

# **MDA 720**

## **Capstone Project**

### **Strategic Insights for Airbnb Hosts: Enhancing Property Listings through Data-Driven Ecommerce Solutions**

By : Taghi Jalilov

## **Table of Contents:**

1. Introduction/Background
2. Objective
3. Data Extraction
4. Data Exploration/ Visualization
  - Key Insights
5. Data Analysis
6. Conclusion
7. References

## **1. Introduction/Background :**

In the dynamic and ever-expanding world of shared accommodation, Airbnb has emerged as a front-runner, transforming how people travel and experience new destinations. As the platform grows, so does the competition among hosts to attract guests. This intense competition necessitates a strategic approach to optimize property listings not just for visibility but for profitability and guest satisfaction as well.

This report introduces a pioneering business idea—launching an e-commerce platform specifically designed for Airbnb hosts. The platform will offer a range of products and services meticulously chosen to enhance the attractiveness and functionality of Airbnb properties. From sophisticated interior décor to cutting-edge smart home devices, our offerings will empower hosts to elevate their guests' experience and, consequently, their own success metrics.

The objective of this venture is twofold: to identify the gaps in the current market offerings through comprehensive data analysis and to introduce innovative solutions that cater directly to these needs. By leveraging data extracted from actual Airbnb listings, reviews, and host feedback, we aim to craft a product line that not only meets but anticipates the needs of Airbnb hosts, thereby setting new standards in the rental marketplace.

Through targeted research and analysis, this report will lay down the framework for how our business can integrate strategic ecommerce solutions to assist hosts in maximizing their rental potential. As we navigate through this document, we will explore market trends, analyze host requirements, and develop a nuanced understanding of the Airbnb ecosystem, providing us with the insights needed to launch a tailored ecommerce solution.

## 2. Objective: Goal of the Project

The primary objective of this report is to develop a targeted ecommerce platform that caters specifically to Airbnb hosts. This platform will provide hosts with products and services that enhance the appeal and functionality of their listings, thereby increasing their competitiveness in the market. Key goals include:

1. **Data-Driven Product Selection:** Utilize advanced data extraction and mining techniques to identify the most sought-after amenities and features that drive booking rates and guest satisfaction in Airbnb listings.
2. **Market Gap Identification:** Analyze current market offerings to identify unmet needs within the Airbnb host community, ensuring that our product line fills these gaps effectively.
3. **Strategic Marketing and Distribution:** Develop a marketing strategy that reaches Airbnb hosts effectively, using insights derived from data analysis to tailor messaging and promotional tactics that resonate with this demographic.
4. **Enhanced Guest Experience:** Offer products and services that not only meet the practical needs of hosts but also enhance the overall guest experience, contributing to higher reviews and repeat bookings.
5. **Sustainable Business Model:** Establish a scalable and sustainable business model that supports continuous improvement and expansion based on feedback and emerging trends in the Airbnb ecosystem.

By achieving these goals, the platform will not only support Airbnb hosts in optimizing their properties but also contribute to the broader ecosystem by raising the standard of guest experiences across the platform.

