

# Capstone Project

## Singapore HDB Resale Price Analysis (2017 – 2024)

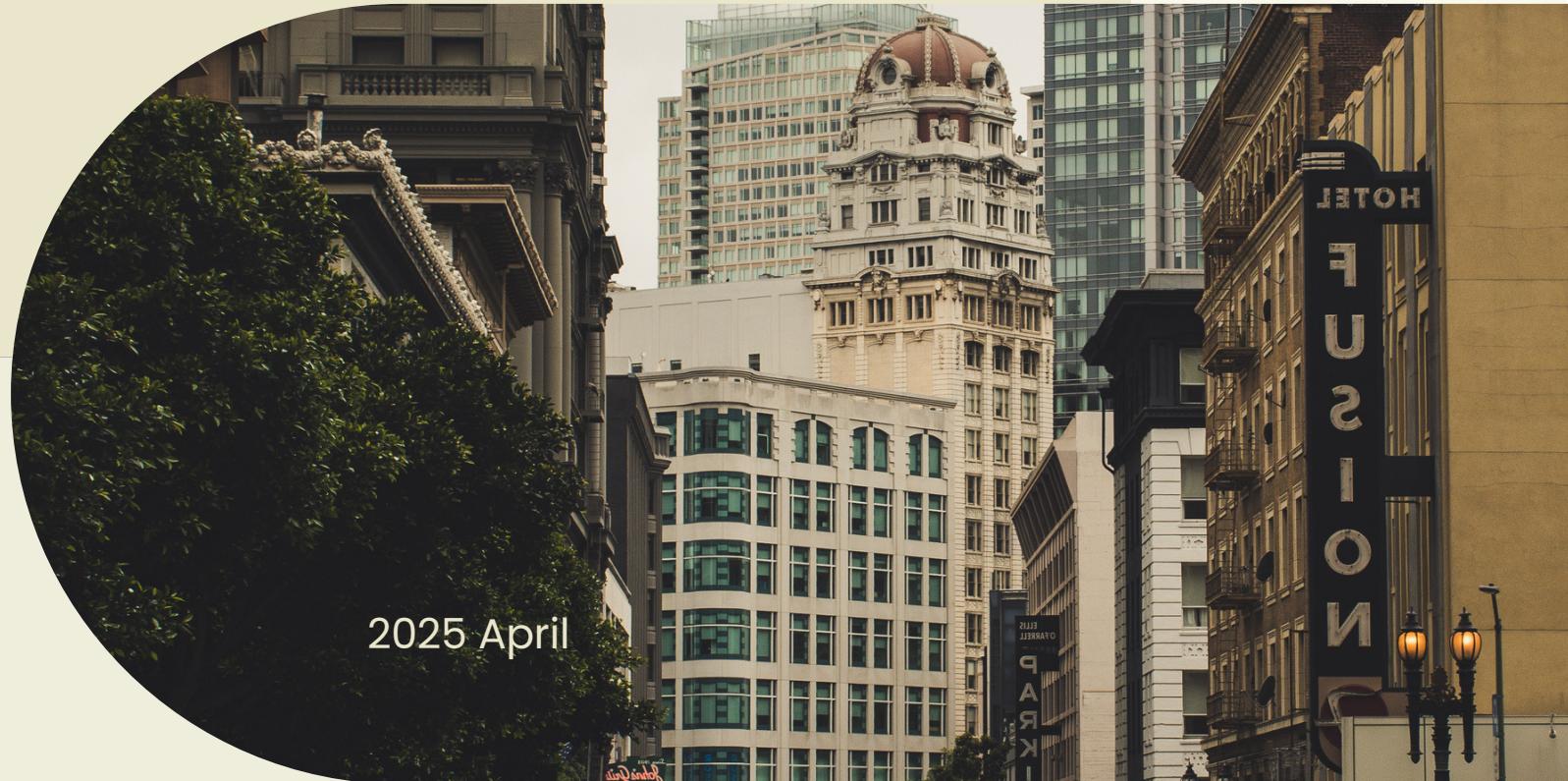
NTUC LearningHub

Associate Data Analyst Programme

[VLC-SCADTII-25-0650]

Lim Pin Pin (Yvonne)

2025 April



# Table of Contents

Introduction & Problem Statement	3	Affordability Analysis	9
Methodology Overview	4	Future Outlook	11
Data Acquisition & Preparation	5	Practical Application	12
Exploratory Data Analysis	7	Challenges & Limitations	13
Predictive Analysis	8	Conclusion & Future Work	14

