Manhattan Airbnb Property Analysis

Project Overview

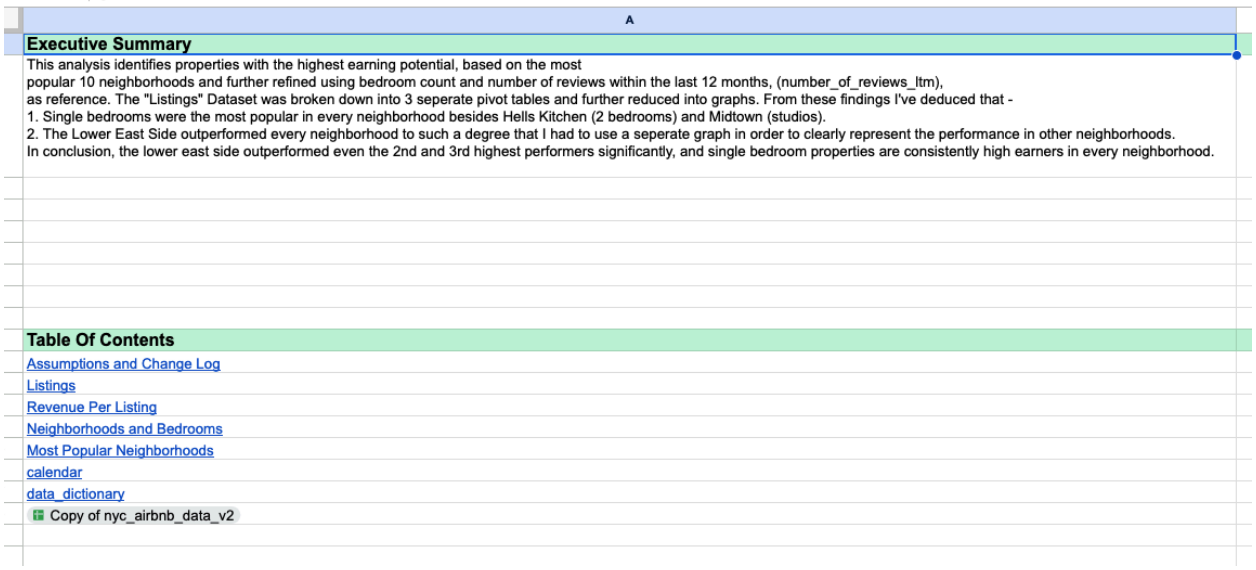
You've been hired to help a client analyze the Manhattan vacation rental market. The client wants guidance on which property types to invest in, and your task is to analyze Airbnb data for actionable insights.

This analysis answers two key questions:

1. **Which neighborhoods and property sizes (number of bedrooms) are most attractive for vacation rentals?**
2. **How much money did these listings generate?**

The project leverages real NYC Airbnb data, focusing on data cleaning, pivot table analysis, and revenue estimation to provide a data-driven roadmap for maximizing returns in the vacation rental sector.

Raw Data



A
Executive Summary
This analysis identifies properties with the highest earning potential, based on the most popular 10 neighborhoods and further refined using bedroom count and number of reviews within the last 12 months, (number_of_reviews_ltm), as reference. The "Listings" Dataset was broken down into 3 seperate pivot tables and further reduced into graphs. From these findings I've deduced that - 1. Single bedrooms were the most popular in every neighborhood besides Hells Kitchen (2 bedrooms) and Midtown (studios). 2. The Lower East Side outperformed every neighborhood to such a degree that I had to use a seperate graph in order to clearly represent the performance in other neighborhoods. In conclusion, the lower east side outperformed even the 2nd and 3rd highest performers significantly, and single bedroom properties are consistently high earners in every neighborhood.
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Listings
Revenue Per Listing
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calendar
data_dictionary
Copy of nyc_airbnb_data_v2

Data Cleaning

Before diving into the analysis, the data was carefully cleaned to ensure accuracy and consistency:

- The `neighborhood` column was standardized for consistent capitalization and removal of trailing spaces, with cleaned values stored in a new column called `neighborhood_clean`.
- The `bedrooms` column was cleaned so that empty cells (representing studios) were set to zero, and the results were stored in a new column called `bedrooms_clean`.
- All cleaning steps were documented in a separate change log sheet, and a copy of the raw data was preserved for reference.

