

Capstone Project

Singapore HDB Resale Price Analysis (2017 – 2024)

NTUC LearningHub

Associate Data Analyst Programme

[VLC-SCADTII-25-0650]

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2025 April

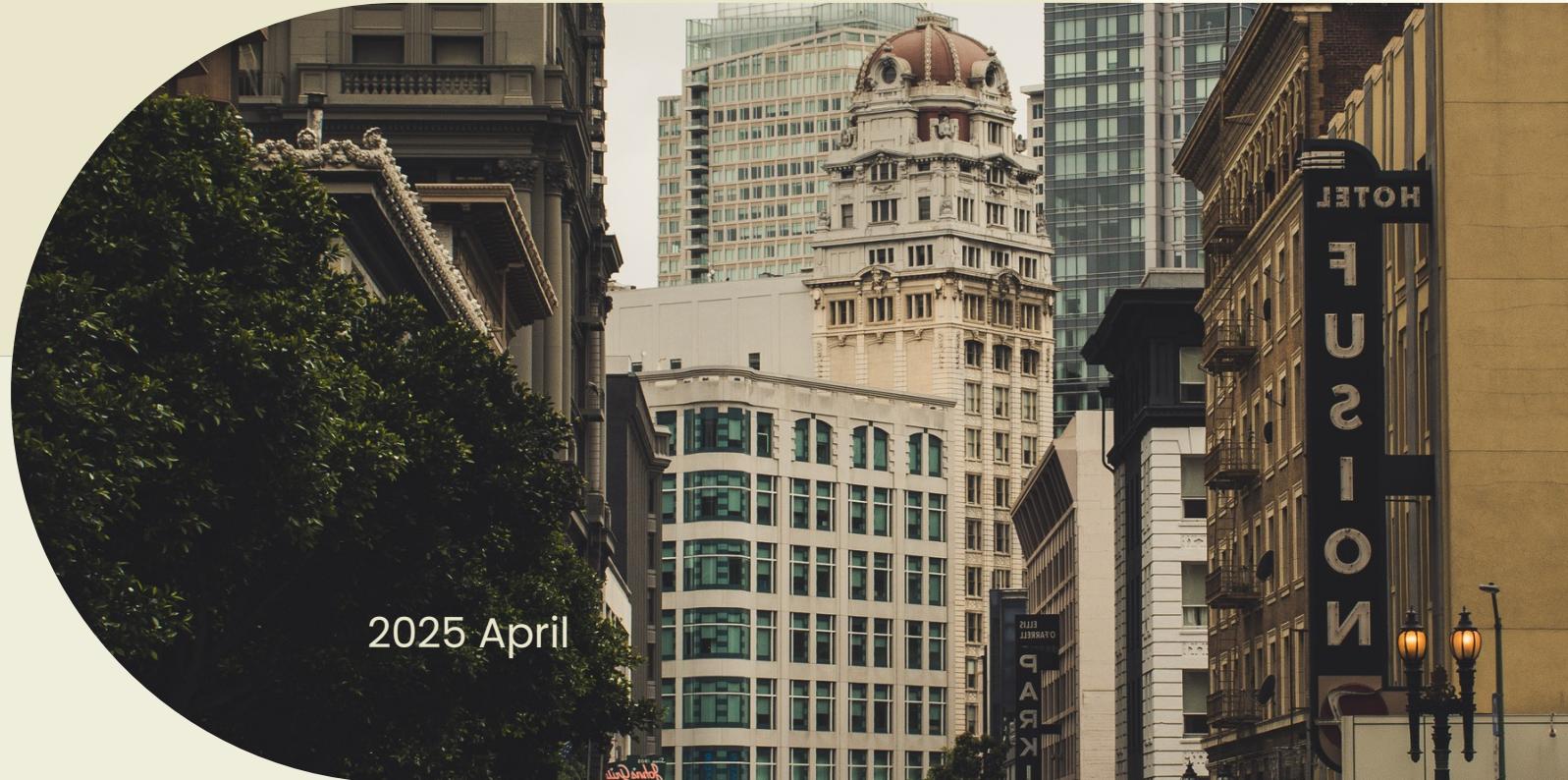


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Introduction & Problem Statement

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

45% Price Surge

Dramatic Shift ► Reshaping Affordability ► Investment Dynamics

What are market key trends?

