

# Exploratory data analysis :Maven Marketing

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# 1.Introduction

## 1.1 Brief Overview of the Maven Marketing Data set

Maven Analytics is a leading provider of data analytics solutions, specializing in extracting actionable insights from complex datasets to drive strategic business decisions. In this context, Maven Analytics has provided a comprehensive marketing dataset comprising information on 2,240 customers. This dataset encompasses customer profiles, product preferences, campaign outcomes, and channel performance metrics, offering a rich source of data for analysis and optimization of marketing strategies.

The marketing dataset includes key variables such as customer demographics (e.g., age, education, marital status, income), historical purchase behavior (e.g., spending on different product categories), campaign acceptance rates (per campaign), and channel engagement metrics (e.g., web visits, catalog purchases, store visits). This data presents a valuable opportunity to delve into customer behavior patterns, identify influential factors, and optimize marketing efforts for Maven Analytics.

## 1.2 Purpose of the Analysis

The primary objective of this analysis is to extract actionable insights from Maven Analytics' marketing dataset to inform strategic decision-making and enhance marketing effectiveness.

1. By examining the provided data on customer profiles, product preferences, campaign outcomes, and channel performance, the analysis aims to achieve the following:
2. Understand Customer Behavior: Gain a deeper understanding of customer demographics, preferences, and purchasing behavior to identify key segments and trends.
3. Optimize Marketing Strategies: Evaluate the performance of past marketing campaigns and channels to identify opportunities for improvement and optimization.
4. Identify Influential Factors: Determine factors that significantly impact customer engagement, purchase behavior, and campaign acceptance, particularly focusing on web purchases.
5. Benchmark Success: Assess the success of different marketing campaigns and channels to identify best practices and areas for enhancement.
6. Enhance Customer Experience: Use insights derived from the analysis to tailor marketing efforts, products, and services to better meet the needs and preferences of Maven Analytics' customers.

Overall, the analysis aims to provide actionable recommendations based on data-driven insights, ultimately helping Maven Analytics to refine its marketing strategies, improve customer targeting, and drive business growth.

## **2. Business Task and Objectives**

### **2.1 Clear Summary of the Business Task with Maven Marketing Data**

The business task with Maven Marketing's dataset is to leverage customer data and campaign performance metrics to optimize marketing strategies and enhance customer engagement. By analyzing the provided dataset, the goal is to gain insights into customer profiles, preferences, and behavior to inform targeted marketing efforts and improve campaign effectiveness.

### **2.2 Objectives of the Analysis**

The objectives of the analysis are as follows:

- **Segmentation and Profiling:** Identify and segment customers based on demographics, behavior, and purchasing patterns to understand distinct customer groups.
- **Campaign Performance Evaluation:** Evaluate the success of past marketing campaigns, including acceptance rates and channel performance, to identify successful strategies and areas for improvement.
- **Identify Key Drivers:** Determine factors influencing web purchases and campaign acceptance to optimize resource allocation and maximize ROI.
- **Recommendations for Enhancement:** Provide actionable recommendations to Maven Marketing for refining marketing strategies, targeting specific customer segments, and improving overall campaign performance.

### **2.3 Importance of Understanding Customer Profiles and Campaign Performance**

Understanding customer profiles and campaign performance is crucial for Maven Marketing for several reasons:

- **Targeted Marketing:** Knowledge of customer demographics and preferences enables targeted and personalized marketing efforts, improving customer engagement and conversion rates.
- **Resource Allocation:** Insights into campaign performance help allocate resources effectively by focusing on high-performing channels and strategies.
- **Customer Experience Enhancement:** Understanding customer behavior allows for tailored marketing approaches, enhancing overall customer experience and satisfaction.
- **Competitive Advantage:** Data-driven decision-making based on customer insights provides Maven Marketing with a competitive edge in the industry.

In summary, analyzing customer profiles and campaign performance is essential for Maven Marketing to optimize marketing strategies, allocate resources efficiently, and enhance customer engagement and satisfaction.

## 3. Data Sources

### 3.1 Overview of Maven Marketing Dataset

The Maven Marketing dataset provides a comprehensive view of customer information and purchasing behavior. Here is an overview of the key columns and derived features available in the dataset:

#### **Given Columns:**

1. **ID:** Customer's unique identifier.
2. **Year\_Birth:** Customer's birth year.
3. **Education:** Customer's education level.
4. **Marital\_Status:** Customer's marital status.
5. **Income:** Customer's yearly household income.
6. **Kidhome:** Number of children in the customer's household.
7. **Teenhome:** Number of teenagers in the customer's household.
8. **Dt\_Customer:** Date of customer's enrollment with the company.
9. **Recency:** Number of days since the customer's last purchase.

10. MntWines: Amount spent on wine in the last 2 years.
11. MntFruits: Amount spent on fruits in the last 2 years.
12. MntMeatProducts: Amount spent on meat in the last 2 years.
13. MntFishProducts: Amount spent on fish in the last 2 years.
14. MntSweetProducts: Amount spent on sweets in the last 2 years.
15. MntGoldProds: Amount spent on gold in the last 2 years.
16. NumDealsPurchases: Number of purchases made with a discount.
17. NumWebPurchases: Number of purchases made through the company's website.
18. NumCatalogPurchases: Number of purchases made using a catalogue.
19. NumStorePurchases: Number of purchases made directly in stores.
20. NumWebVisitsMonth: Number of visits to the company's website in the last month.
21. AcceptedCmp3: 1 if customer accepted the offer in the 3rd campaign, 0 otherwise.
22. AcceptedCmp4: 1 if customer accepted the offer in the 4th campaign, 0 otherwise.
23. AcceptedCmp5: 1 if customer accepted the offer in the 5th campaign, 0 otherwise.
24. AcceptedCmp1: 1 if customer accepted the offer in the 1st campaign, 0 otherwise.
25. AcceptedCmp2: 1 if customer accepted the offer in the 2nd campaign, 0 otherwise.
26. Response: 1 if customer accepted the offer in the last campaign, 0 otherwise.
27. Complain: 1 if customer complained in the last 2 years, 0 otherwise.
28. Country: Customer's location.

**Derived Columns:**

1. Age: Derived from the Year\_Birth and Enrollment year columns.
2. Enrollment month: Derived from the Dt\_Customer column, indicating the month of enrollment.
3. Enrollment year: Derived from the Dt\_Customer column, indicating the year of enrollment.

4. Enrollment day: Derived from the Dt\_Customer column, indicating the day of enrollment.
5. Total\_Purchases: Derived from the sum of spending on fish, meat, fruits, etc.
6. Recency\_Category: Categorized based on the Recency column into 'Low Recency', 'Medium Recency', 'High Recency'.
7. Age\_group: Grouped into age categories based on the Age column.