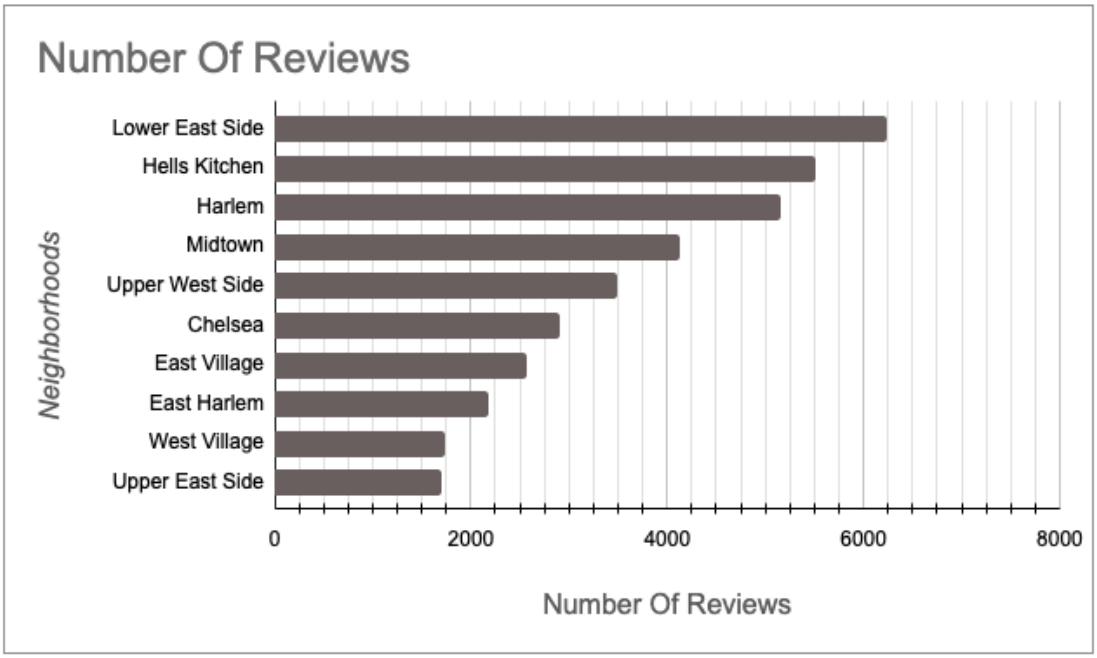
Analysis

1. Most Attractive Neighborhoods

To determine which neighborhoods are most attractive for vacation rentals, a pivot table was created using the `number_of_reviews_ltm` column as a proxy for rental frequency (since reviews are only left after a stay).

Top 10 Most Attractive Neighborhoods (by reviews):

Lower East Side | Hell's Kitchen | Harlem | (plus 7 more, see chart)



