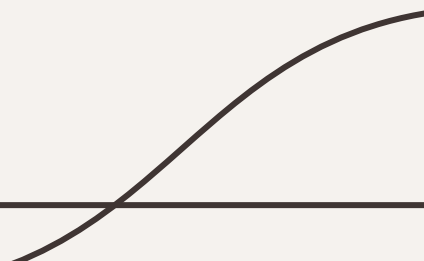




HDB Resale Prices Predictive Modeling

by Lloyd Ong, Amanda Luah, Sim Jia Yi (Chloe)





01

Problem Statement

Insert a subtitle here if you need it

“How can we **accurately estimate**
competitive pricing for HDB resale flats
for **both buyers and sellers?**”



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Statement**

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That affecting HDB
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Key Learnings



02a

About the Dataset

Historical Data



Singapore



150,634 Resale Transactions (for Train data)

16,737 Resale Transactions (for Test data)



January 2012 to April 2021 (for Train data)

March 2012 to April 2021 (for Test data)



Floor Level, Unit Type, HDB Age, Location,
Approximate distance to Public Transport/Hawker
Center/etc.

Data Pre-Processing

Checking for Null Values in dataset

01

**Replaced
with '0'**

For 'mall within
500km, 1km and
2km'

02

**Drop 829
data**

For 'mall nearest
distance'

03

**Replace
With '0'**

For 'hawker within
500m, 1km and 2km'

Data Pre-Processing

Getting Dummies Variable in dataset

04

Flat Type

05

Town

06

Storey

Data Pre-Processing

Other data pre-processing procedures in dataset

07

**Convert to
datetime**

For
'Tranc_YearMonth'

08

**Remove
duplicates**

09

**Created new
column for
data analysis**

HDB Resale Price over the years



The Online Citizen

HDB resale prices Up 2.7% in Q3 amid tight supply and strong demand

HDB resale prices Up 2.7% in Q3 amid tight supply and strong demand. Prices of HDB resale flats increased by 2.7% from July to September 2024,...

4 weeks ago



BT The Business Times

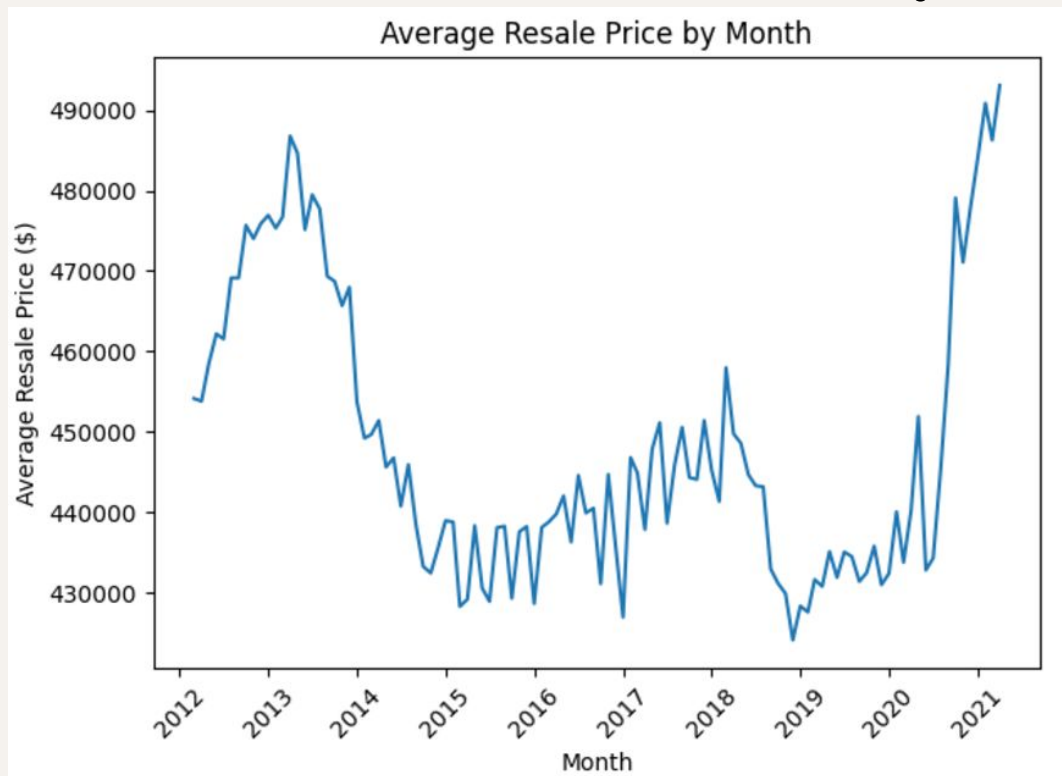
HDB resale prices continue rising in October while transaction volume falls: SRX, 99.co

resale prices of Housing and Development Board (HDB) flats booked a marginal increase of 0.3 per cent in October while fewer HDB flats were...

