# **Project Report**

Team ID	LTVIP2025TMID50341
Project Name	visualizing housing market trends: an analysis of sale prices and
	features using tableau

### 1. INTRODUCTION

### 1.1 Project Overview

The project titled "Visualizing Housing Market Trends: An Analysis of Sale Prices and Features using Tableau" aims to transform raw housing data into meaningful visual insights. It focuses on analyzing factors such as years since renovation, house age, number of bathrooms, bedrooms, and floors, and how these impact house sale prices.

Using **Tableau** and **Tableau Prep Builder**, this project cleans, processes, and visualizes the data through interactive dashboards and storytelling features. The result is a powerful tool that helps users **understand pricing trends**, observe **buyer behavior**, and **explore property feature patterns** through engaging, data-driven visuals.

### 1.2 Purpose

The purpose of this project is to:

- Provide an interactive platform to explore housing market data.
- Identify and visualize how **specific features and renovations** influence house sale prices.
- Help users understand sales distribution trends based on age and renovations.
- Deliver clear, visual narratives for analytical insights using Tableau's storytelling capability.

## 2. IDEATION PHASE

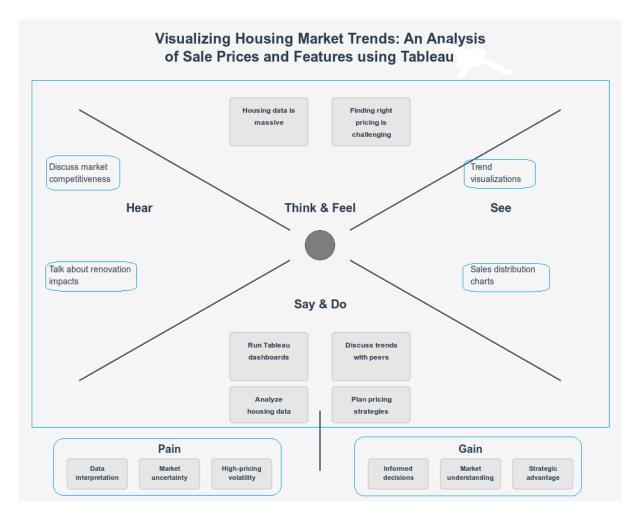
## 2.1 Problem Statement

l am	I'm trying to	But	Because	Which makes me feel
A real estate analyst	Undersatnd what featres affect house prices	the data is too complex and scattered	i don't have a single dashboard that shows clear trends	frustrated and unsure about my decisions
				miro
l am	I'm trying to	But	Because	Which makes me feel
A marketing strategist	Target the right segment of buyers	i don't know what trends are influencing sales	i can't link buyer behavior to house characteristics	ineffective and misaligned
l am	I'm trying to	But	Because	Which makes me feel
A company executive	make strategic investment decisions	i can't clearly see performance patterns	current reports lack visual clarity and interactivity	hesitant and data-blind
				miro

Problem	I am	I'm trying to	But	Because	Which makes me feel
Statement (PS)	(Customer)				
PS-1	A real estate	understand	the data is	I don't have a	frustrated and unsure
	analyst	what features	too complex	single dashboard	about my decisions
		affect house	and	that shows clear	
		prices	scattered	trends	
PS-2	A marketing	target the right	I don't	I can't link buyer	ineffective and
	strategist	segment of	know what	behavior to	misaligned
		buyers	trends are	house	
				characteristics	

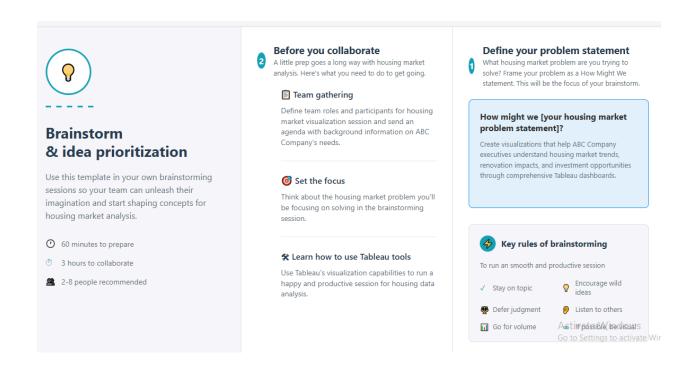
			influencing		
			sales		
PS-3	A company	make strategic	I can't	current reports	hesitant and data-blind
	executive	investment	clearly see	lack visual clarity	
		decisions	performanc	and interactivity	
			e patterns		