# Introduction & Problem Statement

HDB Resale Price Analysis (2017-2024): Trends, Drivers & Challenges

## 45% Price Surge

Dramatic Shift ► Reshaping Affordability ► Investment Dynamics

### What are market key trends?

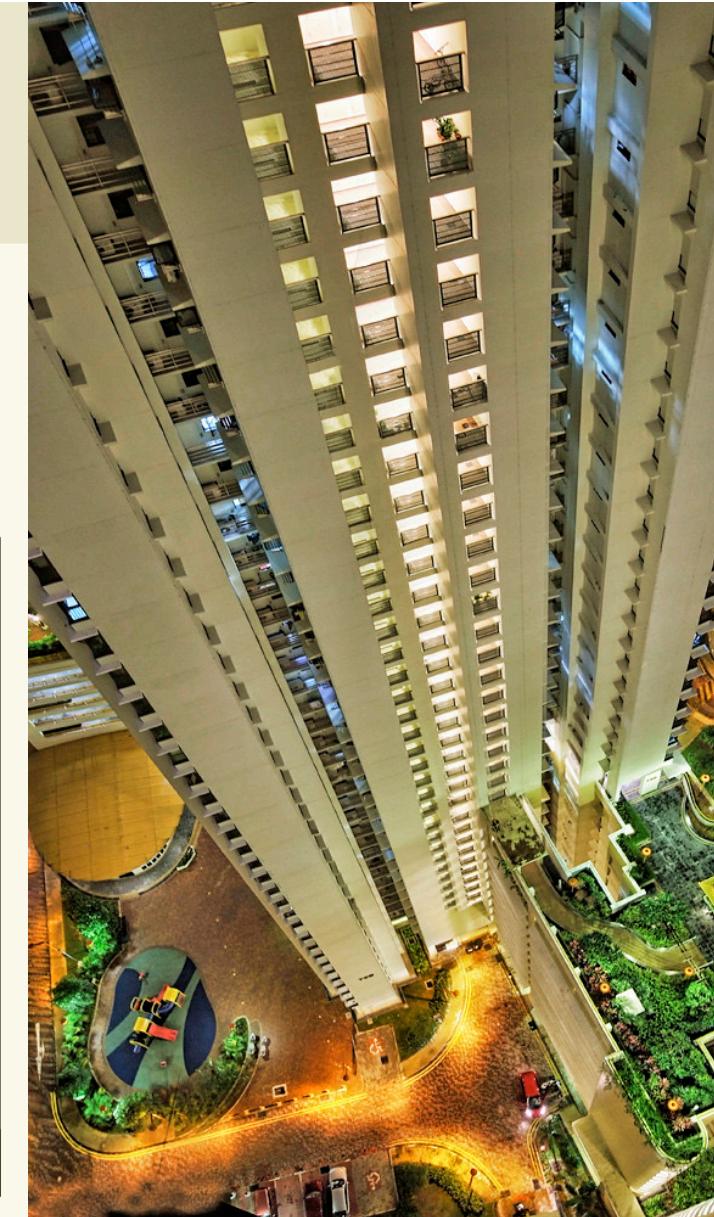
- Accelerated Growth During COVID-19
- Location Premium Hierarchy
- Quantifiable Lease Impact
- Flat Type Performance Divergence

### What questions were explored?

- Price Trends 45% surge
- Town-Level Variations 35 - 40%
- Flat Attributes S\$7,000 premium
- Affordability 9.3% 4-Room
- Predictive Insights 92% accuracy
- Future Outlook 5-7% growth

### Why it matters?

- Potential Buyers
- Current Homeowners
- Policymakers



# Methodology Overview

HDB Resale Price Analysis (2017-2024): Trends, Drivers & Challenges

## Research Approach

- Data Collection
- Exploratory Analysis
- Statistical Modeling
- Time Series Analysis
- Affordability Assessment

## Analytical Techniques

- Descriptive Statistics
- Visualization Techniques
- Inferential Statistics
- Machine Learning Models
- Timer Series Models
- Spatial Analysis
- Financial Metrics

