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Assignment 1 : Mountain Wheels Use Case Assignment

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Step 1: Data Integration and Preparation

a) Import Datasets: I load the provided datasets (Sales Data, Calendar Data, Customer Details, Product Categories, Product Sub-Categories, Products, Returns with Comments, Territories) into Power BI.

b) Clean Data: I need to check for and clean any inconsistencies, missing values, or anomalies in the data. Here is a summary of what I did:
- Removed an empty column in the Customers table
- Transformed the format of the "birthdate" column in Customers table so that the date format is consistent
- Some Customer Prefixes were blanks, I replaced them by "N/A"
- I also checked for other blanks, duplicates, etc but nothing specific to mention.

c) Data Transformation: Use Power Query Editor to transform data, such as changing data types, creating calculated columns, and formatting dates.
- I created a calculated column: 'Total Revenue' in the merged sales table
- I created a measure: "return rate" by doing Total Units Returned / Total Units Sold * 100
- I created a calculated column by buckets: an age bucket column based on the customers birthdate

d) Data Modeling: I establish relationships between the datasets, ensuring the model supports the analysis needs. The relationships are the following:
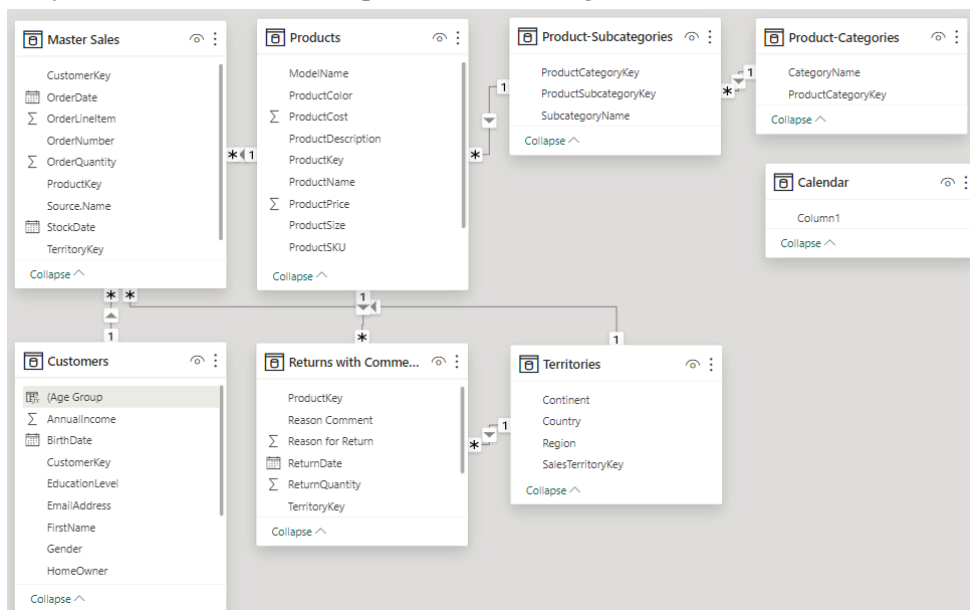
Step 2: USE CASE 1 - Tailoring Marketing to Cycling Enthusiasts

UC 1 Description: By analyzing customer purchase history and demographics, Mountain Wheels can create targeted marketing campaigns. For instance, mountain bikers might be more interested in rugged bikes and safety gear, while urban commuters might prioritize comfort and style in clothing and accessories.

KPI 1: Customer Purchase Frequency
Description: This KPI represents the average number of purchases made by customers within each defined user persona segment over a specified time frame. It serves as an indicator of customer engagement and product interest.

How It Was Calculated: I calculated this KPI by using DAX to count the number of purchases made by each customer segment and dividing that by the number of unique customers within the segment. This ratio provides an average frequency that reflects how often customers are making purchases.

Visualization Used: I chose a stacked bar chart to represent this KPI because it clearly illustrates comparative data across different segments (and by year). Each bar corresponds to a different user persona, allowing for visual comparison of purchase frequency.