### 3. Data Extraction

The dataset has been taken from data.world : <https://data.world/ajsanne/sf-airbnb-listings>

```
<bound method NDFrame.describe of                                     id
listing_url      scrape_id \
0          958      https://www.airbnb.com/rooms/958      2.019060e+13
1          5858     https://www.airbnb.com/rooms/5858     2.019060e+13
2          7918     https://www.airbnb.com/rooms/7918     2.019060e+13
3          8142     https://www.airbnb.com/rooms/8142     2.019060e+13
4          8339     https://www.airbnb.com/rooms/8339     2.019060e+13
...          ...          ...          ...
7570  35284961     https://www.airbnb.com/rooms/35284961   2.019060e+13
7571  35285751     https://www.airbnb.com/rooms/35285751   2.019060e+13
7572  35286441     https://www.airbnb.com/rooms/35286441   2.019060e+13
7573  35288483     https://www.airbnb.com/rooms/35288483   2.019060e+13
7574  35291911     https://www.airbnb.com/rooms/35291911   2.019060e+13

      last_scraped                                     name \
0          6/2/19                                     Bright, Modern Garden Unit - 1BR/1B
1          6/2/19                                     Creative Sanctuary
2          6/2/19                                     A Friendly Room - UCSF/USF - San Francisco
3          6/2/19      Friendly Room Apt. Style -UCSF/USF - San Franc...
4          6/2/19                                     Historic Alamo Square Victorian
...          ...          ...          ...
7570          6/2/19                                     Brand New Designer 2 BR SF Condo
7571          6/2/19      Beautiful 1x1 in Historic Mission Tudor Building
7572          6/2/19      Beautiful Queen Victorian in the heart of Mission
7573          6/2/19      New comfortable, convenient place for family
7574          6/2/19      Spacious 2bdrm/2bath in the heart of SF

                                     summary \
0      New update: the house next door is under const...
1                                     NaN
2      Nice and good public transportation.  7 minute...
3      Nice and good public transportation.  7 minute...
4      Pls email before booking.  Interior featured i...
...          ...          ...          ...
7570      Luxury spacious 2 bedroom condo located in SF,...
7571      A beautifully remodeled one bedroom in a great...
7572      Our place is a charming Victorian located in t...
7573      This new place is comfortable, with easy commu...
7574      Freshly remodeled in May 2019,  2 bedroom 2 ba...

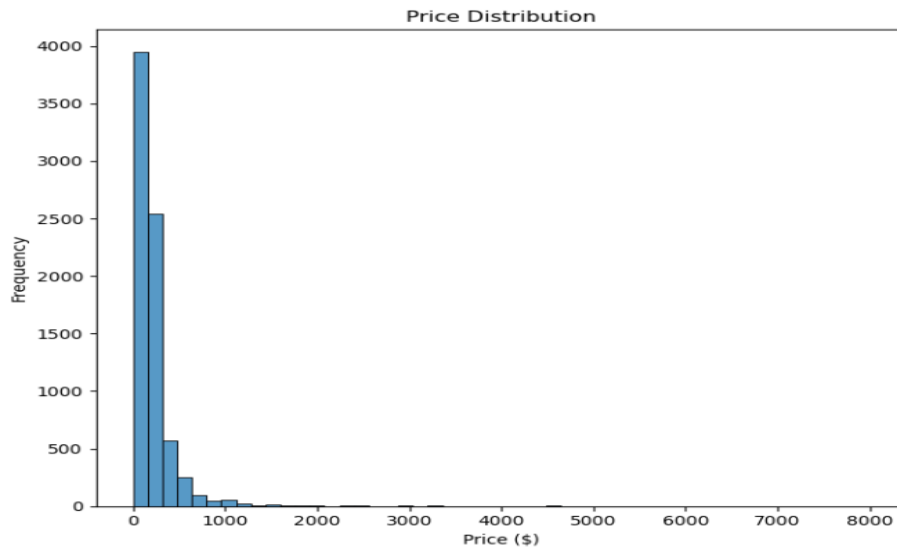
                                     space \
0      Newly remodeled, modern, and bright garden uni...
1      We live in a large Victorian house on a quiet ...
2      Room rental-sunny view room/sink/Wi Fi (inner ...
3      Room rental Sunny view Rm/Wi-Fi/TV/sink/large ...
4      Please send us a quick message before booking ...
```