2 weeks ago



HDB Resale Price over the years





02b

Data Exploration

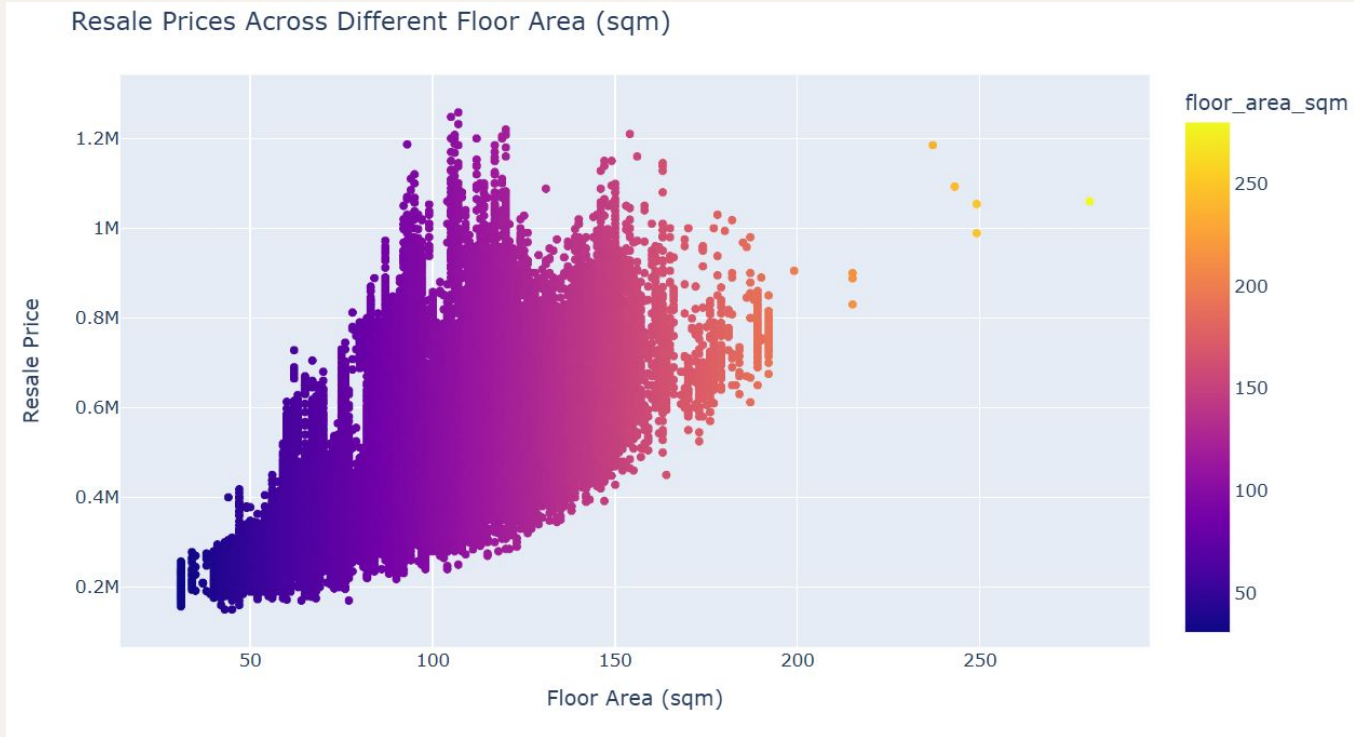
Distribution of Resale Price



\$400k - \$500k

is the most
frequently
transacted value

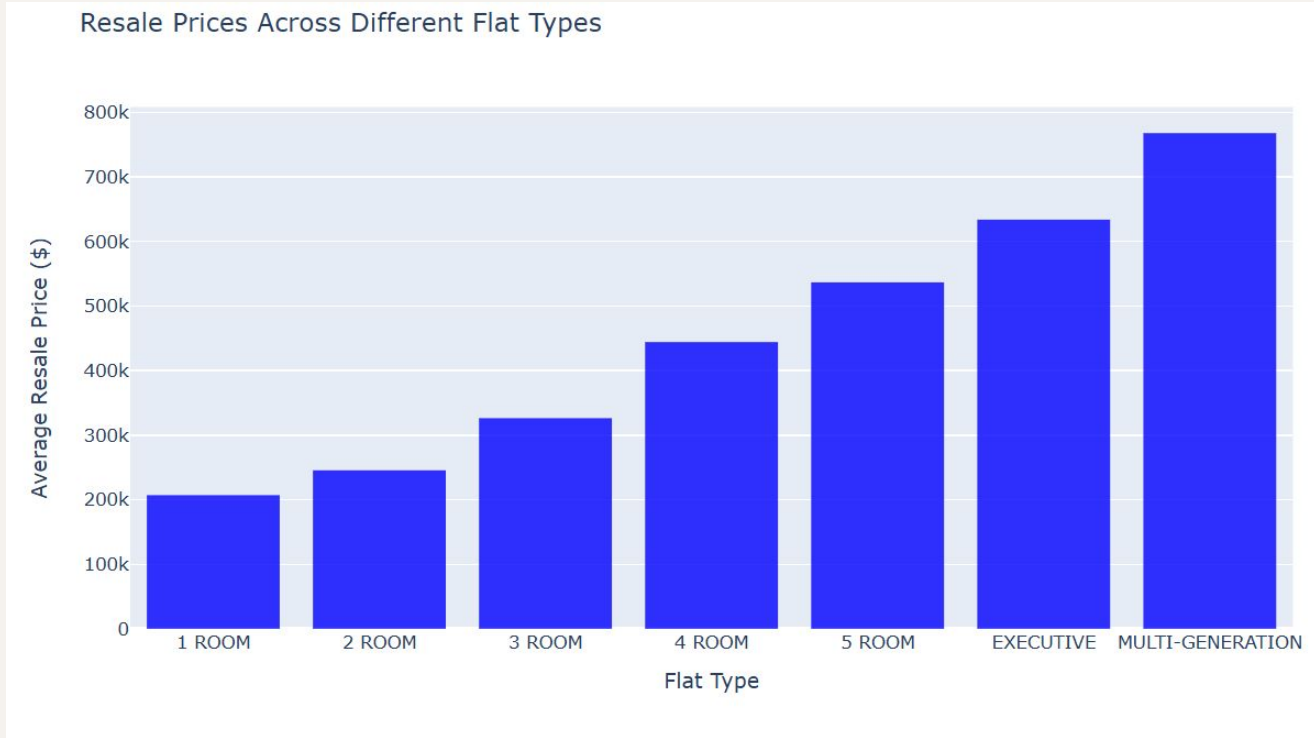