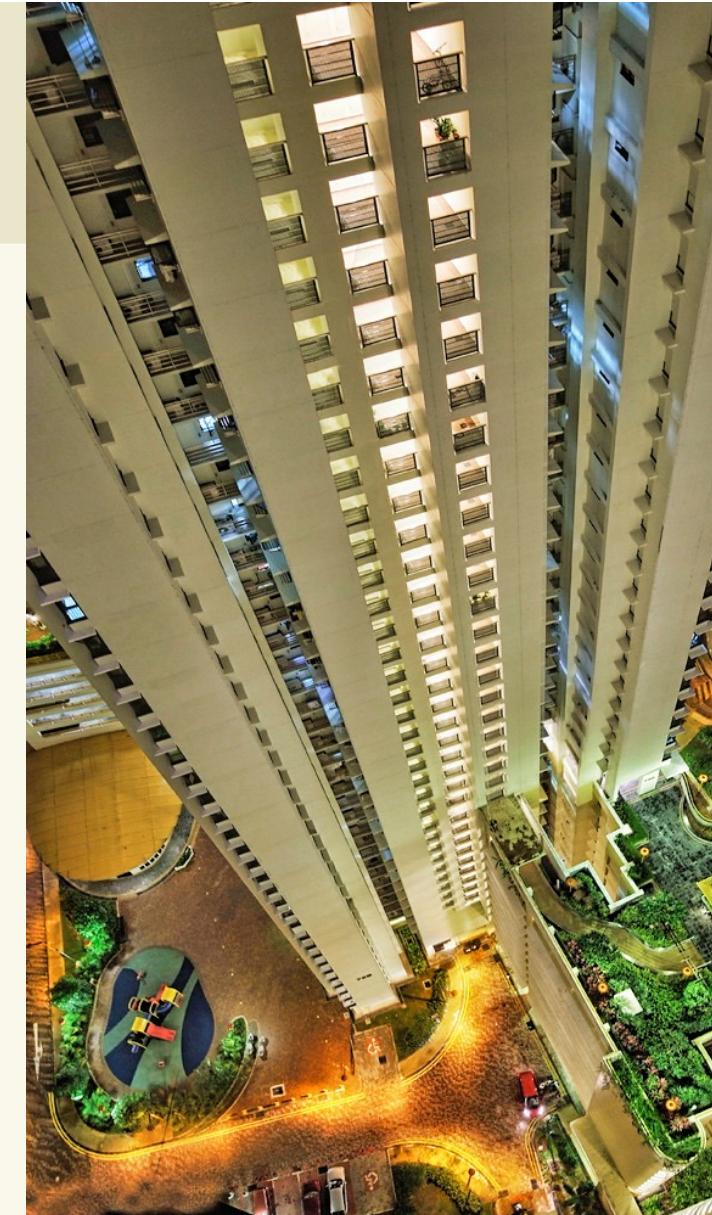
- Accelerated Growth During COVID-19
- Location Premium Hierarchy
- Quantifiable Lease Impact
- Flat Type Performance Divergence

