Airbnb Seattle Revenue & Pricing Intelligence:
A SQL-Driven Exploratory Data Analysis

Goal: *To uncover actionable insights that can support pricing strategy, host performance evaluation, and neighborhood-level decision-making*

Tool used: **SQL Server / Azure Data Studio**

Dataset: **Airbnb Listings, Pricing & Reviews**

By Joan .C. Chukwuemeka

INTRODUCTION

This exploratory data analysis uses SQL to explore how **pricing decisions, customer sentiment, and host activity influence revenue performance** across Airbnb listings.

Using SQL, I explored questions that help Airbnb Seattle understand:

- **Where revenue is generated (Revenue & Financial Performance)**

- **How Listings Compete Locally (Pricing & Neighborhood Market Dynamics)**

- **What Guests Are Saying** (**Customer Sentiment & Review Analysis**)

- **Which hosts and listings remain most active over time (Host & Listing Activity Trends)**.

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Business Questions
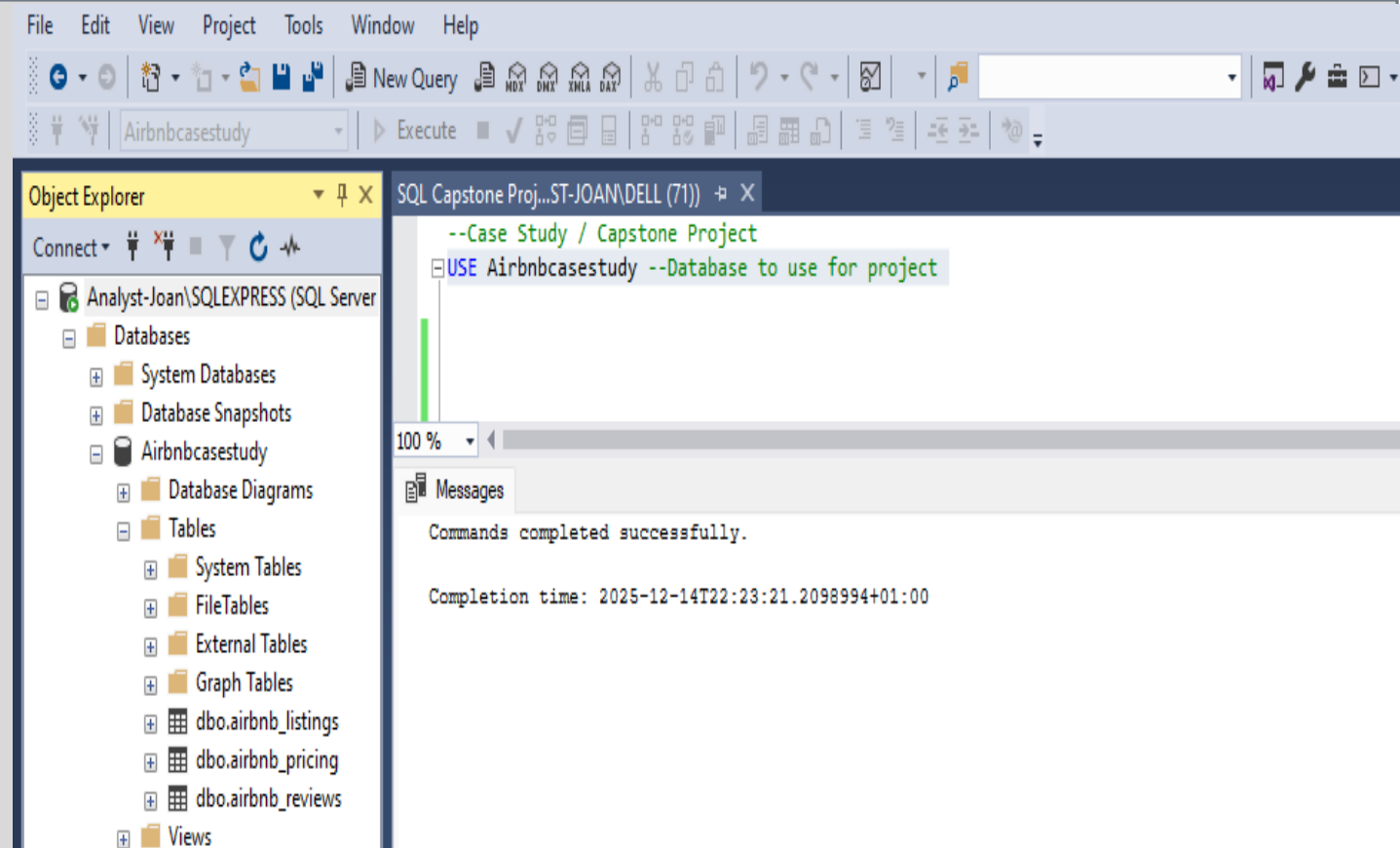
1. Revenue & Financial Performance