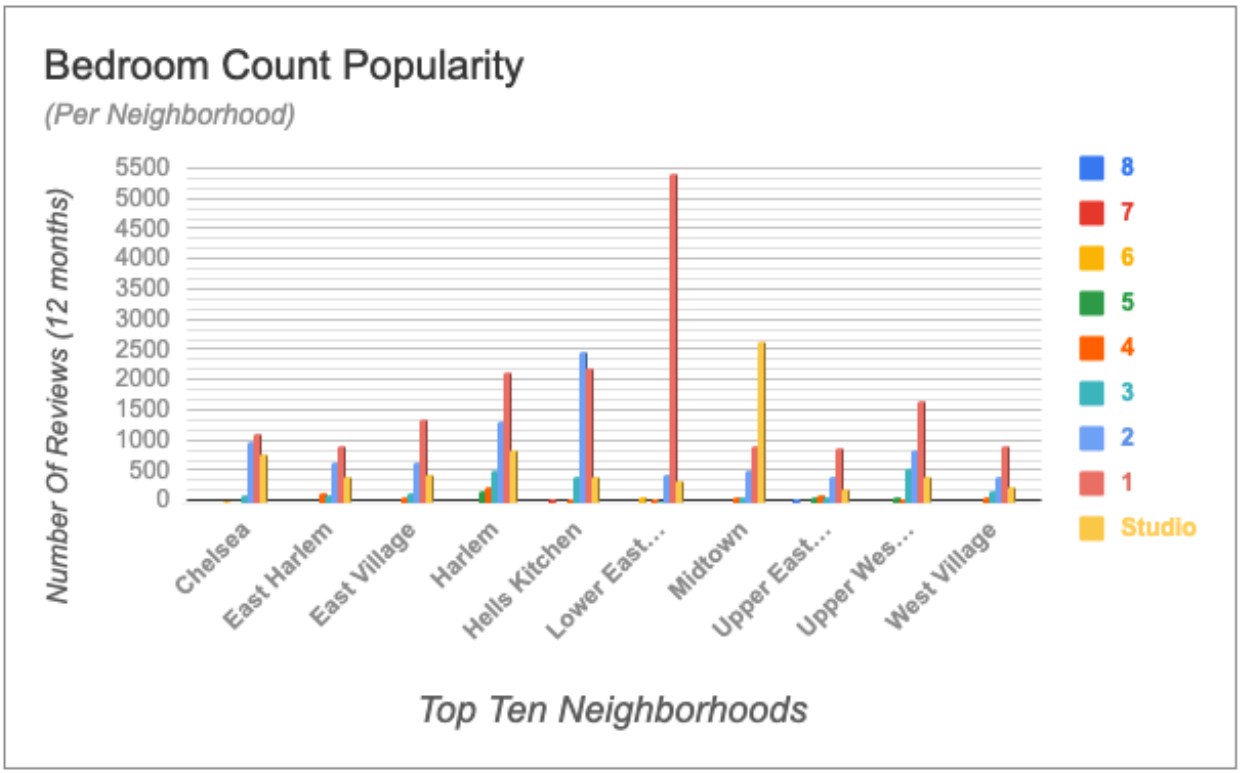
2. Most Popular Property Sizes

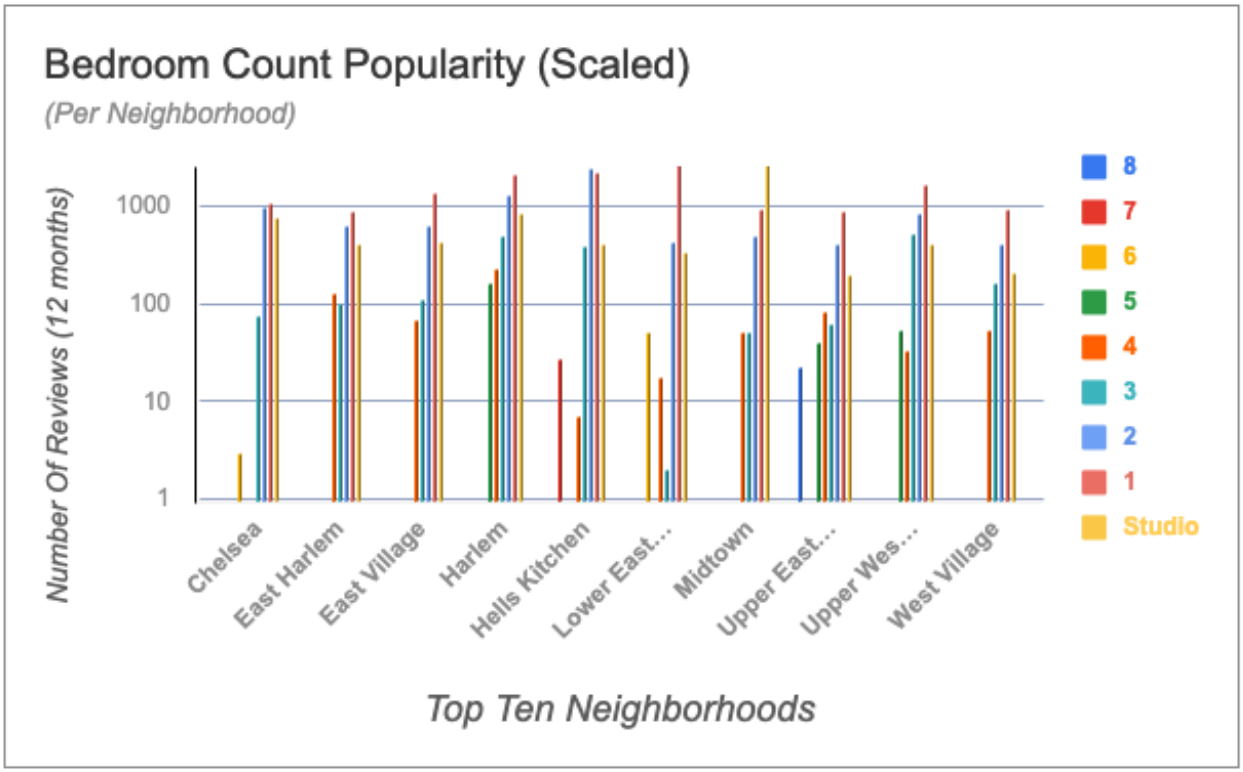
Next, the analysis focused on property size. A pivot table was used to determine which number of bedrooms were most popular among guests.