Slicing/Drilling Down: The left side slicers allow users to slice by various dimensions such as demographic data, time periods, and product preferences. You can also drill down directly on the graph by sub-categories in this visual.

Strategic Utility: This KPI helps the sales and marketing team identify which segments are most active and loyal. By understanding purchase frequency, they can tailor marketing efforts to increase frequency rates, introduce frequency-based loyalty programs, and manage stock levels according to demand patterns.

Insights from Dashboard:
- It appears that Mountain Bikers consistently have the highest average purchase frequency across the years compared to other personas. This suggests a strong brand loyalty or satisfaction within this segment, and it could be beneficial to focus on retention strategies for these customers.
- There is a notable consistency in the purchase behavior of Road Cyclists, Touring Cyclists, and Urban Commuters, which indicates steady demand from these segments.
- The sales and marketing teams could consider developing targeted campaigns to increase the frequency of purchases in the segments with lower averages, possibly by offering incentives or loyalty programs.

KPI 2: Average Purchase Value by Segment
Description: The Average Purchase Value by Segment measures the mean transaction value attributed to each customer segment. It highlights the spending behavior of customers associated with each user persona.

How It Was Calculated: I used a DAX formula that sums up the total sales value for each customer segment and divides it by the total number of transactions in the segment, resulting in the average purchase value.

Visualization Used: I chose a bar graph that was used for this KPI to facilitate the comparison of average purchase values between different user personas. The height of each column easily shows the average value customers contribute per transaction.

Slicing/Drilling Down: This visual can be sliced by product categories, regions, and time frames, allowing to see how the average purchase value may vary across different slices of the data.

Strategic Utility: The insights from this KPI enable the sales and marketing team to develop targeted pricing strategies, create high-value product bundles, and design personalized promotions to increase the average purchase value across various customer segments.

Insights from Dashboard:
- Road Cyclists and Touring Cyclists have a higher average purchase value compared to other personas. This could reflect a preference for higher-priced items or bundled products. Marketing campaigns promoting premium or bundled products could resonate well with these segments.
- Mountain Bikers, despite their high purchase frequency, have a lower average purchase value, which could indicate they are frequent buyers but of less expensive items. Upsell strategies could be employed here to increase their average purchase value.
- Urban Commuters have the lowest average purchase value, suggesting they may be purchasing lower-cost items or fewer items per transaction. Tailored promotions or cross-selling strategies could help increase their spending.

KPI 3: Total Order Quantity by User Persona
Description: Total Order Quantity by User Persona reflects the cumulative number of products ordered by each user persona. It provides a quantitative measure of demand and product popularity across different customer segments.

How It Was Calculated: The calculation was performed by summing the quantity of all orders related to each user persona, using a DAX measure that considers the categorization of products according to customer interests.

Visualization Used: I used a tree chart to depict this KPI due to its effectiveness in showing the distribution of total orders among different user personas. Each branch provides a visual representation of what sub categories are included in it and each segment's contribution to the total order volume. I also decided to add a total revenue by user person to this section (pie chart). I find it helps in visualizing which user personas are generating the most revenue for the company.

Slicing/Drilling Down: The tree chart can be sliced using the slicers on the left of the dashboard (age, region, category, year).

<u>Strategic Utility:</u> With this KPI, the sales and marketing team can estimate the demand for products by segment, allowing them to adjust inventory levels, optimize supply chain logistics, and create marketing campaigns that resonate with segments showing high order volumes.

<u>Insights from Dashboard:</u>
- There's a significant volume of orders from the Mountain Bikers segment, indicating a healthy demand for products related to mountain biking. Combining the high purchase frequency with strategies to increase transaction value could lead to substantial revenue growth in this segment.
- The products they order most are Tires and Tubes, suggesting that these items may need to be stocked more heavily. These insights could also be used to bundle these popular items with other products to increase sales.
- The pie chart indicates that Road Cyclists contribute the most to total revenue, which is a critical insight for inventory and marketing focus. Despite possibly being fewer in number, their higher average purchase value drives significant revenue.