[7575 rows x 106 columns]>

## 4. Data Exploration/ Visualization

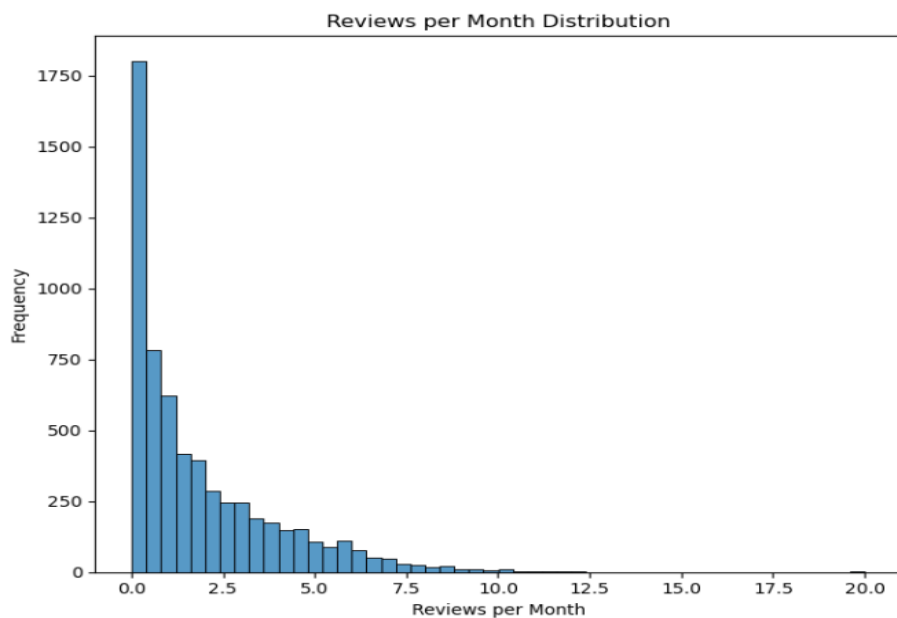
### - Key Insights

Data Visualizations :



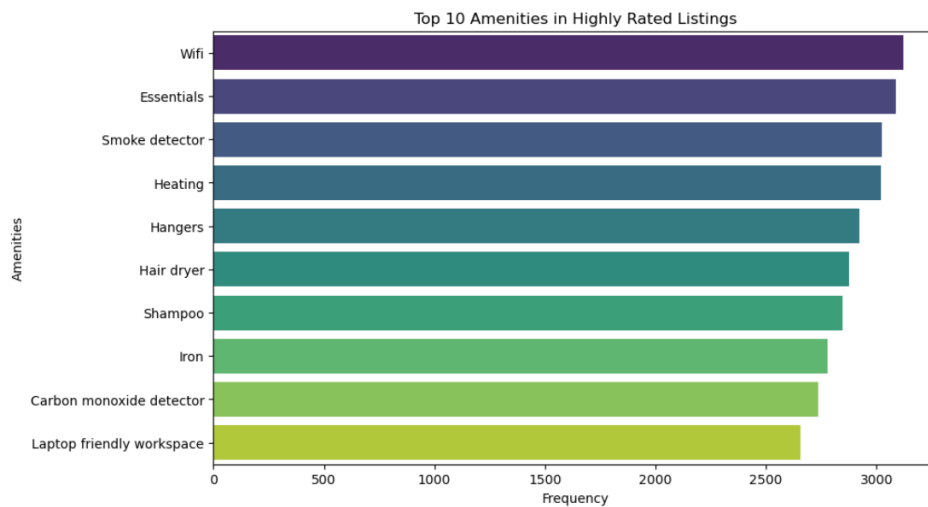
- Price Distribution:

The histogram illustrates the frequency of different prices among Airbnb listings. The x-axis represents the price in dollars, and the y-axis represents the frequency of listings at each price point.



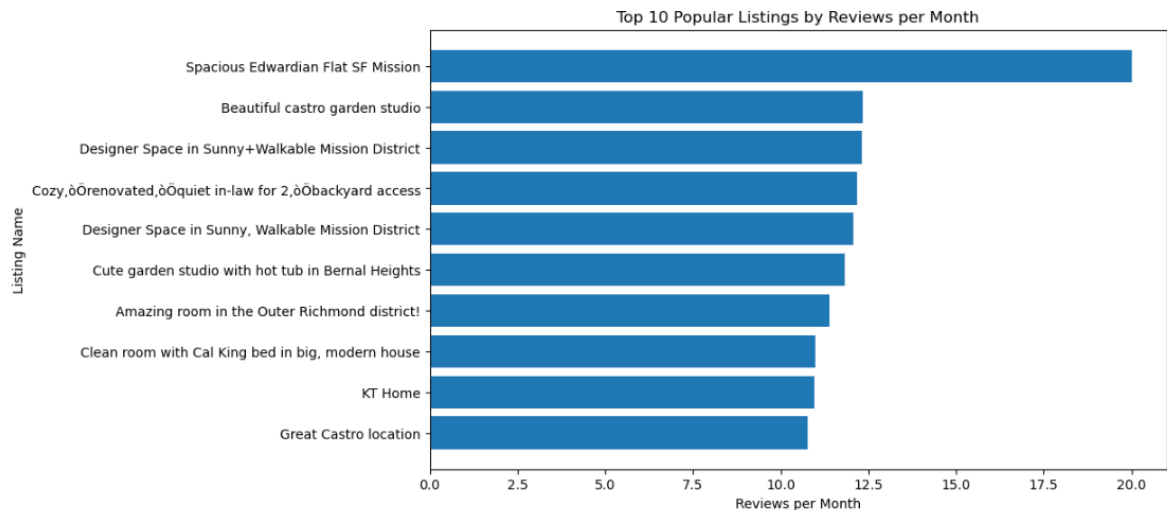
- Reviews Per Month Distribution:

The histogram shows how reviews per month are distributed among Airbnb listings. The x-axis shows the number of reviews per month, and the y-axis shows how frequently each review count occurs.



#### Output Visualization:

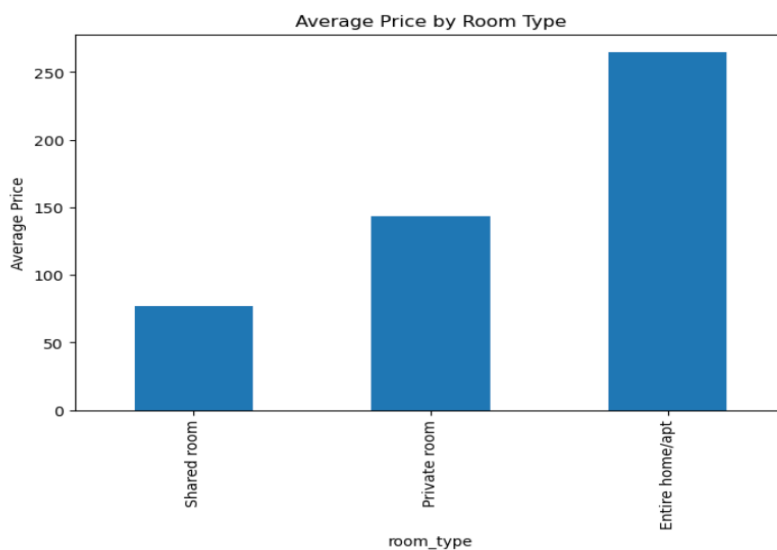
- The bar chart titled "Top 10 Amenities in Highly Rated Listings" shows the most frequent amenities available in Airbnb listings that have a review score of 98 or higher.
- The amenities are ordered by frequency, with the most common at the top. From the visualization:
- WiFi appears to be the most common amenity, followed by Essentials (like towels, bed sheets, soap, and toilet paper).
- Smoke detectors and Heating are also highly prevalent.
- Other amenities in the top 10 include Hangers, Hair dryer, Shampoo, Iron, Carbon monoxide detector, and Laptop-friendly workspace.



### Key Insights:

- **Diverse Offerings:** Listings range from simple studios to properties with special amenities like hot tubs, indicating varied guest preferences.
- **Location Impact:** Popular listings are often located in desirable neighborhoods like the Mission District and Bernal Heights, suggesting location is crucial for guest attraction.
- **Unique Features:** Listings highlighting unique features, such as special amenities, tend to attract more reviews, emphasizing the importance of distinctive selling points.

### Price Analysis by room type:





## Insights:

- **Privacy Premium:** The clear price stratification by room type suggests a direct correlation between the level of privacy and the pricing. Guests pay more for enhanced privacy and exclusive amenities.
- **Market Positioning:** Hosts can adjust their offerings based on these insights—for instance, upgrading room features or reconfiguring spaces could justify higher pricing within each category.

