



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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Template



Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

⌚ 10 minutes to prepare
🕒 1 hour to collaborate
👥 2-8 people recommended

Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

⌚ 10 minutes

A

Team gathering
Real estate analysts, marketing teams, and company executives. Share housing dataset and project objectives beforehand.

B

Set the goal
Focus on identifying key factors that influence house prices and sales trends to improve ABC Company's market competitiveness.

C

Learn how to use the facilitation tools
Master Tableau visualization techniques and data analysis methods for housing market insights.

Open article →

1


Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

⌚ 5 minutes

PROBLEM

How might we analyze housing data patterns to optimize pricing strategies and enhance ABC Company's understanding of market dynamics?



Key rules of brainstorming

To run an smooth and productive session

Stay in topic.

Encourage wild ideas.

Defer judgment.

Listen to others.

Go for volume.

If possible, be visual.

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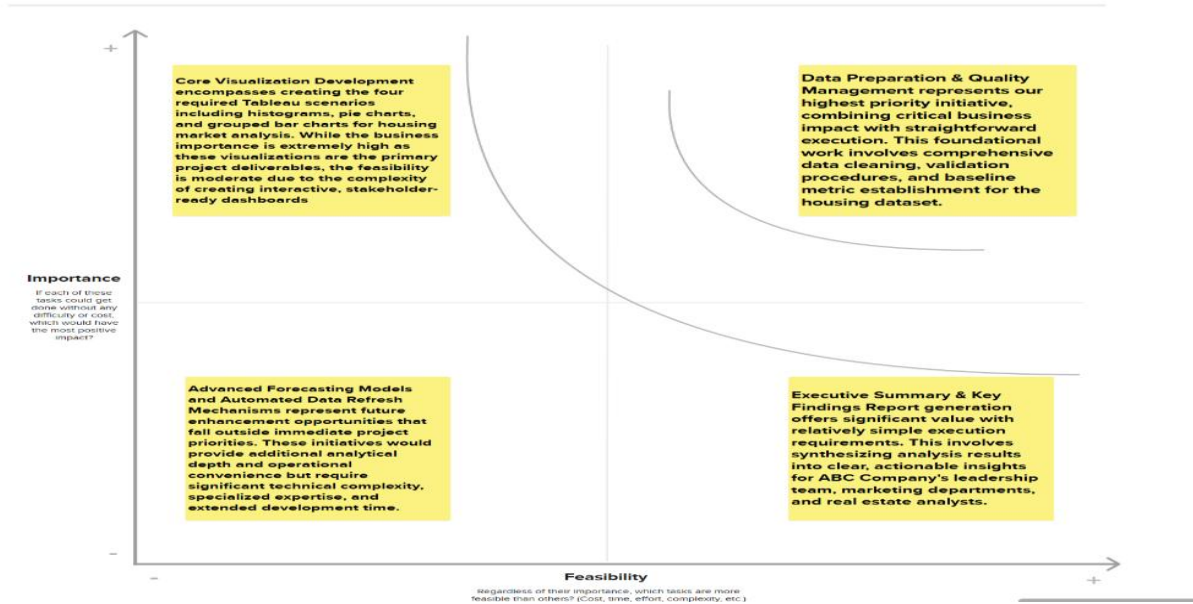
The customer journey begins with a user accessing the dashboard, selecting filters like location or renovation status, and interpreting the visuals to make informed choices. Each stage of the journey was optimized for clarity and impact.