## 2.2 Empathy Map Canvas

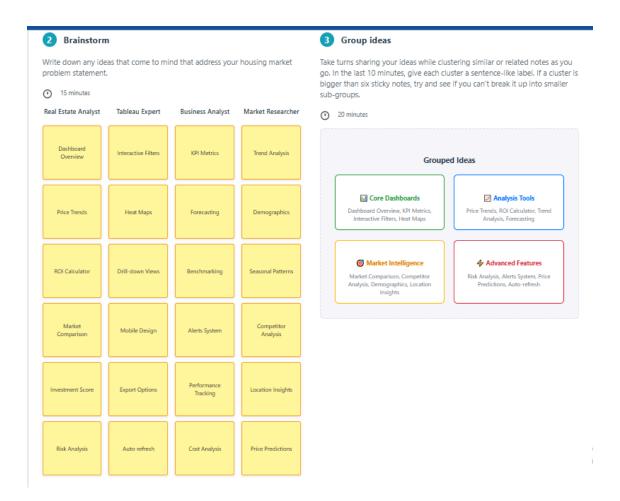


### 2.3 Brainstorming

### Step-1: Team Gathering, Collaboration and Select the Problem Statement



### Step-2: Brainstorm, Idea Listing and Grouping

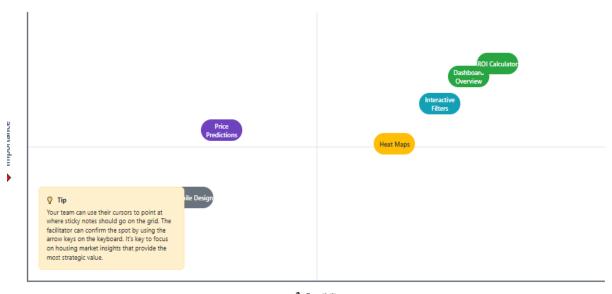


### **Step-3: Idea Prioritization**



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

20 minutes



Feasibility

Feasibility

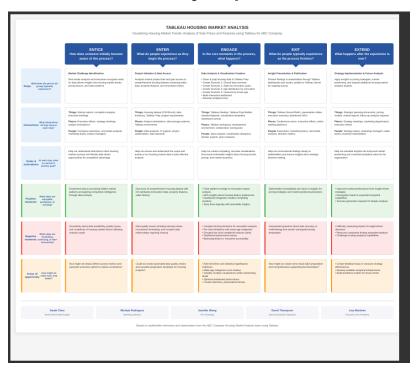
Importance

If each of these housing market ideas could be done without any difficulty or cost, which would have the most positive impact on ABC Company's strategic decisions?

Regardless of their importance, which housing market visualization tasks are more Actividable than others? (Cost, time, effort, complexity, etc.)