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

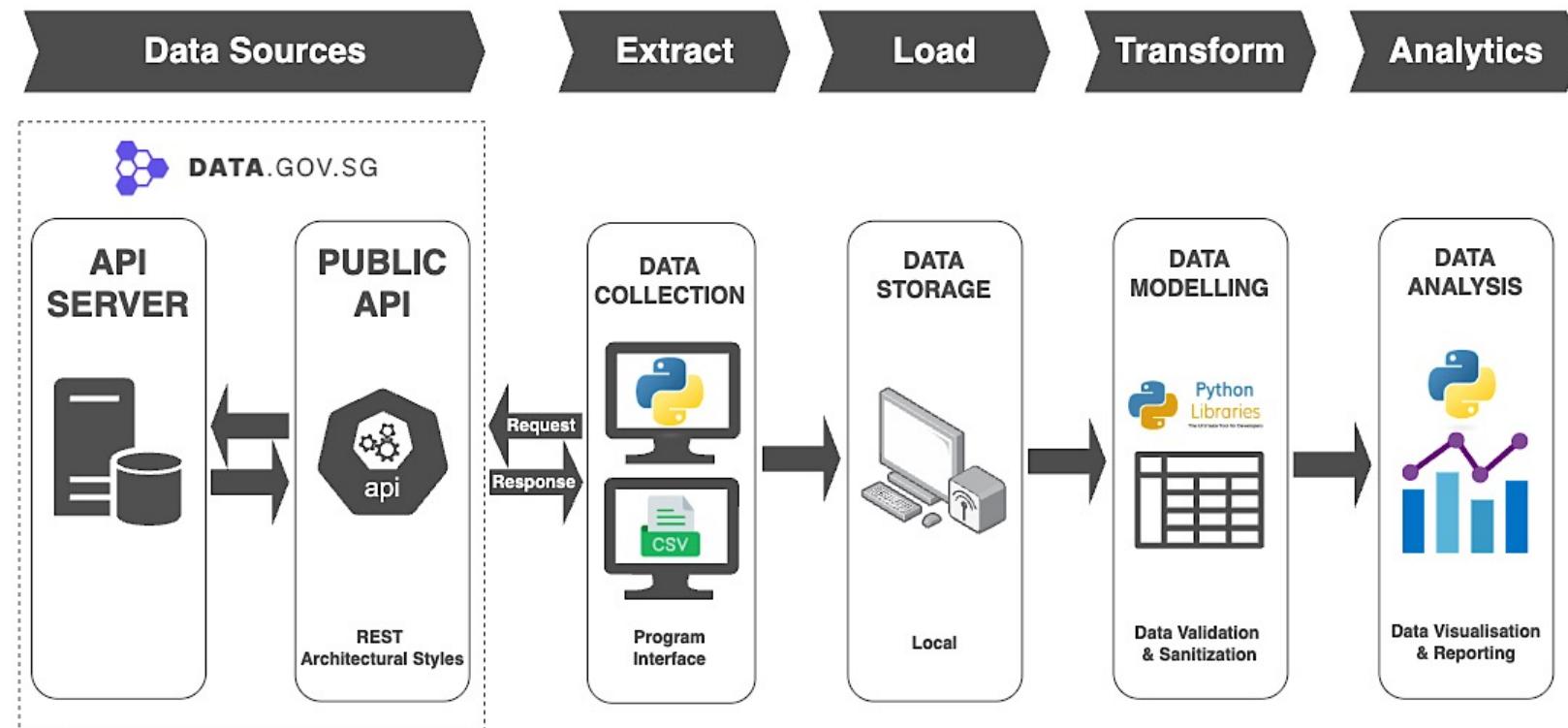
Evaluation Metrics

- **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



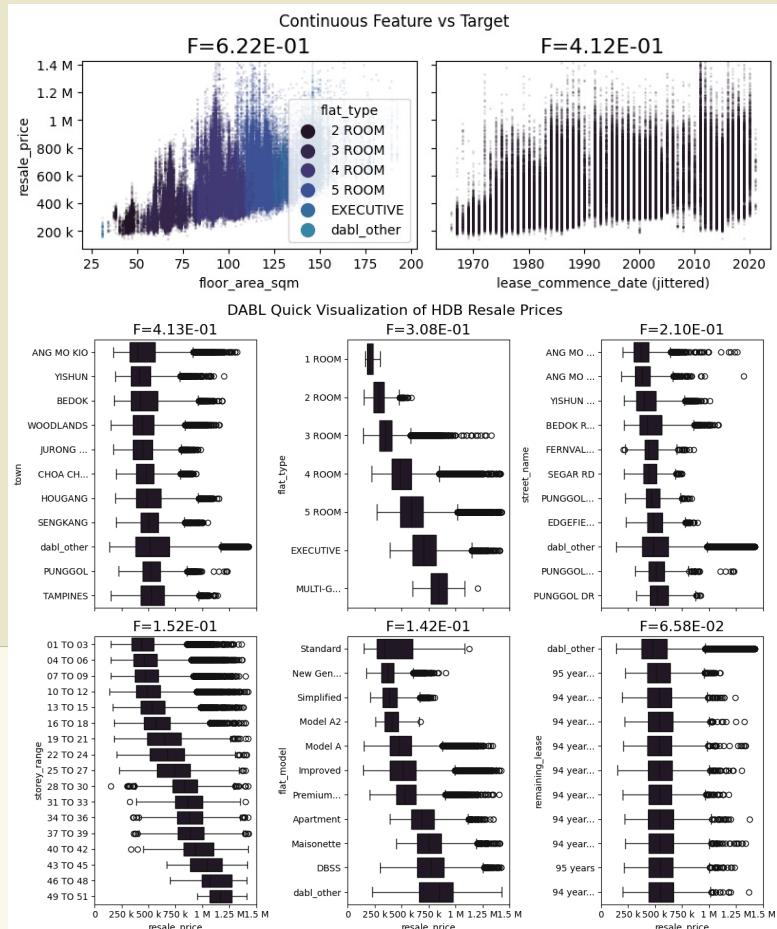
Architecture: Real-Time Data Access (Extract . Load . Transform)

Data Acquisition & Preparation

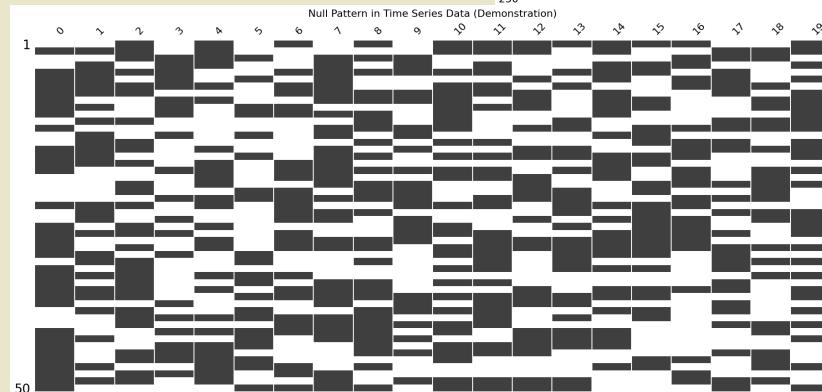
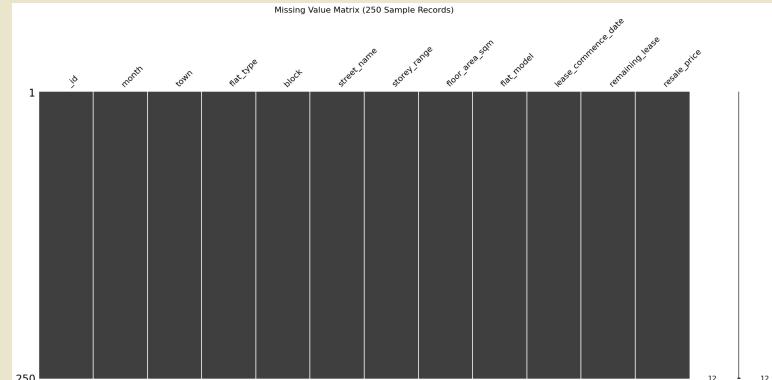
HDB Resale Price Analysis (2017-2024): Trends, Drivers & Challenges



