

# Customer Personality Analysis

## Documentation

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## Steps to Analyze Data

### 1. Formulate Business Questions and Storytelling:

- Identify key business questions to guide the analysis and develop a narrative to effectively communicate insights.

### 2. Data Cleaning:

- Address any inconsistencies and inaccuracies in the dataset to ensure reliability and accuracy in analysis.
- **Nulls and Outliers in Income:**
  - Replace null values and outliers in the income column with the average income to maintain data integrity.
- **Correct Incorrect Data Entries:**
  - Review and rectify any erroneous entries in the customer data to ensure accurate joins and analysis.
- **Standardize Date Formats:**
  - Fix any formatting errors in the date columns related to customer data to facilitate accurate time-based analyses.
- **Remove Fixed Value Columns:**
  - Eliminate any columns containing fixed values that do not contribute to the analysis.

### 3. Visualize and Answer Business Questions in Power BI:

- Create visual representations of the data to explore insights and answer the formulated business questions using Power BI.

### 4. Analyze and Answer Business Questions in SQL:

- Utilize SQL queries to extract and analyze data, providing additional insights and answering the business questions.

- Storytelling

In today's data-driven market, understanding customer behavior is essential for sustained growth and engagement. This analysis delves into customer personality traits, highlighting key spending patterns and preferences across demographics. By leveraging these insights, businesses can tailor their marketing strategies to enhance customer satisfaction, optimize product offerings, and ultimately drive revenue growth. The findings not only illuminate current trends but also provide actionable recommendations for future strategic initiatives, ensuring that the organization remains competitive in an ever-evolving landscape.

## ○ Business questions

### Category 1: Customer Demographics & Income

**Goal:** Understand the relationship between customer demographics and spending.

#### 1. Income by Education Level

- **Insight:** Identify which education levels correspond to higher incomes (e.g., PhD holders have the highest income).
- **KPI:** Median and mean income by education.

#### 2. Spending by Age Group

- **Insight:** Determine how age impacts spending on product categories.
- **KPI:** Average spending by age group.

#### 3. Income vs Gold Purchases

- **Insight:** Explore how income influences spending on luxury goods (like gold).
- **KPI:** Correlation between income and gold purchases.

#### 4. Income vs Overall Spending

- **Insight:** Analyze the relationship between income and spending patterns across all product categories.
- **KPI:** Correlation coefficient between income and total spending.

#### 5. Customer Lifetime Value (CLV)

- **Insight:** Estimate CLV to identify high-value customers and tailor marketing strategies.
- **KPI:** Customer Lifetime Value.

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### Category 2: Product Preferences & Purchasing Patterns

**Goal:** Explore customer preferences and identify trends in product purchasing.

#### 1. Total and Average Amount Spent Across Product Categories

- **Insight:** Calculate total and average spending on categories like wine, meat, etc.
- **KPI:** Total and average spending per product category.
- **Question:** What is the total and average amount spent across all product categories?

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## 2. Spending by Family Structure (Kidhome/Teenhome)

- **Insight:** Assess how family structure affects spending patterns.
- **KPI:** Total spending by family structure.
- **Question:** How does the family structure (Kidhome/Teenhome) affect spending behavior?

3. What is the total number of products purchased per customer, segmented by marital status, and how does this reflect spending behavior among different marital groups?

This question allows you to explore:

- **Total Products:** Understand how many products each marital status group purchases in total.
- **Segmentation:** Compare the purchasing behavior between different marital statuses (e.g., single, married, divorced).
- **Behavioral Insights:** Analyze if there are significant differences in purchasing behavior based on marital status, which could inform marketing strategies and product offerings.

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## Category 3: Customer Engagement & Loyalty

**Goal:** Evaluate customer engagement, loyalty, and frequency of purchases.

### 1. Recency vs Amount Spent

- **Insight:** Determine if frequent customers (low recency) tend to spend more.
- **KPI:** Average spending by customer recency.

