis, skills like thorough data preparation, storytelling with data through effective visualizations, and understanding the audience play crucial roles. These acquired skills are versatile, serving purposes like monitoring KPIs and contributing to data-driven business strategies.