Resale Prices across Different Floor Areas



**Bigger sqm,
Higher Resale
Value**

bigger HDB flats
are transacted to
have higher resale
values

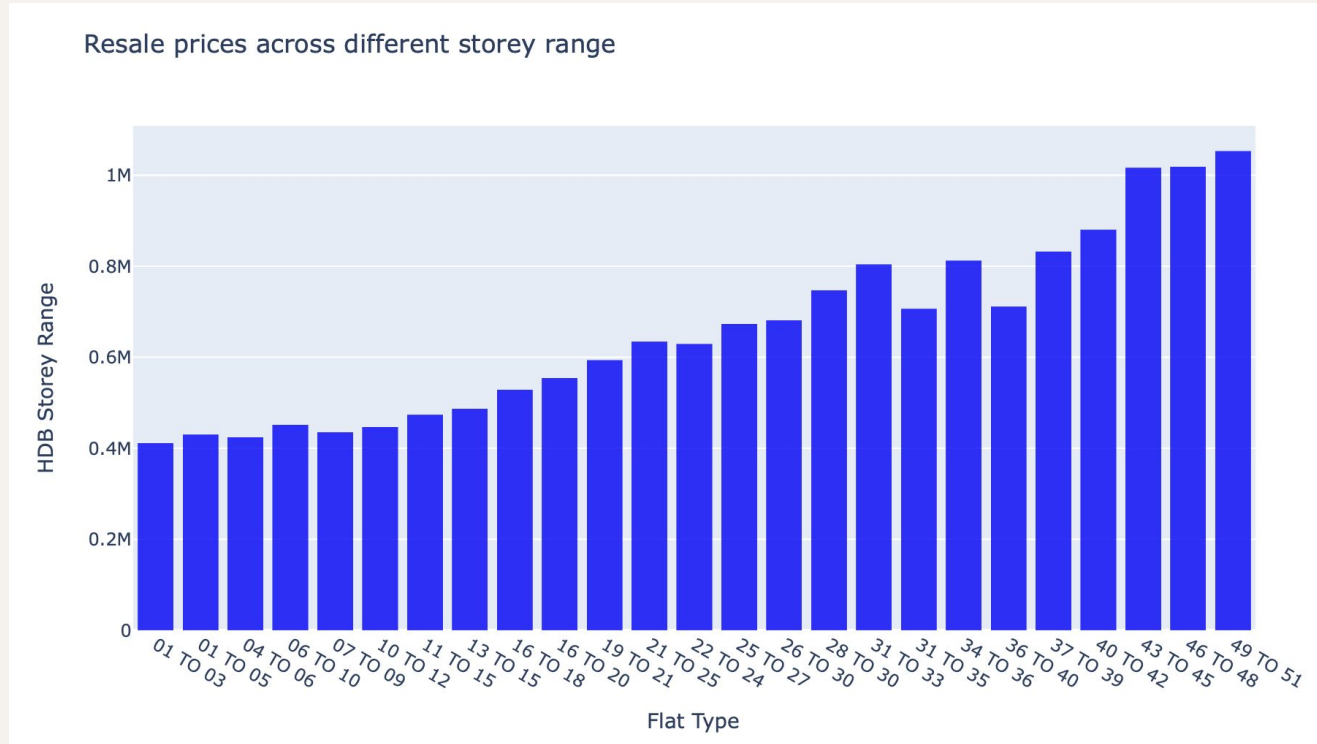
Resale Prices across Different Flat Types