- *Which neighborhoods contribute the most to overall revenue, and how do their average listing prices compare?*

- *How much revenue did hosts generate from listings that were last reviewed within the past one year?*

- *What portion of total revenue is driven by premium listings priced above $700?*

2. Pricing & Neighborhood Market Dynamics

- *How do average listing prices vary across neighborhoods within the market?*

- *How do listings perform financially when priced above or below their neighborhood's average price?*

3. Customer Sentiment & Review Analysis

- *How frequently do guests describe their stays as "comfortable" in review comments?*

- *Which listings receive consistently positive guest feedback based on review sentiment?*

- *Which listing generates the highest level of guest engagement through review volume?*

4. Host & Listing Activity Trends

- *Which listings show recent guest engagement based on review activity in late 2022?*

- *Which hosts can be identified by the name "Stan," independent of letter casing?*

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Revenue & Financial Performance
Which neighborhoods contribute the most to overall revenue, and how do their average listing prices compare?

```
[1]    1    SELECT neighbourhood,SUM(P.price) AS Total_revenue, AVG(P.price) AS Average_Price
       2    FROM airbnb_listings L
       3    LEFT JOIN airbnb_pricing P
       4    ON L.id = P.listing_id
       5    GROUP BY neighbourhood
       6    ORDER BY Total_revenue desc;
```

(88 rows affected)

Total execution time: 00:00:02.784

Insight:

Belltown generates the highest revenue of $18.93M, with an Average price of $360 per night.

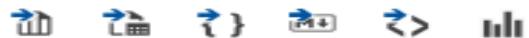*Affordability is a likely driver, as the earnings are above that of South Lake Union with an Average price of $721 per night*

	neighbourhood	Total_revenue	Average_Price
1	Belltown	18927075.00	360.104166
2	Broadway	12328069.00	207.455936
3	South Lake Union	12112525.00	721.413043

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How much revenue did hosts generate from listings that were last reviewed within the past one year?

```
[2]    1    SELECT
       2        L.host_name, L.host_id,
       3        SUM(P.price) AS Total_Revenue
       4    FROM airbnb_listings L
       5    JOIN airbnb_pricing P
       6        ON L.id = P.listing_id
       7    WHERE YEAR(L.last_review) >= (
       8            SELECT MAX(YEAR(last_review))
       9            FROM airbnb_listings
      10        ) - 1        -- past 1 year based on dataset, not today's date
      11    GROUP BY
      12        L.host_id,L.host_name
      13    ORDER BY
      14        Total_Revenue DESC;
      15
```

(1695 rows affected)

Total execution time: 00:00:00.981

Insight:

Vince and Blueground were the top earners, with a Total revenue above **6 Million dollars ($6M)**

	host_name	host_id	Total_Revenue
1	Vince	340706410	6503149.00
2	Blueground	107434423	6469625.00
3	Melissa	3074414	2674720.00
4	Seattle Vacation Home	54812088	2668150.00
5	Eva And Sid	25110157	2541860.00

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What portion of total revenue is driven by premium listings priced above $700?

```sql
1   SELECT
2       SUM(P.price) AS Total_Revenue,
3       SUM(CASE
4               WHEN L.price > 700 THEN P.price
5               ELSE 0
6           END) AS Revenue_Above_700,
7       (SUM(CASE
8               WHEN L.price > 700 THEN P.price
9               ELSE 0
10          END) * 100.0 / SUM(P.price)) AS Revenue_Above_700_Percentage
11  FROM airbnb_pricing P
12  JOIN airbnb_listings L
13      ON P.listing_id = L.id
14  WHERE L.price IS NOT NULL;
```

(1 row affected)

Total execution time: 00:00:01.862

Insight:

*Listings priced above $700 account for **less than 5%** ($9.23M) of total revenue ($190.73M).*

*This indicates that **overall revenue is primarily driven by mid- to lower-priced listings,** likely due to higher booking frequency and broader demand, while premium listings play a smaller, niche role in revenue generation.*

	Total_Revenue	Revenue_Above_700	Revenue_Above_700_Percentage
1	190729535.10	9232726.10	4.840742