CUSTOMER JOURNEY MAP ABC COMPANY - HOUSING MARKET ANALYSIS											
SCENARIO: Real estate analysts, marketing teams, and executives accessing, analyzing, and utilizing Tableau visualizations for housing market insights to inform strategic decisions, optimize pricing strategies, and enhance market competitiveness.											
Initial Access & System Exploration	Initial Data Discovery & Insights	Initial Data Exploration & Analysis	Initial Data Visualization & Interpretation	Initial Data Analysis & Interpretation	Initial Data Reporting & Documentation	Initial Data Decision Making & Strategic Planning	Initial Data Execution & Implementation	Initial Data Monitoring & Evaluation	Initial Data Refinement & Optimization	Initial Data Knowledge Sharing & Training	Initial Data Feedback & Iteration
What does the system typically do?	Access Tableau Dashboard Log into the Tableau platform Navigate to housing market analysis dashboard Filter data by location and renovation status	Review Data Overview Examine high-level metrics and KPIs Assess data quality and completeness Understand dataset scope and structure	Analyze Renovation Impact Use histogram showing sale price distribution by year since renovation Identify correlation patterns Filter by specific renovation	Examine Age Distribution Use pie chart to show the distribution of house age in different neighborhoods Compare age segments Cross-reference multiple variables	Study Feature Correlations Use grouped bar chart of house age in different neighborhoods Compare different data perspectives Identify feature trends	Generate Reference Data Use advanced filters to create reference data for analysis Identify patterns and correlations Compare different data perspectives	Generate Insights Use storyboards to create actionable insights about market trends and opportunities Document key findings Create executive summaries	Strategic Planning Use dashboards to develop pricing strategies, optimize marketing campaigns, and make data-driven decisions Create executive summaries	Execute Strategy Use insights to make data-driven decisions in real estate operations, marketing campaigns, and business development Implement recommendations	Track Performance Use performance monitoring tools to track key metrics and KPIs Identify areas for improvement Enhance analytical models	Refine Analysis Update analysis to reflect new data or questions based on market changes Enhance analytical models
What information does the person have?	Range: Sales, listings, high-level metrics, comparison data People: Top support needed	Range: Dashboard overview, summary KPIs, data report options People: Data analysts, colleagues	Range: Histogram showing sale price distribution by year since renovation People: Data analysts, colleagues	Range: Pie chart showing house age distribution People: Sales team, analysts	Range: Grouped bar chart showing feature correlations People: Sales team, analysts	Range: Storyboards showing reference data for analysis People: Top support needed	Range: Storyboards showing actionable insights about market trends and opportunities People: Top support needed	Range: Dashboards showing strategic planning insights People: Top support needed	Range: Dashboards showing performance monitoring insights People: Top support needed	Range: Dashboards showing performance monitoring insights People: Top support needed	Range: Dashboards showing performance monitoring insights People: Top support needed
Goals & Motivations	Primary Goal: Quick access to comprehensive housing analysis without technical barriers	May not understand the scope and value of the data in working with	Need to understand how renovation timing affects house price and sale patterns	Help me see the relationship between house age distribution and renovation decisions	Help me identify patterns between house features and age distribution	Help me validate insights across multiple data perspectives	Help me transform data patterns into actionable business insights	Help me apply insights to create effective marketing strategies and pricing strategies in the market	Help me successfully execute data-driven strategies	Help me measure the effectiveness of my data-driven decisions	Help me continuously improve analysis accuracy and relevance
Positive Experience	Clear, intuitive interface makes complex data accessible without technical barriers	Comprehensive overview provides clear confidence in data quality and scope	Clear visualization reveals renovation impact on house prices	Pie chart effectively communicates house age distribution patterns at a glance	Multi-dimensional analysis reveals correlations between house features and market value	Satisfaction from comprehending complex data through actionable recommendations	Executive buy-in and appreciation for data-driven strategic recommendations	Successful implementation leads to improved performance, competitive advantage	Validation that data-driven decisions produce better results and opportunities	Continuous learning cycle improves skill set and analytical capabilities	Recognition for building valuable and data-driven insights
Negative Experiences & Frustrations	Login issues or system downtime hinder access and data analysis	Overwhelming amount of data makes it hard to identify relevant focus areas	Complex integrations may be difficult to interpret effectively without clear data visualization experience	Pie chart segments may be too small or unclear to distinguish at a glance, leading to misinterpretation	Information overload from multiple dimensions makes it hard to extract clear conclusions	Conflicting patterns between multiple dimensions create uncertainty about data reliability	Pressure to generate insights quickly may lead to oversimplification or incomplete analysis	Resistance from stakeholders who prefer traditional decision-making approaches	Implementation challenges when insights require changes need to be made to operational reality	Market volatility makes it difficult to attribute performance to specific strategic changes	Analysis becomes stale quickly as market conditions change rapidly
Areas of Opportunity	How might we streamline login and system access performance for wider access?	How might we create guided tours to contextualize data and help users focus on relevant insights?	How might we add interactive tooltips or annotations to help users understand complex visualizations?	How might we use different chart types or colors to distinguish data segments?	How might we create simplified summary views alongside detailed analysis capabilities?	How might we build confidence around data quality and data collection?	How might we create automated insight generation or human oversight?	How might we provide change management support and education programs?	How might we create more sophisticated attribution models and action plans?	How might we develop more sophisticated attribution models and action plans?	How might we implement real-time data updates and automated refresh cycles?
Based on stakeholder interviews and analysis requirements from ABC Company Housing Market Analysis team											
Sarah Chen Real Estate Analyst			Michael Rodriguez Marketing Manager			Jennifer Park Data Analyst			David Thompson Executive Director		
									Lisa Wang Strategy Consultant		

