

Project Final Presentation

Optimizing HDB Investment: Predicting Hotspot based on Proximity to MRT Station and Other Key Factors



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Introduction and Problem Statement

BUSINESS PROBLEM

- How can we **leverage data analytics** to explore **how proximity to public transportation (MRT) and other factors influence HDB resale sales** to identify flats with the highest potential for capital appreciation and **optimize investment decision**.

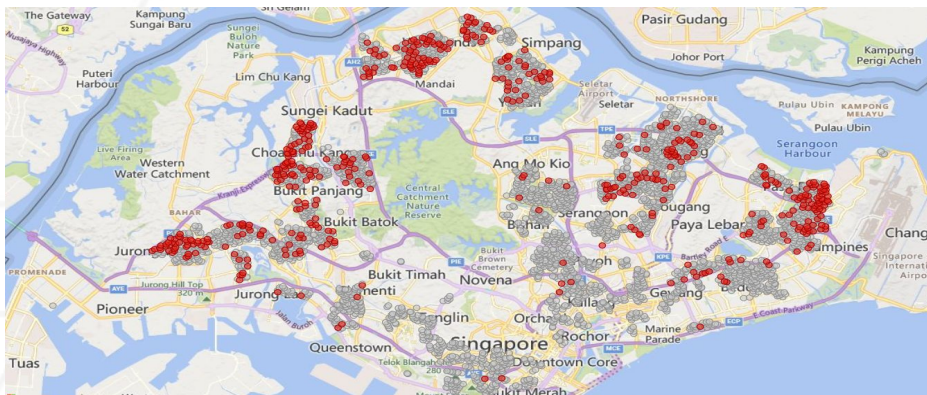
CONTEXT AND IMPORTANCE

- HDB resale prices show **upward trend** with a growth rate **~26%** over the past decade. Making it an attractive investment opportunity.
- The recent introduction of flat-to-MRT distance data in the HDB dataset provide opportunity to analyze the impact of **proximity to public transportation on resale prices**. Given that 83% of the population relies on public transport for commuting.
- **Informed decisions** and **risk mitigation** can be achieved by understanding factors influencing HDB prices, guiding investors towards **profitable resale investments**

OBJECTIVES

- **Comprehensive Market Analysis**
To conduct a detailed analysis of the HDB resale market, focusing on how various factors such as proximity to MRT stations, amenities, flat size, and lease duration affect resale prices.
- **Identify and Capitalize on Market Opportunities**
Enabling investors and homebuyers to make strategic investments that maximize returns.
- **Enhance Real Estate Market Transparency**
Increase transparency in the HDB resale market, making it easier for all market participants to understand the factors driving property values.

Key Insight and Findings



TOP INSIGHT

Analytical method applied has identified **high potential flats (hotspot)** with a **70% probability** of achieving a **profit** of at least **75% of the average profit** within the next **two-year** timeframe.

The highest potential for capital appreciation are visualized on map as **hotspots** (red circle), offer promising investment opportunities.

The highest return for the next 2 years are **Executive** flats in Bishan (Cluster#1) within a **300m** radius of MRT and **5 Room** flat in Marine Parade (Cluster#4) within a **2km** radius of MRT

FINDINGS

- **Proximity to MRT stations** - being close to an MRT station is important mainly for Multi-Generation flats. Those within a short distance tend to have higher resale prices. Other flat types are less affected by location. Analytical model shows that distance has low negative correlation with resale price.
- **Remaining Lease Duration** and **Flat Size** - are the most important factors affecting resale prices. These factors consistently impact the value of all flat types. The larger the flat, the higher resale price.
- **Flat Type** - Multi Generation and Executive flats showed the highest increase in average resale prices, indicating strong demand for this flat type. Investors may consider focusing on these types, especially those in prime locations and with favorable remaining lease duration.

Hotspot Flat Characteristic By Proximity To MRT

Cluster	No of Town	No of Flat Type	Distance to MRT	Remaining Lease (Month)	Flat Size	Price Increase for 2Y
1	2	1	0.29	804.00	229.00	45,092.22
2	21	3	0.79	819.26	120.17	5,406.01
3	18	4	0.38	857.74	129.34	12,594.93
4	18	2	1.38	774.13	144.98	24,332.93

Business Impact and Implications

IMPLICATIONS OF FINDINGS

Data-Driven Investment Decisions

1. By leveraging the probability scores, investors can identify specific areas with **higher potential for profitable resale**, focusing resources on flats with a greater likelihood of high Return on investment (ROI).
2. Analyzing additional factors, like flat type, can help identify **high-demand segments** in the market.

Customized Strategies for Homebuyers

Homebuyers seeking long-term value can use the probability distribution across clusters to **identify emerging hotspots** for future capital appreciation, providing **transparency** and **confidence** in their location choices.