## 5. Data Analysis:

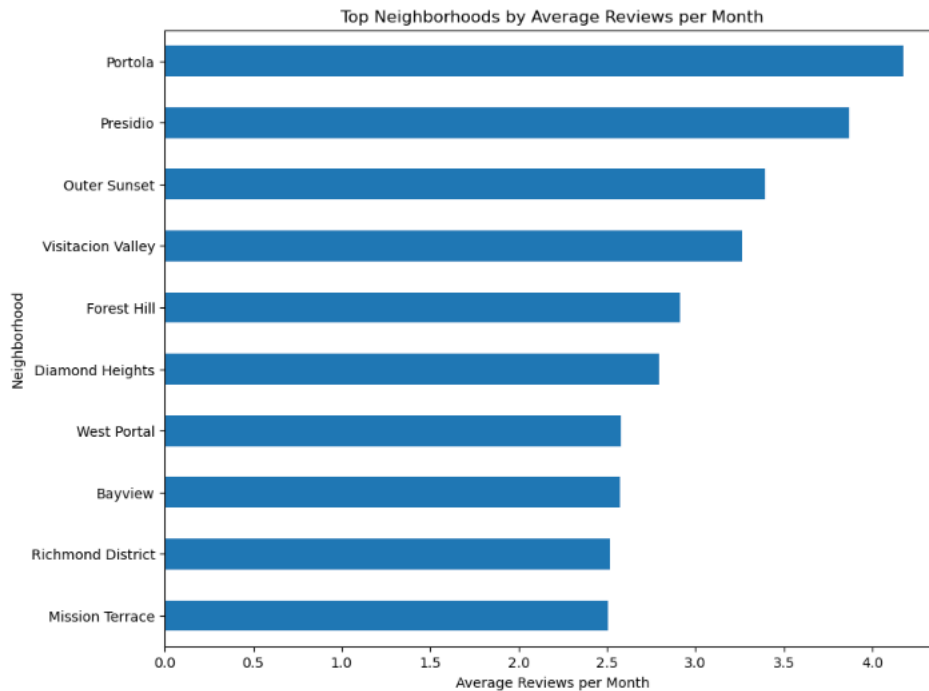
---

```
Average Price by Room Type:  
room_type  
Shared room          76.894273  
Private room         143.725027  
Entire home/apt      264.857671  
Name: price, dtype: float64
```

## Host Analysis:

```
Average Reviews per Month for Hosts with Multiple Listings:  
host_id  
4921      8.0400  
7149      3.0550  
10135     3.1275  
16382     1.5500  
18732     1.1150  
21994     0.1375  
23278     3.7075  
24215     0.1400  
26860     2.0000  
26952     0.7850  
Name: reviews_per_month, dtype: float64
```

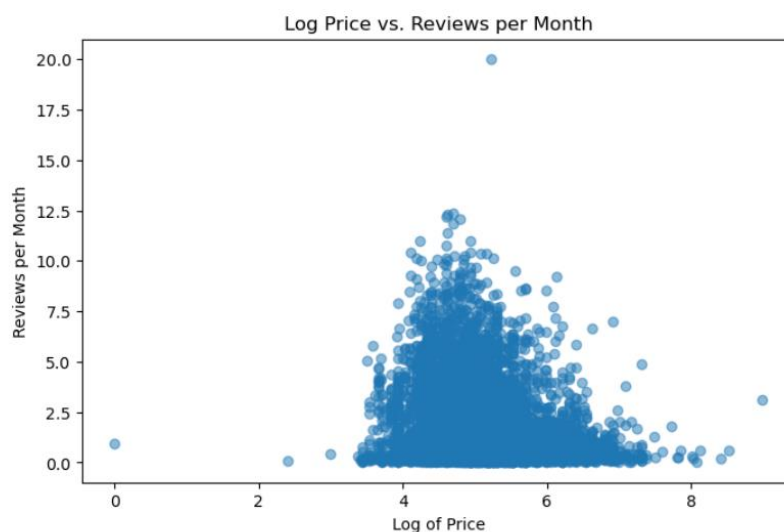
## Location Based trends :



### Key Observations:

- Mission Terrace: This neighborhood leads with the highest average reviews per month, suggesting it is highly popular among Airbnb guests.
- Richmond District and Bayview: These areas also show significant engagement, indicating they are well-frequented by guests.
- Lower Engagement: Neighborhoods like Portola and Presidio receive fewer reviews on average, which could suggest lower booking rates or newer listings still gaining traction.