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Pricing & Neighborhood Market Dynamics

How do average listing prices vary across neighborhoods within the market?

```sql
1    SELECT neighbourhood, AVG(P.price) AS Average_Price
2    FROM airbnb_listings L
3    LEFT JOIN airbnb_pricing P
4    ON L.id = P.listing_id
5    GROUP BY neighbourhood
6    ORDER BY Average_Price desc;
```

(88 rows affected)

Total execution time: 00:00:02.946

	neighbourhood	Average_Pr...
1	South Lake Union	721.413043
2	Pioneer Square	446.523809
3	Pike-Market	399.111111
4	Belltown	360.104166
5	Whittier Heights	341.694444
6	Rainier View	297.333333
7	Eastlake	281.666666
8	West Queen Anne	263.045454
9	Madrona	247.666666
10	Harrison/Denny-Blaine	247.235294

Insight:

Average listing prices vary substantially across neighborhoods, indicating strong location-based pricing dynamics.

South Lake Union stands out as a premium pricing area with an average nightly rate of $721, while Highland Park represents the lower end of the market at $71.

Neighborhoods like Madrona ($247) fall between these extremes, reflecting moderate pricing relative to the broader market distribution.

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How do listings perform financially when priced above or below their neighborhood's average price?

```sql
1   -- 1 Calculate average price per neighbourhood using CTE
2   WITH NeighbourhoodAvg AS (
3       SELECT
4           neighbourhood,
5           AVG(price) AS avg_neighbourhood_price
6       FROM airbnb_listings
7       WHERE price IS NOT NULL -- ✅ exclude NULLs from average
8       GROUP BY neighbourhood
9   ),
10  -- 2 Calculate total revenue per listing using CTE
11  ListingRevenue AS (
12      SELECT
13          listing_id,
14          SUM(price) AS total_revenue
15      FROM airbnb_pricing
16      GROUP BY listing_id
17  )
18
```

(2873 rows affected)

Total execution time: 00:00:01.322

```sql
19
20  -- 3 Final result: categorize listings
21  SELECT
22      L.id AS listing_id,
23      L.name AS listing_name,
24      L.neighbourhood,
25      L.price AS listing_price,
26      N.avg_neighbourhood_price,
27      R.total_revenue,
28
29      CASE
30          WHEN L.price IS NULL
31              THEN 'Price Unlisted' -- ✅ 3rd category
32              -- (Added by me to handle NULLs,i.e listings will no price)
33          WHEN L.price > N.avg_neighbourhood_price
34              THEN 'High-priced'
35          ELSE 'Low-priced'
36      END AS price_category
37
38  FROM airbnb_listings L
39  JOIN NeighbourhoodAvg N
40      ON L.neighbourhood = N.neighbourhood
41  JOIN ListingRevenue R
42      ON L.id = R.listing_id
43  ORDER BY R.total_revenue DESC;
```

Insight:

The Price of the listings relative to the their neighborhood's average price _does not directly influence the financial performance_

	listing_id	listing_name	neighbourhood	listing_price	avg_neighbourhood_p...	total_rev...	price_catego...
1	42681629	Blueground | S. Lake Union, fitness & roo...	Belltown	413	257	1624250.00	High-priced
2	49211457	6th months or longer home in the Heart of...	Belltown	3000	257	1095000.00	High-priced
3	45336316	Blueground | Belltown, gym & roof lounge,...	Belltown	492	257	933670.00	High-priced
4	48344827	Blueground | S. Lake Union, gym, bbq, nr ...	Belltown	NULL	257	916880.00	Price Unlisted
5	53118717	Blueground | S. Lake Union, gym, nr space...	South Lake Union	288	270	903010.00	High-priced
6	41701444	Blueground | S. Lake Union, gym, nr groce...	South Lake Union	246	270	893520.00	Low-priced
7	42084111	Blueground | Pioneer Sq, gym & laundry	Pioneer Square	458	204	885490.00	High-priced
8	41976651	Blueground | S. Lake Union, gym, pool & r...	South Lake Union	256	270	849355.00	Low-priced
9	52506678	Blueground | S. Lake Union, gym, nr space...	South Lake Union	185	270	738395.00	Low-priced
10	6053606	Mint Julep - Southern hospitality in Seat...	Wallingford	284	246	730000.00	High-priced

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Customer Sentiment & Review Analysis
How frequently do guests describe their stays as "comfortable" in review comments?

```sql
1   ALTER TABLE airbnb_reviews
2   ALTER COLUMN comments NVARCHAR(MAX);
3
```

Commands completed successfully.