STRATEGIC VALUE

1. The model's **high predictive accuracy** (e.g. AUC of 0.943 in Cluster 2), demonstrates its strong ability to distinguish profitable hotspots from non-hotspots, enabling investors to make **targeted, high-return investments** while **minimizing risks**.
2. The hotspot map, with **red dots highlighting key areas**, reveals previously unclear geographic trends, helping investors and developers visualize market demand and growth potential to better align their strategies with market dynamics.

Recommendations

ACTIONABLE RECOMMENDATIONS

- **Prioritize Investment Area**
With the property hotspots concentrating on the more rural areas in the West, North West, North, North East and East, these are the areas that investor can target to potentially obtain a high profit in the future.
- **Evaluate Trends on Flat Type/Size and Lease Duration**
Larger flats with longer lease duration seems to be more popular indicating higher demand. This could lead to higher return and favorable for property investment.
- **Area-targeted Price Cooling Off Measure**
Based on the areas identified as hotspots where resale price has a high increase, the government and policy makers can increase the availability of new HDB in or near those areas to increase the supply of property for the areas and cool down the price increase.

IMPLEMENTATION STEPS

- Define the **target area** based on the expected investment return using hotspot map.
- Conduct **data gathering** on available flat on the market that are open for sale.
- **Use analytical model** to process this information to provide further **insight** for investment decision making
 - Evaluate proximity to MRT
 - Evaluate trends on flat type and remaining lease duration of offered flat
 - Compare the asking price with predicted price from model
 - Diversify investment portfolio to reduce unsystematic risk
- Stay alert on possible policy that might be released by Government which could impact the market resale price.

Implementation Plan





HIGH LEVEL PLAN

- Define **investment objective**
- Conduct **data gathering** for available flat in market
- Process collected data with available **analytical model** to gain **insights** for understanding the market
- Build **investment portfolio**
- Decide on **potential target for short/long-term investment**

RESOURCES AND SUPPORT

- **Data Access** - Continuous access to property data, such as prices, sales trends, and more (e.g., government databases, market research reports).
- **Partnerships** - Collaboration with property agencies and real estate developers to get up-to-date information on the latest market dynamics.
- **Human Resources** - A skilled team with expertise in data analysis, real estate, and market research, including data scientists, real estate analysts, and project managers.

TIMELINE

	Month 1	Month 2	Month 3
Data Gathering			
Gain Insights			
Build Investment Portfolio			
Define Target			

Challenges and Considerations

POTENTIAL CHALLENGES

Data Availability and Quality - Accurate and up-to-date property data may not always be readily accessible, particularly for certain regions or property types, which could affect the reliability of the analysis.

Market Dynamics - Real estate markets can be highly sensitive to changes in the government policies, economy, interest rates, and external factors.

Competition and Market Saturation - In highly competitive, popular areas, market saturation occurs when the supply of properties surpasses demand, leading to stalling or declining property values, which makes it more difficult for investors to achieve desired returns.



MITIGATION STRATEGIES

Data Partnerships and Automation - Establish partnerships with trusted data providers to ensure continuous access to high-quality, up-to-date information. Utilize automation tools for data collection and reduce manual effort.

Risk Assessment Model - Incorporate advanced risk assessment models that factor in economic variables and real-time data, helping to predict the risk associated with certain property types or regions.

Emerging, Underserved Areas - By analyzing population growth, transportation upgrades, and shifts in consumer preferences, investors can identify emerging or underexplored neighborhoods with lower entry costs and potential for future capital appreciation.

Future Directions

FURTHER ANALYSIS

- **Improve accuracy** by tuning the analytical model
- Enrich the analytical model by **exploring additional factors** influencing resale prices, such as:
 - Proximity to schools and childcare facilities.
 - Environmental quality, including air pollution levels and green spaces.
 - Access to amenities like shopping centers and healthcare services.
- Analyze **behavioral trends**, such as commuting patterns and family size preferences, to align with buyer priorities.
- Assess the **impact of external variables**, including government policies and macroeconomic factors.

LONG-TERM IMPROVEMENTS

- **Enhance Models with Real-Time Data** - Integrate live updates from property listings, public transport developments, and demographic changes to ensure more accurate and responsive insights.
- **Expand Geographic Scope** - Extend analysis to private property markets or regions beyond Singapore for broader applicability.
- **Develop User-Friendly Tools** - Build interactive platforms or dashboards to empower users to explore predictive insights and make informed decisions.

Conclusion and Summary

This project **successfully identified HDB resale hotspots** by analyzing key factors such as proximity to MRT stations, flat size, and lease duration. The insights empower investors to target high-return opportunities while minimizing risk and help homebuyers make informed decisions with long-term value in mind.

Additionally, the findings **enhance transparency for policymakers and developers**, supporting strategic urban planning and housing policy improvements to align with market needs.

Strategic Recommendations



- **Maximize Capital Appreciation:** Align investments with high-potential properties and emerging market trends.
- **Enhance Market Efficiency:** Provide clarity on price determinants to improve market transparency for all participants.
- **Drive Strategic Growth:** Utilize insights to adapt strategies to evolving market dynamics, fostering better alignment with buyer and investor needs.