**Bigger flats,
Higher Resale
Value**

bigger HDB flats
are transacted to
have higher resale
values

Resale Prices across Different Storey Levels

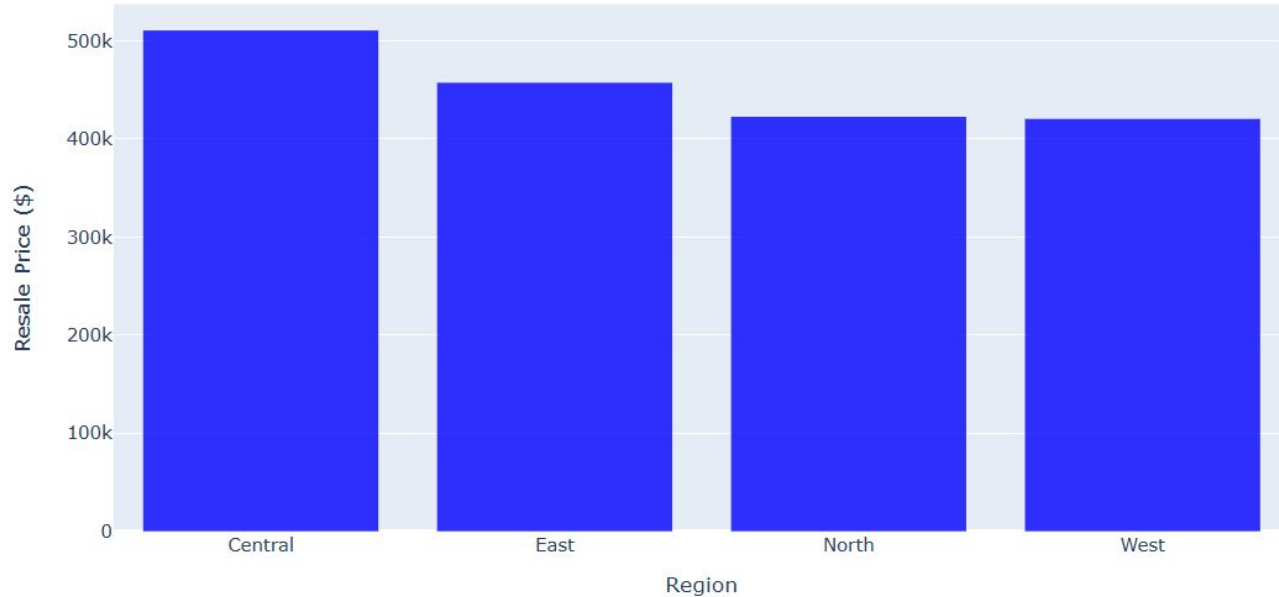


**Higher floors,
Higher Resale
Value**

high floored HDB
flats are transacted
to have higher
resale values

Resale Prices across Different Regions

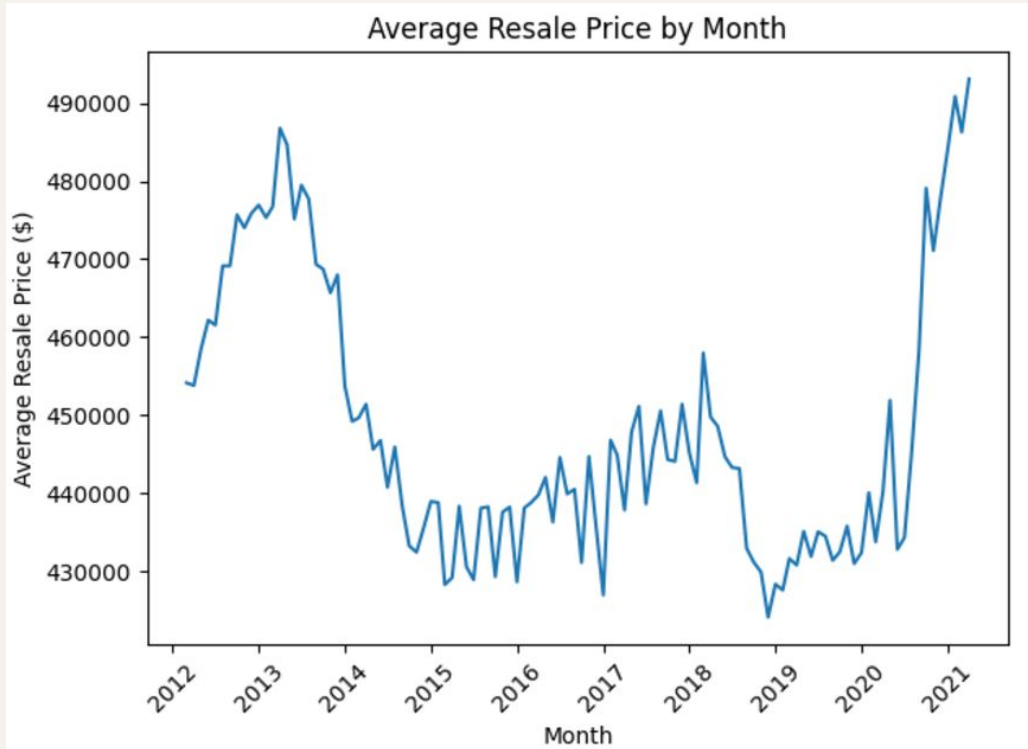
Resale prices across different regions in Singapore