## 3. REQUIREMENT ANALYSIS

## 3.1 Customer Journey map



## 3.2 Solution Requirement

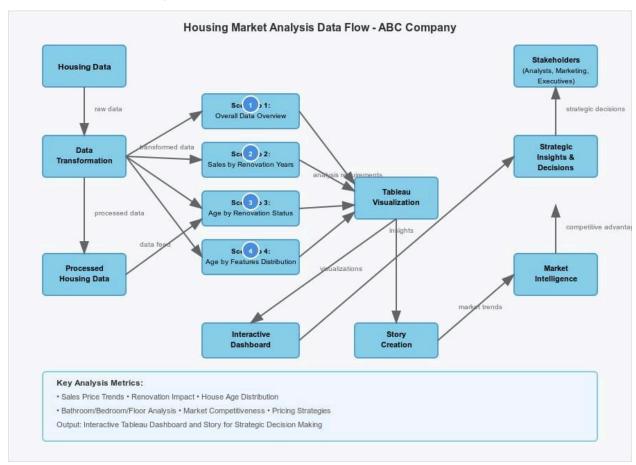
### **Functional Requirements:**

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Data Import	Ability to upload and read housing datasets (CSV/Excel)
FR-2	Data Cleaning & Transformation	Transform raw data for analysis (e.g., derive years since renovation, house age)
FR-3	Dashboard Visualization	Visualize total sales, average price, and square footage
FR-4	Interactive Filtering	Enable filters for renovation years, bathrooms, bedrooms, and floors
FR-5	Feature-wise Distribution	Charts showing how features (e.g., bathrooms) vary with house age
FR-6	Storytelling & Insights	Present scenario-based visual storytelling (sales trends, renovation impact, etc.)

#### **Non-functional Requirements:**

FR No.	Non-Functional Requirement	Description	
NFR-1	Usability	Easy-to-use and intuitive Tableau dashboards for stakeholders	
NFR-2	Security	Data privacy maintained during import and dashboard sharing	
NFR-3	Reliability	System consistently provides accurate insights without crashes	
NFR-4	Performance	Visualizations load quickly even with large datasets	
NFR-5	Availability	Dashboards and stories available 24/7 for internal users	
NFR-6	Scalability	Supports future expansion to include more data features	

## 3.3 Data Flow Diagram



### **User Stories**

Use the below template to list all the user stories for the product.

User Type	Functional Requiremen t (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Real Estate Analyst	Data analysis & Visualization	USN-1	As a real estate analyst, I can view the overall data overview dashboard to understand the dataset scale and key metrics	I can see count of housing records, average sales price, and total basement area	High	Sprint-1
Real Estate Analyst	Renovation Impact analysis	USN-2	As a real estate analyst, I can analyze total sales by years since renovation through histogram visualization	I can identify correlation between renovation timing and price ranges	High	Sprint-1
Real Estate Analyst	House Age Distribution	USN-3	As a real estate analyst, I can view house age distribution by renovation status through pie chart	I can assess age characteristics and renovation prevalence	Hlgh	Sprint-1
Real Estate Analyst	Feature analysis	USN-4	As a real estate analyst, I can analyze house age distribution by number of bathrooms, bedrooms, and floors	I can identify patterns in housing characteristi cs over time	High	Sprint-2
Real Estate Analyst	Interactive dashboard	USN-5	As a real estate analyst, I can access an interactive dashboard combining all visualizations	I can navigate between different views and filter data dynamically	Medium	Sprint-2

## 3.4 Technology Stack

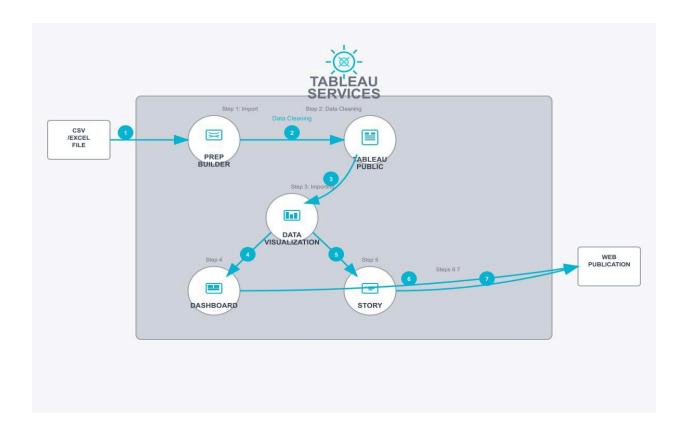
Table-1 : Components & Technologies:

S.N	Component	Description	Technology
0	•		
1.	User Interface	Web-based dashboards for viewing and interaction	Tableau Public
2.	Application Logic-1	Data preprocessing and transformation workflows	Tableau Prep Builder
3.	Application Logic-2	Interactivity using filters, parameters, and actions	Tableau Filters, Parameters, Actions
4.	Dashboard/Story Logic	Logical flow of insights using story features	Tableau Story Feature
5.	Data Source	Flat files used as housing market datasets	CSV
6.	File Storage	Housing datasets stored locally	Local File System / Google Drive

**Table-2: Application Characteristics:** 

S.N o	Characteristics	Description	Technology
1.	Open-Source Frameworks	yes	Tableau Public
2.	Security Implementations	N/A	N/A
3.	Scalable Architecture	Can scale by publishing to Tableau Cloud for wider access	Tableau Public
4.	Availability	Dashboards available online 24/7	Tableau Public
5	Performance	Good \ Better performance	Tableau Public

### **Technical Architecture:**



## 4. PROJECT DESIGN

## **4.1 Problem Solution Fit**

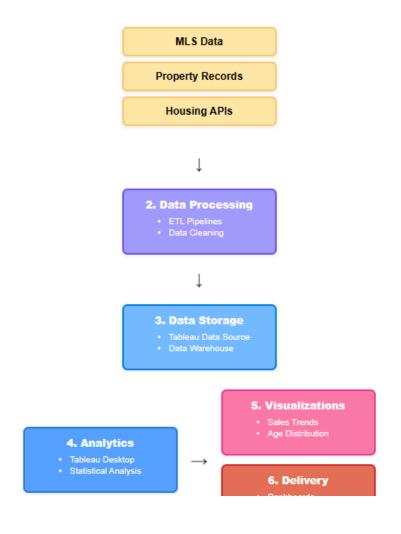
	1. CUSTOMER SEGMENTS	2. CUSTOMER CSTRAINTS
CUSTOWN EBAORET (CS	Home buyers     Real estate inveestors     Data analyste in real est     Government housing deparetments	Lack of fesights on now renovations impact real impact recapolities. No centralized access to renovation-uniked sales data Target price apprecocalition from recent renovationalves Identify trends in renovate novated vs. non renovated house
PUSTIAQIL' SENUTIORIS	4. JOBS-TO-BE-DONE / PROBLEMS  • Using property portals like Zillow or 88acres with limited filtering  • Relying on agents' subjective opinions  • Manually checking past sale history (often outdated or incomplete)	PROBLEM ROOT CAUSE     No focused analysis tools combining renovation age and sales price     Traditional listings don't link renovation status to pricing data     Lack of visual data tools for rear-Itime market trend comparison
REMAMOUR	5 TRIGGERS  • Wanting to buy-sell home ua confused  • Skipp over renowation history unless highlighted by seller  • Avording older homes without clear value evidence	9. SOLUTION OVERVIEW (SO)  • A visualization dashboard that uses histogram charts to show the correlation between renovation age and total sales  • Enables fultering based on reverbing pa/), price bands, and location
SELLPYON OTTAIRLA	9. SOLUTION OVERVIEW  • A visualization dashboarded that uses histogram charts to show yconslation between renovation age and total sales	Online. Interactive dashboards, real estate websites. Tableal Dalabobors. Sc. Real estate advisory offices, investor meets, brochures

## **4.2 Proposed Solution**

S. No	Parameter	Description
	Problem Statement (Problem to be solved)	The housing market often lacks clarity regarding how property renovations impact sales prices over time. Buyers and sellers struggle to assess the return on investment for renovations due to the absence of clear data analytics. This limits effective decision-making and market efficiency.
2.	Idea / Solution description	Our project addresses this issue by visualizing total sales in relation to the number of years since a house was renovated. Using Tableau, we created a histogram that displays how recently renovated properties correlate with various sales price ranges. This visualization enables

