**Airbnb-Zillow-data-challenge**

**Executive Summary:**

**Objective:**

The objective of this analysis is to identify ideal Zip codes in NY city area for real estate company to invest in two-bedroom properties for short term rentals. Two publicly available datasets, Airbnb listing data (for Revenue) and Zillow Property (for cost) are used to conduct this study.

An ideal Zip code for investment would yield high revenue with low cost. In short term rental business there are Fixed costs and Variable costs. Property cost makes up the major of Fixed costs. There are other costs such as wages to employees, utilities etc. And there are Variable costs such as housekeeping, food, groceries, maintenance etc. Those information are not available to us right now. so, we are making few assumptions along the way to arrive at conclusive findings.

**Assumptions:**

* The analysis is conducted assuming current period as May-Jun-2017 since the datasets are time-stamped for that window and we do not have time-series data for Airbnb for later periods.
* We assume the estimation study conducted per May-Jun-2017 would be relevant for future period as well, since the time value of money discount rate is 0%. Also, the ratio of income vs expenses should remain fairly same for near future.
* We assume the occupancy rate of the listings for 90-day period has no outside influences such as promotions, seasonal attractions etc.
* Due to non-availability of time-series data. we assumed a study of listings for their performance for one quarter would provide insight on profitability.
* Since the listing price per night provides the highest revenue, for this study we assume all the listings are rented for daily rental so that the estimated revenue is highest possible for a given listing. Moreover, the monthly and weekly prices are closely related to Daily price.
* We assumed that variable costs and minor fixed costs associated with running a short-term rental to be similar across all Zip codes. meaning in RoI calculations the only cost considered is the property purchase price and all other cost offsets are considered to be uniform across all properties. moreover, other costs unaccounted are very nominal when compared to property cost.

**Findings**:

An Ideal/profitable investment would be in a Zip code that has high demand, most popular, high customer affinity and high Return of Investment (ROI). In order to determine ideal Zip codes, we could either build out an estimation model that could predict profitability OR study the performance of current listings over a fixed period of time and determine high performing Zip codes. Due to unavailability of time-series data for Airbnb listings and information on external factors that influence demand and price, we used the later for this analysis, that is performance of current listings over a fixed period of time. Based on quality check of datasets it is determined a 3-month (quarterly) performance of listings would give us insight on profitability.

Major factors that influence investment strategy are: Demand, Supply, Location Popularity, Value to customer, Revenue & Cost.

Demand influences Revenue and the number of days a property is booked indicates demand. Adding a property for rental in a Zip code would add to supply thereby reducing demand (assuming no other external factors influencing demand). so, if a Zip code had 10 listings, adding one more would increase the supply by 10%, whereas Zip code with 100 listings would have 1% increase in supply. Hence Total number of listings in a Zip code is a blended indicator for Supply and Popularity of neighborhood/Zip code. Higher the number of listing, lower the influx of supply when new properties are added for rental. Customer affinity drives demand. Happy customer brings repeat business, moreover high review rating attracts new customers.

After detailed analysis we are concluding that the ideal price range for listings is $250 to $350 per night with an average occupancy rate higher than 80% and have high customer affinity. The median cost of property in these Zip codes ranges from $900,000 to $2.3 Million thereby quarterly ROI is estimated to be around 1.25% to 2.5%. The list of Zip codes ideal for investment in the order of preference:

**Zip codes in first preference:**

11215

10003

10025

10036

10011

10014

11217

Additionally, the following Zip codes with low cost low revenue high returns can be considered, in the order of priority based on their current demand level, number of listings:

**Zip codes in second preference:**

10308

10305

10304

**Next Steps:**

1. As next steps we currently have only a snapshot of revenue data and historical cost data. We can augment this with more input data related to zip code population index, seasonality, attractions etc. and further refine the analysis.
2. The cost information from Zillow data matched for less than 40% of Zip codes. There were more than 50 Zip codes without median property cost and hence could not be included into this analysis for conclusive finding. The property cost data can be expanded to include all zip codes
3. The most appealing price band for NY rentals is $250 - $350. This puts Airbnb listings in direct competition with hotel market. Our understanding is that the Airbnb listings are doing well because they do not have overhead costs involved in traditional hotel business. However, an extensive analysis considering those factors could reveal new patterns.
4. Airbnb listings are very popular in $100 - $200 price band. This economical segment could turn out to be most profitable since the properties in such Zip codes tend to cost less. Also, overall trend of rental price vs property cost shows that the property cost increases at a rate of 2x - 3x times that of rental price increase.
5. This analysis is performed entirely within Airbnb market, we need to include data from traditional hotel market and other competitive business to realistically gauge the performance.

Thanks

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