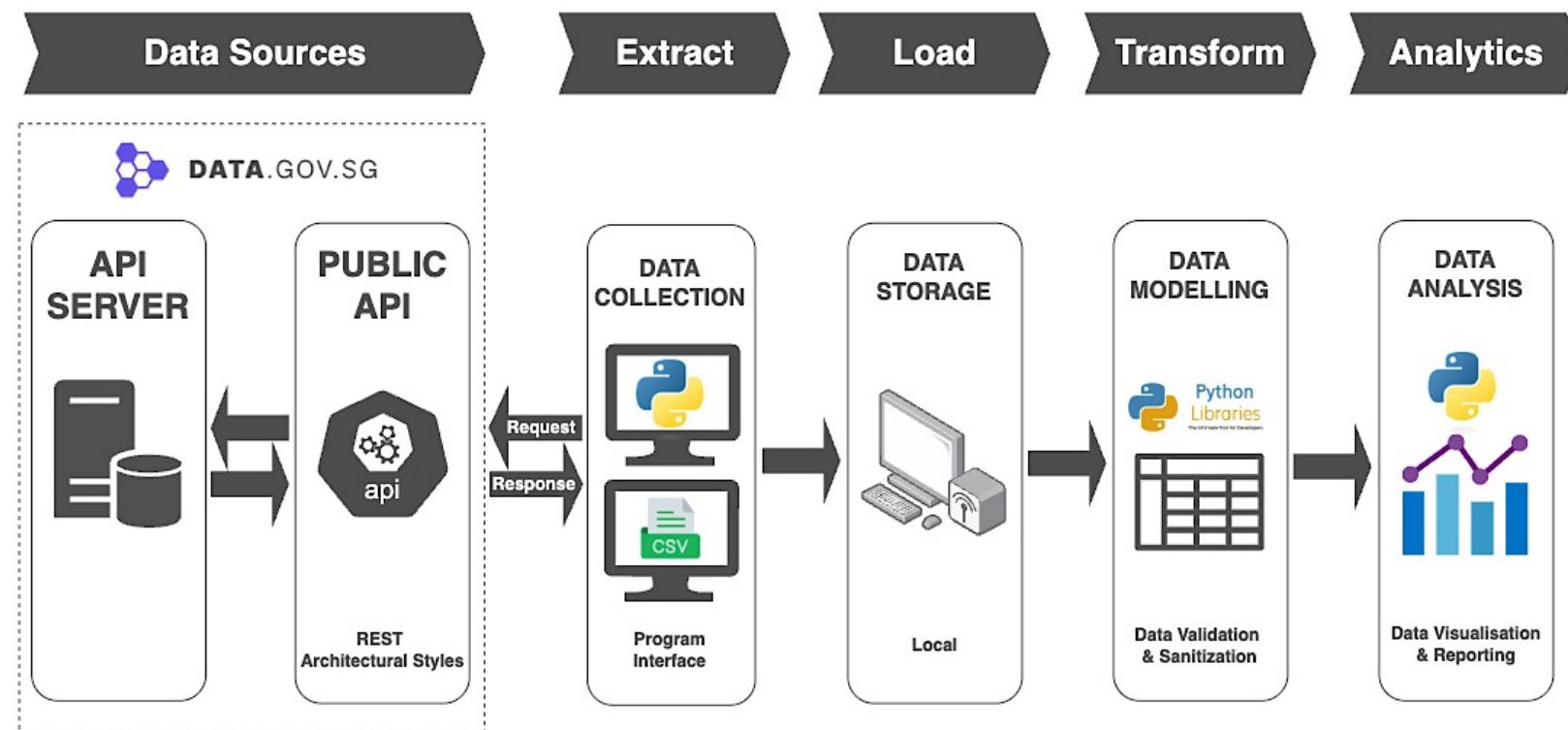
## Evaluation Metrics

- **Data manipulations:** pandas, numpy, dabl, missingno
- **Visualization:** matplotlib, seaborn, plotly, klib, folium
- **Statistical analysis:** statsmodel
- **Machine learning:** scikit-learn, XGBoost
- **Time series analysis:** statsmodels.tsa
- **Geospatial analysis:** plotly.geo

# Data Acquisition & Preparation

HDB Resale Price Analysis (2017–2024): Trends, Drivers & Challenges

## API to Database Integration | Unlocking Public Data



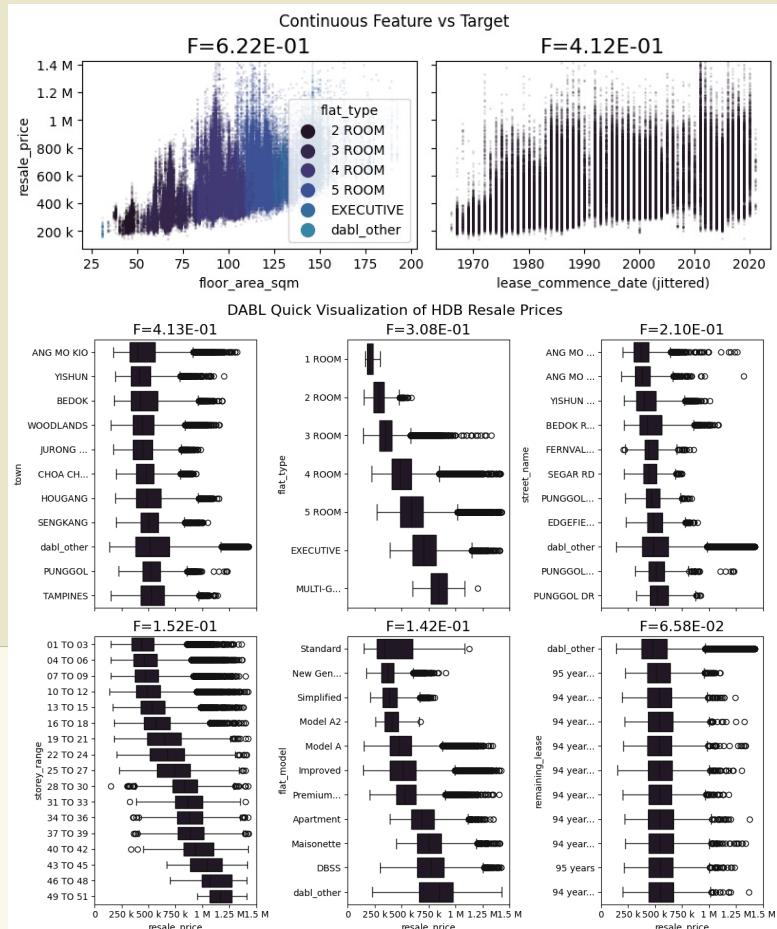
Architecture: Real-Time Data Access (Extract . Load . Transform)

# Data Acquisition & Preparation

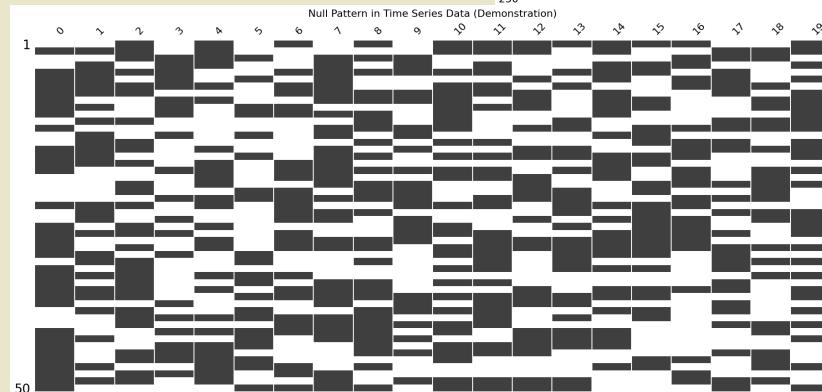
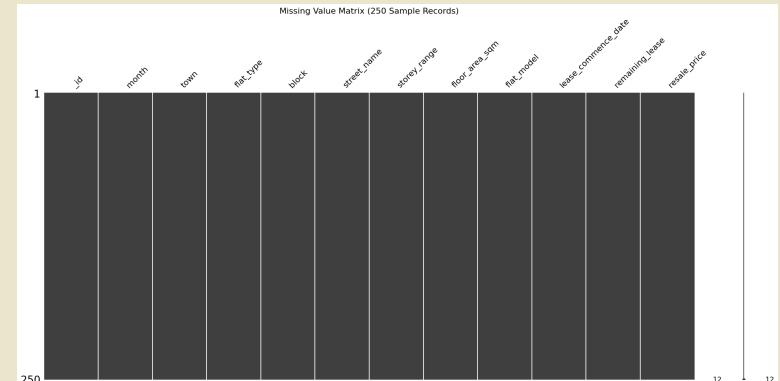
HDB Resale Price Analysis (2017–2024): Trends, Drivers & Challenges