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

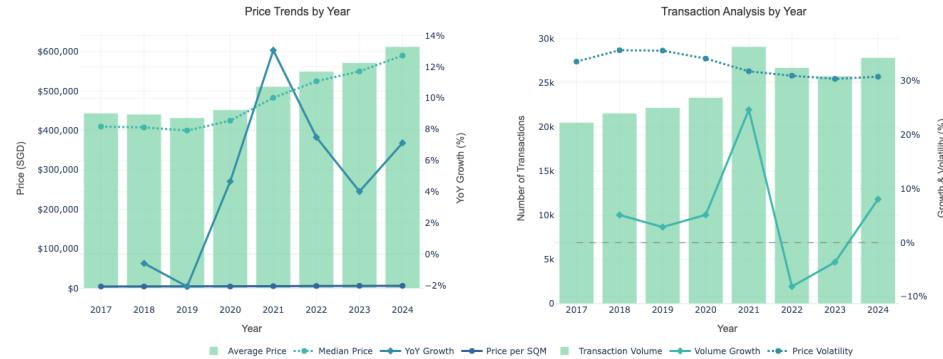
Feature Interaction Analysis: Price by Flat Type, Town, and Floor Level



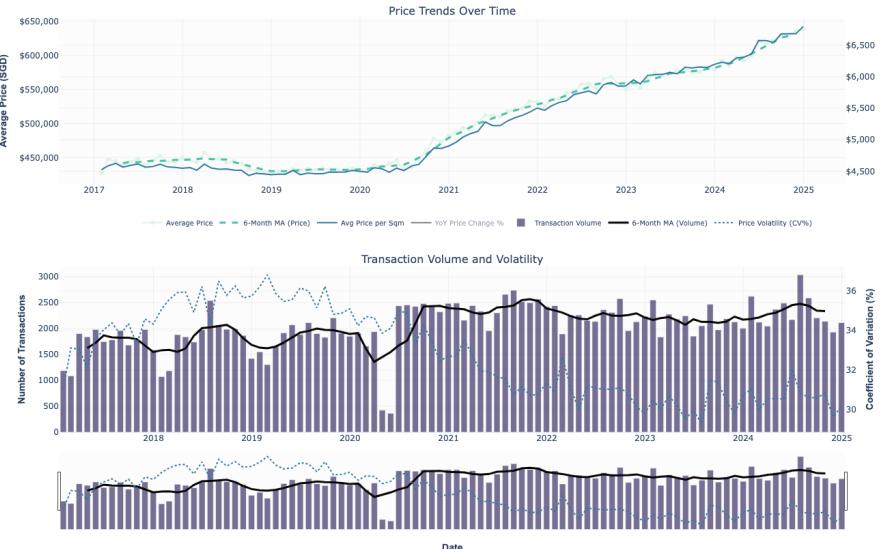
Property Type Analysis by Year



Comprehensive Year-over-Year Real Estate Analysis



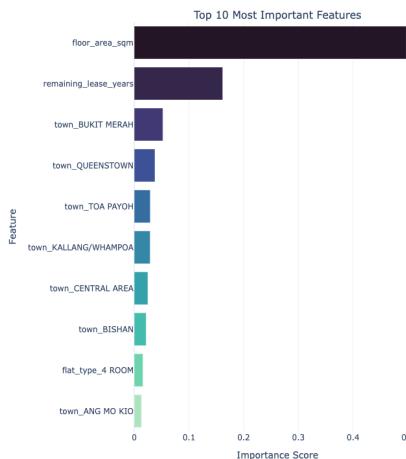
Time Series Analysis of Singapore HDB Resale Market