### 3.2 Data Collection Methods and Source

The Maven Marketing dataset was likely collected through various methods aimed at gathering customer information and transactional data. Here's an overview of potential data collection methods and sources:

1. Customer Enrollment Process: The initial data, including customer identifiers (ID), birth year (Year\_Birth), education level (Education), marital status (Marital\_Status), and date of enrollment (Dt\_Customer), were likely collected during the customer onboarding or enrollment process. This data may have been provided directly by customers at the time of registration.
2. Transaction Records: Information about customer purchases, such as spending on wine (MntWines), fruits (MntFruits), meat products (MntMeatProducts), fish products (MntFishProducts), sweets (MntSweetProducts), and gold products (MntGoldProds) over the last two years, as well as the number of purchases made with discounts (NumDealsPurchases), through the website (NumWebPurchases), catalog (NumCatalogPurchases), and in stores (NumStorePurchases), were likely captured from transactional records or sales databases.
3. Behavioral Data: Customer engagement metrics, such as the number of web visits per month (NumWebVisitsMonth), recency of purchases (Recency), acceptance of marketing campaigns (AcceptedCmp1 to AcceptedCmp5, Response), and complaints (Complain) over the past two years, were likely tracked using customer relationship management (CRM) systems or analytics tools.
4. Surveys and Feedback: Additional customer attributes, such as household composition (Kidhome, Teenhome), income (Income), and geographic location (Country), may have been obtained through surveys or feedback mechanisms designed to gather demographic and lifestyle information.

5. **Data Aggregation and Integration:** The collected data from various sources were likely aggregated, cleaned, and integrated into a centralized database or data warehouse, ensuring consistency and accessibility for analysis and reporting purposes.
6. **Derived Variables:** Some variables, such as age (derived from Year\_Birth), enrollment month, year, and day (derived from Dt\_Customer), total purchases (calculated from spending on specific product categories), recency categories (based on Recency), and age groups, were derived or computed based on existing data to provide additional insights and context for analysis.

Overall, the Maven Marketing dataset represents a rich collection of customer-centric data obtained through diverse data collection methods, enabling comprehensive analysis of customer behavior, preferences, and campaign performance to drive informed marketing decisions and strategies.

## 4. Data Cleaning and Preparation

### 4.1 Steps Taken to Clean and Preprocess the Maven Marketing Data

All the necessary packages were loaded

```
import plotly.io as pio
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import csv
import seaborn as sns
# import plotly.graph_objects as go
import squarify
from sklearn.datasets import load_iris
import folium
import geopandas as gpd
import plotly.express as px
from geopy.geocoders import Nominatim
```

The dataset was loaded and saved under the marketing dataframe

```
marketing = pd.read_csv(r"C:\Users\user\Documents\marketing_data.csv")
print(marketing.head())
```



```
##   ID Year_Birth Education ... Response Complain Country
## 0  1826      1970 Graduation ...      1      0   Spain
## 1    1      1961 Graduation ...      1      0   Canada
## 2 10476      1958 Graduation ...      0      0    USA
## 3  1386      1967 Graduation ...      0      0 Australia
## 4  5371      1989 Graduation ...      1      0   Spain
##
## [5 rows x 28 columns]
```

## 4.2 Handling Null Values, Outliers, and Data Transformations

**1. Handling Missing Values:** • Missing values in the dataset, if any, were identified using the `.isnull()` method. • Strategies such as imputation or removal were applied based on the nature and significance of missingness. • Imputation methods like mean, median, or mode substitution might have been used for numerical variables. • For categorical variables, missing values could have been imputed with the most frequent category or a separate category denoting missingness. • Alternatively, rows with missing values might have been dropped altogether to maintain data integrity.

**2. Whitespace Removal:** • Leading and trailing whitespaces in column names were eliminated using the `.str.strip()` method to prevent potential errors in data manipulation. • This step ensured uniformity and consistency in column names, facilitating easier access and manipulation of data.

**3. Outlier Removal:** • Outliers were detected using statistical methods including box plots, and domain knowledge. • Outliers exceeding predefined thresholds, particularly in the 'Income' column, were removed to mitigate their influence on statistical analyses. • Removing outliers helped prevent skewed interpretations and inaccurate modeling results, ensuring the robustness of subsequent analyses.

**4. Data Type Conversion:** • Data types of specific columns, such as 'Year\_Birth', were converted to float format using `.astype(float)` to align with the intended analytical operations. • This conversion facilitated numerical computations and enhanced the compatibility of data across different functions and libraries.

## 4.3 Feature Engineering

### 1. Date Parsing:

- The 'Dt\_Customer' column containing customer enrollment dates was parsed into datetime format using `pd.to_datetime()` for temporal analysis.
- This transformation enabled exploration of temporal trends, seasonality effects, and customer lifecycle patterns.

## **2. Enrollment Details:**

- From the parsed date, additional features such as 'Enrollment\_Month' and 'Enrollment\_Year' were extracted to capture granular enrollment information.
- Analyzing enrollment trends over months and years provided insights into seasonality, marketing campaign effectiveness, and customer acquisition dynamics.

## **3. Age Calculation:**

- Customer ages ('Age') were derived by subtracting birth years ('Year\_Birth') from enrollment years, reflecting the age at the time of enrollment.
- Age computation facilitated demographic segmentation and targeted marketing strategies tailored to different age cohorts.

## **4. Age Grouping:**

- Customers were categorized into distinct age groups ('Age\_group') based on predefined ranges (e.g., <30, 30-39, 40-49, 50-59, 60+).
- Age grouping facilitated comparative analyses across demographic segments and informed personalized marketing approaches.

## **5. Total Purchase Aggregation:**

- Total spending across various product categories was aggregated ('Total\_Purchases') by summing expenditures on wine, fruits, meat products, fish products, sweet products, and gold products.
- This consolidated metric provided a comprehensive view of customer purchasing behavior and overall engagement with the product offerings.

## 5. Exploratory Data Analysis

### 5.1 Summary Statistics of Key Variables (e.g., CustomerDemographics, Product Preferences)

```
summary_stats = marketing.describe()
summary_stats_transposed = summary_stats.T
print(summary_stats_transposed)
```

##	count	mean ...	75%	max
## ID	2240.0	5592.159821 ...	8427.75	11191.0
## Year_Birth	2240.0	1968.805804 ...	1977.00	1996.0
## Income	2216.0	52247.251354 ...	68522.00	666666.0
## Kidhome	2240.0	0.444196 ...	1.00	2.0
## Teenhome	2240.0	0.506250 ...	1.00	2.0
## Recency	2240.0	49.109375 ...	74.00	99.0
## MntWines	2240.0	303.935714 ...	504.25	1493.0
## MntFruits	2240.0	26.302232 ...	33.00	199.0
## MntMeatProducts	2240.0	166.950000 ...	232.00	1725.0
## MntFishProducts	2240.0	37.525446 ...	50.00	259.0
## MntSweetProducts	2240.0	27.062946 ...	33.00	263.0
## MntGoldProds	2240.0	44.021875 ...	56.00	362.0
## NumDealsPurchases	2240.0	2.325000 ...	3.00	15.0
## NumWebPurchases	2240.0	4.084821 ...	6.00	27.0
## NumCatalogPurchases	2240.0	2.662054 ...	4.00	28.0
## NumStorePurchases	2240.0	5.790179 ...	8.00	13.0
## NumWebVisitsMonth	2240.0	5.316518 ...	7.00	20.0
## AcceptedCmp3	2240.0	0.072768 ...	0.00	1.0
## AcceptedCmp4	2240.0	0.074554 ...	0.00	1.0
## AcceptedCmp5	2240.0	0.072768 ...	0.00	1.0
## AcceptedCmp1	2240.0	0.064286 ...	0.00	1.0
## AcceptedCmp2	2240.0	0.013393 ...	0.00	1.0
## Response	2240.0	0.149107 ...	0.00	1.0
## Complain	2240.0	0.009375 ...	0.00	1.0