		stakeholders to identify patterns and trends in buyer preferences and renovation impact.
3.	Novelty / Uniqueness	This solution stands out by offering an interactive, visual data analysis centered around the renovation timeline—a variable rarely explored in depth in traditional market reports. It brings actionable insights to the forefront using clear, user-friendly dashboards, making the data more accessible to both experts and laypeople.
4.	Social Impact / Customer Satisfaction	he solution empowers homebuyers with valuable insights into how renovation age affects home value, leading to more informed purchasing decisions. It also helps sellers and agents time renovations effectively to increase profits. Overall, it supports transparency, enhances consumer trust, and contributes to better housing policy and urban planning.
5.	Business Model (Revenue Model)	The solution can be monetized through a subscription-based model targeting real estate agencies, property investors, and developers. Additional income streams include custom dashboard development, real-time market reporting, and integration services with existing property listing platforms or CRMs.
6.	Scalability of the Solution	This model can be extended to include multiple variables such as location, square footage, number of bedrooms, or neighborhood crime rates. It can also scale geographically to analyze real estate markets across different cities or countries. With integration into national real estate databases, it can provide ongoing, large-scale market intelligence.

## **4.3 Solution Architecture**



## 5. PROJECT PLANNING & SCHEDULING

## 5.1 Project Planning

**Product Backlog, Sprint Schedule, and Estimation** 

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Point s	Priority	Team Members
Sprint-1	Data Collection & Overview	USN-1	As a stakeholder, I want to collect and transform housing market data to create a comprehensive dataset overview.	1	High	Team Member -2
Sprint-1	Data Analysis Setup	USN-2	As a real estate analyst, I want to load housing data into Tableau for visualization and analysis.	2	High	Team Member -2
Sprint-1	Data Preprocessing	USN-3	As a user, I want to clean and prepare housing data including sales prices, renovation years, and house features.	2	High	Team Member -3
Sprint-2	Renovation Impact Analysis	USN-4	As a stakeholder, I want to visualize total sales by years since renovation to understand renovation impact on pricing.	3	High	Team Member -4

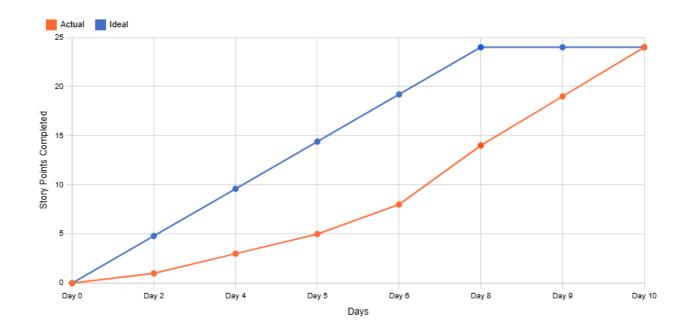
Sprint-2	Age Distribution Analysis	USN-5	As a real estate analyst, I want to create a pie chart showing house age distribution by renovation status.	3	Medium	Team Member -4
Sprint-2	Feature-Base d Analysis	USN-6	As a marketing team member, I want to analyze house age distribution by number of bathrooms, bedrooms, and floors.	3	High	Team Member -4
Sprint-2	Dashboard Creation	USN-7	As an executive stakeholder, I want an interactive dashboard combining all visualizations for strategic decision making.	5	High	Team Member -3
Sprint-2	Story Development	USN-8	As a company executive, I want a Tableau story that presents insights in a narrative format for presentations.	5	Medium	Team Member -3

### **Project Tracker, Velocity & Burndown Chart**

Sprint	Total Story Points	Duratio n	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed	Sprint Release Date
Sprint-1	8	5 Days	16 June 2025	20 June 2025	5	20 June 2025

Sprint-2	18	5 Days	21 June 2025	25 June 2025	19	25 June 2025

## **Burndown Chart**



## 6. FUNCTIONAL AND PERFORMANCE TESTING

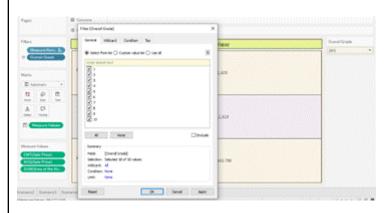
## **6.1 Performance Testing**

Project team shall fill the following information in model performance testing template.