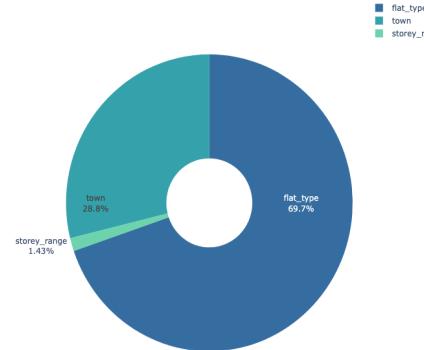
Predictive Analysis

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

Feature Importance Analysis for HDB Resale Price Prediction



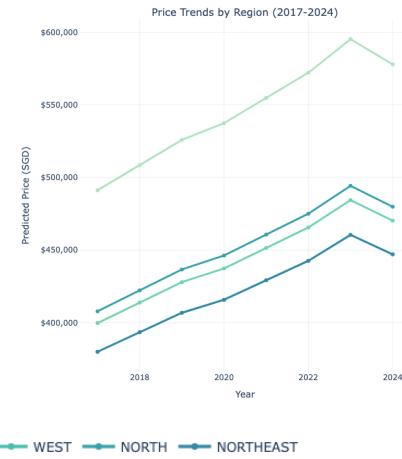
Relative Importance by Feature Category



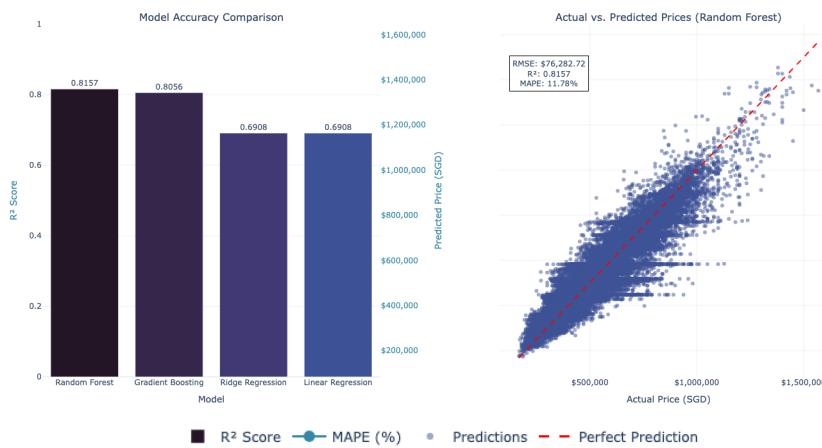
Predicted Prices by Region (4 Room, 2024)



Regional and Temporal Price Predictions



Model Performance Analysis



HDB Price Prediction by Property Characteristics



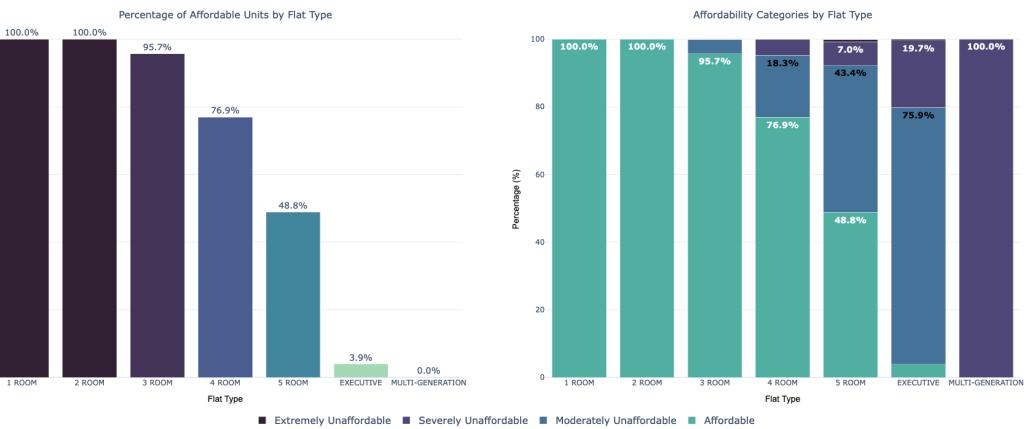
Affordability Analysis

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

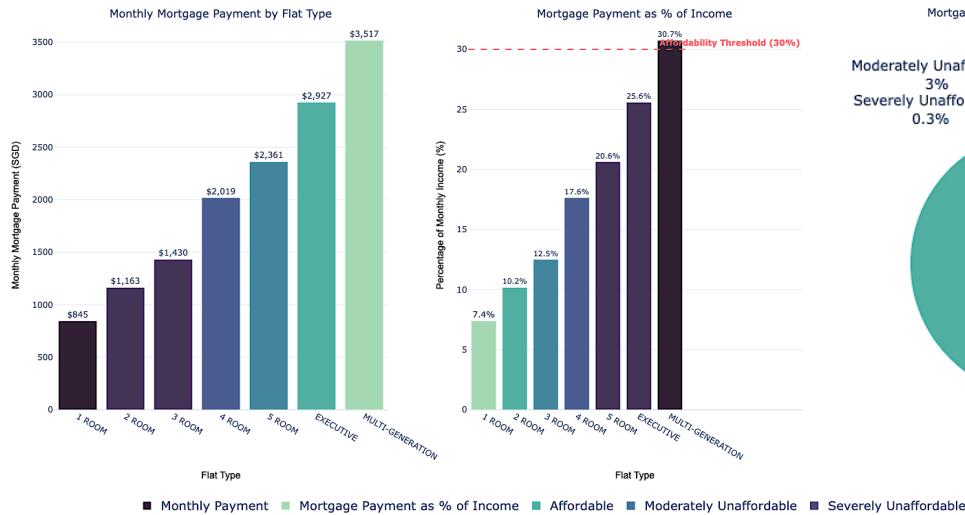
Housing Affordability Analysis (2017–2024)