##

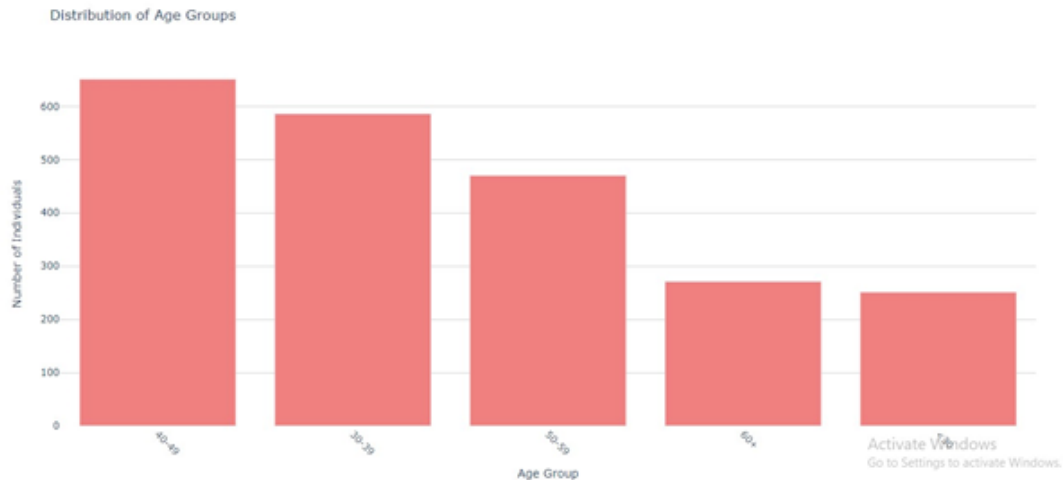
## [24 rows x 8 columns]

1. **Age Distribution:** • The mean birth year is approximately 1969, indicating that the average age of customers is around 53 years. • The youngest customer was born in 1996, while the oldest was born in
2. **Income Distribution:** • The mean income is around \$52,247, with a wide range of incomes from \$8,787 to \$666,666. • There are missing values in the income column since the count is less than the total count of observations (2216 instead of 2240).
3. **Household Composition:** • On average, customers have around 0.44 kids at home and 0.51 teenagers at home. • Some customers have up to 2 kids and up to 2 teenagers at home.
4. **Purchase Behavior:** • Customers have varying levels of engagement with different product categories, as indicated by the mean and maximum spending on wines, fruits, meat products, fish products, sweet products, and gold products. • The number of deals purchases ranges from 0 to 15, with an average of approximately 2.33 deals purchases per customer.
5. **Channel Engagement:** • Customers make an average of 4.08 web purchases, 2.66 catalog purchases, and 5.79 store purchases. • On average, customers visit the website approximately 5.32 times per month.
6. **Campaign Response:** • The response rates to various marketing campaigns (AcceptedCmp1 to AcceptedCmp5, Response) are relatively low, with mean values ranging from 0.013 to 0.149.
7. **Customer Complaints:** • The complain rate is very low, with an average of approximately 0.009375, indicating that most customers do not file complaints. These insights provide a snapshot of the demographics, purchasing behavior, channel engagement, campaign response, and customer satisfaction within the dataset. They can guide further analysis and decision-making in marketing strategies and customer relationship management.

## 5.2 Insights Derived

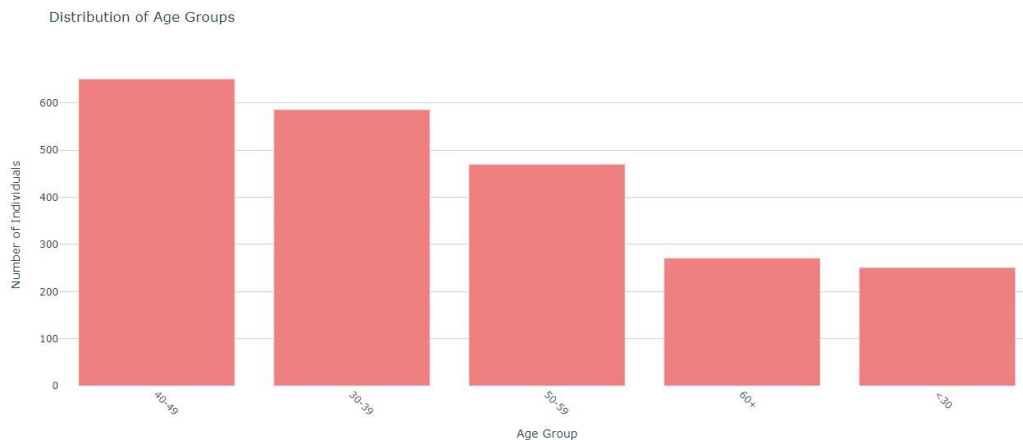
### 5.2.1 Uni-variate Analysis

#### 1. Distribution of Customer Education Levels



- **Graduation:** This is the most common education level among customers, with 1,124 individuals falling into this category. Graduates often constitute a significant portion of the customer base due to their likely higher income levels and purchasing power.
- **PhD:** The presence of 481 customers with a PhD suggests a segment of highly educated individuals within the customer base. Customers with PhDs may have specific preferences and behaviors that could influence their purchasing decisions.
- **Master:** There are 369 customers with a Master's degree. This group represents individuals with advanced education, often associated with higher levels of income and potentially different spending patterns compared to those with lower education levels.
- **2n Cycle:** With 202 customers falling into the "2n Cycle" category, these individuals likely possess a second-cycle degree or a postgraduate degree, indicating a higher level of education and potentially higher income.
- **Basic:** A smaller group of 54 customers has a basic education level. Customers in this category may have different spending patterns compared to those with higher education levels.

## 2. Distribution of Customer Age:



- Distribution of Age Groups:
  - The dataset is segmented into five age groups: <30, 30-39, 40-49, 50-59, and 60+.
  - The largest age group is 40-49, comprising 651 individuals, indicating that Maven Marketing's customer base primarily consists of middle-aged individuals.
  - The smallest age group is <30, with 251 individuals, suggesting a relatively smaller proportion of younger customers in the dataset.
- Age Distribution Trends:
  - There is a gradual increase in the number of customers as age increases from younger to older age groups, peaking in the 40-49 age group and declining slightly in the 60+ age group.
  - This trend aligns with general demographic patterns, where the middle-aged population tends to represent a significant portion of consumers.
- Marketing Strategy Implications:
  - Understanding the age distribution of customers can inform targeted marketing strategies tailored to different age segments.
  - For example, Maven Marketing may focus on product offerings, messaging, and communication channels that resonate with the preferences and lifestyles of middle-aged customers, who constitute the majority of their customer base.
- Customer Lifetime Value Considerations:

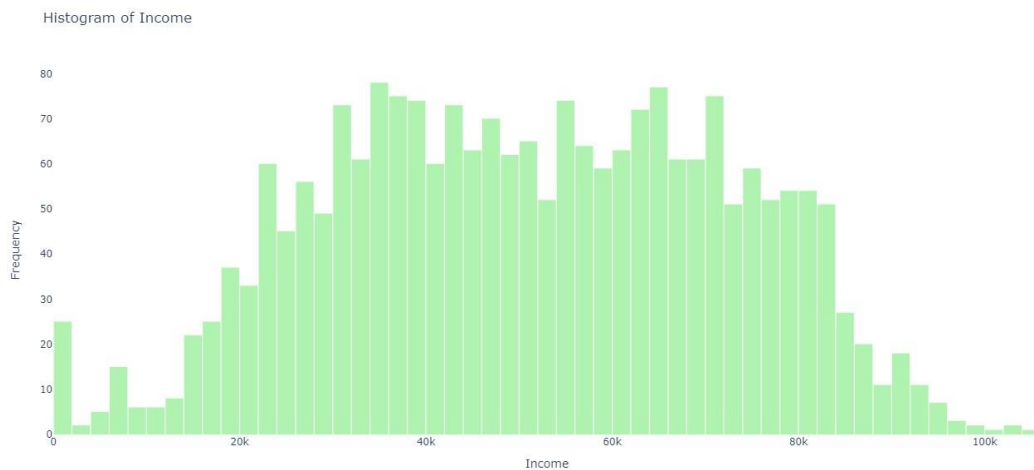
- Middle-aged customers in the 40-49 and 50-59 age groups may have higher purchasing power and longer customer lifetime value compared to younger age groups.
- Maven Marketing could prioritize customer retention strategies and loyalty programs to capitalize on the potential lifetime value of these segments.
- Opportunities for Expansion:
  - While the dataset shows a significant presence of middle-aged customers, there may be opportunities for Maven Marketing to explore strategies to attract and engage younger customers (<30 and 30-39 age groups).
  - Implementing targeted campaigns or product offerings tailored to the preferences and needs of younger demographics could help expand Maven Marketing's customer base and foster long-term growth.

### **3. Distribution of Customers Marital Status**

- Predominant Marital Status:
  - The most common marital status among customers in the dataset is "Married," with a count of 861 individuals.
  - Following "Married," the next most prevalent categories are "Together" (576 individuals) and "Single" (478 individuals).
- Less Common Marital Status Categories:
  - Other marital status categories such as "Divorced" (230 individuals) and "Widow" (77 individuals) also have notable representation but are less frequent compared to "Married," "Together," and "Single."
- Unusual or Sparse Categories:
  - There are some unusual or less conventional marital status categories listed, such as "YOLO," "Alone," and "Absurd," each with very few individuals (ranging from 2 to 3).
  - These categories may represent unconventional or potentially erroneous entries in the dataset that could require further investigation or cleaning for data quality purposes.
- Marketing and Customer Engagement Considerations:
  - Understanding the distribution of marital status categories can inform targeted marketing strategies and customer engagement tactics.

- For example, marketing campaigns and product offerings may be tailored to appeal to specific marital status groups based on their unique preferences and needs.
- Specialized messaging or promotions could be developed for married couples, singles, or divorced individuals, taking into account their differing lifestyle and purchasing behaviors

#### 4. Distribution of Customer Income



- **Income Distribution:** The data shows a relatively even distribution of income across the bins, with the highest count of individuals in the income range of \$69,528 to \$72,425, with 107 individuals each. This suggests a diverse customer base in terms of income levels.
- **High-Income Individuals:** There are notable numbers of individuals in the higher income brackets, with 82 individuals earning between \$78,219 and \$81,116, and 78 individuals earning between \$75,322 and \$78,219 annually. This indicates a substantial portion of the customer base with higher purchasing power.
- **Middle-Income Individuals:** The income bins between \$52,146 and \$69,528 also have relatively high counts, indicating a significant portion of the customer base falling into the middle-income range.
- **Low-Income Individuals:** While fewer in number, there are still individuals with lower incomes represented in the data, with 26 individuals reporting an income of \$0 annually.
- **Even Distribution:** Overall, the distribution of income across the bins seems fairly balanced, with no extreme skew towards any particular income range. This suggests that Maven Marketing's customer base is diverse in terms of income levels, which can



provide opportunities for targeting different segments with tailored marketing strategies and product offerings.

## **5. Distribution of Customer Recency**

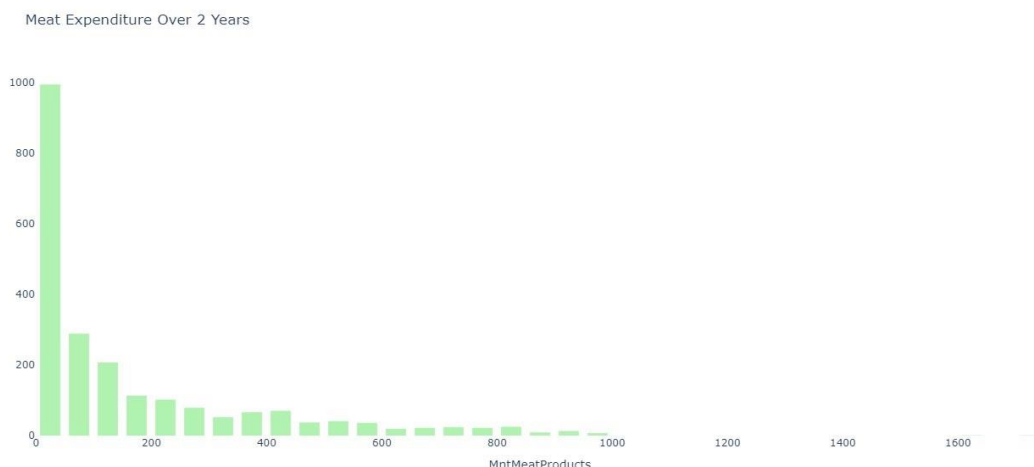
- The majority of customers (172) made a purchase very recently (within the last 6 days), suggesting a high level of recent engagement with the company.
- There's a significant drop in customer counts as recency increases, with the lowest count (37 customers) observed at 97 days since the last purchase.
- Customer Engagement Analysis:
  - The data indicates that a considerable portion of customers are active and making purchases frequently (within the last month), as evidenced by the higher counts in the lower recency bins (e.g., 0-6 days).
- Segmentation for Targeting:
  - Customers within the 0-6 day recency bin represent a valuable segment for targeted marketing or promotions, as they have recently engaged with the company and are likely receptive to further offers or campaigns.
  - Customers in higher recency bins (e.g., 85-97 days) might require specific re-engagement strategies to bring them back to the purchasing cycle.
- Customer Retention Insights:
  - The decline in customer counts as recency increases underscores the importance of customer retention efforts. Understanding why customers become less active or disengaged over time can inform strategies to improve retention rates.
- Impact on Campaign Targeting:
  - Campaigns and promotions can be tailored based on recency segments. For instance, customers with shorter recency (0-6 days) might respond better to immediate, time-sensitive offers, whereas those with longer recency may require different messaging or incentives.

## **6. Distribution of Wine Products**

- Distribution of Wine Expenditure:
  - The majority of customers (765) did not spend any amount on wine during the specified period, indicating a significant portion of the customer base may not be interested in purchasing wine products.

- As the spending on wines increases (moving from lower to higher bins), the number of customers generally decreases, suggesting that higher levels of wine expenditure are less common among customers.
- Identifying Wine Enthusiasts:
  - Customers in the higher spending bins (e.g., 204-1,479) represent a smaller but potentially valuable segment of wine enthusiasts who are willing to invest more in wine products.
  - Targeted marketing campaigns focused on wine-related offerings or promotions can be directed towards these higher-spending segments.
- Market Potential and Strategy:
  - The presence of a large number of customers (765) who did not spend on wines highlights an opportunity to explore strategies to encourage wine purchases among this segment, such as introducing new wine products or targeted incentives.