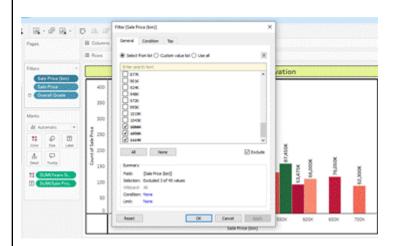
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	Data Preproce ssing	Identified 1: missing or n			moved ı	unneces	sary col	umns	like zipcodes, no	

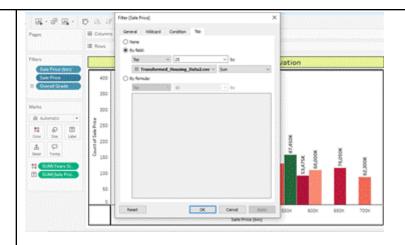
Utilizatio n of Filters

#### For scenario - 1

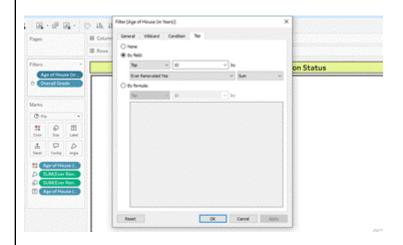


### For scenario – 2



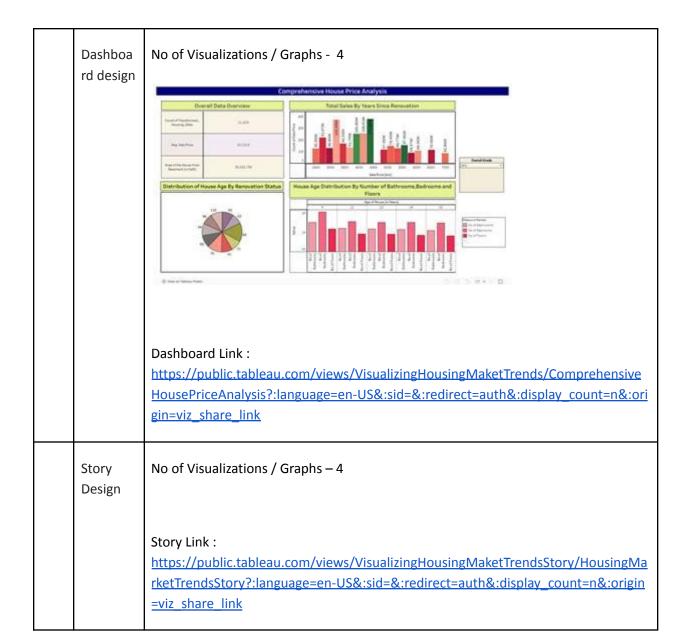


#### For scenario – 3



#### For scenario – 4

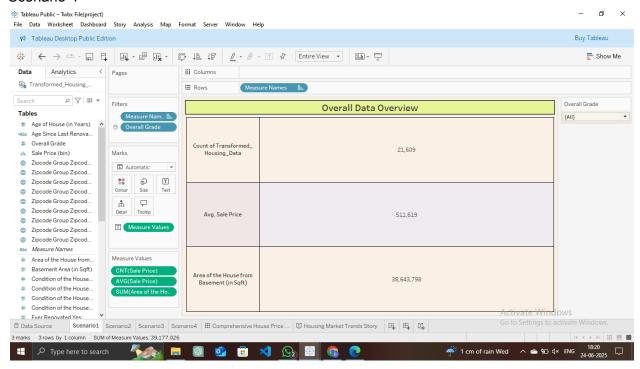




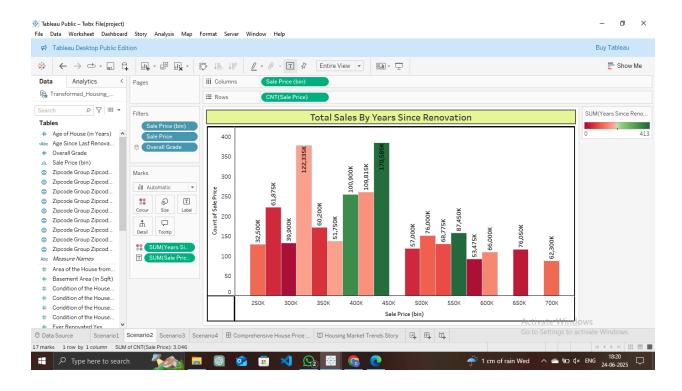
### 7. RESULTS

## 7.1 Output Screenshots

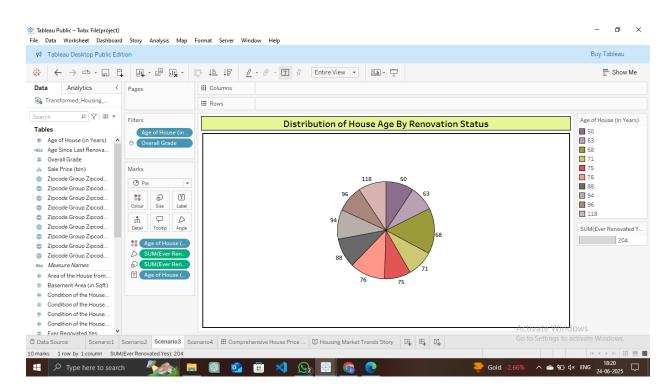
#### Scenario-1



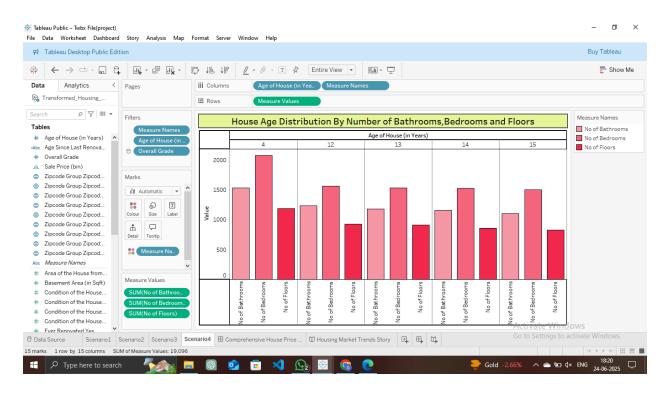
#### Scenario-2



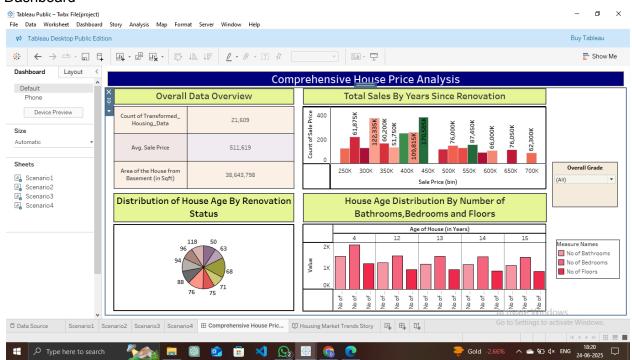
#### Scenario-3



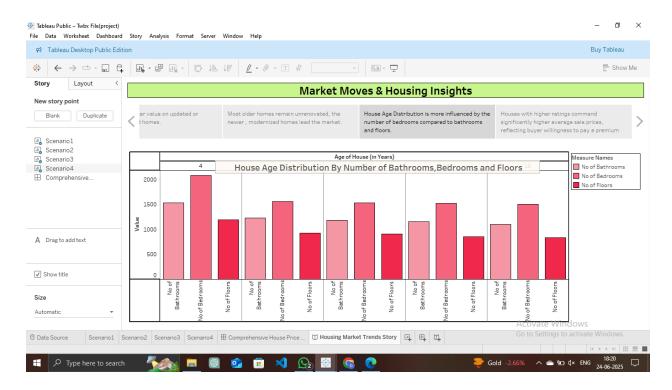
#### Scenario-4



#### Dashboard



#### Story



### 8. ADVANTAGES & DISADVANTAGES

### **8.1 ADVANTAGES**

- 1. **Visual Clarity**: Tableau enables intuitive, easy-to-understand visualizations for complex housing datasets.
- 2. **Interactive Dashboards**: Users can filter data dynamically based on features like renovations, age, or number of rooms.
- 3. **Business Insights**: Helps stakeholders identify trends and patterns that influence pricing strategies and buyer behavior.
- 4. **Time-Efficient**: Reduces manual analysis through automated and visual insights.
- 5. **Storytelling Capability**: Tableau's story feature allows presenting data as step-by-step narratives.
- 6. Non-technical Accessibility: Designed for business users with minimal technical skills.
- 7. **Improves Decision Making**: Enhances strategic planning through data-driven recommendations.