Flat Type Affordability Analysis (2024)

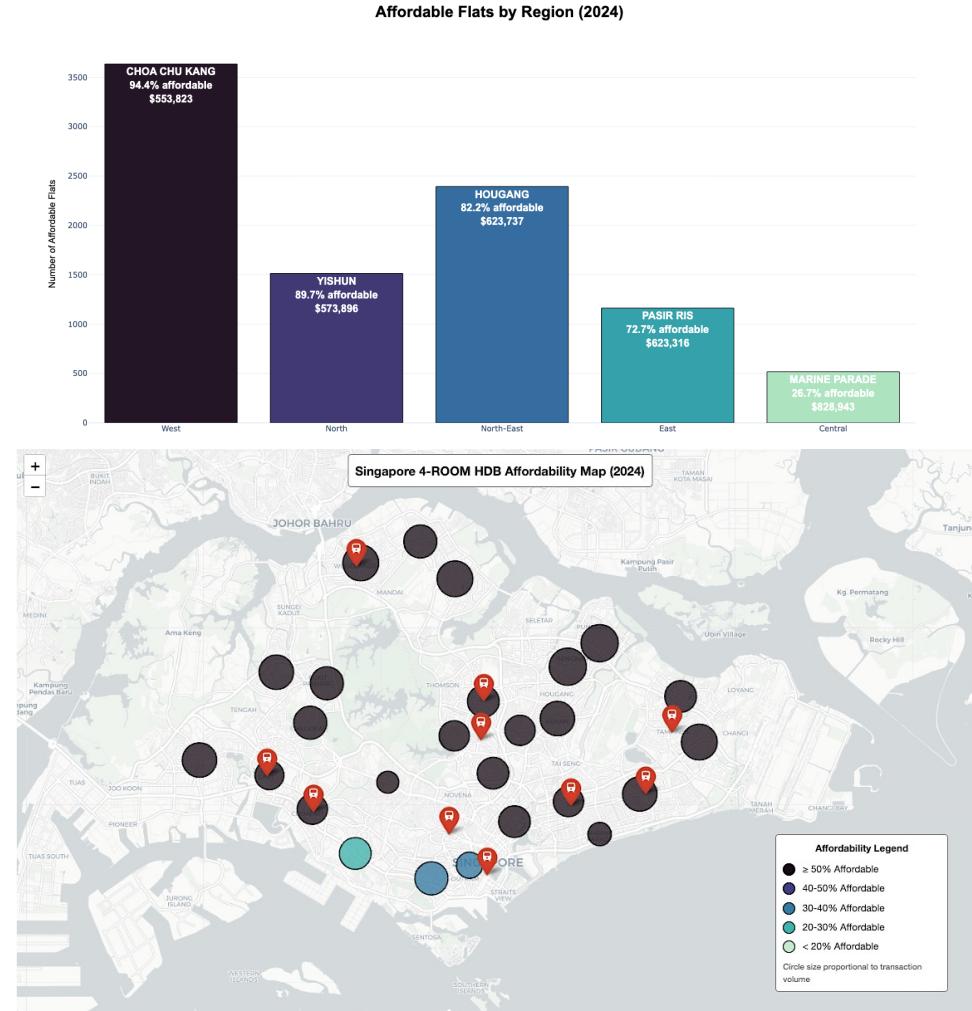
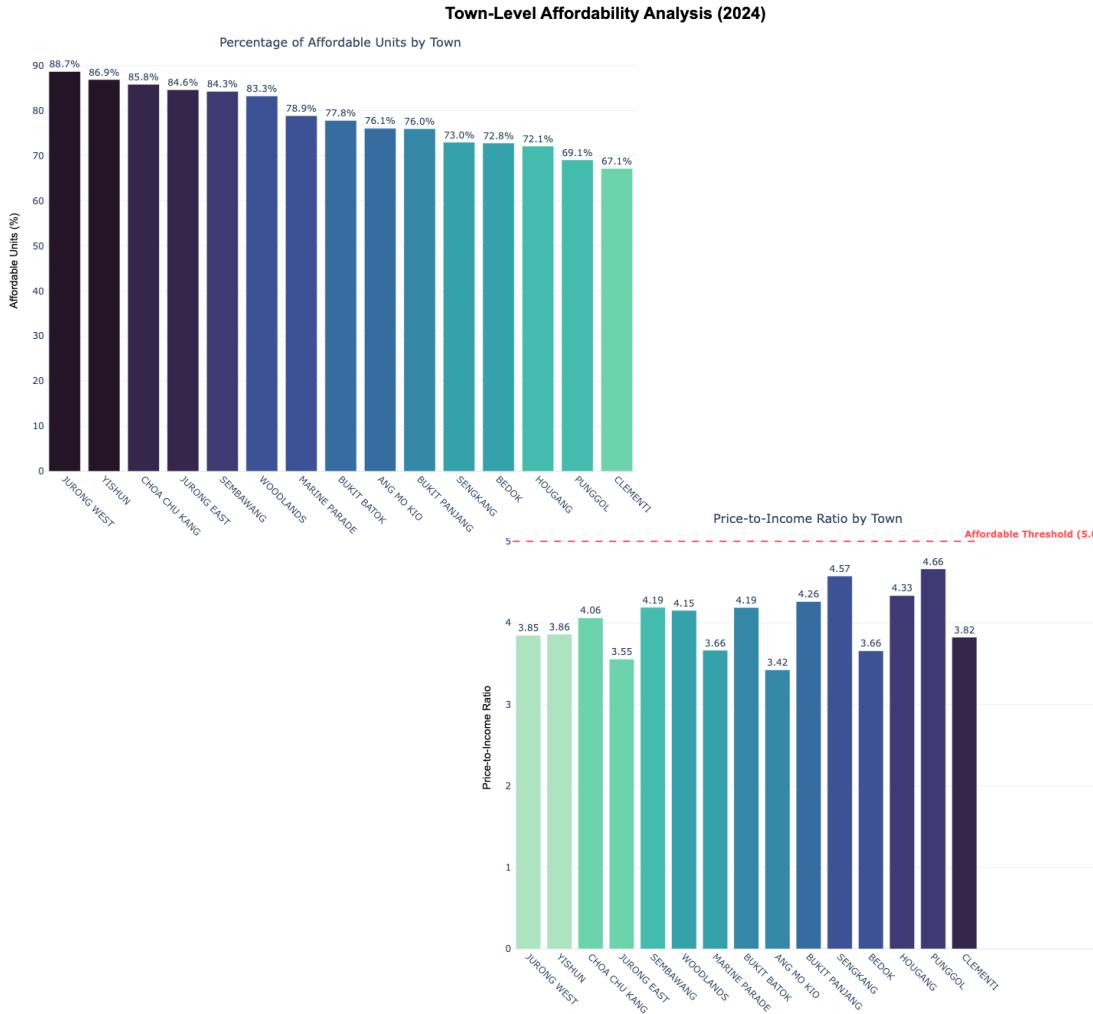