### 2. Loyal Customers

- **Insight:** Identify which customers are most loyal based on frequent purchases or low recency.
  - **KPI:** Percentage of loyal customers.
3. **Website Engagement vs Total Purchases**
- **Insight:** Analyze how the number of web visits correlates with total purchases across channels.
  - **KPI:** Web engagement rate (number of web visits vs total purchases).
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#### Category 4: Marketing & Sales Channel Efficiency

**Goal:** Measure the effectiveness of marketing campaigns and understand sales channel performance.

1. **Marketing Campaign Response Rate**
- **Insight:** Determine which customer segments respond most effectively to marketing campaigns.
  - **KPI:** Marketing response rate.
2. **Channel Distribution (Web vs Store vs Catalog)**
- **Insight:** Identify which channels (web, store, catalog) customers prefer.
  - **KPI:** Percentage of purchases per channel.

3. **Average Customer Acceptance**

- **Insight:** Understand customer engagement with marketing campaigns.
- **KPI:** Average number of campaigns accepted per customer.
- **Question:** On average, how many campaigns does each customer respond to?

4. **Customer Engagement with Deals**

- **Insight:** Determine which customer categories are most responsive to deals and promotions.
- **KPI:** Deal acceptance rates by demographic groups.
- **Question:** Which customer segments are most likely to respond to promotional deals?

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## Category 5: Time-Based Analysis & Trends

**Goal:** Track customer behavior and sales patterns over time for trend analysis.

### 1. Customer Purchase Trends Over Time

- **Insight:** Identify seasonal or time-based trends in customer purchases.
- **KPI:** Monthly average purchases.

### 2. Promotional Efficiency (Deal Purchases Impact)

- **Insight:** Measure how promotional deal purchases influence total spending.
- **KPI:** Percentage increase in spending due to deal purchases.

### 3. Web Visits Over Time and Purchase Likelihood

- **Insight:** Track how the frequency of web visits changes over time and its correlation with purchases.
  - **KPI:** Conversion rate (web visits to purchases).
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## Additional KPIs and Measures

### 1. Customer Lifetime Value (CLV)

- **Insight:** Estimate CLV to identify high-value customers and tailor marketing strategies.
- **KPI:** Customer Lifetime Value.



## ○ Power BI Data Model: Column Descriptions and Business Insights

### 1. Age Demographic Group

- **Description:** Categorizes customers based on their generational cohort (e.g., Boomers, Millennials) to analyze purchasing behavior across different age groups.

### 2. Income Category

- **Description:** Segments customers based on their annual income (e.g., Lower-Middle, Middle, Upper-Middle) to understand spending patterns in relation to income level.

### 3. Total Amount Per Customer

- **Description:** Reflects the total monetary value of all purchases made by each customer, providing insight into individual customer spending.

### 4. Total Number of Sons

- **Description:** Represents the number of children each customer has. This can be used to explore potential correlations between family size and purchasing behavior.

### 5. Number of Total Purchases

- **Description:** Shows the total number of purchases made by each customer, which can be useful for tracking purchasing frequency.

### 6. Total Accepted Campaigns

- **Description:** Tracks the total number of marketing campaigns that each customer has accepted, helping to measure engagement with promotional activities.

### 7. Last Purchase Date

- **Description:** Displays the date when the customer last made a purchase, which is valuable for understanding recency and predicting future behavior.
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## 8. Customer Lifetime (Days)

- **Description:** Calculates the number of days between the customer's first purchase date and their last purchase date, helping to measure customer tenure.

## 9. Deal Acceptance Rate

- **Description:** The percentage of deals accepted by a customer relative to the total number of offers received. A higher rate indicates better engagement with promotional deals.

## 10. Loyalty Level

- **Description:** Categorizes customers based on how recently they have made a purchase. Categories include:
  - **Loyal** (purchased within the last 30 days)
  - **Semi-Loyal** (last purchase between 31 and 60 days)
  - **At Risk** (last purchase between 61 and 90 days)
  - **Inactive** (last purchase over 90 days ago)

## 11. Web Views vs Purchases

- **Description:** Indicates whether a customer has more website visits than actual purchases. It highlights gaps between interest (views) and conversion (purchases).

## 12. Accepted Campaign Rate

- **Description:** Measures the rate of marketing campaign acceptance by dividing the total accepted campaigns by the total number of campaigns. This metric helps evaluate the effectiveness of marketing efforts.