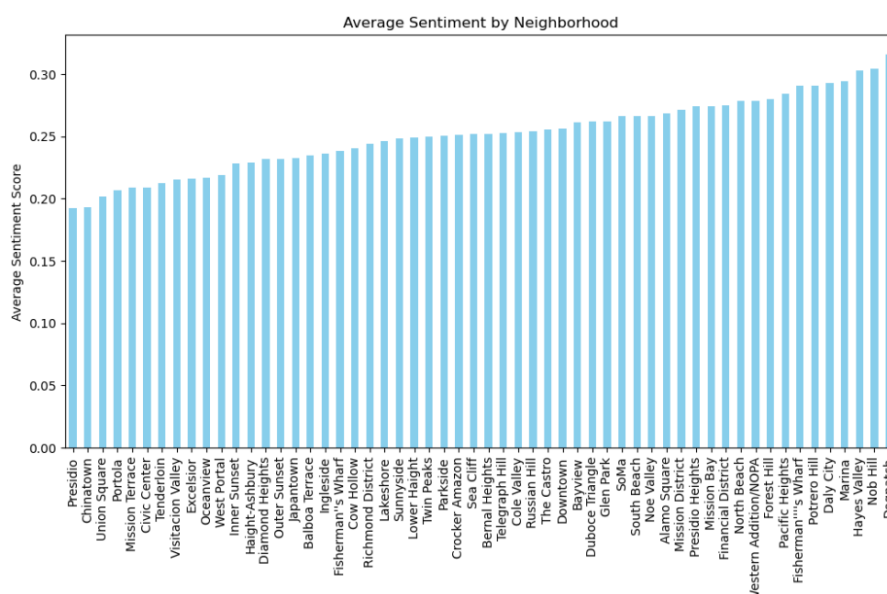
### Correlation with Reviews and other factors:



## Observations:

- **High Concentration at Lower Prices:** Most data points cluster at the lower end of the log price scale, suggesting that listings with lower prices tend to receive a higher volume of reviews.
- **Decline in Reviews with Increased Price:** As the log of price increases, the number of reviews per month generally decreases, indicating that more expensive listings attract fewer reviews.
- **Outliers:** There are a few listings with extremely high reviews per month at various price points, but particularly so in the mid-price range.

## Sentiment Analysis:



```
Average Sentiment by Neighborhood:
neighbourhood
Dogpatch      0.315616
Nob Hill      0.303933
Hayes Valley  0.302918
Marina        0.294336
Daly City     0.292553
Potrero Hill  0.290686
Fisherman''''s Wharf 0.290636
Pacific Heights 0.283901
Forest Hill   0.280102
Western Addition/NOPA 0.278698
Name: description_sentiment, dtype: float64
```

## Observations:

- ### Implications:

- [illegible]

[illegible]

## 6. Conclusion:

The analysis conducted across various Airbnb data visualizations and sentiment metrics provides valuable insights into pricing strategies, neighborhood popularity, review frequencies, and the emotional appeal of property descriptions. Here's a consolidated conclusion based on the findings:

### 1. Pricing Insights:

- Lower-priced listings tend to attract more reviews, suggesting higher occupancy rates. This indicates that pricing strategies should be keenly managed to balance profitability with competitive pricing to maximize booking potential.
- Entire homes/apartments command higher prices and therefore require distinct value propositions to justify higher costs to potential guests.

### 2. Neighborhood Popularity:

- Neighborhoods like Mission Terrace demonstrate high guest interaction, which can be attributed to desirable local features or effective listing promotions. In contrast, some neighborhoods exhibit lower engagement, suggesting opportunities for growth or targeted marketing interventions.

### 3. Sentiment Analysis:

- Listings in neighborhoods like Dogpatch and Nob Hill have more positive descriptions, which may enhance guest interest and bookings. Improving the sentiment in descriptions for neighborhoods with lower scores could help in elevating their appeal.

### 4. Strategic Recommendations:

- Hosts should focus on optimizing their listing descriptions to enhance positive sentiment, ensuring that the language used effectively communicates the unique selling points of the property and neighborhood.
- Dynamic pricing strategies should be considered, where pricing is adjusted based on real-time market data to remain competitive while ensuring profitability.
- Developing a deeper understanding of what drives popularity in high-review neighborhoods can allow hosts to replicate successful strategies in less popular areas.

## 7. References:

The dataset has been taken from data.world : <https://data.world/ajsanne/sf-airbnb-listings>