Generating dabl plot for quick data preview



Crucial For Data Cleaning



Using Missingno to provide simple and intuitive visualizations to explore missing data patterns

# Exploratory Data Analysis

## HDB Resale Price Analysis (2017–2024): Trends, Drivers & Challenges

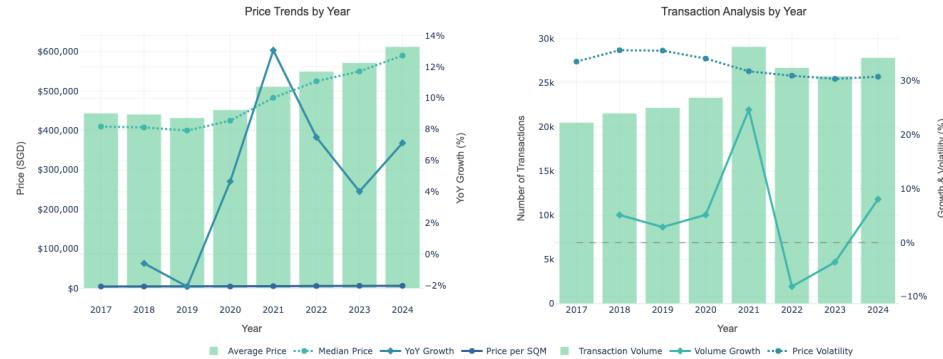
Feature Interaction Analysis: Price by Flat Type, Town, and Floor Level



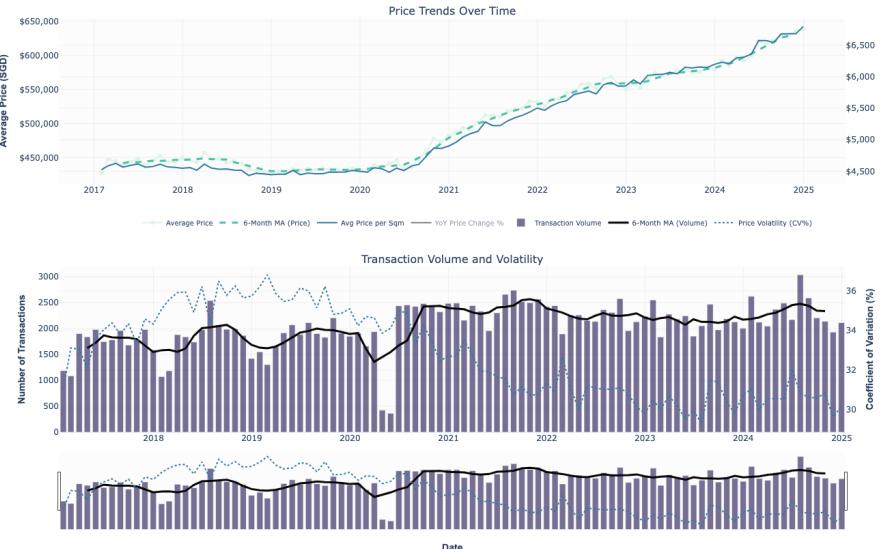
Property Type Analysis by Year



Comprehensive Year-over-Year Real Estate Analysis



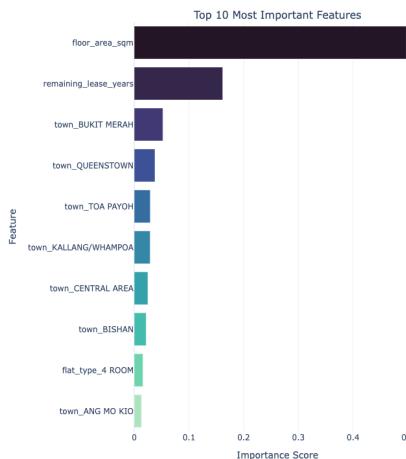
Time Series Analysis of Singapore HDB Resale Market



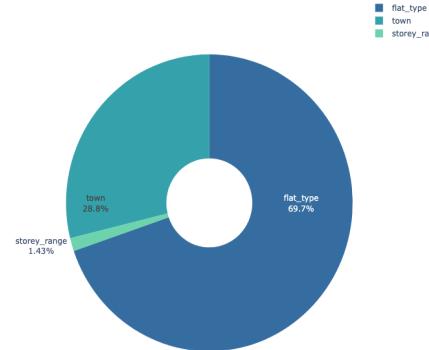
# Predictive Analysis

## HDB Resale Price Analysis (2017–2024): Trends, Drivers & Challenges

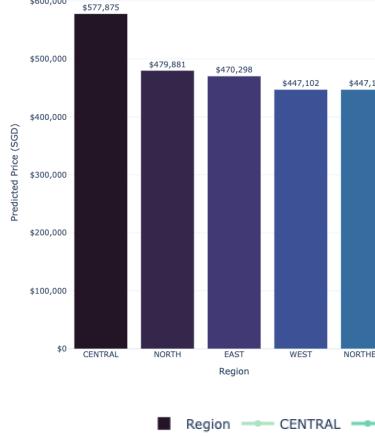
Feature Importance Analysis for HDB Resale Price Prediction