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

⌚ 20 minutes



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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:

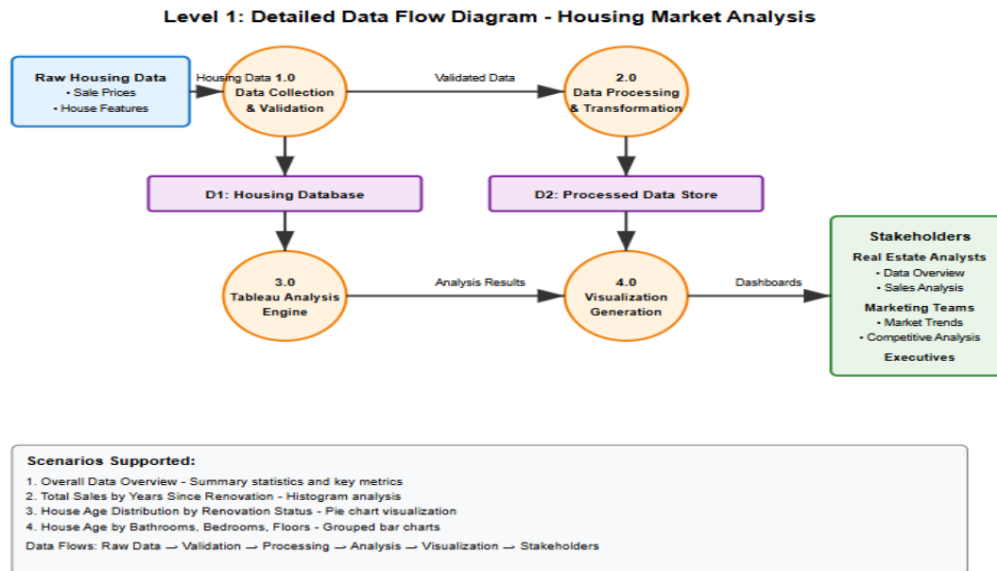
- Interactivity and responsiveness
- Clean design with consistent formatting
- Performance optimization