Mortgage Affordability Analysis (2024)



Affordability Analysis

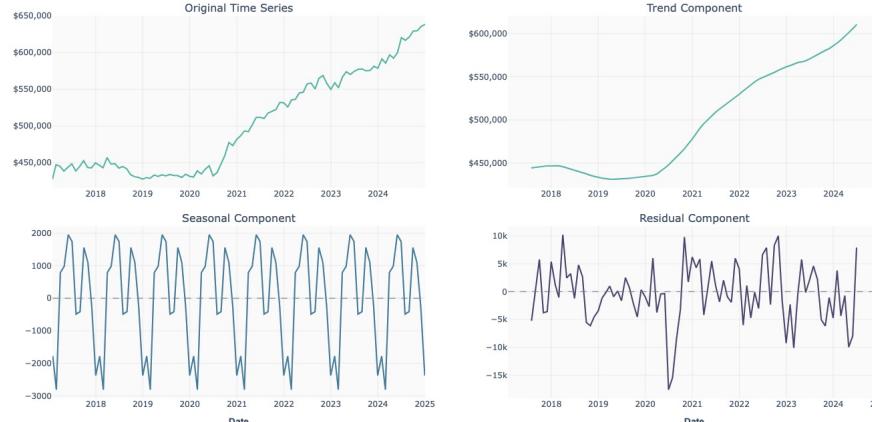
HDB Resale Price Analysis (2017-2024): Trends, Drivers & Challenges