Central regions, Higher Resale Value

due to the limited supply and proximity to several businesses and being a favourable location

History of Resale Prices in Singapore



2012 - 2013: **Peak**
Due to High Demand, and economic growth

2013 - 2014: **Cooling measures**
Introduced to stabilise the rising resale price.

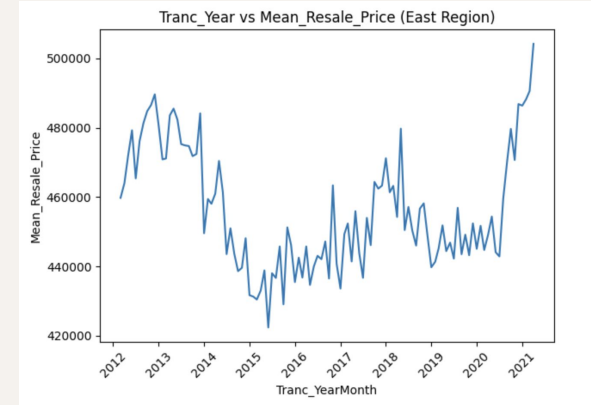
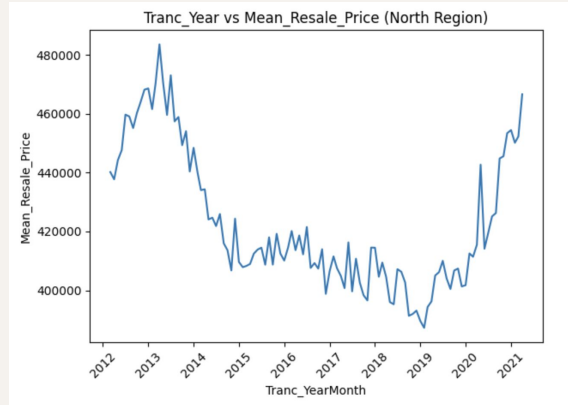
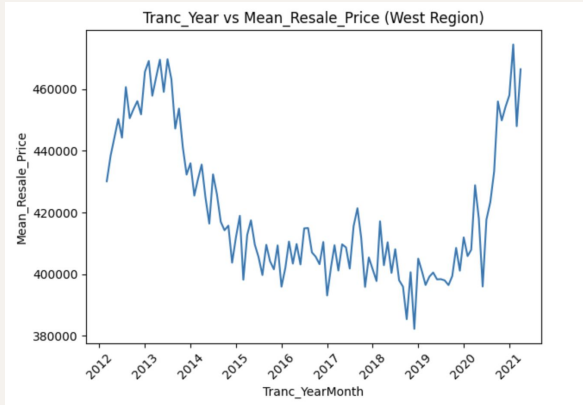
2015 - 2017: **Stabilizing**
Steady market correction