## 7. Distribution of Meat Expenditure



- The majority of customers (1,097) did not spend any amount on meat products during the specified period, indicating a significant portion of the customer base may not prioritize meat purchases.
- As spending on meat products increases (moving from lower to higher bins), the number of customers generally decreases, with the smallest count observed at the highest expenditure bin (1,690), suggesting that high levels of meat expenditure are less common among customers.
- Identifying Meat Enthusiasts:
  - Customers in the higher spending bins (e.g., 130-1,690) represent a smaller segment of meat enthusiasts who are willing to invest more in meat products.

- Targeted marketing campaigns focused on meat-related offerings or promotions can be directed towards these higher-spending segments to maximize engagement and sales.
- **Market Potential and Strategy:**
- The presence of a large number of customers (1,097) who did not spend on meat products highlights an opportunity to explore strategies to encourage meat purchases among this segment. This could involve introducing new meat products, highlighting promotions, or tailoring marketing messages to showcase the value of meat products.
- **Segmentation for Product Development:**
- Understanding the distribution of meat expenditure can guide product development efforts. For example, if a significant number of customers fall into lower spending bins, there may be a need to introduce more affordable or appealing meat options to cater to different budget preferences.
- **Effectiveness of Meat Campaigns:**
- Campaigns related to meat products can be evaluated based on customer response and engagement levels within each spending bin. Analyzing customer behavior across different expenditure levels can provide insights into which campaigns resonate best with specific segments of meat purchasers.

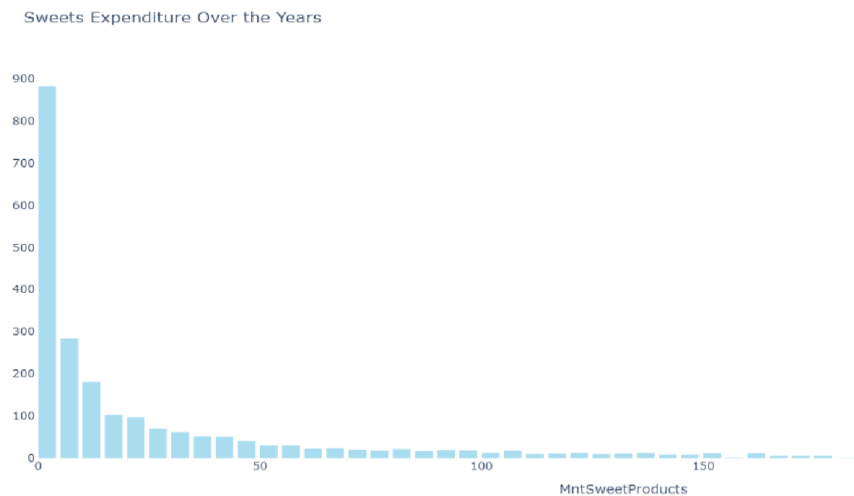
## **8. Distribution of Fish Products**

- **Distribution of Fish Expenditure:**
- The majority of customers (1,182) did not spend any amount on fish products during the specified period, indicating that fish purchases are less common among the customer base.
- As spending on fish products increases (moving from lower to higher bins), the number of customers generally decreases, with the smallest count observed at the highest expenditure bin (255), suggesting that high levels of fish expenditure are relatively uncommon.
- **Identifying Fish Enthusiasts:**
- Customers in the higher spending bins (e.g., 27-255) represent a smaller segment of fish enthusiasts who are willing to invest more in fish products.
- Targeted marketing campaigns focused on fish-related offerings or promotions can be directed towards these higher-spending segments to maximize engagement and sales.
- **Market Potential and Strategy:**
- The presence of a large number of customers (1,182) who did not spend on fish products highlights an opportunity to explore strategies to encourage fish purchases among this

segment. This could involve introducing new fish products, highlighting promotions, or tailoring marketing messages to showcase the value of fish products.

- Segmentation for Product Development:
  - Understanding the distribution of fish expenditure can guide product development efforts. For example, if a significant number of customers fall into lower spending bins, there may be a need to introduce more appealing fish options or address potential barriers to fish purchases (e.g., pricing, availability).

## 9. Distribution of Sweet Products over 2 years



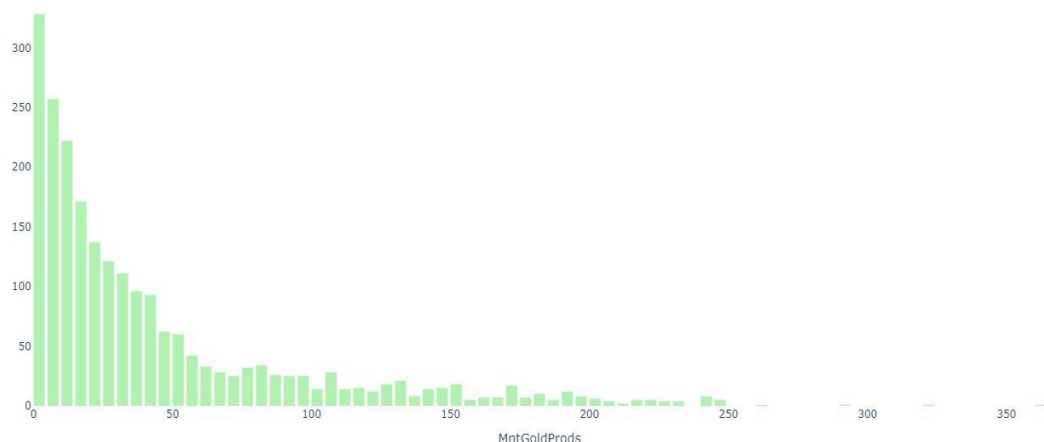
- Distribution of Sweet Expenditure:
  - The majority of customers (1,306) did not spend any amount on sweet products during the specified period, indicating that sweet purchases are less common among the customer base.
  - As spending on sweet products increases (moving from lower to higher bins), the number of customers generally decreases, with the smallest count observed at the highest expenditure bin (262), suggesting that high levels of sweet expenditure are relatively uncommon.
- Identifying Sweet Enthusiasts:
  - Customers in the higher spending bins (e.g., 14-262) represent a smaller segment of sweet enthusiasts who are willing to invest more in sweet products.
  - Targeted marketing campaigns focused on sweet-related offerings or promotions can be directed towards these higher-spending segments to maximize engagement and sales.
- Market Potential and Strategy:
  - The presence of a large number of customers (1,306) who did not spend on sweet products highlights an opportunity to explore strategies to encourage sweet purchases among this

segment. This could involve introducing new sweet products, highlighting promotions, or tailoring marketing messages to showcase the value of sweet products.

- Segmentation for Product Development:
  - Understanding the distribution of sweet expenditure can guide product development efforts. For example, if a significant number of customers fall into lower spending bins, there may be a need to introduce more appealing sweet options or address potential barriers to sweet purchases (e.g., pricing, variety).
- Effectiveness of Sweet Campaigns:
  - Campaigns related to sweet products can be evaluated based on customer response and engagement levels within each spending bin. Analyzing customer behavior across different expenditure levels can provide insights into which campaigns resonate best with specific segments of sweet purchasers.

