**Real Estate Power BI Dashboard - Supporting Document**

**Project Overview**

The **Real Estate Power BI Dashboard** provides a comprehensive analysis of real estate market data, allowing users to assess property affordability, key features, and market trends. With a focus on interactivity, the dashboard delivers insights through various visualizations and filters, helping stakeholders make data-driven decisions on property investments, pricing, and returns.

**Data Cleaning and Transformation**

This section describes the crucial steps taken to clean and transform the data before visualizing it.

**1. Data Cleaning:**

* **Added Conditional Columns**: Introduced calculated columns such as *Price Category* and *Size Category* to classify properties based on price and size.
* **Deleted Unnecessary Columns**: Removed irrelevant data fields that did not add value to the analysis, ensuring a focused dataset.
* **Replaced Null Values**: Filled null or missing values with averages, defaults, or other imputation strategies to maintain data integrity.
* **Handled Blank Rows**: Removed incomplete rows to prevent skewed analysis or missing insights.

**2. Data Splitting:**

* **Column Splitting**: Split combined location details (such as city, state) into individual columns for easier filtering and analysis.

**3. Value Replacement:**

* **Categorical Data**: Standardized categorical values (e.g., converting Boolean fields like "has pool" or "has parking" to *Yes/No* categories).
* **Numeric Data Adjustments**: Where required, adjusted numeric values to align with analytical needs (e.g., converting prices into appropriate currency or format).

**Data Structure**

The dataset comprises various columns that capture essential details of the real estate properties. Below is a description of the key columns used in the dashboard:

* **id**: Unique identifier for each property.
* **title**: Descriptive name or type of property (e.g., *Casa*, *Piso*).
* **sq mt built**: Total built-up area in square meters.
* **rooms**: Number of rooms in the property.
* **bathrooms**: Number of bathrooms in the property.
* **floor**: The floor level on which the property is located.
* **rent price**: Rental price of the property.
* **buy price**: Purchase price of the property.
* **buy price by area**: Price per square meter of the property.
* **house id type**: Category of the property (e.g., *Chalet*, *Apartment*).
* **built year**: Year of construction.
* **city, state**: Location details.
* **has parking, balcony, pool, garden, exterior, terrace**: Boolean fields representing property features.
* **is new development**: Indicates whether the property is part of a new real estate development.
* **price category**: Categorizes properties into *Affordable*, *Mid-range*, and *Luxury*.
* **size category**: Classifies properties as *Small*, *Medium*, or *Large* based on square footage.

**Measures and Calculations**

The dashboard incorporates several key measures and calculated fields, which provide dynamic insights and support analysis of various aspects of the real estate market:

**1. Affordability and Pricing Measures:**

* **Affordability Index**: A comparative ranking metric showing the affordability of properties based on price and features relative to others.
* **Average Price**: Average buy price across different property categories.
* **Avg Price by Area**: Average price per square meter segmented by city and state.
* **Avg Price by Type**: Average property price based on type (e.g., *Apartment*, *Chalet*).
* **Avg Rent Price**: Average rental price segmented by property type or region.
* **Median Sale Price**: The median buy price of properties across the dataset, providing a central measure.

**2. ROI and Financial Metrics:**

* **Expected Annual Rent**: Projects the annual rental income based on current rent prices.
* **Price per Bathroom/Room**: Calculates the average buy price per bathroom or room, aiding in detailed cost comparisons.
* **Price per Sq Mt**: Price per square meter for each property, useful for spatial analysis.
* **ROI (Return on Investment)**: Financial ratio measuring profitability, calculated as (Expected Rent / Buy Price).
* **Rank per ROI**: Ranking system to prioritize properties with higher ROI, aiding investment decisions.

**Visualizations and Interactive Features**

The dashboard includes various visualizations that allow for interactive exploration of the data. Each visualization is designed to answer specific questions about the real estate market.

**1. Price Category Breakdown (Pie Chart)**

* **Purpose**: Visualizes the distribution of properties across price categories (*Affordable*, *Mid-range*, *Luxury*).
* **Interaction**: Hover over chart segments to see the percentage of properties in each price category.

**2. Size Category Breakdown (Pie Chart)**

* **Purpose**: Shows the distribution of properties by size (Small, Medium, Large).
* **Interaction**: Hover over each segment to view the proportion of properties in each size group.

**3. Yearly Listing Trends (Line Graph)**

* **Purpose**: Tracks the number of property listings over time, highlighting historical trends and market activity.
* **Interaction**: Use this to understand listing surges or declines over specific years.

**4. ROI Metrics (Table)**

* **Purpose**: Tabulates key financial metrics such as ROI, buy price, and price per room or bathroom.
* **Interaction**: Compare properties based on profitability, using filters to narrow down based on geographic or property characteristics.

**5. Affordability Index by City (Bar Chart)**

* **Purpose**: Displays cities ranked by affordability, with bars showing Affordability Index scores for quick comparisons.
* **Interaction**: Filter the dashboard by selecting specific cities or affordability ranges.

**Filters and Interactive Controls**

The dashboard offers multiple filters to refine data analysis and customize views:

* **Property Features**: Filters for key features such as *Garden*, *Pool*, and *New Development* allow users to display only properties with specific characteristics.
* **Geographic Filters**: Users can select properties by city or state to focus on specific regions.
* **Category Filters**: Filters for *Price Category* and *Size Category* allow users to narrow down their analysis to specific market segments.

**How to Use the Dashboard**

Follow these steps to get started with the dashboard and customize it for your analysis:

1. **Download the Template**: Access the .pbit template file from the GitHub repository.
2. **Open in Power BI Desktop**: Launch Power BI Desktop and open the template file.
3. **Load Your Own Data**: Connect your dataset (CSV, SQL, etc.) to the Power BI report by replacing the sample data with real property data.
4. **Refresh Data**: After loading your data, refresh the visuals to see your custom insights reflected in the dashboard.
5. **Customize**: Modify filters, visuals, and measures as needed to suit your business needs or analytical goals.

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**Screenshot of the Dashboard**

Below is a preview of the dashboard showcasing key visual components:

