Visualizing Housing Market Trends An Analysis of Sale Prices and Features using Tableau

LTVIP2025TMID50072

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1. INTRODUCTION

1.1 Project Overview

This project focuses on analyzing housing data using the data visualization tool Tableau. The dataset comprises 21,585 records and 33 fields, containing features such as sale price, year built, number of bedrooms, bathrooms, zip code, lot size, renovation details, and more. The main objective is to extract meaningful insights that can help homeowners, realtors, and property investors better understand pricing patterns, the impact of renovations, and regional differences in property value. By converting raw data into interactive visualizations, the project seeks to enhance data accessibility, usability, and decision-making effectiveness. In addition to static analysis, the project also introduces interactive dashboards and story points that allow users to filter data, explore trends, and identify correlations based on key property attributes.

1.2 Purpose

The primary purpose of this project is to demonstrate how interactive visualizations can simplify complex datasets and deliver actionable insights. Rather than sifting through thousands of rows, end-users can explore visual dashboards to answer critical questions like:

- Does renovation increase property value?
- Which zip codes show consistently high sale prices?
- How does property age correlate with price depreciation?
- Which age group of houses are renovated mostly?

This project serves both as a learning opportunity and as a real-world application of business intelligence tools in the real estate domain.

2. IDEATION PHASE

2.1 Problem Statement

In real estate, pricing decisions are influenced by numerous factors, such as property age, location, renovation status, and market conditions. Unfortunately, raw data alone doesn't make it easy to identify the most influential factors, especially when dealing with large datasets. This project seeks to bridge the gap between data and decision-making by converting unstructured information into structured dashboards. By visualizing key metrics, we can detect patterns and anomalies, helping buyers, sellers, and investors make smarter, data-driven decisions.

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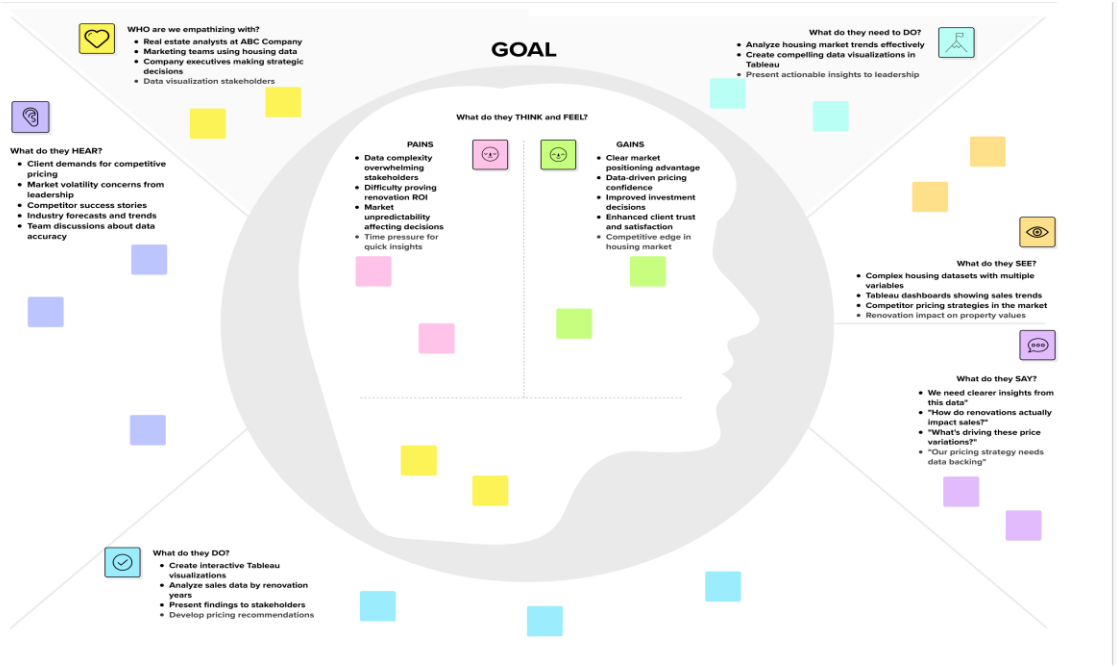
2.2 Empathy Map Canvas

The empathy map was developed with end-users in mind — mainly prospective home buyers and property investors. It helped identify the following user behaviors and expectations:

- Think & Feel: "Am I making the right investment?", "Will this home appreciate in value?"
- See: Complicated property listings, no clear trends
- Say & Do: "Show me renovated homes only", "Compare houses in different zip codes"
- Pain Points: Overwhelming data, lack of personalization
- Gains: Clear visuals, location-based insights, renovation trends