2018 - 2019: **Stabilizing**
Steady market correction

2020: **Covid-19**
Uncertainty in market, causes shift in housing preferences

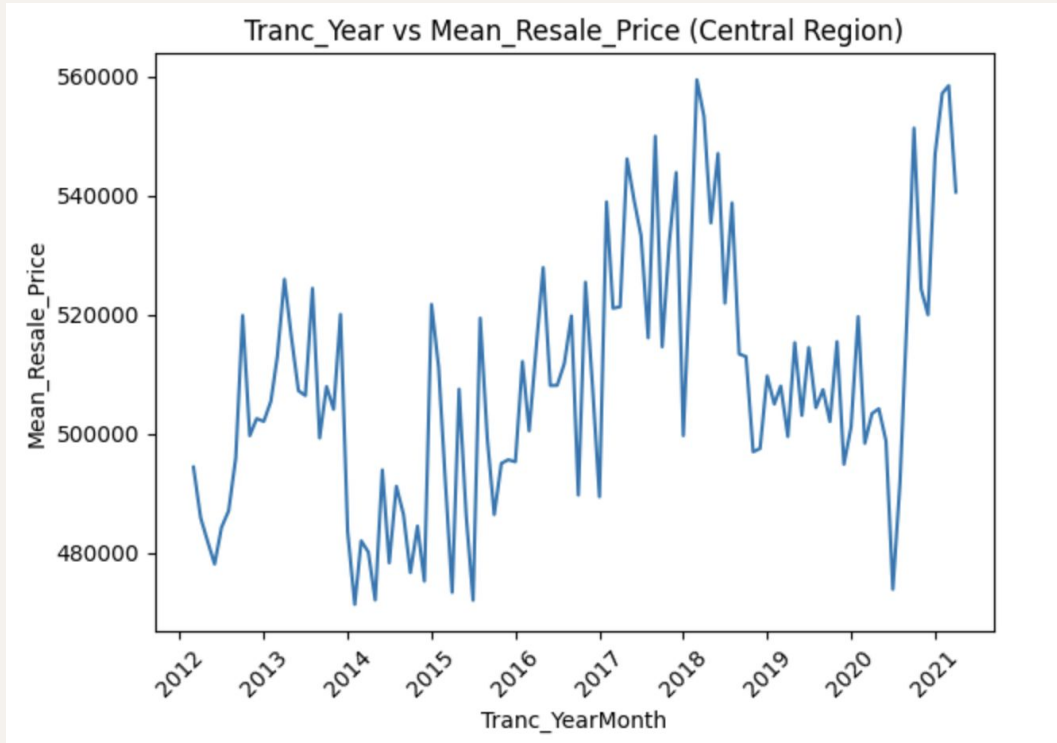
2021: **Strong Demand**

Resale Prices in West, North and East Regions



Follows the market trend in resale value over the years

Resale Prices in Central Regions



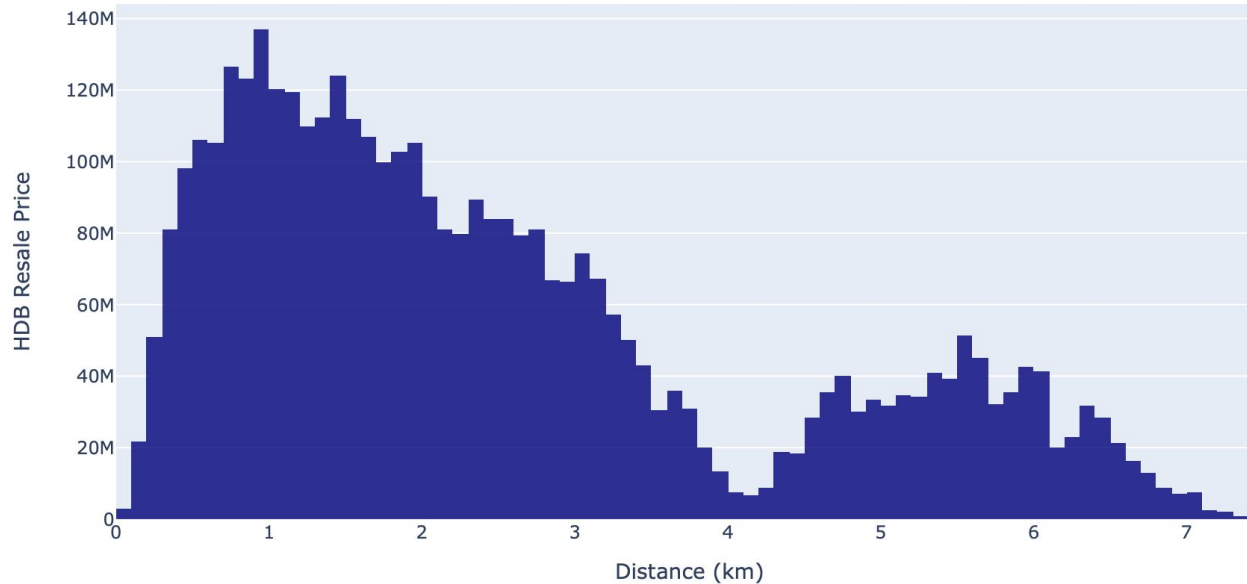
Do not follow the market trend in resale value over the years

This could be due to the location demand in Central regions are higher due to the proximity to the central building district.

In addition, there is government policies and limited supply of HDB flats located in the Central region which could be a driving force.

Resale Prices based on Supermalls

Resale prices based on location away from Supermall



Closer to
Supermalls,
Higher Resale
Value

Data Limitations

- **Limited HDB Townships data**

Only $\frac{1}{8}$ of the historical data have been used for training and data analysis, on basis of total number of actual historical sold resale flats in Singapore from 2012 to 2021.

- **Dataset having wide historical data range**

As resale prices trends overtime due to several external factors (such as: changes in employment rate, foreign investment or even inflation) and government policies to curb the rising prices of resale flats in Singapore.



Data Limitations

- **Information might not be updated**

As huge number of unknown values are detected in Hawker and Mall. These values might be crucial in the deciding factor on whether the resale flat could fetch a higher or lower value flat.