Dashboard 1
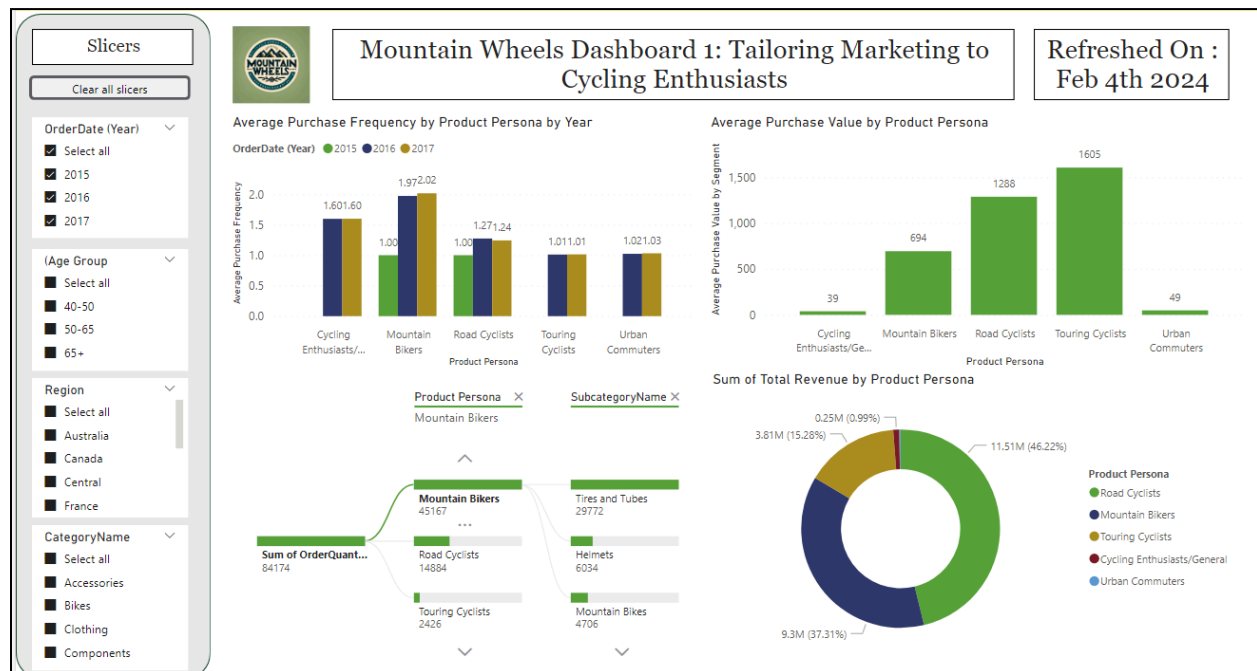
Step 3: USE CASE 2 - Expanding Reach in Untapped Territories

UC 2 Description: The regional sales analysis feature of the dashboard enables Mountain Wheels to identify potential markets for expansion. Understanding regional preferences ensures that new stores stock the most relevant products for their local customer base.

KPI 1: Total Revenue by Geographic Location
Description: This KPI measures the total sales revenue generated by Mountain Wheels in each geographic location. It reflects the financial impact of different regions on the overall business.

How It Was Calculated: To calculate this KPI, I created a DAX measure that aggregated the Total Revenue figures from the Master Sales table, grouping the data by the Region attribute derived from the Territories table.

Visualization Used: I chose a matrix to visualize this KPI due to its ability to show numerical data easily and ordered in ascending order. The choice of a matrix supports a quick assessment of which regions generate the most revenue and effectively communicates the data story at a glance, which is important for strategic discussions. I also decided to add 2 cards, showing the top performing sales countries and least performing. I had to create 2 new DAX measures in order to identify these countries.

Slicing/Drilling Down: The left side slicers allow users to slice by various dimensions such as demographic data, time periods, and product preferences. You can also drill down directly on each territory to see the countries, or on each country to see all the regions.

Strategic Utility: This KPI helps identify which regions are the most valuable markets and could influence decisions regarding resource allocation, market investment, and strategic planning for expansion.