2.3 Brainstorming

Initial brainstorming sessions were used to generate ideas around key visualizations. Here are some of the concepts discussed:

- Bar charts comparing renovated vs. non-renovated homes

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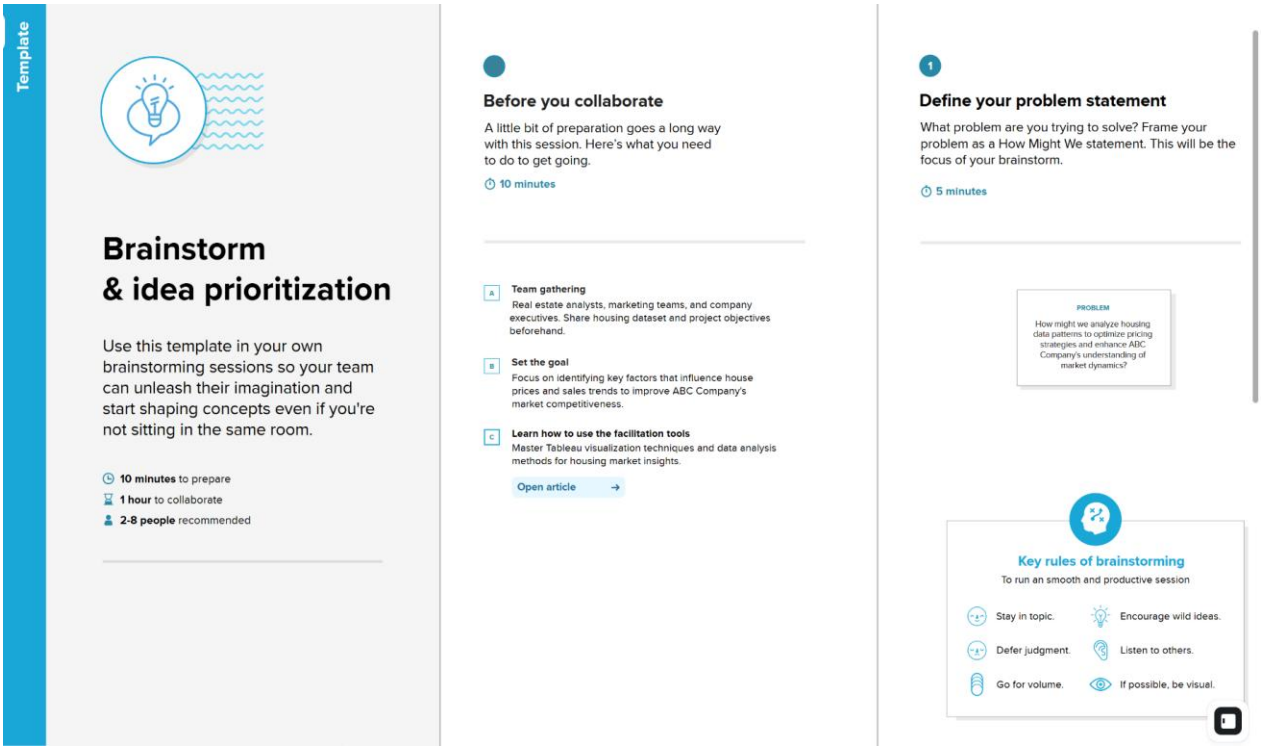

- Line charts showing price trends over time
- Heat maps by zip code
- Dashboards that combine multiple filters
- Creating a final story using Tableau Story Points to narrate key insights

After evaluating feasibility and relevance, the most impactful visualizations were shortlisted for implementation.