- **Government policies are not reflected as external factors**

External factors such as Housing Grants, Cooling Measures and URA Development plans might not be captured as a driving force or factor on resale prices and sales decisions.





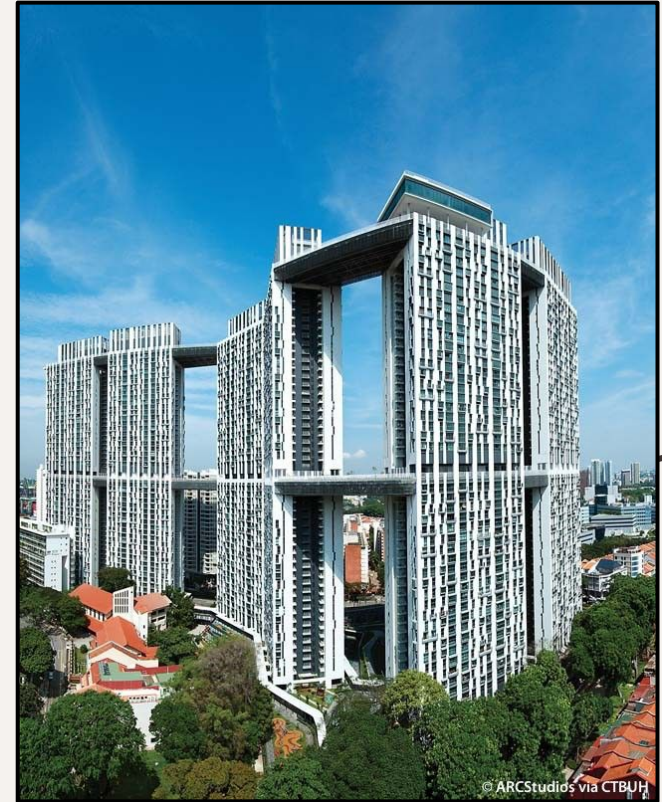
03

Key Factors

Affecting HDB Resale Price

Key Features

- Town
- Floor Area (sqm)
- Lease Commence Year
- Transaction Year
- Transaction Month
- Distance to Mall, Hawker & MRT
- Storey Range





04

Modeling

Linear Regression

- Correlation between key factors $< \pm 0.7$
- Linear relationship between resale price and different factors.
- For example:
 - Every km further from MRT would decrease the unit value by \$25,000
 - Every sqm increase will have a positive impact of \$ 104,000



Linear Regression

- Root Mean Squared Error: 55,000
- Based on our model, the predicted price can vary from the actual price by \$55,000 on average.



Linear Regression

- R2 Score: 0.85
- 85% of the changes / variation in the resale prices of HDB houses can be explained by our model