Insights from Dashboard:
- The United States emerges as the sales powerhouse, leading in revenue generation, which underscores its role as a primary market for Mountain Wheels.
- The notable revenue from the United Kingdom and Germany suggests a robust customer base in Europe, hinting at potential for further expansion or increased marketing spend.
- The relatively lower revenue figures for Canada and the Pacific regions identify them as areas where Mountain Wheels might explore strategic partnerships, localized advertising, and promotional campaigns to boost market share.

KPI 2: Order Quantity by Region
Description: The Order Quantity by Region KPI delves into the operational aspect of sales, revealing not just how much money is made, but how many products are physically moving through each region.

How It Was Calculated: The measure was calculated by aggregating the Quantity column from the Master Sales table for each region.

<u>Visualization Used:</u> I utilized a donut chart for its effectiveness in showing proportions. Since all regions amount to a whole, this chart was ideal. The donut chart facilitates an easy comparison of order quantities across regions with its segmented circular format.

<u>Slicing/Drilling Down:</u> Once again, you can apply the silencers on the left of the dashboard. You can also drill-up if you want to see the order quantity by country or by continent.

<u>Strategic Utility:</u> This KPI is important for inventory planning and logistics, as it helps to understand demand volume by region and can guide distribution strategies.

<u>Insights from Dashboard:</u>
- The Southwest and Northwest regions are depicted as high-quantity order locations, which may indicate successful sales strategies or a strong presence of cycling enthusiasts. The considerable order quantities in these regions could suggest that Mountain Wheels' product offerings are well-aligned with consumer preferences there.
- Even though Canada is the least performing country in terms of revenue, it comes in fourth place for amount of orders. This might just mean that customers are buying cheaper products in Canada (such as accessories over bikes) or perhaps the prices need to be increased.
- Conversely, smaller segments in the chart highlight regions where order quantities are lower, prompting a review of marketing tactics and possibly indicating untapped or underperforming markets.

KPI 3: Order Quantity by Country and Product Mix
<u>Description:</u> This KPI shows regional sales order quantities into finer categories of product mix per country. It offers a more detailed view of customer preferences, allowing Mountain Wheels to discern which products are favored in different locales.

<u>How It Was Calculated:</u> Order quantities were counted and grouped by both country and product category to show the diversity of product demand. I did not need to create any new measures for this step of the process.

<u>Visualization Used:</u> I picked a stacked bar chart to represent this KPI due to its ability to segment data within a single bar, and the fact that it shows not only the total order quantity but also the relative contribution of each product category to the whole, providing a detailed view of sales composition.

<u>Slicing/Drilling Down:</u> The chart allows for drilling down into specific product categories and filtering by different demographics or time frames, giving a nuanced view of sales patterns. From each product category you can drill down into product subcategories or you can also drill-up to see it by territory.

<u>Strategic Utility:</u> By analyzing the product mix, the sales and marketing teams can optimize product assortments in different countries, align supply with demand, and tailor marketing campaigns to regional preferences.

Insights from Dashboard:

- In countries like France and Germany, accessories form a significant portion of the product mix, suggesting that these markets may value practicality and additional features in their cycling experience.
- The dominance of bikes in the United States and Australia indicates a strong core market for Mountain Wheels' primary product line, which could be the focus of further brand reinforcement.
- Across all countries, accessories have the highest order quantity, hence when stocking new stores, the company should always over-stock on accessory products.