3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

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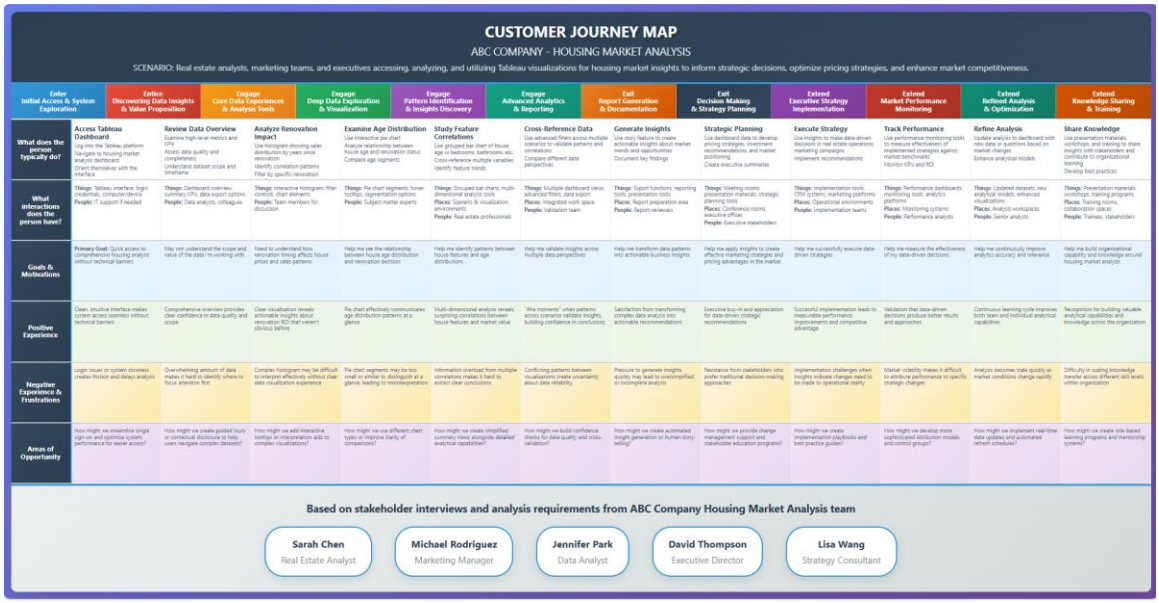
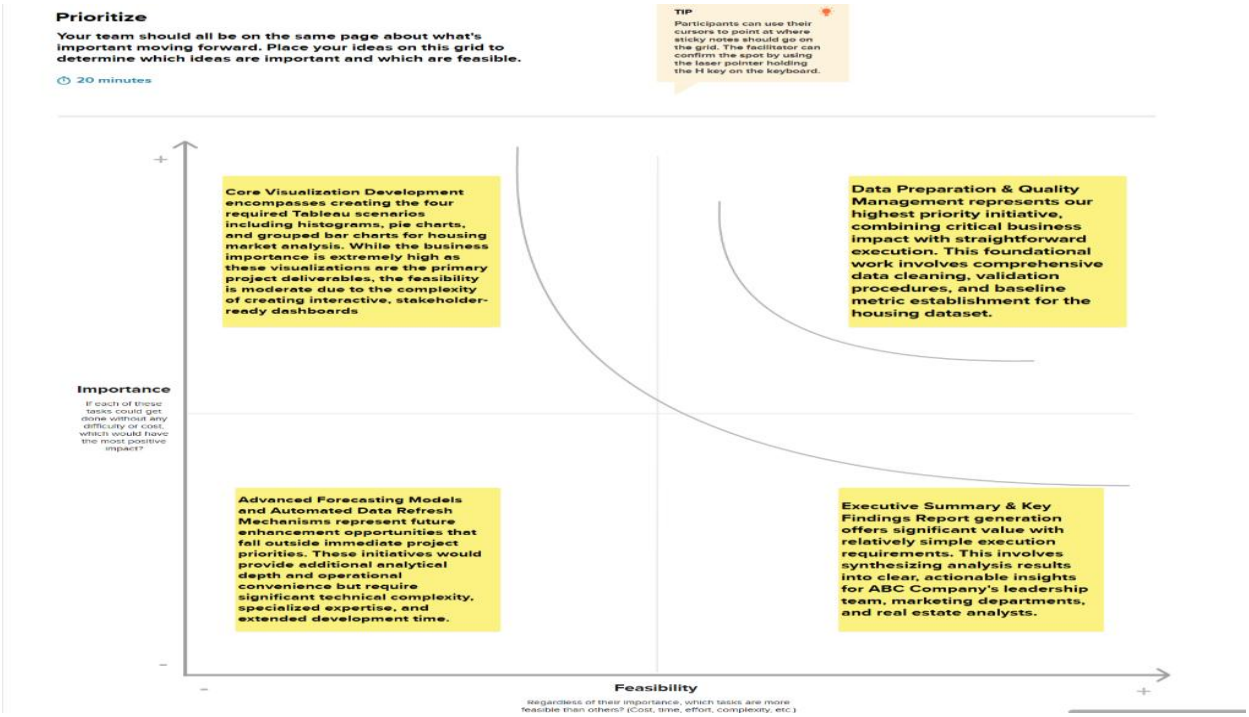
The customer journey begins with a user accessing the dashboard, selecting filters like location or renovation status, and interpreting the visuals to make informed choices. Each stage of the journey was optimized for clarity and impact.





