**Customer Personality Analysis Documentation**

**The story** would revolve around understanding customer behavior based on demographic, product, promotion, and purchasing attributes to better target marketing strategies. The goal is to identify distinct customer segments to enable personalized engagement, improve customer satisfaction, and increase sales.

**Business Questions:**

**Question 1:**

Identify the main customer data, by collecting key data needed to perform clustering.

**Question 2:**

Analyze average spending by segment, by collecting the average spending on each category and showing the values of each, we can determine from them the most rated spendings in which category.

**Question 3 :**

Analyze which segment has the most Total Spend, through identifying which segments contribute most to our revenues, we calculated total spending based on marital status.

**Question 4:**

Analyze relation between complaints and total spending, by identifying if there is a relation between the complaints and Spending or not.

**Question 5:**

Analyze the Customer Loyalty, identifying the most loyal customer demographic involves analyzing repeat purchases by marital status.

**Question 6:**

Determine how recency affects the total spending and customer loyalty, showing the relation and the effect of recency on the number of customers and their total spendings.

**Question 7:**

Spending behavior based on family structure (Marital Status, Education), analyzing the behaviors according to Spending Behavior

**Question 8:**

What percentage of customers have accepted at least one marketing campaign?

Determining the percentage of the overall customers whose at least accept one campaign for one time

**Question 9:**

Identifying the most popular product categories gives us insight into where to focus our marketing efforts and the most popular product?

**Question 10:**

Rank customers by total spending, rank customers based on their total spending across all product categories.

**Visualization Plan (PowerBi Dashboards)**

**Page 1: Overview**

Main Customer Segments:

* Column Chart: Showing the average of purchases regarding the Education segments. Noticing that the largest average of purchases goes to the PHD customers.
* Bar Chart: Showing the average of Total spending regarding the Education segments. Noticing that the average of total spending matches with the average of purchases that goes to the PHD customers.
* Column Chart: Showing the average of purchases regarding the Marital Status of the customers. Noticing that the largest average of purchases goes to the Absurd Customers.
* Bar Chart: Showing the average of Total spending regarding the Education segments. Noticing that the average of total spendings are directly proportional with the average of purchases regarding the Marital Status.
* Donut and Pie Charts: Showing the average of both the total spendings and purchases regarding if there are teens or kids at home.
* Cards: Showing the Sum and Average of Total Spendings, and the Sum and Average of Purchases, that would be interactive with the other visuals.

**Page 2: Income**

Recognizing the income relation with each of the segments we have:

* Card: Visual the average of Income.
* Slicer: For the income starting from 0 to the max income we have 162k.
* Stacked Bar Chart: Show average income by education, observing the largest income average goes to the PhD customers.
* Column Chart: Track the average income by marital status.
* Pie Chart: Track the average of income by the customer age segments (Senior, Adult, Young).
* Stacked Column Chart: Visual the average of products (Fish, Fruits, Meat, Gold, Sweets, Wine) by the income flag (High income and Low income).

**Page 3: Customer**

* Donut Chart: visual the number of customers by complaints. Observing that only a small number of customers made complaints.
* Pie Chart: Visual the number of customers by the age segments (Adult, young, Senior). Observing that the Adult segment has large numbers of customers.
* Stacked Column Chart: Visualizing the average of purchases by customer age segment.
* Bar Chart: Shows the number of customers by Marital status. Observing the largest number of customers are married.
* Card: Visualize the no. of customers.
* Slicers: Visualize the year of birth and customer age.

**Page 4: Deals and Web Visits**

* Bar Chart: Plot sum of deal purchases by the customer age.
* Stacked Column Chart: Show the average of purchases (Catalog, Store, Web, Deal) by customer age segment.

* Column Chart: Plot the number of customers by the monthly web visits.
* Bar Charts: Show the average monthly web visits by marital status and education.
* Card: Visual the sum of deal purchases.
* Slicers: Visual the marital status and education.

**Page 5: Accepted Campaigns**

- Bar Chart: View the number of customers by count of accepted campaigns. Observing the largest number of customers 2027k accepted only one campaign.

- Pie Charts: Shows the sum of accepted campaigns by the customer age and income flag.

- Bar Chart: Plot the number of customers by each accepted campaign ( Campaign 1, Campaign 2, Campaign 3, Campaign 4, Campaign 5, Last Campaign). Observing that the last campaign has the largest number of customers.

- Card: Shows the sum of accepted campaigns.

**Page 6: Total Spending**

- Bar Chart: View the sum of products (Fish, Meat, Gold, Fruits, Sweets, Wine). Observing that the largest sum of products goes to the wine products.

- Pie Charts: Shows the sum of total spending by each accepted campaign.

- Cards: Shows the sum of total spendings and the average of total spendings.