Future Outlook

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

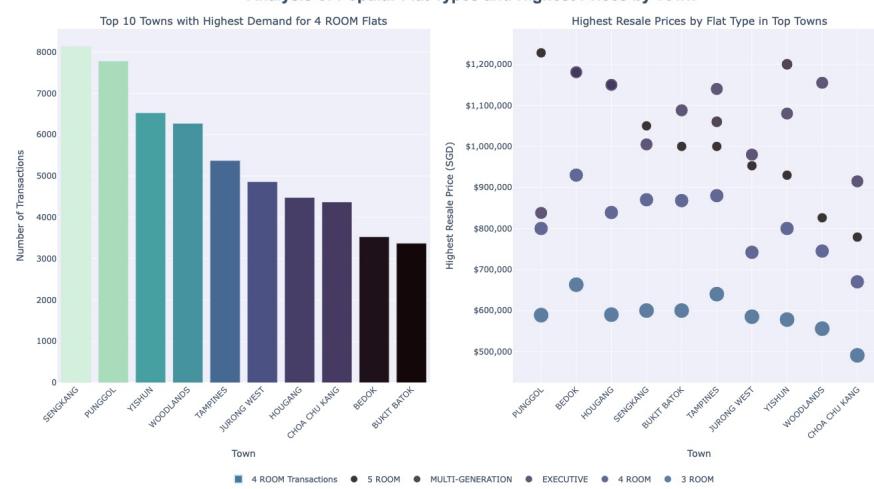
Time Series Decomposition of HDB Resale Prices



Price Analysis by Floor Range and Remaining Lease



Analysis of Popular Flat Types and Highest Prices by Town



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

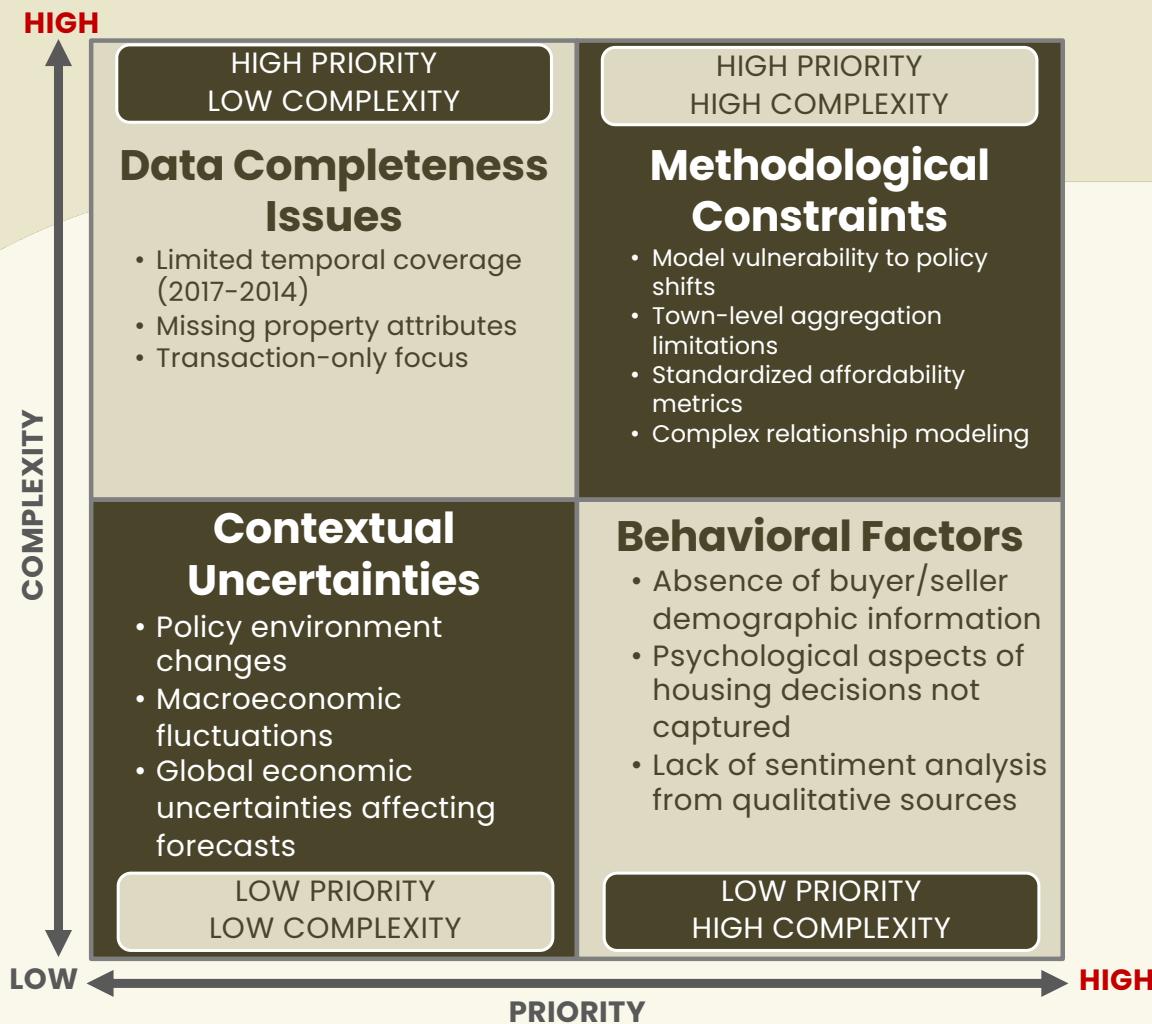
Application of Predictive Model:

- ▶ 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

Lim Pin Pin (Yvonne)

2025 April