

Business Running Case

New York Real Estate

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Confidential

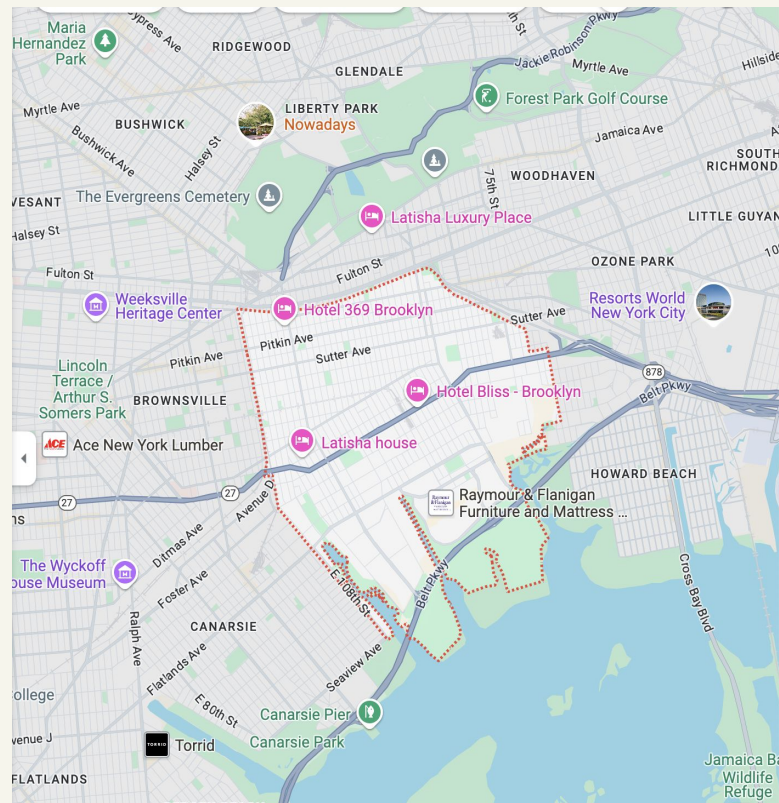
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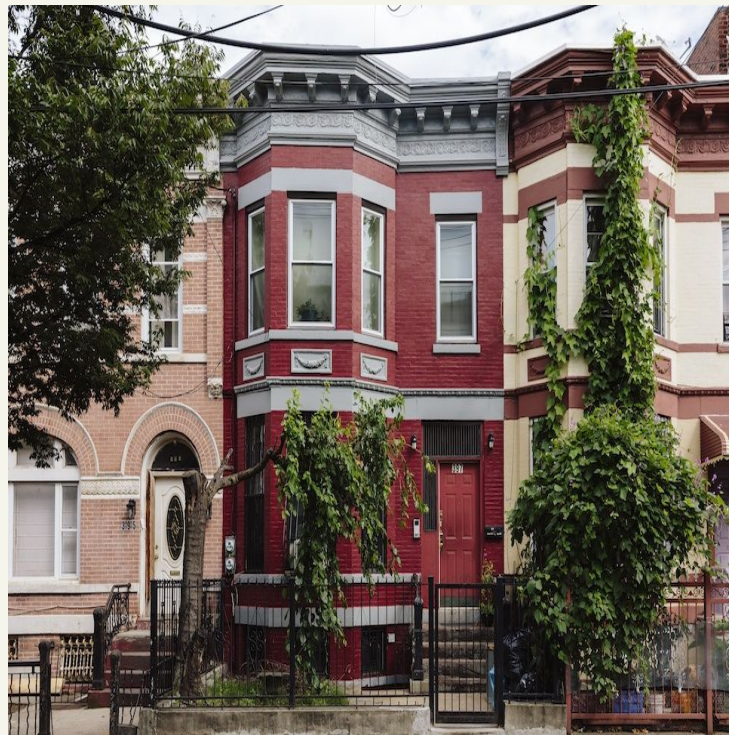
Introduction

- Real estate brokerage firm looking to open office in NYC
- **Problem:** Weigh opportunity cost in opening an office
- **Goal:** Optimize location strategy & profitability
- **Chosen Location of Analysis:** East New York
- **Opportunity:** Emerging, high-risk, high-reward market



Categorization Overview - East New York

- **Emerging Market:** Lower price per square foot compared to NYC peers (Dyker Heights & East Elmhurst)
- **High Volatility:** Sharp fluctuations in sales volume; property prices indicate higher risk
- **Potential:** Projects coupled with demand for affordable housing
- **Strategic Opportunity:** High-risk, High-reward market