Top 3 Most Popular Property Sizes: Studios | 1-bedrooms | 2-bedrooms

These unit types consistently attracted the highest number of reviews, indicating strong guest preference, as seen below:

Most Popular Neighborhoods	Number Of Reviews (Last 12 Months)								
Bedroom Count	8	7	6	5	4	3	2	1	0
Chelsea			3			76	958	1095	781
East Harlem					131	101	639	899	405
East Village					68	110	626	1332	436
Harlem				165	228	494	1320	2126	824
Hells Kitchen		27			7	394	2470	2204	404
Lower East Side			51		18	2	429	5399	343
Midtown					51	52	488	908	2629
Upper East Side	23			41	85	61	407	885	194
Upper West Side				55	33	521	847	1639	402
West Village					53	162	402	907	211


Bedroom Count Popularity
(Per Neighborhood)
Number Of Reviews (12 months)
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Chelsea
East Harlem
East Village
Harlem
Hells Kitchen
Lower East...
Midtown
Upper East...
Upper Wes...
West Village
8
7
6
5
4
3
2
1
Studio
Top Ten Neighborhoods


Bedroom Count Popularity (Scaled)
(Per Neighborhood)
Number Of Reviews (12 months)
1000
100
10
1
Chelsea
East Harlem
East Village
Harlem
Hells Kitchen
Lower East...
Midtown
Upper East...
Upper Wes...
West Village
8
7
6
5
4
3
2
1
Studio
Top Ten Neighborhoods

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3. Neighborhood-Specific Preferences

Manhattan neighborhoods show unique tastes in property sizes, impacting rental demand and income. Knowing these preferences helps investors make smarter choices.

Key Findings:

1. **Harlem:**
    - **Most Popular:** 1-bedrooms
    - **Why?** Affordable space for solo travelers and couples.
2. **Lower East Side:**
    - **Most Popular:** Studios and 1-bedrooms
    - **Why?** Great location for budget-conscious, short-term visitors.
3. **Hell's Kitchen:**
    - **Most Popular:** 1-bedrooms and 2-bedrooms
    - **Why?** Tourists and groups need more space.
4. **Midtown:**
    - **Most Popular:** Studios
    - **Why?** Cheaper alternative to hotels in a central spot.
5. **Williamsburg (Brooklyn):**
    - **Most Popular:** 1-bedrooms and 2-bedrooms
    - **Why?** Trendy area attracts longer stays and remote workers.

Investment Tips:

- **Match property size to neighborhood.** Invest in 1-bedrooms in Harlem or studios in Midtown.
- **Avoid unpopular sizes.** Don't oversupply 3+ bedrooms in Hell's Kitchen.
- **Consider a mix.** Some areas (like Lower East Side) do well with both studios and 1-bedrooms.

Insert chart here: "Most Popular Property Size by Neighborhood"

Next Steps:

- **Adjust prices by neighborhood.** Charge more for popular sizes in high-demand areas.
- **Check out the competition.** See how well different property sizes are doing in each area.