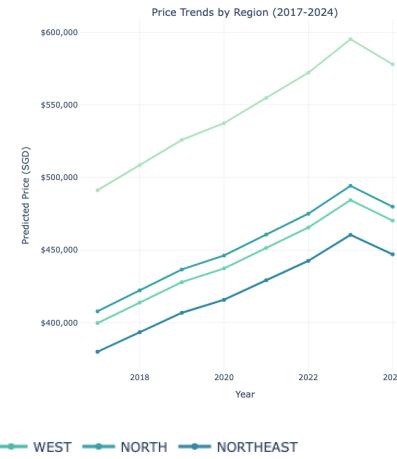
Relative Importance by Feature Category



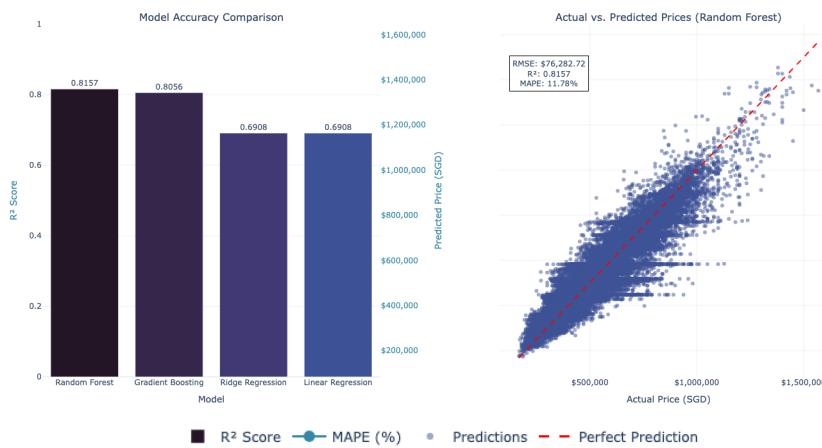
Predicted Prices by Region (4 Room, 2024)



Regional and Temporal Price Predictions



Model Performance Analysis



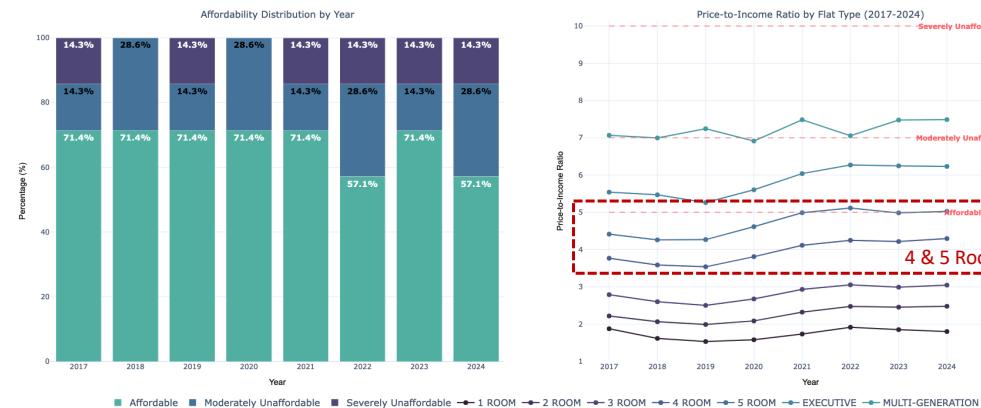
HDB Price Prediction by Property Characteristics