3.2 Solution Requirement

Functional Requirements:
- Load housing data into Tableau
- Create calculated fields (e.g., Years Since Renovation)
- Build four dashboards
- Design a Tableau story from dashboard insights

Non-functional Requirements:
- Interactivity and responsiveness
- Clean design with consistent formatting
- Performance optimization

3.3 Data Flow Diagram

Data flows from CSV format into Tableau, undergoes transformation through calculated fields and filters, and is finally visualized through dashboards and a compiled story view.

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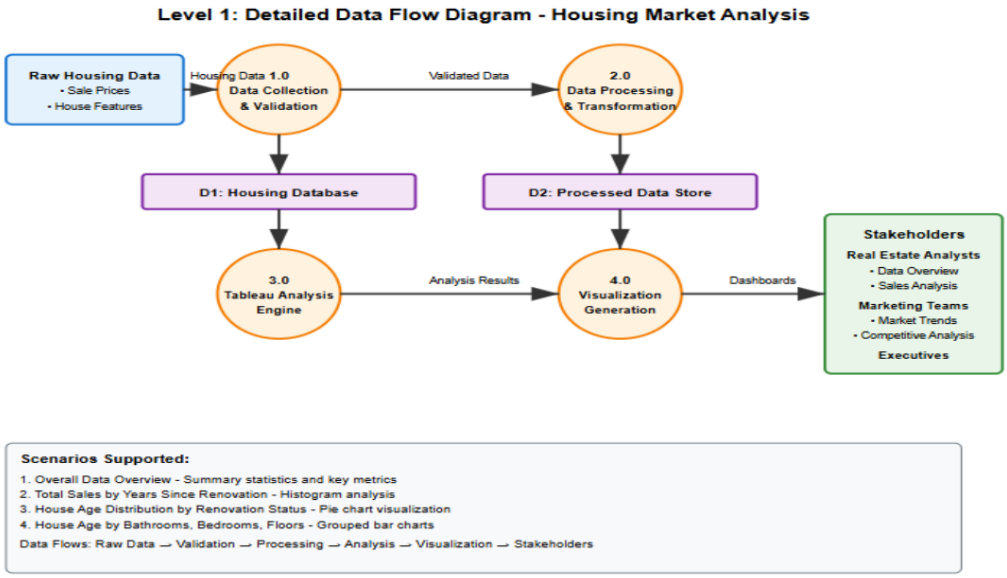

3.4 Technology Stack

- Tableau Desktop (Visualization)
- Microsoft Excel/CSV (Data Format)
- Windows OS
- Optional: MS PowerPoint or Word for documentation

4. PROJECT DESIGN

4.1 Problem Solution Fit

The problem of fragmented and difficult-to-interpret housing data is effectively addressed by Tableau's visual analytics. Through charts, maps, and interactive dashboards, the project offers a compelling solution that brings clarity to buyers, sellers, and analysts. By allowing users to segment data by renovation status, age, or zip code, the dashboards offer direct and actionable insights aligned with the initial objectives.

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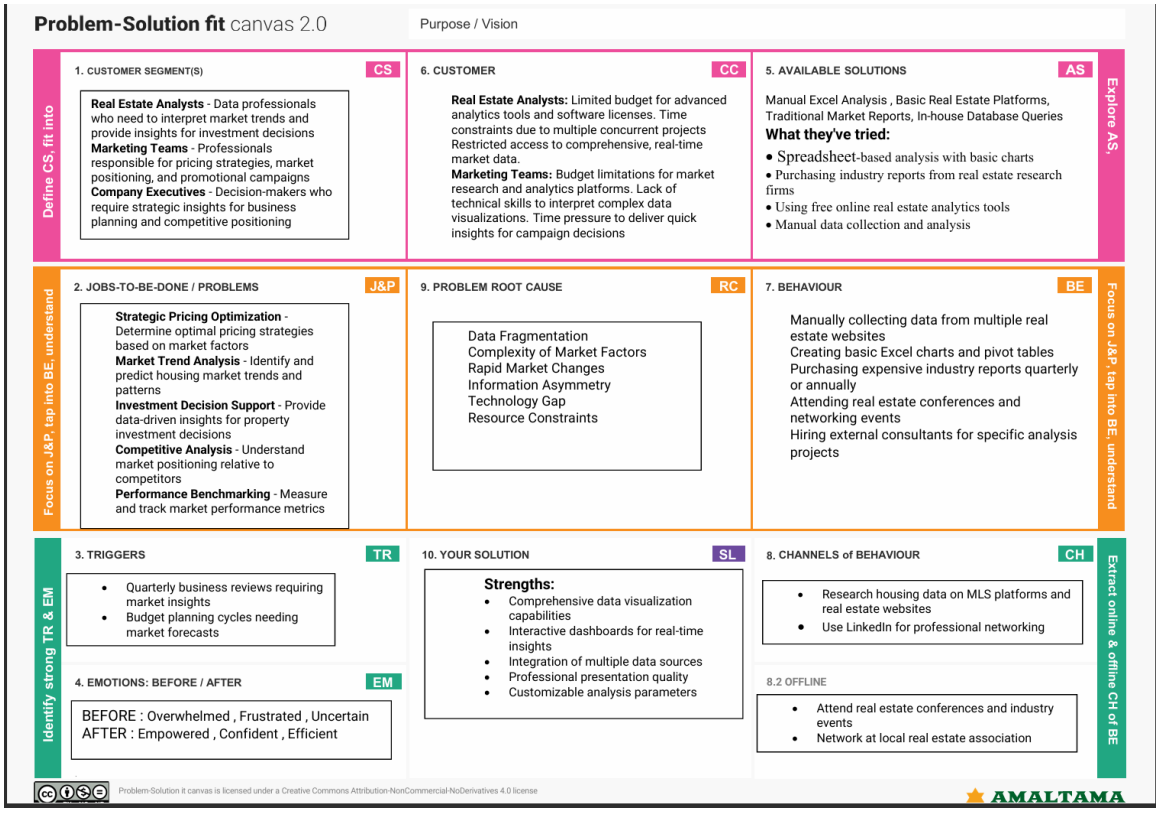

4.2 Proposed Solution

The proposed solution includes creating calculated fields such as 'Years Since Renovation', filtering by zip code clusters, and visualizing market trends using line charts and bar graphs. The dashboards include:

- Sale Price vs. Age of Property
- Renovation Status Impact
- Sale Price by Zip Code
- A compiled Story combining the above dashboards

These visualizations simplify complex relationships and allow decision-makers to quickly identify patterns.

4.3 Solution Architecture

The architecture includes data ingestion from CSV into Tableau, applying calculated fields and filters, building dashboards, and exporting the final product for reporting. Each component is modular and ensures reusability for future housing datasets.

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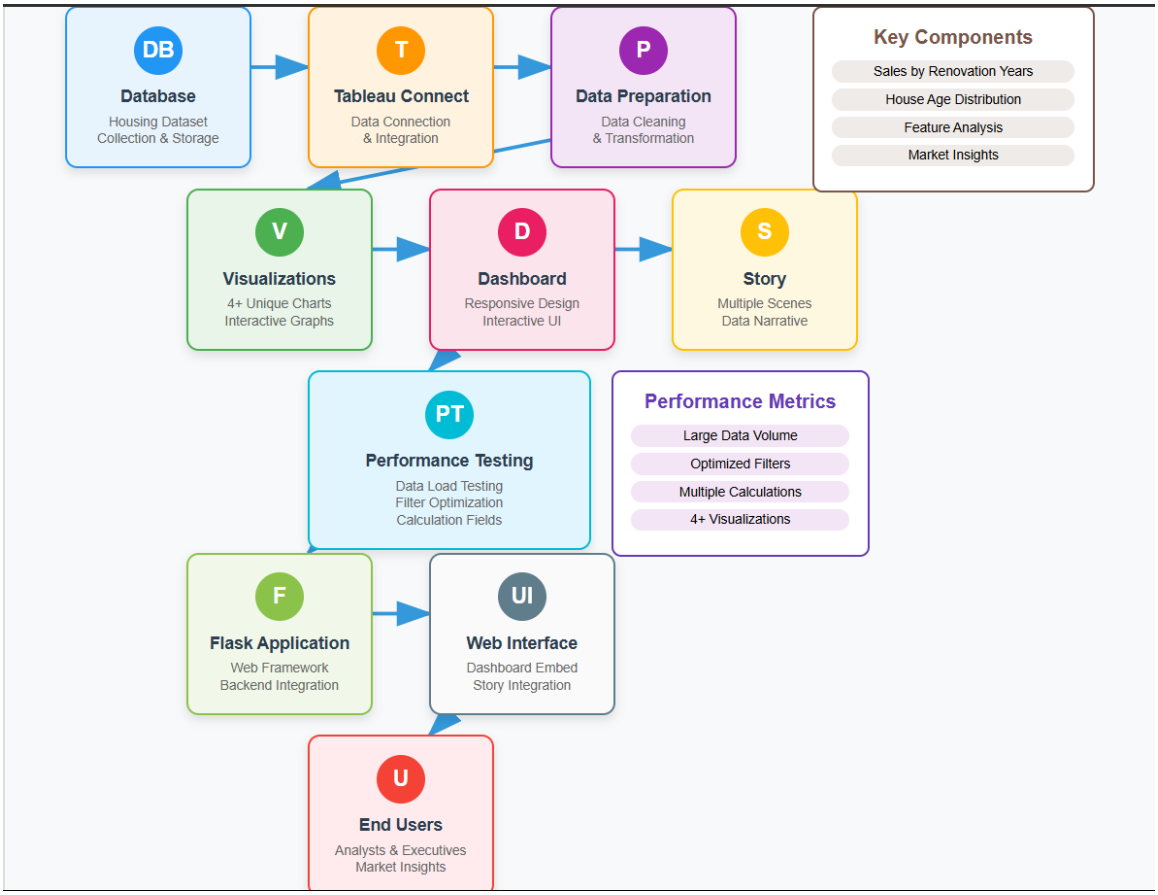


5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

The project was planned in phases over a period of 1–2 weeks:

- **Day 1–2**: Dataset understanding and cleaning
- **Day 3–4**: Brainstorming, empathy mapping, and ideation
- **Day 5–6**: Calculated field creation and data transformation
- **Day 7–8**: Designing dashboards and interactivity features
- **Day 9**: Creating the story points view
- **Day 10**: Final polishing, testing, and documentation

This systematic planning ensured that the entire workflow progressed without bottlenecks.

6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

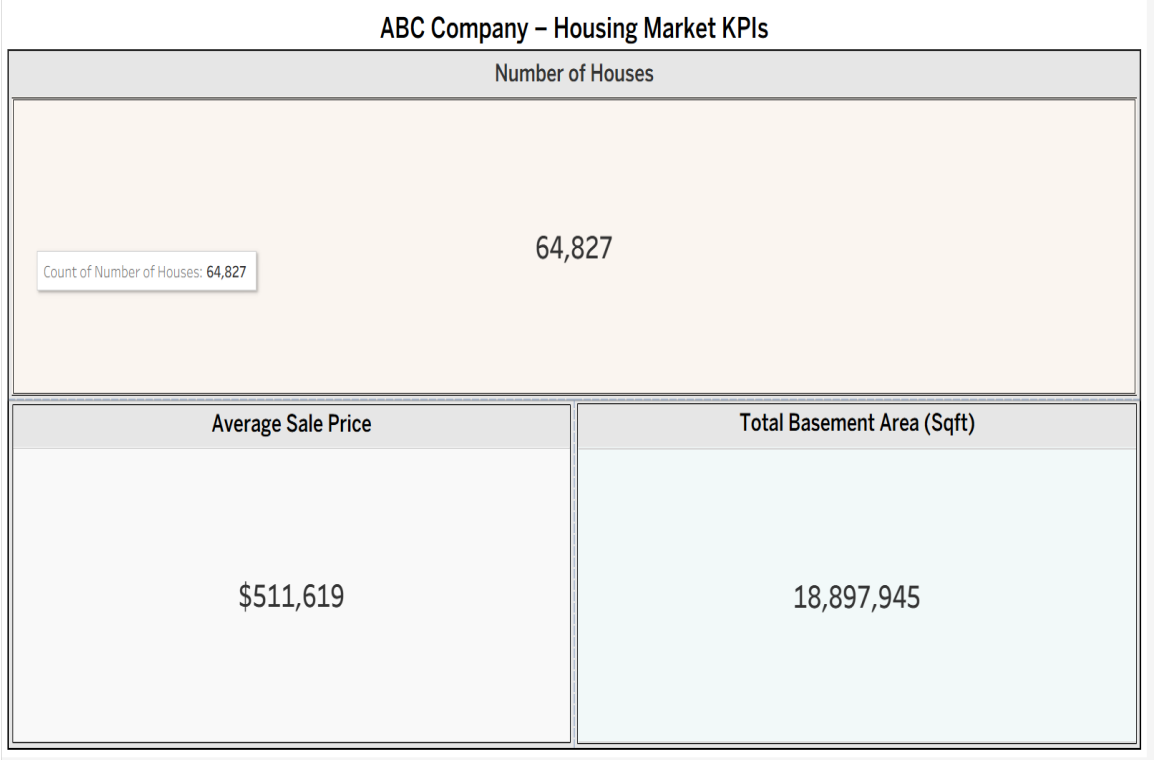
Testing involved validating the accuracy of calculated fields and responsiveness of filters. The dashboards were evaluated for performance across various user interactions like:

- Filtering by renovation status
- Filtering by zip code and age
- Dashboard-to-dashboard filtering in the story view

All visuals responded efficiently with no noticeable lag. Filters worked seamlessly across multiple views, confirming the robustness of Tableau's engine.