Dashboard 2
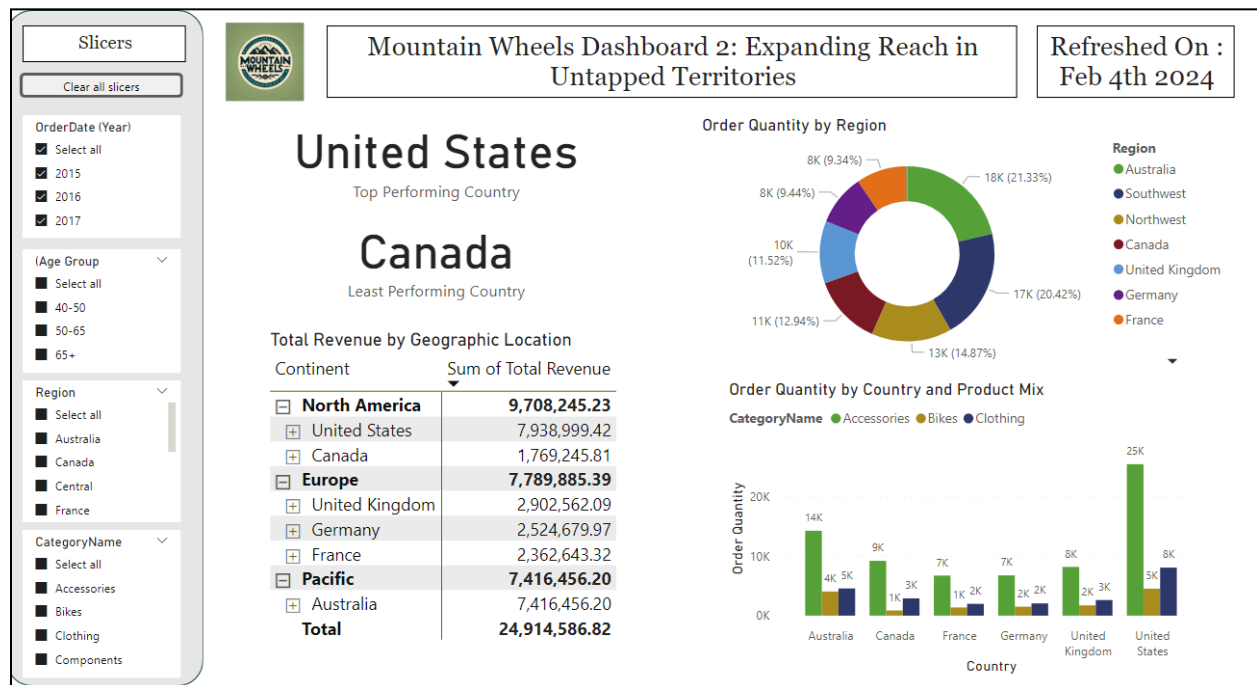
Step 4: USE CASE 3 - Reducing Returns Through Quality Feedback

UC 3 Description: Analysis of returns and customer feedback provides insights into product quality and customer satisfaction. This helps Mountain Wheels address any issues promptly, ensuring that only the best products are on their shelves.

KPI 1: Return Rate by Product Category
Description: The Return Rate by Product Category is a critical measure that quantifies the frequency of returns relative to total sales within each product subcategory. A higher return rate may indicate customer dissatisfaction, issues with product quality, or misalignment between customer expectations and the product experience.

How It Was Calculated: I calculated the return rate by dividing the number of returned items by the total number of items sold within each subcategory, then multiplying the result by 100 to express it as a percentage.

Visualization Used: A matrix chart was selected to visualize the return rate for each product category. This type of chart is particularly effective for this KPI as it allows for quick comparison across categories and easily identifies those with higher rates of return. You can see the numbers quickly and since they are ordered in ascending order, we can quickly tell which category gets returned the most.

Slicing/Drilling Down: The data can be sliced by different time periods, geographical regions, or customer demographics with the slicers. You can also drill-up to see the main categories instead of product sub-categories.

Strategic Utility: Monitoring the Return Rate by Product Category is important for maintaining product quality and customer satisfaction. It enables the sales and marketing team to pinpoint problematic areas and initiate corrective actions, such as reviewing product descriptions, quality checks, or customer service policies.

Insights from Dashboard:
  ● High Return Categories: Shorts and Vests are showing notably higher return rates, which may warrant a review of product specifications or customer feedback for these items to understand the underlying issues.
  ● Low Return Categories: On the other end, Caps and Fenders exhibit lower return rates, suggesting higher customer satisfaction or better alignment with customer expectations.
  ● Potential Quality Issues: The varying return rates across categories could indicate potential quality issues or misalignment in customer expectations, particularly for categories like Hydration Packs and Bike Stands, which show higher return rates than the total average.