Total execution time: 00:00:00.013

Insight:

```sql
[1]  1   SELECT
     2       SUM(
     3           (LEN(comments) - LEN(REPLACE(comments, 'comfortable', ''))) / 11
     4       ) AS Total_Occurrences
     5   FROM airbnb_reviews;
```

***The word comfortable appears over 100k times.
This indicates that hosts provide a good
experience overall***

(1 row affected)

Total execution time: 00:01:03.571

Total_Occurre...
1 101920

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Which listings receive consistently positive guest feedback based on review sentiment?

```sql
1  SELECT
2      l.id,
3      l.name,
4      l.host_name,
5      l.price,
6      l.neighbourhood,
7      r.review_count,
8      r.positive_reviews,
9      (r.positive_reviews * 100.0 / r.review_count) AS positive_pct
10 FROM airbnb_listings l
11 INNER JOIN --Only listings that have reviews (exist in the subquery result below) are included
12     (SELECT
13         listing_id,
14         COUNT(*) AS review_count,
15         SUM(
16             CASE
17                 WHEN LOWER(comments) LIKE '%great%'
18                     OR LOWER(comments) LIKE '%good%'
19                     OR LOWER(comments) LIKE '%comfortable%'
20                 THEN 1 ELSE 0
21             END
22         ) AS positive_reviews
23     FROM airbnb_reviews
24     GROUP BY listing_id -- Groups all rows by listing_id (reviews for the same listing go together)
25     ) r
26         ON l.id = r.listing_id -- matches rows where l.id = r.listing_id
27 WHERE r.review_count >= 5 --  Removes listings with fewer than 5 reviews
28     AND (r.positive_reviews * 100.0 / r.review_count) >= 70  -- Removes listings with less than 70% positive reviews
29 ORDER BY positive_pct DESC;
30
```

(530 rows affected)

Total execution time: 00:00:47.310

Insight:
Listings in Fremont, Columbia city, and Broadway had more that one records of 100% positive reviews

	i..	name	host_na...	price	neighbourho...	review_co...	positive_rev...	positive...
1	1305...	Garden view room in Quiet Greenlake house w trees	Nathan	55	Wallingford	6	6	100.00000000...
2	9448...	Capital hill	Savannah	89	Minor	8	8	100.00000000...
3	1467...	Bright, modern home centrally located-Wallingford	Kerry	286	Fremont	6	6	100.00000000...
4	2114...	Columbia City Secluded Apartment	Maura	95	Columbia City	10	10	100.00000000...
5	3807...	Admiral's Nest: Luxury Condo in West Seattle	Grant	111	North Admiral	6	6	100.00000000...
6	4377...	Ravenna ADU, private entrance and patio	Eli	110	Ravenna	6	6	100.00000000...
7	4516...	Spacious 3 bedroom -- Quiet location	Doug	NULL	Columbia City	8	8	100.00000000...
8	4809...	NEW Clean & Modern West Seattle Studio	Tiffany	120	High Point	5	5	100.00000000...
9	4945...	Cute Craftsman in Walkable Fremont	Crystal	128	Fremont	8	8	100.00000000...
10	5117...	Beautiful Capitol Hill Furnished Monthly Rental	Mel	157	Broadway	5	5	100.00000000...
11	5329...	Olympic Hills Four Bedroom with Hot Tub and Grill	David	NULL	Pinehurst	8	8	100.00000000...
12	6779...	Beautiful Condo on Caphill	Matthew	250	Broadway	14	13	92.857142857...
13	1603...	Center UW Fast Internet Comfy 208	Melissa	125	University Dist...	24	22	91.666666666...
14	1788...	Large 2 bdr 5 min to UW /Green Lake/ Bryant 4	Melissa	170	Bryant	11	10	90.909090909...

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Which listing generates the highest level of guest engagement through review volume?

```sql
SELECT l.id, l.name, COUNT(*) AS Total_reviews
        FROM airbnb_reviews R
        LEFT JOIN airbnb_listings l
        on R.listing_id = L.id
        WHERE R.comments IS NOT NULL AND l.id IS NOT NULL AND l.name IS NOT NULL
        GROUP BY l.id,L.name
        ORDER BY Total_reviews DESC
```

(2894 rows affected)

Total execution time: 00:00:01.241

Insight:

Beautiful Guest Suite for 2 in Ballard generated the highest level of guest engagement with a review volume of 1,404.

i..	name	Total_rev…
1	3861…	Beautiful Guest Suite for 2 in Ballard	1404
2	25002	Beautiful Private Spot in North Ballard	1056
3	1139…	Cottage in the Heart of the City	961
4	1292…	Ballard Greenwood Private Suite	880
5	7462…	Walkable, cozy backyard cottage near beach & city	871
6	2108…	Sunny Tiny House, Deck, Parking and Garden	862
7	3655…	art loft downtown~ID~Stadiums	860

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Host & Listing Activity Trends
Which listings show recent guest engagement based on review activity in late 2022?