- 8. **Flexible Data Sources**: Supports a wide range of formats like Excel, CSV, and cloud-based data.

## **8.1 DISADVANTAGES**

- 1. **No Predictive Modeling**: Tableau lacks built-in machine learning or forecasting capabilities.
- 2. **Dependence on Data Quality**: Inaccurate or unclean data can lead to misleading visualizations.
- 3. **Limited Data Cleaning**: Complex data transformations require external tools like Tableau Prep.
- 4. **Performance Issues**: Can slow down with very large datasets if not optimized properly.

- 5. **Story Limitations**: Tableau's story feature is static and not as flexible as interactive dashboards.
- 6. Cost (for full version): Tableau Creator licenses and cloud solutions may be expensive.
- 7. No Native Real-Time Streaming: Tableau is not ideal for real-time dynamic updates.
- 8. **Requires Training**: Users need time to become proficient in designing meaningful dashboards.

### 9. CONCLUSION

This project demonstrates the effective use of **Tableau** and **Tableau Prep Builder** to analyze and visualize housing market data in a meaningful and interactive way. By examining patterns related to **sale prices**, **renovations**, **house age**, **and structural features**, the project reveals key insights that support a deeper understanding of real estate trends.

Through a combination of **interactive dashboards** and **story-driven visualizations**, the project transforms raw datasets into easily interpretable insights. It proves how data visualization can **enhance clarity, support decision-making**, and provide a **structured narrative** around complex datasets. The approach used ensures the findings are accessible to both technical and non-technical users, making it a valuable asset for real estate data analysis.