7. RESULTS

7.1 Output Screenshots



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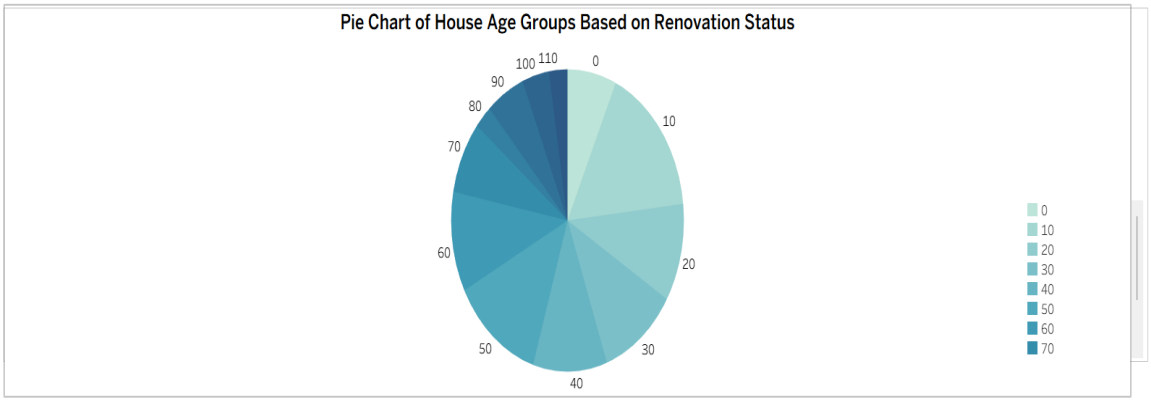
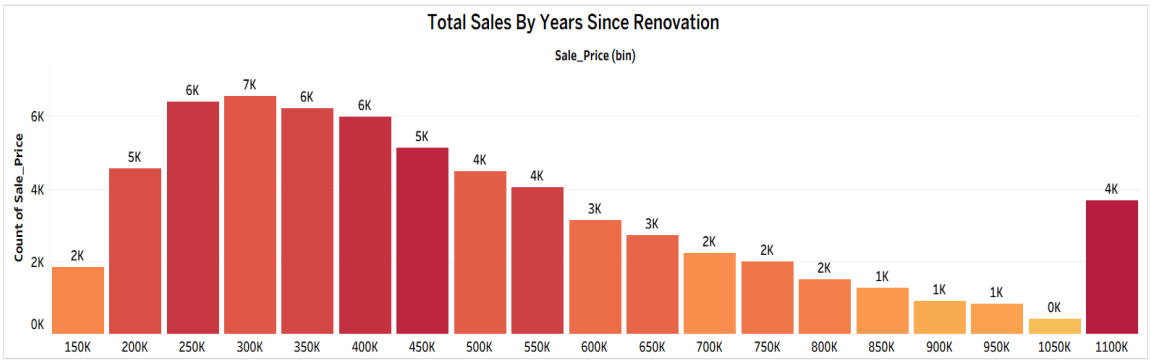
"Renovation Impact Analysis: Housing Age Groups and Sales Trends"



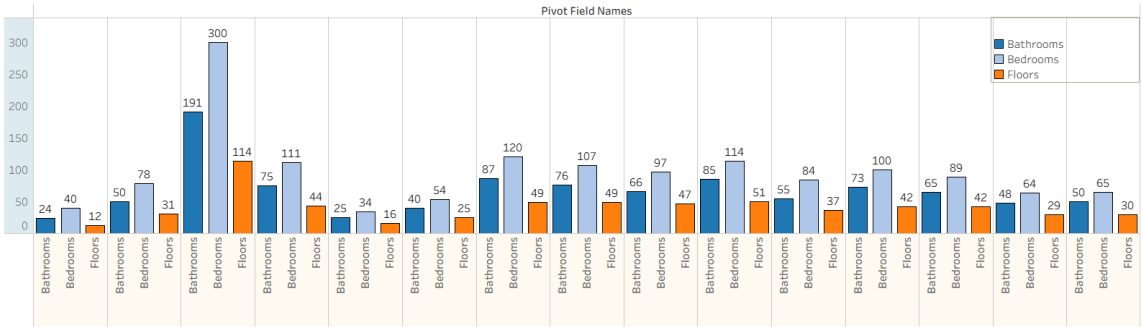


"Housing Data Insights: Market Metrics and Renovation Trends"