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4. Revenue Analysis

To measure real-world earning potential, we analyzed revenue data from actual bookings. Each listing's income was calculated using the **calendar data**, tracking every night the property was rented. We created a new column called **revenue_earned**, which recorded the nightly **adjusted_price** if the property was booked, or **$0** if it was vacant.

By summing up 30 days of bookings, we estimated **monthly revenue** for each listing, then projected **annual revenue** by multiplying by 12. This approach revealed a dramatic gap between the highest and lowest earners.

Key Findings:

- **Top 10 Listings:** The best-performing properties earned **$29,940 in just 30 days**, projecting to **$359,280 annually**. These high earners typically had prime locations, strong reviews, and competitive pricing.
- **Bottom 10 Listings:** In contrast, the lowest earners struggled to generate meaningful income, with some barely covering costs. Poor photos, outdated listings, or inconvenient locations often held them back.

This stark difference highlights how **smart pricing, presentation, and location selection** can make or break an Airbnb investment. Investors should study top performers to replicate their success while avoiding the pitfalls of underperforming listings.

Results

- **Lower East Side, Hell's Kitchen, and Harlem** are the most attractive neighborhoods for Airbnb rentals.
- **Studios, 1-bedrooms, and 2-bedrooms** are the most popular property sizes.
- Neighborhood preferences vary, with 1-bedrooms being especially in demand in Harlem.
- There is a significant gap between the top and bottom earning listings, with the top listing generating over $29,000 in a single month.

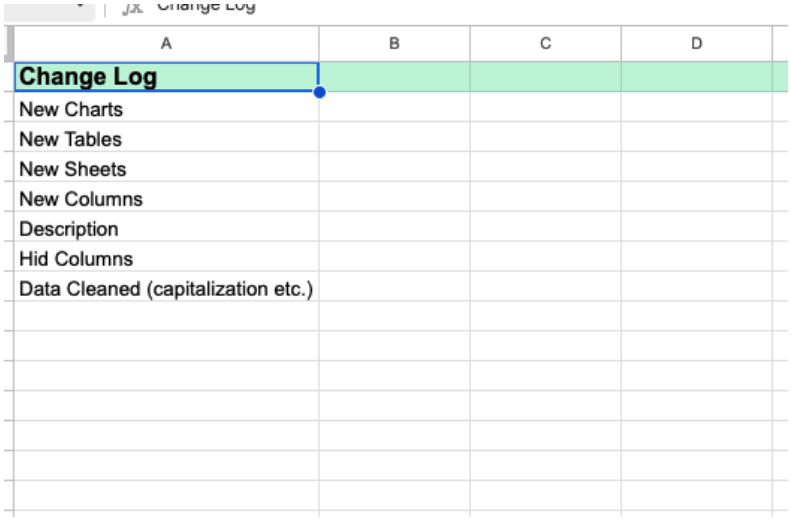
Conclusions

Manhattan’s Airbnb market shows strong, data-driven trends in both neighborhood and property size preferences. Investors can maximize occupancy and revenue by focusing on the most in-demand areas and unit types. Revenue potential is significant, especially for well-located and appropriately sized properties, but performance varies widely between listings.

Recommendations

- **Invest in the Lower East Side, Hell's Kitchen, or Harlem** to capture high demand.
- **Prioritize studios and 1-bedroom units**, especially in neighborhoods where they are most popular.
- **Regularly review and adjust pricing** based on neighborhood trends and seasonality.
- **Maintain high listing quality and monitor guest reviews** to sustain strong rental performance.
- **Analyze top and bottom performers** to identify what drives success and avoid common pitfalls.

Change Log



	A	B	C	D
	Change Log			
	New Charts			
	New Tables			
	New Sheets			
	New Columns			
	Description			
	Hid Columns			
	Data Cleaned (capitalization etc.)			

Assumptions

	A	B	C	D	E	F	G	H	I	J	K
	Assumptions										
1	The dataset includes all active vacation rental listings in the target market for the analysis period.										
2	Listings marked as “active” are available for booking during the entire analysis period.										
3	Guest review counts are used as a proxy for bookings, assuming review rates are consistent across listings.										
4	Revenue is calculated as nightly rate times booked nights; extra fees are excluded unless specified.										
5	Occupancy rate is booked nights divided by total available nights for each listing.										
6	Listings are grouped by bedroom count; listings with missing or unclear bedroom data are excluded from property size analysis.										
7	Listings are assigned to neighborhoods based on address or coordinates; those with missing or unclear location data are excluded from neighborhood analysis.										
8	Host activity is measured by calendar updates, response times, and recent listing changes, if available.										
9	Nightly rates are treated as fixed unless dynamic pricing data is provided; if so, the average rate is used.										
10	Guest preferences are inferred from higher occupancy and review counts for certain property types.										
11	The data period is assumed to reflect normal seasonal trends unless it only covers a specific season.										
12	Obvious data errors (e.g., impossible prices, occupancy rates over 100%) are excluded from analysis.										
13	Revenue differences are linked to management practices, listing quality, and location, based on available data.										
14	Listing visibility is assumed to be influenced by review count, response rate, and listing updates.										
15	Local rental laws or regulations are not considered unless included in the data.										

Cleaned Raw Data

A	AC	AK	AM	AN	AO	AP	AQ	BF
id	neighborhood_clean	bathrooms_text	bedrooms_clean	Top_Listing	Top_NB	Top_BD	revenue_earned	number_of_reviews_ltm
82638	East Village	1 bath	1	1	TRUE	TRUE	3549	3
9357	Hells Kitchen	1 bath	0	0	TRUE	FALSE	5250	0
57618	Hells Kitchen	1 bath	1	1	TRUE	TRUE	7500	7
57754	Flatiron District	1 bath	1	0	FALSE	TRUE	9570	28
57874	East Harlem	1 bath	1	1	TRUE	TRUE	4320	55
15341	Lower East Side	1 bath	1	1	TRUE	TRUE	2729	6
59014	Lower East Side	1 bath	1	1	TRUE	TRUE	5750	1
59709	Chinatown	1 bath	2	0	FALSE	FALSE	8100	23
60164	Tribeca	1 bath	3	0	FALSE	FALSE	3500	3
16974	East Harlem	2 baths	4	0	TRUE	FALSE	7350	26
60611	East Harlem	1 bath	1	1	TRUE	TRUE	3300	1
107895	Upper West Side	1 bath	0	0	TRUE	FALSE	4980	2
17037	East Village	1 bath	1	1	TRUE	TRUE	6600	0
60680	East Village	1 bath	1	1	TRUE	TRUE	4800	2
61509	Midtown	1 bath	1	0	TRUE	FALSE	3300	0
62427	East Village	1 bath	1	1	TRUE	TRUE	3120	1
19159	Harlem	1 bath	2	0	TRUE	FALSE	3190	0
62891	East Village	1 bath	0	0	TRUE	FALSE	4725	9
116551	Harlem	1 bath	0	0	TRUE	FALSE	2100	2
63693	East Village	2 baths	2	0	TRUE	FALSE	11700	0
23686	West Village	2 baths	3	0	TRUE	FALSE	14250	3
123784	Harlem	1 bath	0	0	TRUE	FALSE	2739	33
126443	East Village	2 baths	2	0	TRUE	FALSE	12852	60
27644	Harlem	1 bath	1	1	TRUE	TRUE	4750	18
65425	Nolita	1 bath	2	0	FALSE	FALSE	3075	10
29683	Lower East Side	1 bath	1	1	TRUE	TRUE	5550	2
66251	East Village	1 bath	0	0	TRUE	FALSE	9776	32
140973	East Village	Half-bath	2	0	TRUE	FALSE	6450	4
67288	East Harlem	1 bath	1	1	TRUE	TRUE	3665	7
144087	Harlem	1 bath	2	0	TRUE	FALSE	9584	7
36703	West Village	1 bath	1	1	TRUE	TRUE	6000	5
148825	Upper West Side	1 bath	2	0	TRUE	FALSE	5021	36
68974	Nolita	1 bath	3	0	FALSE	FALSE	17275	11
69894	Upper West Side	1 bath	1	1	TRUE	TRUE	4800	3
42300	Lower East Side	2 baths	2	0	TRUE	FALSE	19950	8
71248	Chinatown	1 bath	1	0	FALSE	TRUE	4650	4