### **10. FUTURE SCOPE**

- 1. Add Predictive Analytics: Integrate machine learning to forecast housing prices.
- Use Real-Time APIs: Connect to real estate APIs (like Zillow or Realtor.com) for live data updates.
- 3. **Enhance with Maps**: Use Tableau's map visualizations for geospatial housing trends.
- 4. **Deploy on Tableau Server**: Expand collaboration through server-hosted dashboards.
- 5. **Include External Data**: Add economic, demographic, or regional data to enrich insights.

- 6. Mobile Dashboards: Optimize dashboards for mobile accessibility.
- Automated Data Refresh: Schedule regular updates from connected data sources.
- 8. **Multi-User Interaction**: Enable tailored views for different user types like analysts, buyers, or planners.

### 11. APPENDIX

#### Dataset Link:

https://www.kaggle.com/datasets/rituparnaghosh18/transformed-housing-data-2

#### **Dashboard Link:**

https://public.tableau.com/views/VisualizingHousingMaketTrends/ComprehensiveHouse PriceAnalysis?:language=en-US&:sid=&:redirect=auth&:display\_count=n&:origin=viz\_sh are\_link

#### Story Link:

https://public.tableau.com/views/VisualizingHousingMaketTrendsStory/HousingMarketTrendsStory?:language=en-US&:sid=&:redirect=auth&:display\_count=n&:origin=viz\_share\_link

#### Project Demo Link:

https://drive.google.com/drive/folders/11xEUgBagoYCUNu1YZjbJsg9DWxGj212-

#### Project GitHub Link:

https://github.com/DeepakVarma-k/visualizing-housing-market-trends-an-analysis-of-sale-prices-and-features-using-tableau/tree/main