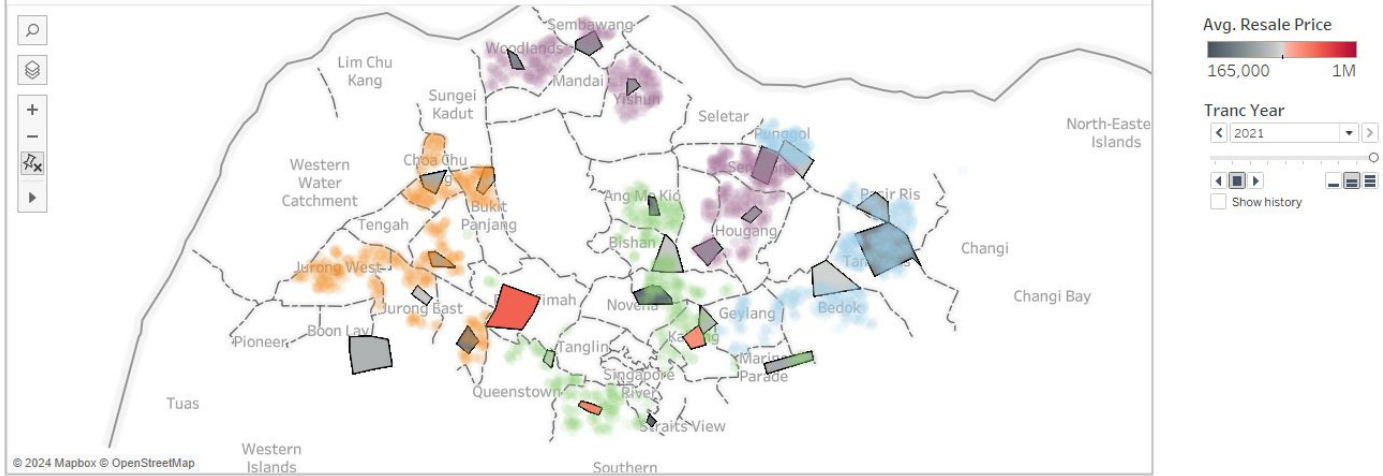




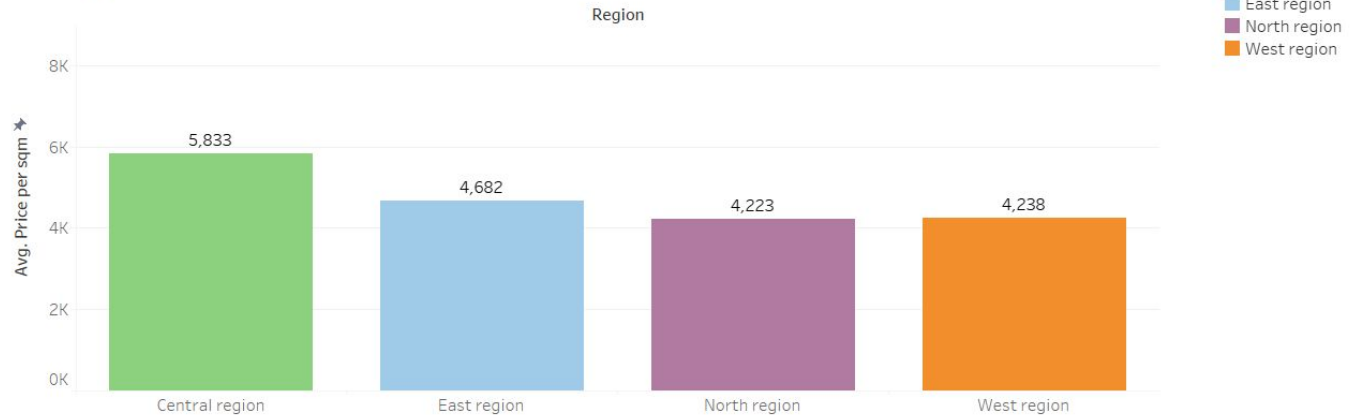
05

Dashboard

Resale prices across the years - 2021



Resale price per sqm across region





06

Recommendation

Customer type #1 - The Newlyweds

Profile of Sean and Joanne

- Both 28 year old
- Newly married
- Combined monthly income of \$8k
- Do not want to wait for a BTO as waiting time is too long
- Wants the home to be convenient (located near MRT)
- Parents live in Tampines
- Looking for a forever home in a mature estate



Customer type #1 - The Newlyweds

Recommendations

- Consider flats in Tampines region to maximise proximity housing grants
- Focus on flats within 5-10 minute walking distance of MRT stations
- Focus on 4 or 5 room to cater to future family planning
- Look for newer flats with at least 90 years of lease remaining within a mature estate for better resale value
- Look for flats surrounded by amenities such as shopping malls will help increase capital gain

Customer type #2 - The Downsizers

Profile of Mr and Mrs Tan


- Both in retirement age
- Downsizing due to lifestyle reasons - their children has moved out and they do not need a large space
- Currently lives in a 5 room flat in Ang Mo Kio
- Looking for a smaller flat for easy maintenance



Customer type #2 - The Downsizers

Recommendations

- Consider 3 room flats as it offers ample space for a couple while being easy to clean and maintain
- Consider flats in the mature estates for proximity to amenities
- Looking for a flat within Ang Mo Kio would be a better choice, not only is it a mature estate, staying in the same area keeps them close to familiar surroundings as well as their friends.
- The resale value for their current home could fetch a high value as high as \$1m depending on their surrounding amenities, hence they would have ample budget to work on.



Town	Id	₹
ANG MO	105570	1,008,888
KIO	146822	980,000
	105569	970,888
	146860	960,000
	146861	950,000
	105572	950,000
	105566	950,000
	105565	950,000
	105559	945,000
	105568	940,000

Customer type #3 - The Upgraders

Profile of David and Linda

- Age 39 and 37 respectively, with 2 kids (age 10 and 12)
- Combined monthly income \$12,000
- Currently living in a 4 room flat in Yishun but looking to upgrade to a bigger unit in an estate with reputable schools
- Seeking proximity to MRT stations and amenities
- Prefers high floor units for better privacy



Customer type #3 - The Upgraders

Recommendations

- Consider 5 room or Executive flats for more space
- Consider Bishan estates with schools in the vicinity like Catholic High School, Kuo Chuan Presbyterian Secondary School and Raffles Institution.
- Look for flats within the vicinity of Bishan MRT Station as well with many amenities nearby such as Junction 8 shopping mall & Bishan ActiveSG swimming complex
- Look for flats on the higher floors
- These factors contribute to a higher resale value for future planning.



07

Key Learnings

Learning Points

1. Learning how to set up Deepnote so that everyone on the team can collaborate on the project together is essential.
2. Effective communication and task segregation are also important.
3. Learning how to work within a tight deadline, which is common in the real working world.



08

Appendix

Linear Regression Model

```
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    1.04150596e+03  9.21333746e+03  7.04202091e+03  3.25129123e+02
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Linear Regression Model

1.

2.

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Thank You!