## 10. Distribution of Gold Products

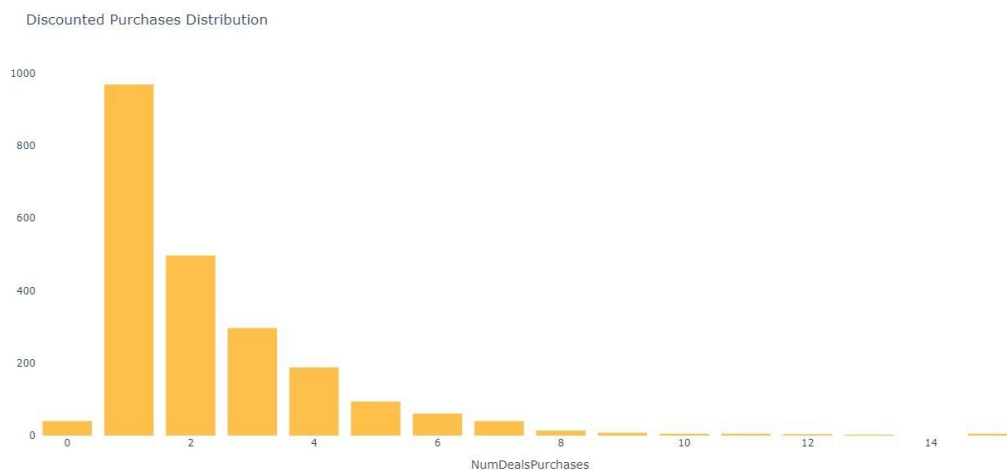
Gold Expenditure Over the Years



- Distribution of Gold Expenditure:
  - The majority of customers (922) did not spend any amount on gold products during the specified period, indicating that gold purchases are relatively uncommon among the customer base.
  - As spending on gold products increases (moving from lower to higher bins), the number of customers generally decreases, with the smallest count observed at the highest expenditure bin (350), suggesting that high levels of gold expenditure are rare among customers.
- Identifying Gold Enthusiasts:

- Customers in the higher spending bins (e.g., 18-350) represent a smaller segment of gold enthusiasts who are willing to invest more in gold products.
- Targeted marketing campaigns focused on gold-related offerings or promotions can be directed towards these higher-spending segments to maximize engagement and sales.
- **Market Potential and Strategy:**
  - The presence of a large number of customers (922) who did not spend on gold products highlights an opportunity to explore strategies to encourage gold purchases among this segment. This could involve introducing new gold products, highlighting promotions, or tailoring marketing messages to showcase the value of gold products.

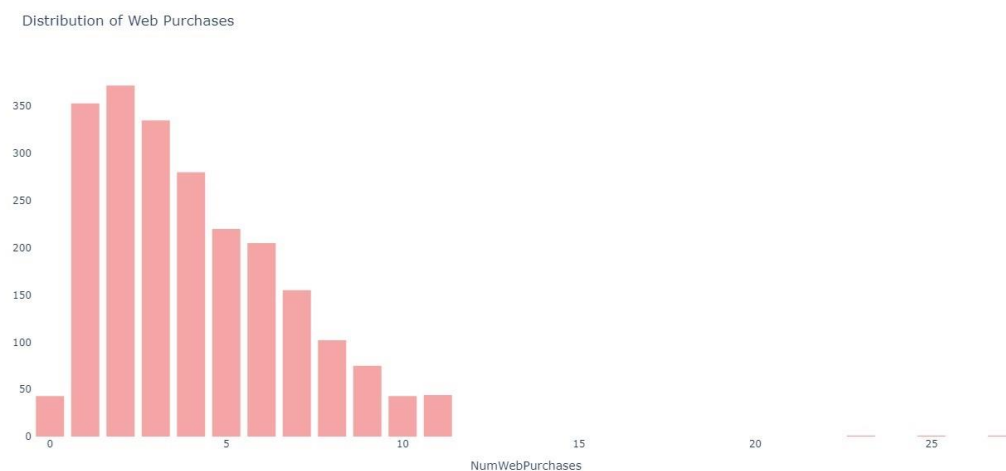
## 11. Distribution of Deals



- The majority of customers (1,009) did not make any purchases with a discount during the specified period, indicating that a significant portion of the customer base may not heavily prioritize or actively seek out discount offers.
- As the number of deals purchases increases (moving from lower to higher bins), the count of customers generally decreases, with the smallest count observed at the highest discount purchase bin (14), suggesting that high levels of discount purchases are less common among customers.
- **Identifying Deal-Seekers:**
  - Customers in the higher discount purchase bins (e.g., 2-14) represent a smaller segment of deal-seekers who are more inclined to make purchases when discounts are available.
  - Targeted marketing campaigns focused on discount offerings or promotions can be directed towards these deal-seeking segments to maximize engagement and sales.

- **Market Potential and Strategy:**
  - The presence of a large number of customers (1,009) who did not make discount purchases highlights an opportunity to explore strategies to incentivize discount utilization among this segment. This could involve introducing compelling discount offers, promoting limited-time deals, or emphasizing the value of discounted purchases.
- **Segmentation for Promotion Targeting:**
  - Understanding the distribution of discount purchases can guide promotion targeting efforts. For example, if a significant number of customers fall into lower discount purchase bins, there may be a need to create more appealing discount offers or tailor promotions to different customer segments based on their propensity for deal-seeking.
- **Effectiveness of Discount Campaigns:**
  - Campaigns related to discount offers can be evaluated based on customer response and engagement levels within each discount purchase bin. Analyzing customer behavior across different discount levels can provide insights into which campaigns resonate best with specific segments of discount purchasers.

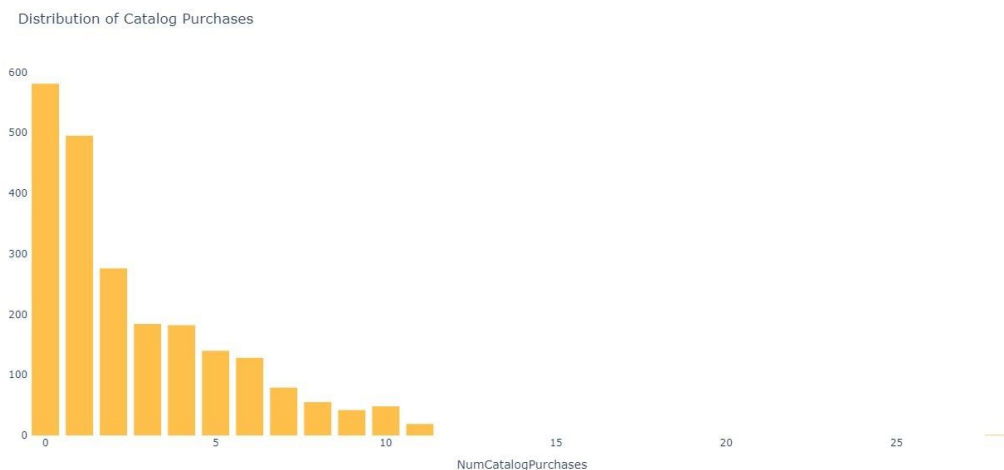
## 12. Distribution of Web Purchases



- The majority of customers (1,103) did not make any purchases through the company's website during the specified period, indicating that a significant portion of the customer base may not prefer online shopping or may use other channels for purchases.
- As the number of web purchases increases (moving from lower to higher bins), the count of customers generally decreases, with the smallest count observed at the highest web purchase bin (27), suggesting that high levels of online purchasing are less common among customers.

- Identifying Online Shoppers:
  - Customers in the higher web purchase bins (e.g., 4-27) represent a smaller segment of online shoppers who are more inclined to make purchases through the company's website.
  - Targeted marketing campaigns focused on online offerings or promotions can be directed towards these online shopping segments to maximize engagement and sales.
- Market Potential and Strategy:
  - The presence of a large number of customers (1,103) who did not make web purchases highlights an opportunity to explore strategies to incentivize online shopping among this segment. This could involve improving the online shopping experience, offering exclusive online promotions, or emphasizing the convenience and benefits of online purchases.

### 13. Distribution of Catalog Purchases:

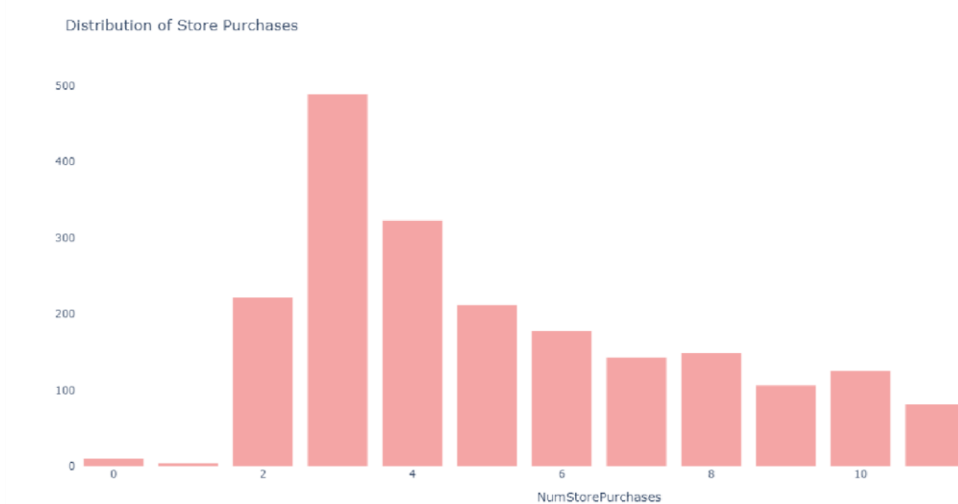


- The majority of customers (1,536) did not make any purchases using a catalog during the specified period, indicating that catalog purchases are less common among the customer base.
  - As the number of catalog purchases increases (moving from lower to higher bins), the count of customers generally decreases, with the smallest count observed at the highest catalog purchase bin (28), suggesting that high levels of catalog-based purchasing are relatively rare among customers.
- Identifying Catalog Shoppers:
    - Customers in the higher catalog purchase bins (e.g., 4-28) represent a smaller segment of catalog shoppers who prefer to make purchases using catalogs.



- Targeted marketing campaigns focused on catalog-based offerings or promotions can be directed towards these catalog shopping segments to maximize engagement and sales.
- Market Potential and Strategy:
  - The presence of a large number of customers (1,536) who did not make catalog purchases highlights an opportunity to explore strategies to incentivize catalog shopping among this segment. This could involve showcasing the benefits of catalog purchases, offering exclusive catalog promotions, or improving the catalog browsing experience.

#### 14. Distribution of Store Purchases



- The majority of customers (14) did not make any purchases directly in stores during the specified period, indicating that store-based purchases are less common among the customer base.
- As the number of store purchases increases (moving from lower to higher bins), the count of customers generally increases, with the highest count observed at the lowest store purchase bin (12), suggesting that a significant portion of customers prefer making a moderate number of purchases in-store.

##### A. Identifying Offline Shoppers:

- Customers in the higher store purchase bins (e.g., 2-12) represent a segment of customers who prefer to make purchases directly in stores.
- Targeted marketing campaigns focused on in-store offerings or promotions can be directed towards these offline shopping segments to maximize engagement and sales.

b. Market Potential and Strategy:

- The presence of customers who made moderate to higher levels of store purchases (e.g., 2-12) highlights an opportunity to leverage offline shopping preferences among certain segments.
- Strategies could include optimizing store layouts, improving customer service in-store, and offering exclusive in-store promotions to enhance the offline shopping experience.

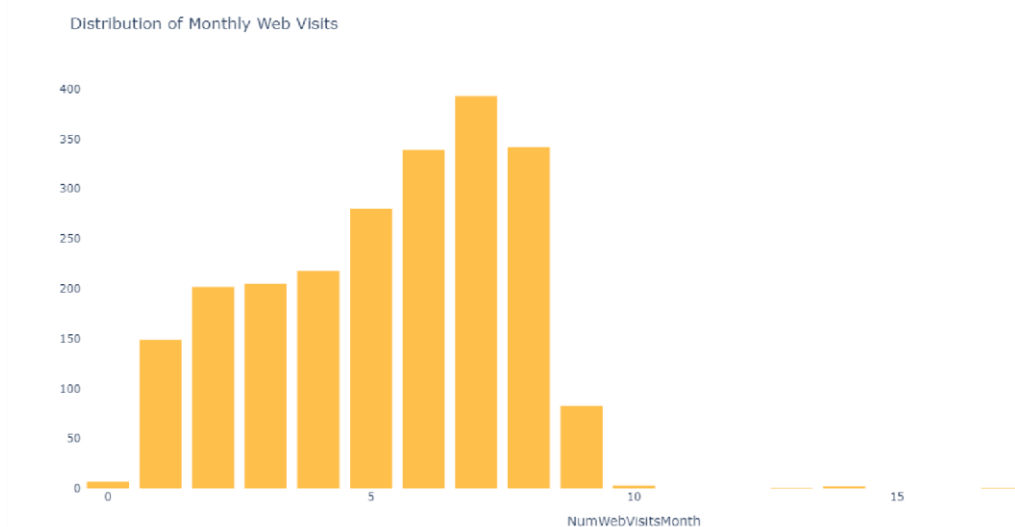
c. Segmentation for Offline Marketing:

- Understanding the distribution of store purchases can guide offline marketing efforts. For example, if a significant number of customers fall into specific store purchase bins (e.g., 4-5), efforts can be made to enhance engagement and loyalty among these customers through targeted offline marketing strategies.

d. Effectiveness of Store Campaigns:

- Campaigns related to store purchases can be evaluated based on customer response and engagement levels within each store purchase bin. Analyzing customer behavior across different store purchase levels can provide insights into which store campaigns resonate best with specific segments of offline shoppers.

16. Distribution of Web Visits



- The majority of customers (1,074) made 5 visits to the company’s website in the last month, indicating that this is a common level of engagement among the customer base.
- As the number of web visits decreases (moving from higher to lower bins), the count of customers generally decreases, with the lowest count observed at the lowest web visit bin (0), suggesting that a significant portion of customers may not visit the website frequently.

a. Identifying Engaged Customers:

- Customers in the higher web visit bins (e.g., 3-19) represent a segment of highly engaged customers who visit the company's website more frequently.
- Targeted marketing campaigns or personalized content can be directed towards these highly engaged segments to deepen engagement and encourage conversion.

b. Market Potential and Strategy:

- The presence of customers who make multiple web visits (e.g., 3-19) indicates potential for optimizing online experiences and driving conversions through strategic website engagement.
- Strategies could include improving website usability, implementing personalized content recommendations, and offering exclusive online incentives to enhance the online customer journey.

**17. Distribution of customer response**

• Response Distribution:

- The majority of customers (1,896) did not respond to the last campaign (Response = 0), indicating a low overall response rate.
- A smaller number of customers (334) responded positively to the last campaign (Response = 1), representing a segment of engaged customers who were receptive to the campaign message or offer.

• Campaign Effectiveness:

- The low response rate (334 out of 2,230 customers) suggests that the last campaign may not have resonated well with the majority of the customer base.
- Analyzing customer characteristics and behaviors associated with positive responses (Response = 1) can provide insights into factors driving campaign success and areas for improvement.