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

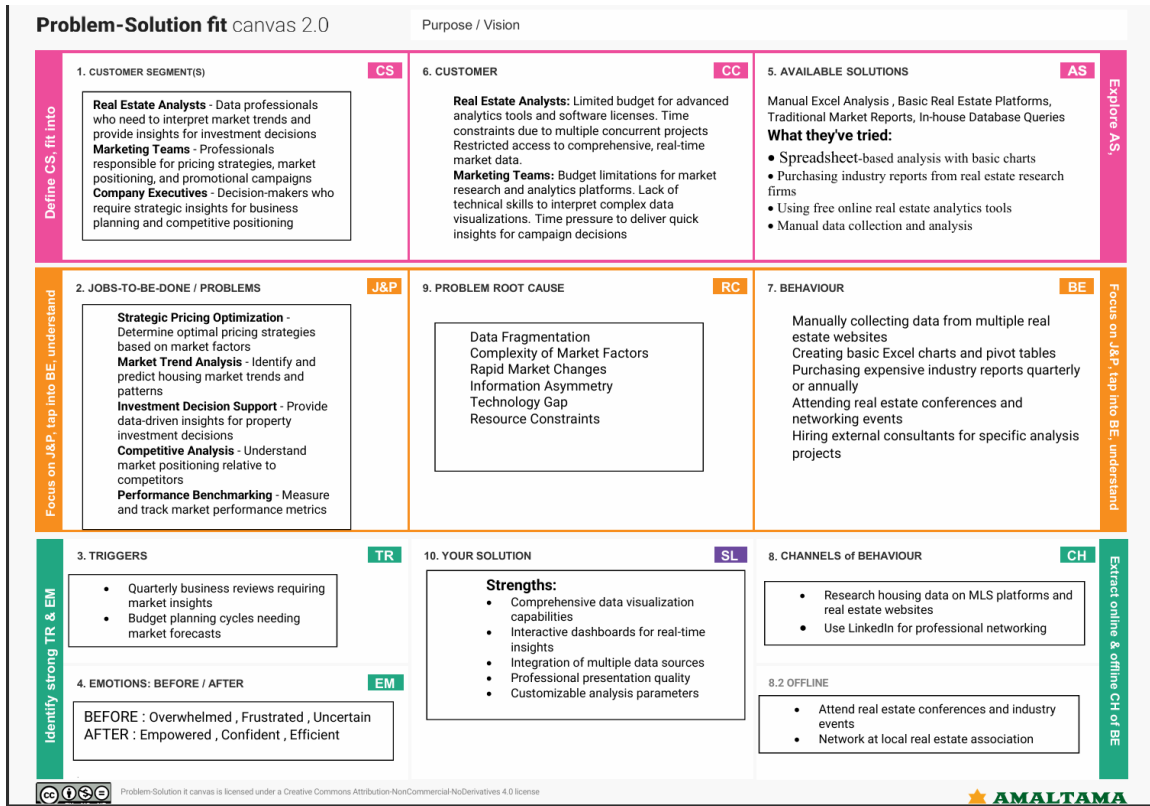
4. PROJECT DESIGN

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.

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6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

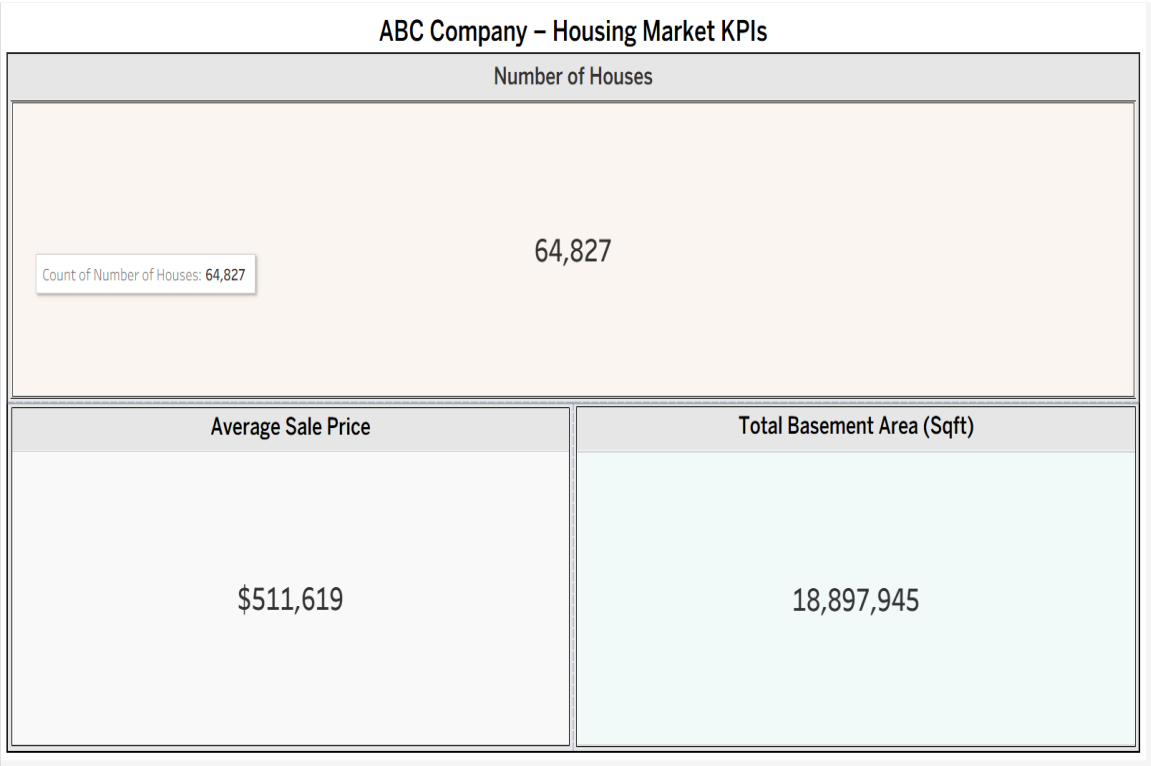
Testing involved validating the accuracy of calculated fields and responsiveness of filters. The dashboards were evaluated for performance across various user interactions like:

- 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

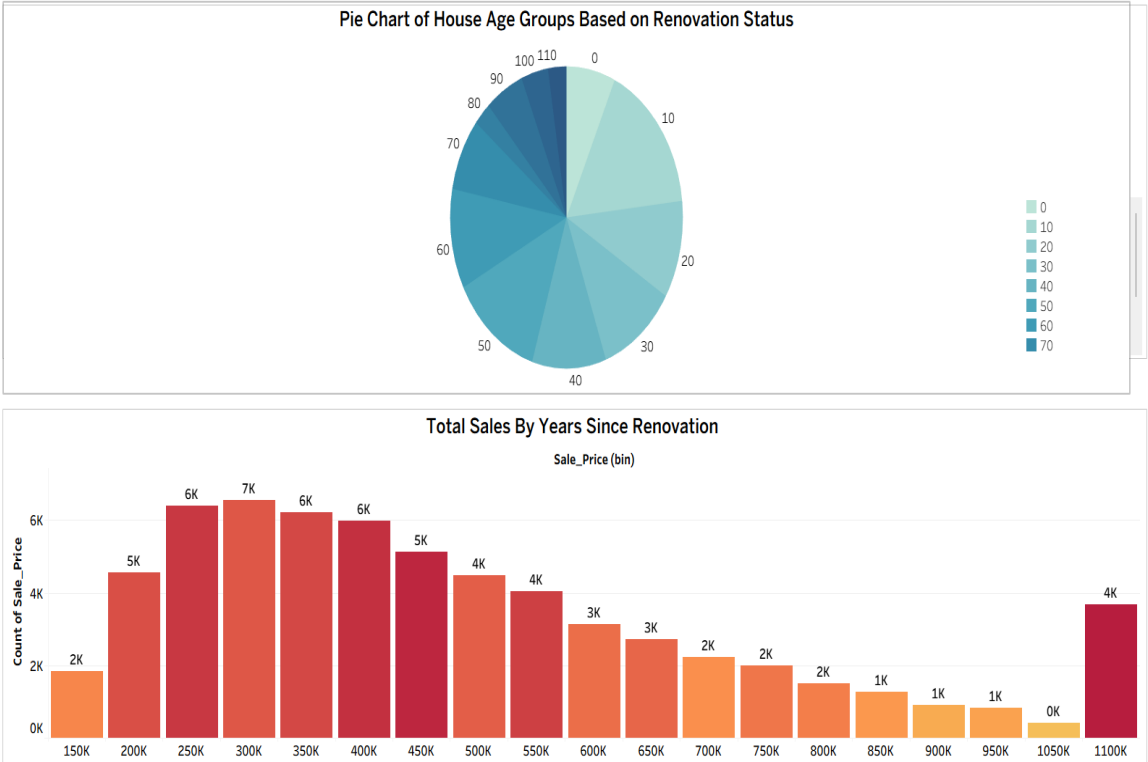
7.1 Output Screenshots



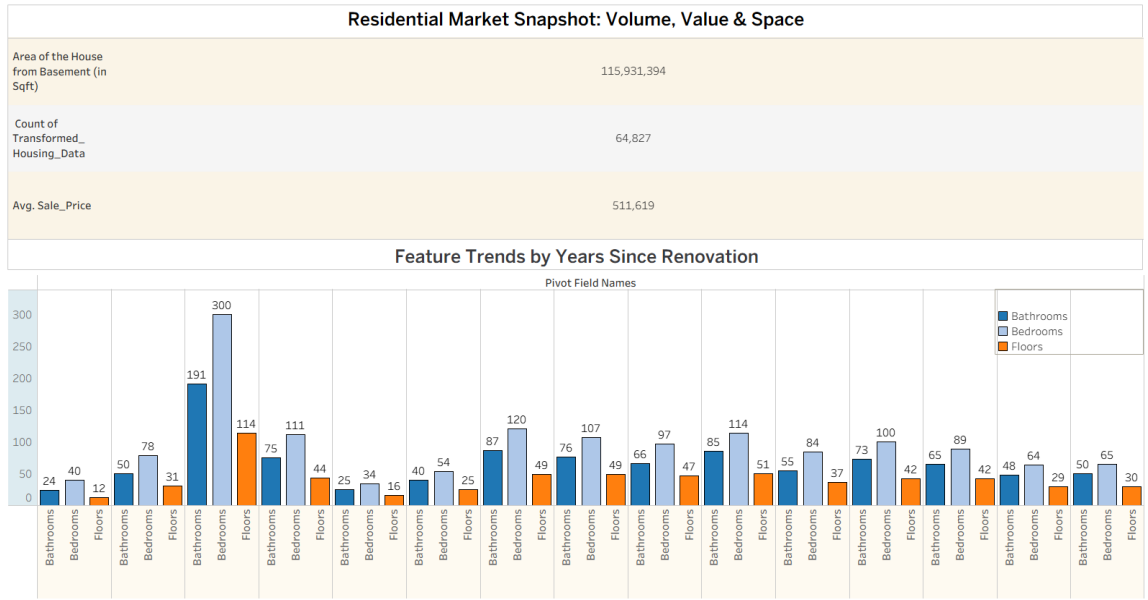
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"Renovation Impact Analysis: Housing Age Groups and Sales Trends"



"Housing Data Insights: Market Metrics and Renovation Trends"



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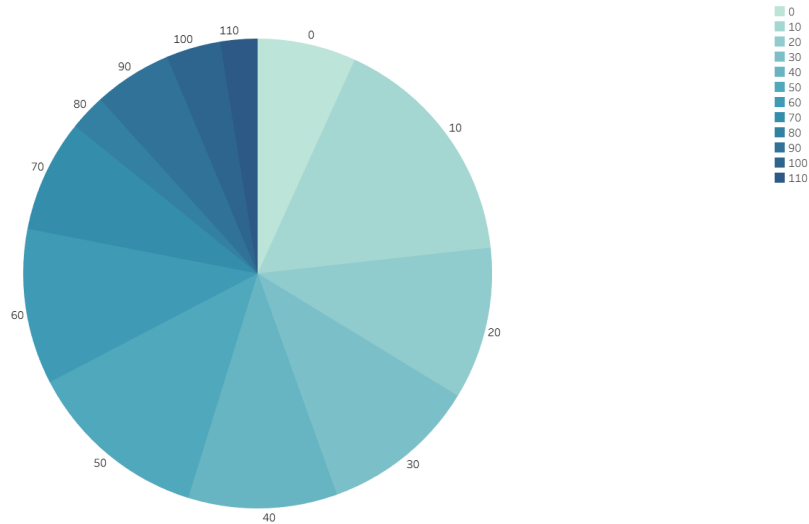
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The dashboards enabled end-users to to:

- 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

Key Housing Metrics at a Glance

The strong housing volume and substantial basement area reflect market depth, while the	Most older homes remain unrenovated, while newer age groups show higher renovation	Homes renovated in the last 5 to 15 years contribute the highest total sales, indicating	House age distribution is more influenced by the number of bedrooms compared to bathrooms
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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](#)