**Page 7: Recency**

- Column Chart: View the sum of total accepted campaigns by recency segment (Last purchase from our company).

- Line Chart: Shows the number of customers by recency segment (Champion, Recent Customer, Loyal Customer, At risk, Need attention, Potential Customer, Lost). Observing that the largest number of customers the company has are from the champion segment.

- Line Chart: Shows the average of total spendings by the recency segments. Observing that despite the largest number of customers the company has are from the champion segment, the average of their total spendings ar the least, which indicate that the company is losing and has to take a quick action to keep their loyal customers purchases.

**These visuals explore customer segments from various perspectives, spending habits, engagement, and marketing responsiveness. Each page focuses on answering key business questions with interactive visuals, enabling deep insights into customer behavior.**

**Finding and Recommendations:**

* The largest average of purchases goes to the PHD customers.
* The average of total spending matches with the average of purchases that goes to the PHD customers.
* The largest average of purchases goes to the Absurd Customers.
* The average of total spendings are directly proportional with the average of purchases regarding the Marital Status.
* The largest income average goes to the PhD customers.
* Only a small number of customers made complaints.
* The Adult segment has large numbers of customers.
* The largest number of customers are married.
* The largest number of customers 2027k accepted only one campaign. Showing this could help us to be more effective with our campaigns to achieve purchases and gains out of them.
* That the last campaign has the largest number of customers. Observe the pattern and method of the last campaign and modify it to be better.
* The largest sum of products goes to the wine products. The marketing team could work on more than one sector to target a rise in the rest of product purchases and also keep the large number of purchases for the wine sector.
* The largest number of customers the company has are from the champion segment, yet despite the largest number of customers the company has are from the champion segment, the average of their total spendings are the least, which indicates that the company is losing and has to take quick action to keep their loyal customers' purchases.

**Data Cleansing and Calculations:**

**Cleaning Data**

* Removing all the blank and nonsense inputs of data from the data set.
* Consider the birth age of clients starting from 1940 not before as the values before have a 40 year gap which doesn’t make sense.
* Neglect the income input of 666666 as it seems not a real input and the gap between it and all the previous data isn’t logical.
* Using filters based on each used chart, to specify the needed output from the visual and neglect the unneeded values.

**Calculations and Measures**

Done some measures that would help to observe the data better and came out with the above insights.

* Customer Age = 2014 - marketing\_campaign(year\_bitrth)

Considering the last year of dealing with the company as the year that will help to calculate the age of our customers using their year of birth.

* Customer Age Segments

Applying a grouping for the Customer age to cluster them into three different sectors (Senior, Adult, Young).

* All Kids = marketing\_campaign(kidhome) + marketing\_campaign(teenhome)

Calculate the whole numbers of kids at home either they are kids or teens to show the impact of the total number of kids regarding different aspects in our visuals.

* Income Flag = if (marketing\_campaign(income) >= 45000, “HighIncome” , “LowIncome” )

Apply a flag on the customer income to categorize them into two categories (High and Low Income customers), customers with an income more than 45k will be considered as a high income customers, otherwise will be considered as a low income customers.

* Num of Purchases = marketing\_campaign(numcatalogpurchases) + marketing\_campaign(numStorepurchases) + marketing\_campaign(numwebpurchases)

Calculated the total number of purchases that took place either through the web, store or deals together and consider their sums as the Total number of Purchases.

* Total spending = marketing\_campaign(mntfishproducts) + marketing\_campaign(mntfruits) + marketing\_campaign(mntgoldprods) + marketing\_campaign(mntmeatproducts) + marketing\_campaign(mntsweetproducts) + marketing\_campaign(mntwines)

Calculate the total spendings by adding all the spending for all the products we have (Fish, Meat, Gold, Sweet, Wine, Fruits) together, to have the total spending of each customer.

* DealPurchaseCategory = if (marketing\_campaign(numdealspurchases) >= 6, “Frequent Purchaser” , “Infrequent Purchaser”)

Segment the Deal Purchases that took place for each customer into two sectors (Frequent Purchaser , Infrequent Purchaser) the customer with more than or equal 6 purchases from the deal purchases will be considered as a Frequent Purchaser otherwise will be an Infrequent Purchaser.

* Count acceptedcmps = marketing\_campaign(AcceptedCmp1) + marketing\_campaign(AcceptedCmp2) + marketing\_campaign(AcceptedCmp3) + marketing\_campaign(AcceptedCmp4) + marketing\_campaign(AcceptedCmp5) + marketing\_campaign(Response)

Calculating the whole accepting count of campaigns that took place together to find the count of them regarding each customer we have, the company made 6 campaigns ( 1, 2, 3, 4, 5, and response campaigns). Taking in consideration the response campaign, the last campaign happened.