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### 13. Total Meat Spent

- **Description:** A binary column that indicates whether the customer has spent money on meat products. A "1" means they purchased meat, while "0" means they did not.

### 14. Total Fish Spent

- **Description:** A binary column that flags whether a customer has purchased fish products. A "1" means they bought fish, while "0" means no purchase was made.

### 15. Total Gold Spent

- **Description:** Indicates whether a customer has spent on gold products. A "1" means they made a purchase, while "0" means they did not.

### 16. Total Sweet Spent

- **Description:** Identifies whether the customer has purchased sweet products. A "1" represents a purchase, while "0" represents no purchase.

### 17. Total Wine Spent

- **Description:** Shows whether the customer has spent on wine products. A "1" means they made a purchase, while "0" means no purchase was made.

### 18. Total Fruits Spent

- **Description:** Indicates whether the customer has spent on fruit products. A "1" means they made a purchase, while "0" means they did not.

## ○ Power BI Data Model: Measures Descriptions and Calculations

### 1. Total Amount Spent

**Description:** Represents the total monetary value spent by customers across various product categories.

**Calculation:** Sum of spending on wines, fruits, meats, fish, sweets, and gold products.

### 2. Average Purchase Value

**Description:** Calculates the average amount spent per purchase by customers.

**Calculation:** Total amount spent divided by the total number of purchases.

### 3. Purchase Frequency

**Description:** Measures the average number of purchases made by customers.

**Calculation:** Total number of purchases divided by the distinct number of customers.

### 4. Store Purchase Percentage

**Description:** The proportion of total purchases made in physical stores.

**Calculation:** Total store purchases divided by total purchases.

### 5. Catalog Purchase Percentage

**Description:** Represents the percentage of total purchases made through catalogs.

**Calculation:** Total catalog purchases divided by total purchases.

### 6. Web Purchase Percentage

**Description:** Shows the proportion of total purchases made via online channels.

**Calculation:** Total web purchases divided by total purchases.

### 7. Loyal Customers Percentage

**Description:** Calculates the percentage of customers who made purchases within the last 30 days.

**Calculation:** Number of customers with purchases in the last 30 days divided by the total distinct customer count.

### 8. Deal Acceptance Rate

**Description:** Shows the percentage of deals accepted by customers relative to the total number of purchases.

**Calculation:** Total deals accepted divided by total purchases.

9. **Web Views vs Total Purchases**

**Description:** Compares the number of web visits to the total number of purchases.

**Calculation:** If web visits > total purchases, it indicates a gap in conversion.

10. **Web Views vs Web Purchases**

**Description:** Compares the number of web visits to the number of web purchases.

**Calculation:** If web visits > web purchases, it indicates a gap in online conversion.

11. **Fruits and Meat Co-occurrence**

**Description:** Counts the number of customers who purchased both fruits and meat products.

**Calculation:** Count of rows where both total fruits spent and total meat spent are equal to 1.

12. **Sweets and Fish Co-occurrence**

**Description:** Identifies the number of customers who bought both sweets and fish products.

**Calculation:** Count of rows where both total sweets spent and total fish spent are equal to 1.

13. **Wine and Meat Co-occurrence**

**Description:** Tracks how often customers purchased both wine and meat products.

**Calculation:** Count of rows where both total wine spent and total meat spent are equal to 1.

14. **Wine and Sweets Co-occurrence**

**Description:** Calculates the number of customers who purchased both wine and sweets.

**Calculation:** Count of rows where both total wine spent and total sweets spent are equal to 1.

15. **Average Age**

**Description:** Calculates the average age of customers in the dataset.

**Calculation:** Average of the age column.

16. **Total Fish Spent**

**Description:** Represents the total amount of money customers spent on fish products.

**Calculation:** Sum of spending on fish products.

**17. Total Fruits Spent**

**Description:** Summarizes the total amount spent on fruit products.

**Calculation:** Sum of spending on fruit products.

**18. Total Gold Spent**

**Description:** Shows the total monetary value spent on gold products.

**Calculation:** Sum of spending on gold products.