Data Exploration - Key Insights

Sales Trends

Sales volume peaked @ **\$7B (2021)**, followed by a correction to **\$263M (2023)**

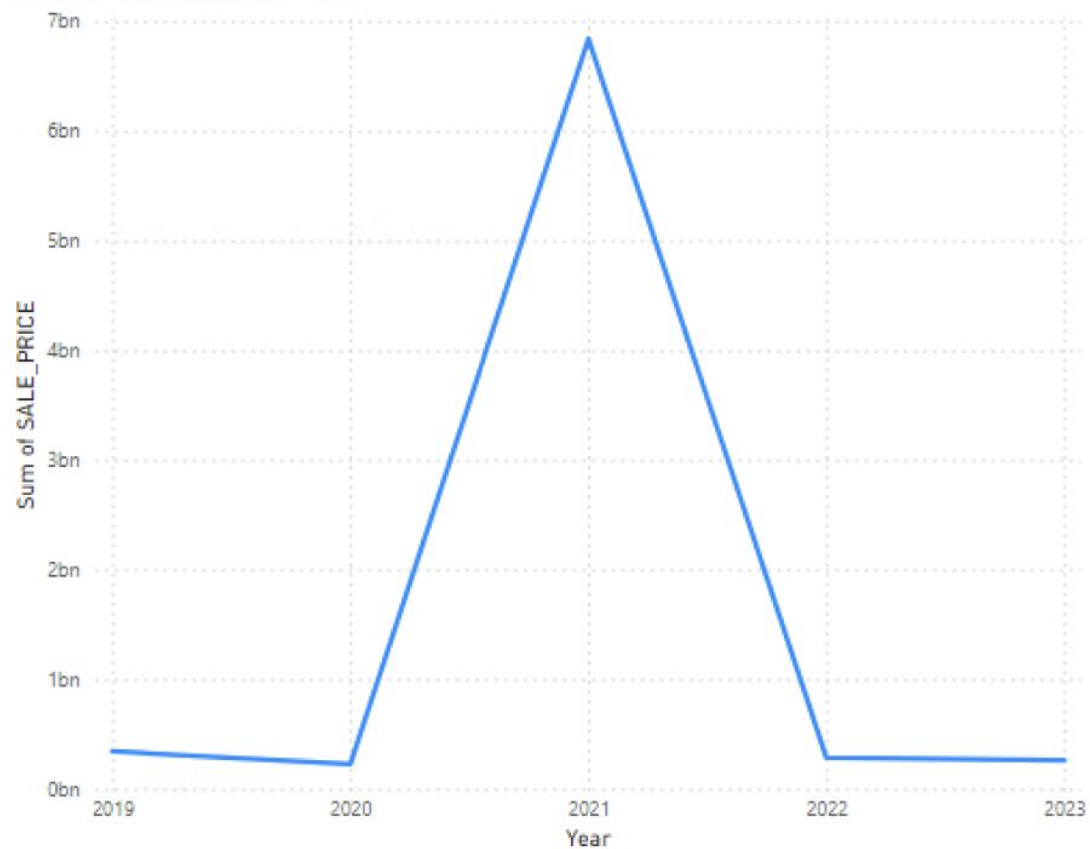
Price per Square Foot

Increased from **\$65.45 in 2003** to a peak of **\$331.61 in 2021**

Market Competition

Offers lower costs & higher growth potential, but greater volatility

Sum of SALE_PRICE by Year



Descriptive Analytics

Sales Distribution

Residential properties dominate East NY's market, with an increasing trend in commercial & mixed-use properties

Correlation

Strong, positive correlation between sale price & square footage

Cluster Analysis

Positioned East NY with neighborhoods characterized by low property prices, larger property sizes, & higher market risk

Market Variability

Standard deviation of property prices indicates higher volatility (larger returns, higher risks)

Model Life Cycle Management

Development

Built ETS (time series) & regression models to forecast & value, validated with historical data