Residential Market Snapshot: Volume, Value & Space

Area of the House from Basement (in Sqft)	115,931,394
Count of Transformed_ Housing_Data	64,827
Avg. Sale_Price	511,619

Feature Trends by Years Since Renovation



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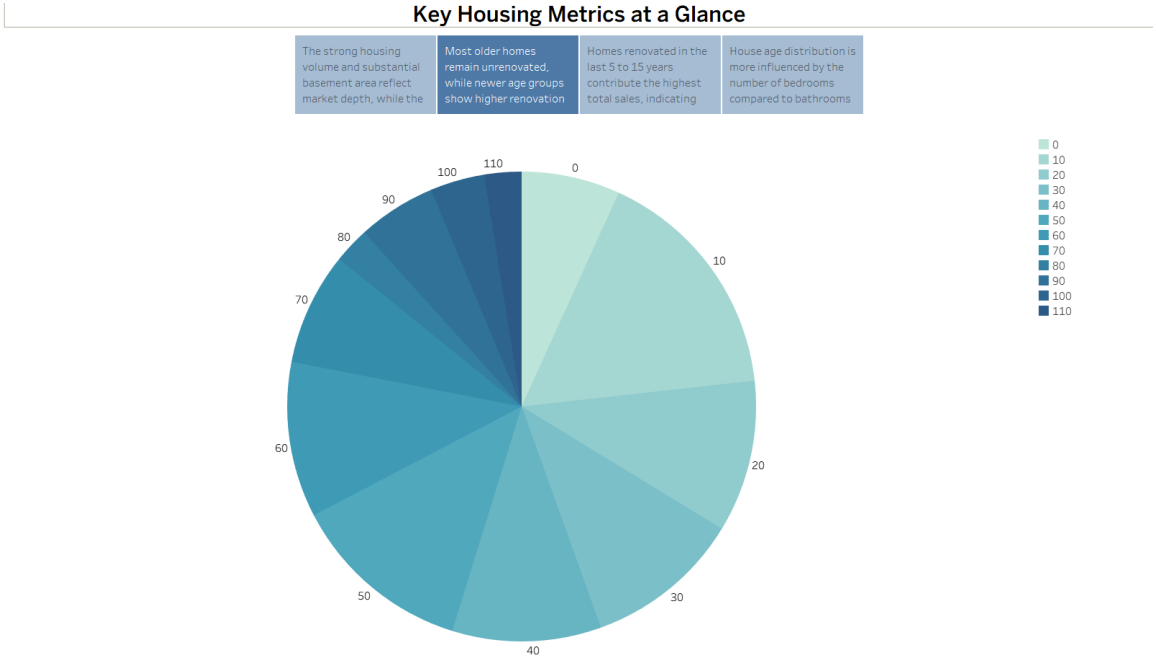
The dashboards enabled end-users to:
- Compare renovated vs. non-renovated houses
- Understand pricing clusters by zip codes
- Analyze age-based depreciation and its market impact
- Make confident investment decisions using clear story-based narratives



8. ADVANTAGES & DISADVANTAGES

Advantages:
- Easy interpretation through visuals
- High interactivity with filters
- Comprehensive insights from minimal inputs
- Scalable for similar datasets

Disadvantages:
- Requires Tableau license for creation/editing
- Dependent on accuracy of original dataset
- May require training for non-technical users

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9. CONCLUSION

This Tableau-based project successfully transformed a complex housing dataset into easy-to-understand dashboards and stories. Through calculated fields and filters, key patterns were uncovered, helping users identify valuable trends in home sales, pricing, and renovation. The project met its original goals and offered clear value to potential home buyers, sellers, and real estate professionals.

10. FUTURE SCOPE

- Incorporate real-time housing price updates from APIs
- Add geospatial maps and heatmaps for deeper location analysis
- Include more advanced predictive analytics (e.g., regression-based forecasting)
- Build mobile-optimized dashboard versions
- Allow user login for saving personalized filter settings

11. APPENDIX

Dataset Link: LINK_TO_DATASET

GitHub Repository : CLICK HERE FOR GITHUB REPOSITORY