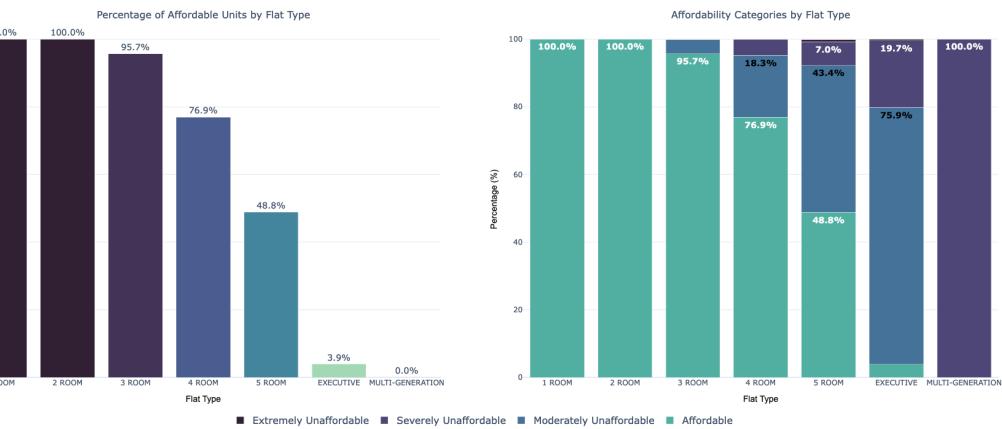
# Affordability Analysis

## HDB Resale Price Analysis (2017–2024): Trends, Drivers & Challenges

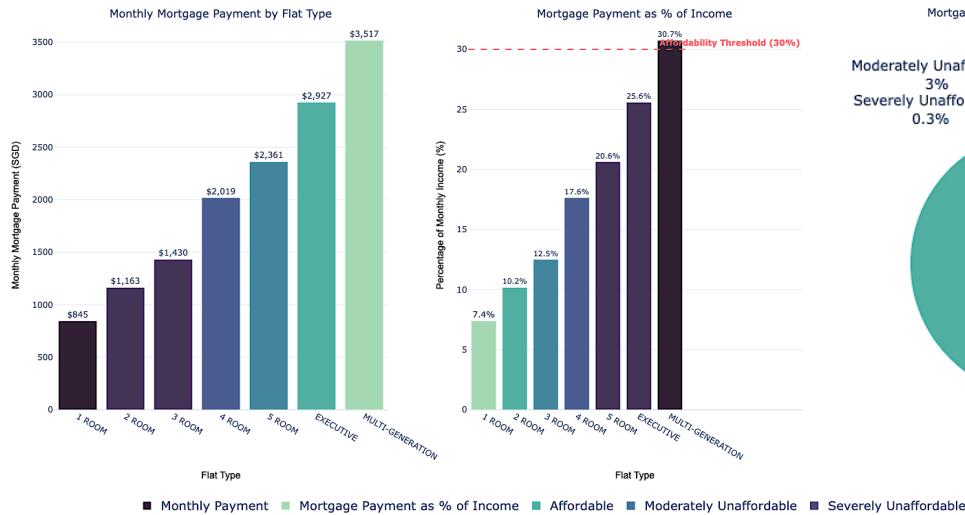
Housing Affordability Analysis (2017–2024)



Flat Type Affordability Analysis (2024)

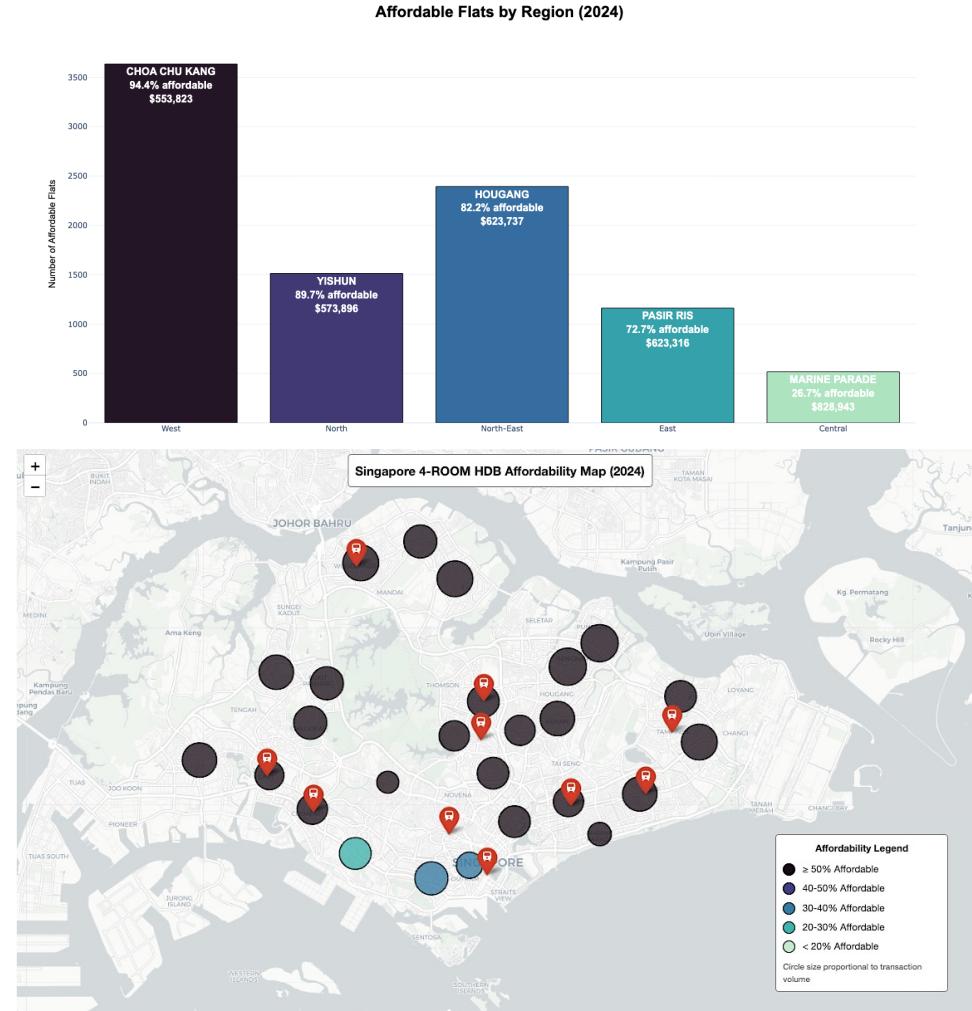
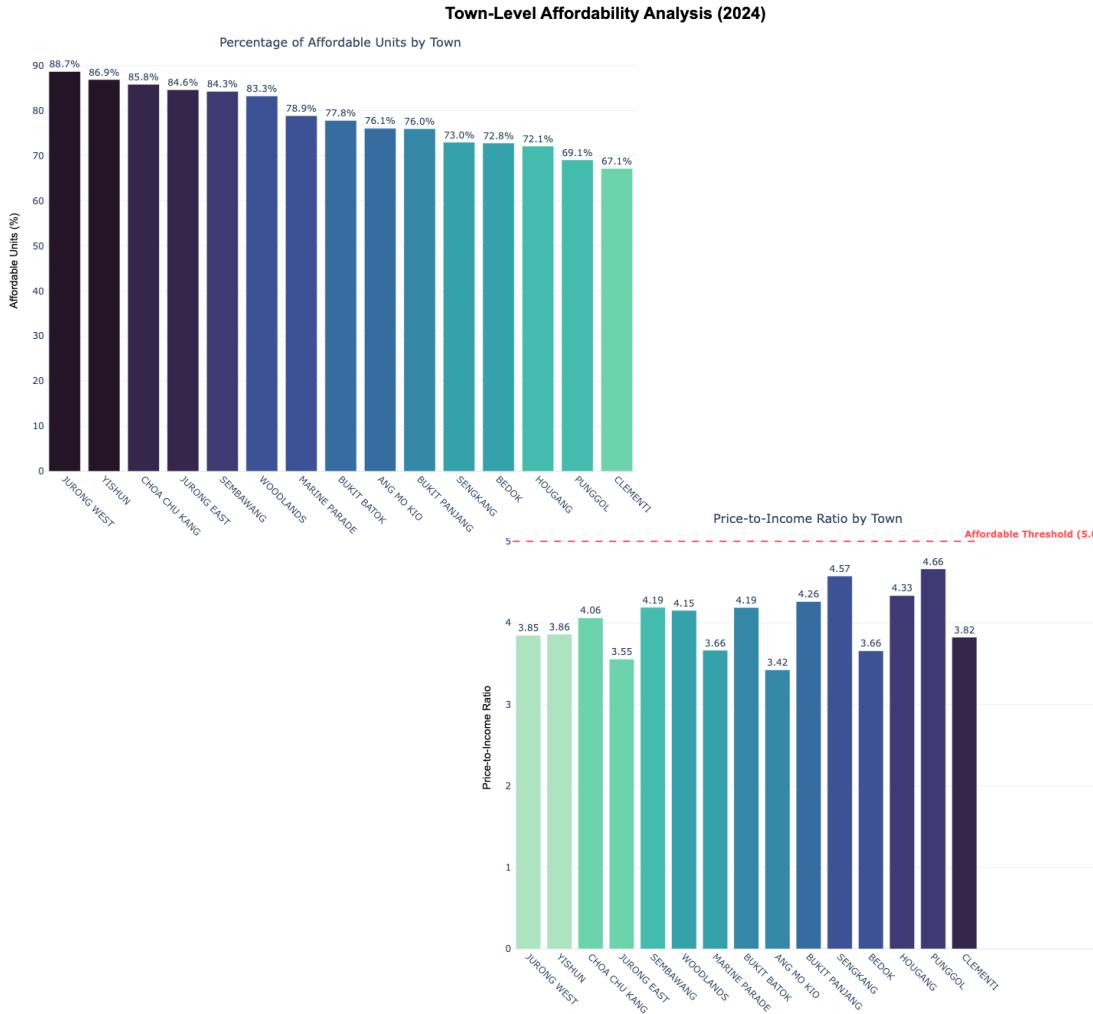