Testing & Development

Models projected stable sales with seasonal spikes, cross-validated for accuracy

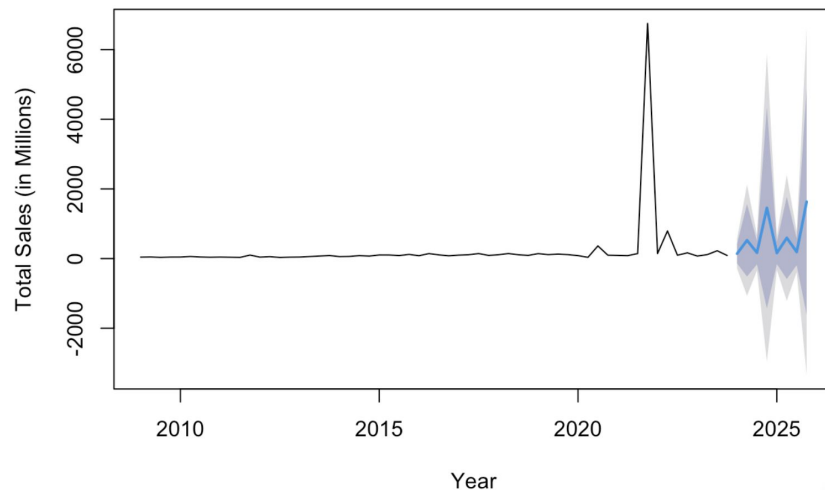
Maintenance

Quarterly updates & retraining ensure alignment with market trends & performance metrics

Predictive Analytics

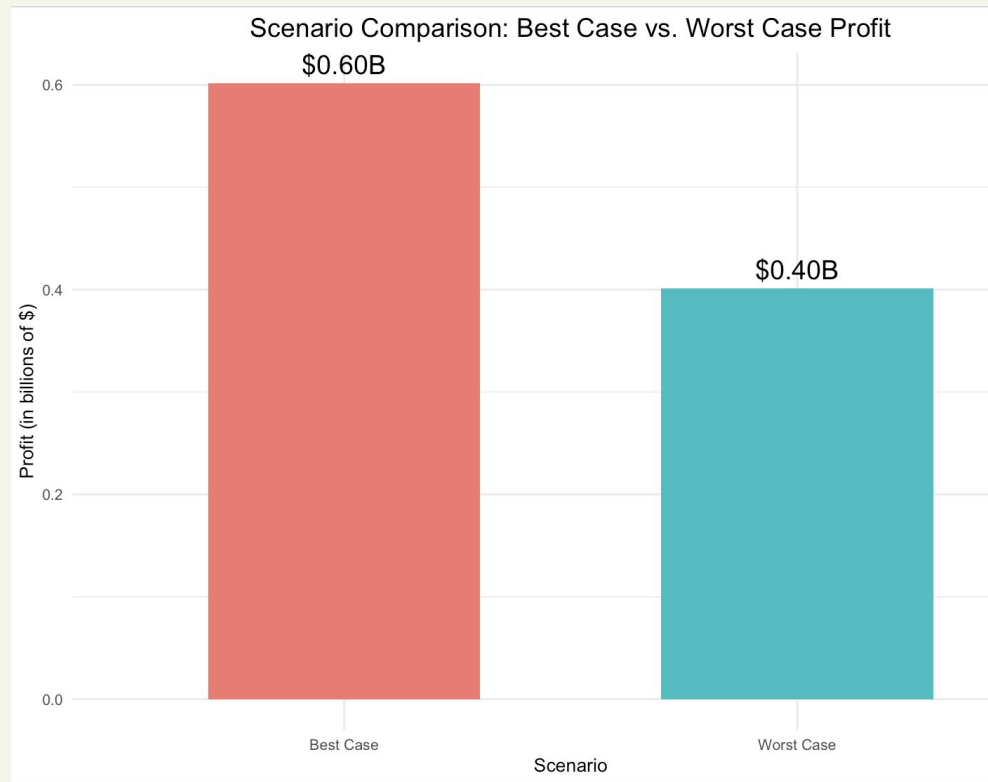
- **Time Series:** ETS model forecasts steady residential sales in East New York over the next two years, with slight seasonal variations
- **Seasonal Insights:** Sales volume fluctuates between quarters, reflects seasonal demand spikes
- **Regression Analysis:** Multiple regression model incorporating time & seasonality revealed cyclical demand patterns, reinforcing the value of timing operational efforts to maximize revenue
- **Strategic Implication:** Predictable seasonal patterns & stable forecasts provide a strong found

ETS Forecast, Demonstrating Total Sales in East New York



Prescriptive Analytics

- **Optimization Model:** 0 employee & a 4% commission rate, achieving NPV of \$3.75B, breaking even within a single quarter
- However, starting with 1 employee provides better operational feasibility
- **Cost Efficiency:** Lean operations minimized costs to \$6,069/month; Adding 1 employee ensures operation capability without significantly impacting profitability



Recommendation

- **Decision:** Proceed with opening the East New York Office
- **Staffing:** Start with 1 employee to balance cost-efficiency & operational needs
- **Next Steps:** Monitor sales trends and retrain models quarterly to adapt market changes