KPI 2: Customer Satisfaction Index by Year and Category
Description: The Customer Satisfaction Index (CSI) by Year and Category is a metric that estimates consumer contentment with Mountain Wheels' products over time. It reflects the qualitative aspect of

customer experience by aggregating satisfaction scores, giving insight into how well products meet customer expectations.

How It Was Calculated: The CSI was done by attributing satisfaction scores to each return comment. For each product not returned (indicating customer satisfaction), I assigned a perfect score of 5. Returns were evaluated based on the reason provided, with scores assigned as follows: "Broken item received" scored 1, indicating significant dissatisfaction; "Product quality not up to mark" was scored at 2, signaling moderate dissatisfaction; and "Unable to pay cash on delivery" was given a score of 3, representing a neutral satisfaction level impacted by payment methods rather than product quality. Then, I created two DAX measures to calculate the CSI. The first measure tallied the total scores for all successful sales (score of 5) and aggregated the scores for returned items based on the reasons mentioned. The second measure computed an average satisfaction score by dividing the sum of all individual scores by the total number of products sold (including both returned and non-returned items).

Visualization Used: I selected a line chart for visualizing the CSI as it effectively displays trends over time. Each product category is represented by a line, with the X-axis denoting time (year), and the Y-axis depicting the average satisfaction score. The line chart enables stakeholders to track the trajectory of customer satisfaction and make temporal comparisons.

Slicing/Drilling Down: The line chart supports slicing by category, allowing for a more granular analysis of customer satisfaction within specific product categories. Drilling down into individual years or quarters can reveal seasonal trends or the impact of specific product launches and marketing campaigns.

Strategic Utility: The CSI is important for Mountain Wheels in identifying which product categories are consistently meeting customer expectations and which may require further attention or improvement. It also serves as a benchmark to measure the effectiveness of changes to product design, quality control measures, or customer service enhancements.

Insights from Dashboard:
- Overall Trend: The gradual upward trend across all categories suggests improvements in product quality or customer service have positively impacted customer satisfaction.
- Category-Specific Analysis: Accessories show a notably high satisfaction score, indicating a well-received product line that could be expanded or used as a model for other categories.
- Temporal Fluctuations: Certain points in time show significant changes in satisfaction levels, such as a notable increase for Bikes around mid-2016, which may correlate with product revisions, promotional events, or market changes.

KPI 3: Top Reasons for Returns
Description: The "Top Reasons for Returns" KPI provides insightful data into why customers are returning products, which is a direct indicator of issues that could be impacting customer satisfaction. By categorizing and quantifying the reasons for returns, Mountain Wheels can identify patterns and trends that may require immediate action or longer-term strategic changes.

How It Was Calculated: The measure for this KPI was computed by counting the instances of each unique return reason listed in the 'Returns with Comments' table. A DAX formula was created to aggregate the total units returned for each reason.

Visualization Used: I picked a donut chart to show the distribution of return reasons. The donut chart's segmented circular display is effective in showing proportions and allows for quick assessment of which issues are most prevalent. I also added a card showing the top reason for return.

Slicing/Drilling Down: The chart can be interacted with to slice data by time periods, regions, or product categories, allowing for a deeper dive into when and where specific issues are more pronounced.

Strategic Utility: This KPI enables Mountain Wheels to strategically address product issues, improve quality control, and refine customer service responses. By understanding the primary drivers behind returns, the company can take corrective actions, such as improving product durability, clarifying product descriptions, or enhancing customer support for payment processes.

Insights from Dashboard:
- Prevalent Return Reasons: The chart shows that "Product Quality not up to mark" and "Broken item received" are the leading reasons for returns, suggesting product quality and shipping or handling processes should be reviewed for improvements.
- Payment Issues: A significant number of returns are due to "Unable to pay cash on delivery," which could indicate a need for better communication about payment options before purchase or an expansion of payment methods available to customers.
- Minor Issues: Fewer returns are due to other reasons, which may imply that outside of quality and payment issues, customers are generally satisfied with their purchases.

Dashboard 3