Mortgage Affordability Analysis (2024)



# Affordability Analysis

# HDB Resale Price Analysis (2017-2024): Trends, Drivers & Challenges



# Future Outlook

## HDB Resale Price Analysis (2017-2024): Trends, Drivers & Challenges



# Practical Applications

HDB Resale Price Analysis (2017–2024): Trends, Drivers & Challenges

## Current Homeowners:

- ▶ Value enhancement
- ▶ Timing considerations
- ▶ Lease management

## Potential Buyers:

- ▶ Location strategy
- ▶ Lease-price optimization
- ▶ Timing considerations
- ▶ Flat type selection

## Policymakers:

- ▶ Affordability interventions
- ▶ Non-mature estate enhancement
- ▶ Lease decay management

## Decision Frameworks:

- ▶ Maximize property value

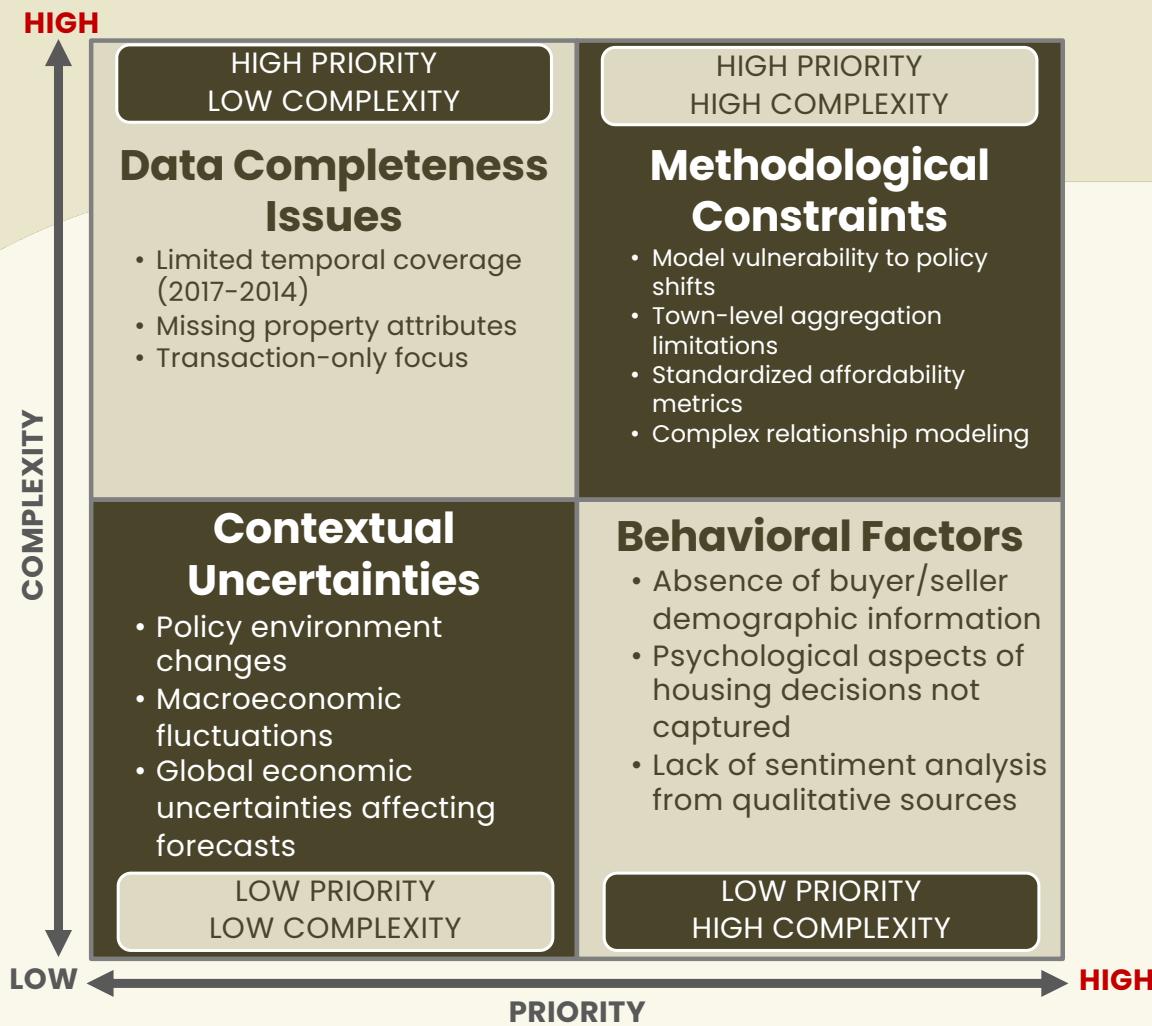
## Application of Predictive Model:

- ▶ Using 92% accurate model to guide decisions



# Challenges & Limitations

HDB Resale Price Analysis (2017–2024): Trends, Drivers & Challenges



# Conclusion & Future Work

HDB Resale Price Analysis (2017-2024): Trends, Drivers & Challenges

## Key Findings

- 45% growth
- Location
- Affordability
- 92% model accuracy



## Limitations

- Data
- Methodological
- Contextual



## Future Research Directions

- Enhanced data integration
- Advanced analytical approaches
- Expanded research questions



## Methodological Improvements

- Model refinement
- Validation approaches



## Data Collection

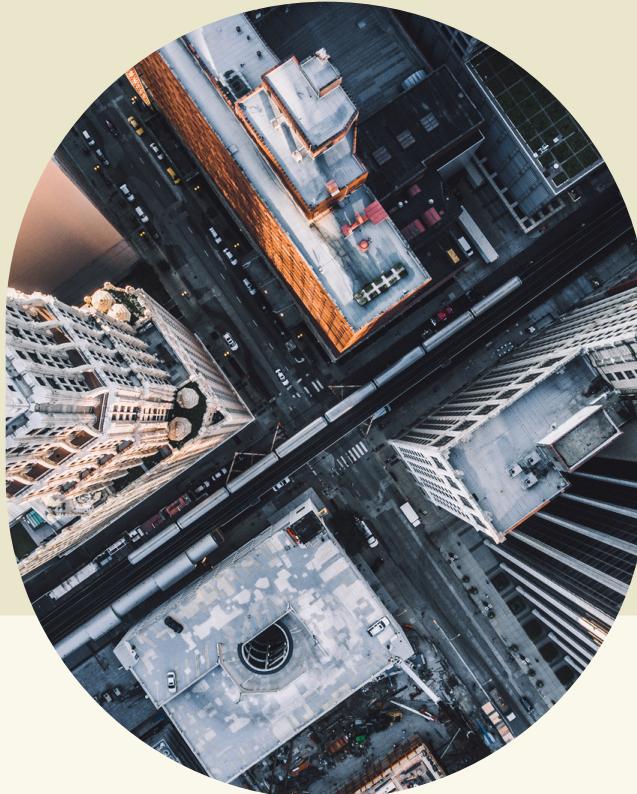
- Enhanced transactional data
- Contextual data
- Longitudinal data



# Q & A

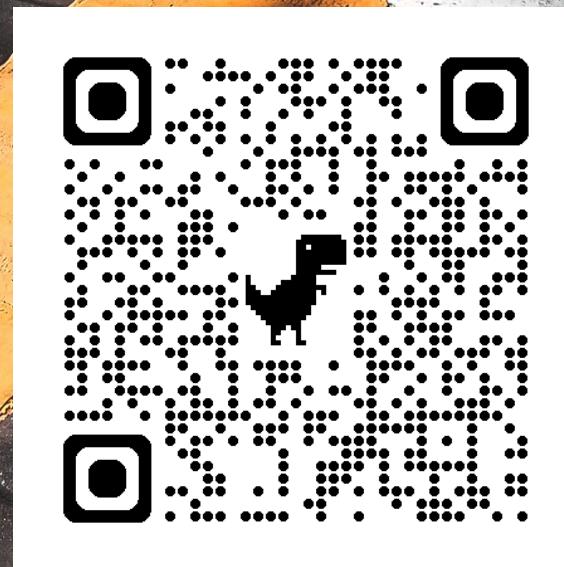
**Navigating Housing Decisions: Strategic Insights for Buyers and Homeowners**

**Shaping Housing Policy: Data-Driven Recommendations for Sustainable Growth**



# The End of Presentation

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2025 April