+ Cell ∨ ▷ Run all | Kernel SQL ∨ | Attach to Analyst-Joan\SQLEXPRESS, ∕ ∨

```sql
1   SELECT
2       id,
3       name,
4       host_name,
5       neighbourhood,
6       last_review
7   FROM airbnb_listings
8   WHERE last_review >= '2022-10-01'
9     AND last_review < '2023-01-01'
10  ORDER BY last_review;
11
```

Insight:

Robert's Madrona Magic is part of the 59 listings with recent guest engagements based on review activity in late 2022

(59 rows affected)

Total execution time: 00:00:00.043

	id	name	host_name	neighbourhood	last_review
1	4892357	Madrona Magic	Robert	Madrona	2022-10-01
2	17075365	Gorgeous Apartment - Access to Lake and Downtown!	Grace And Benson	Leschi	2022-10-01
3	65873300	Greenwood's Calendar Hidden Gem	Jen	Greenwood	2022-10-02
4	39138621	6810 (S+ÇµÑ+)s+ªtï¼t¼ïsì¼töfTù¦µê+Tù¦sç¦tºƒ	Yoyo	Mid-Beacon Hill	2022-10-03
5	48684444	Center UW near UW Tower and Graduate Hotel 206	Melissa	University District	2022-10-05
6	17889129	Large 2 bdr 5 min to UW /Green Lake/ Bryant 4	Melissa	Bryant	2022-10-08
7	1142010	Small artsy house in vibrant Columbia City	Carla	Columbia City	2022-10-09
8	50038618	Blueground	Capitol Hill, roof, lounge, nr park	Blueground	Broadway	2022-10-10
9	51862505	Sentral 30+ Designer-Furnished 1BR w/ Flex Office	Sentral SLU	South Lake Union	2022-10-10

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Which hosts can be identified by the name "Stan," independent of letter casing

```sql
1   SELECT [id]
2         ,[name]
3         ,[host_id]
4         ,[host_name]
5         ,[neighbourhood]
6         ,[room_type]
7         ,[price]
8         ,[minimum_nights]
9         ,[number_of_reviews]
10        ,[last_review]
11        ,[calculated_host_listings_count]
12        ,[availability_365]
13        ,[license]
14  FROM airbnb_listings
15  WHERE LOWER(host_name) LIKE 'stan';
16
```

Insight:

The analysis identifies **a single host named "Stan"**, associated with **one private-room listing** located in **North Beach/Blue Ridge (Sequim, Olympic Mountains)**.

The listing shows **no recorded license**, has **42 total reviews**, and was **last reviewed in October 2015**, indicating limited recent hosting activity.

(1 row affected)

Total execution time: 00:00:00.030

	id	name	host_id	host_name	neighbourhood	room_type	price	minimum_nights
1	1593991	Sequim, Olympic Mountains Wa	8501598	Stan	North Beach/Blue Ridge	Private room	NULL	30

_nights	number_of_reviews	last_review	calculated_host_listings_count	availability_365	license
	42	2015-10-06	1	365	NULL

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Key insight & Recommendation

-   **Revenue & Financial Performance**: *Affordability is a key driver of revenue in Airbnb Seattle, as the overall revenue is primarily driven by mid- to lower-priced listings.*

-   **Pricing & Neighborhood Market Dynamics**: *Average listing prices vary substantially across neighborhoods, indicating strong location-based pricing dynamics. However, the Price of the listings relative to the their neighborhood's average price does not directly influence the financial performance*

-   **Customer Sentiment & Review Analysis**: The overall customer sentiment *indicates that hosts provide a good experience overall, however, there's room for improvement as only 500+ had consistent positive reviews out of 2000+ reviews.*

-   **Host & Listing Activity Trends**: *Robert's Madrona Magic is part of the active listings, while Stan's Sequim, Olympic Mountains had no recent reviews indicating limited recent hosting activity.*

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Thank you

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