• Identifying Responsive Customers:

- Customers who responded positively to the campaign (Response = 1) represent a valuable segment for future targeted campaigns and personalized outreach.

- Understanding the preferences and behaviors of responsive customers can inform segmentation strategies and help tailor marketing efforts to maximize engagement and conversion.
- Campaign Optimization:
  - Insights from customer response data can guide campaign optimization efforts. For example, analyzing response patterns across different customer segments can help identify which messages, offers, or channels are most effective in driving customer action.
- Improving Campaign ROI:
  - By leveraging insights from customer response data, Maven Marketing can optimize future campaigns to improve ROI and maximize customer engagement. This includes refining targeting strategies, enhancing message relevance, and selecting the most effective channels based on customer responsiveness.

## **18. Distribution of Customer Complaints**

- Complaint Distribution:
  - A small number of customers (20) made complaints within the specified period (Complain = 1), indicating a relatively low incidence of customer dissatisfaction or issues.
  - The majority of customers (2,210) did not file any complaints (Complain = 0), suggesting a generally satisfactory experience among the customer base.
- Customer Satisfaction:
  - The low number of complaints (20 out of 2,230 customers) suggests that most customers are satisfied with Maven Marketing's products, services, or interactions.
  - Understanding the nature and reasons behind complaints can provide insights into specific areas of improvement or potential pain points experienced by customers.
- Identifying Critical Issues:
  - Analyzing complaint data can help identify critical issues or recurring problems that require immediate attention and resolution.
  - Addressing customer concerns promptly and effectively can help enhance overall satisfaction and loyalty.
- Improving Customer Experience:

- Insights from complaint data can guide efforts to improve customer experience and service delivery. For example, addressing common complaints, refining processes, or enhancing communication channels can contribute to a more positive customer interaction.
- Customer Relationship Management:
  - Proactively addressing complaints and resolving issues can strengthen customer relationships and foster long-term loyalty.
  - Leveraging complaint data to personalize interactions and tailor solutions to individual customer needs can contribute to a positive customer experience.

#### 19. **Distribution of Total Purchases:**

- The majority of customers (624) did not make any purchases within the specified period (Total Purchases = 0), indicating a substantial portion of inactive or non-purchasing customers within the dataset.
- As the total purchases increase (moving from lower to higher bins), the count of customers generally decreases, with the highest counts observed at mid-range purchase levels (e.g., 80, 160, 240), suggesting that moderate levels of purchasing are more common among customers.
- Identifying Active Customers:
  - Customers in the higher total purchase bins (e.g., 160-2,480) represent a segment of active customers who have made significant purchases within the specified period.
  - Targeted marketing campaigns or loyalty programs can be directed towards these active customer segments to enhance retention and maximize customer lifetime value.
- Market Potential and Strategy:
  - The presence of a large number of non-purchasing customers (624) highlights opportunities to re-engage and convert these customers through targeted marketing efforts or incentives.
  - Understanding customer preferences and barriers to purchase can inform strategies aimed at increasing conversion rates and driving incremental sales.
- Segmentation for Targeting:

- Understanding the distribution of total purchases can guide customer segmentation strategies. For example, customers who fall into specific purchase bins (e.g., 240-1,280) may have distinct preferences or behaviors that can be leveraged for more personalized marketing approaches.
- Effectiveness of Retention Efforts:
- Analyzing customer behavior based on total purchases can provide insights into the effectiveness of retention efforts and customer loyalty initiatives.
- Evaluating repeat purchase rates and customer engagement levels can inform strategies to strengthen relationships and foster repeat business.

## 20. Distribution of Teenhome

- The majority of customers (1,150) have no teenagers in their household (Teenhome = 0), indicating that a significant portion of the customer base consists of households without teenagers.
- A smaller number of customers (1,028) have one teenager in their household (Teenhome = 1), representing a distinct segment of households with teenage members.
- An even smaller subset of customers (52) have two teenagers in their household (Teenhome = 2), indicating a niche segment of customers with multiple teenagers.
- Household Composition Insights:
- Understanding household composition based on the number of teenagers can inform marketing strategies and product offerings targeted towards different family dynamics.
- For households with teenagers (Teenhome = 1 or 2), considerations may include products or services that appeal to teenage interests or family-oriented offerings.
- Market Potential and Targeting:
- The presence of households with teenagers presents opportunities to explore market segments related to family-oriented products or services tailored to teenage needs and preferences.
- Targeted marketing campaigns can be designed to resonate with households based on their specific composition and demographic characteristics.

## 21. **Distribution of Kidhome:**

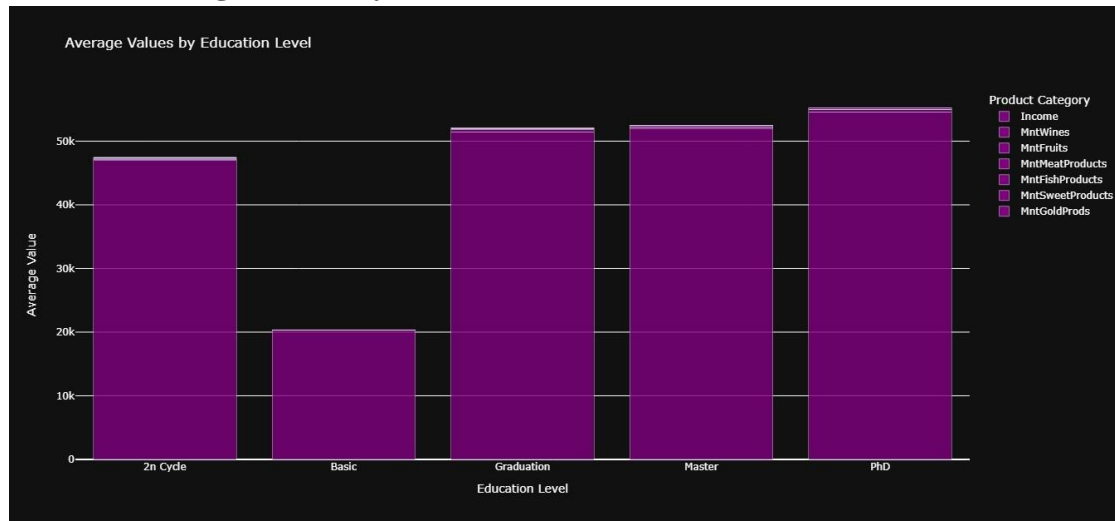
- The majority of customers (1,287) have no children in their household (Kidhome = 0), indicating that a significant portion of the customer base consists of households without children.
- A substantial number of customers (895) have one child in their household (Kidhome = 1), representing a distinct segment of households with single-child families.
- A smaller subset of customers (48) have two children in their household (Kidhome = 2), indicating a niche segment of customers with multiple children.
- **Household Demographics Insights:**
  - Understanding household demographics based on the number of children can inform marketing strategies and product offerings targeted towards different family dynamics.
  - For households with children (Kidhome = 1 or 2), considerations may include products or services that appeal to families and cater to children's needs.
- **Market Potential and Targeting:**
  - The presence of households with children presents opportunities to explore market segments related to family-oriented products or services tailored to family needs.
  - Targeted marketing campaigns can be designed to resonate with households based on their specific composition and demographic characteristics.
- **Segmentation for Family-Oriented Products:**
  - Household composition data (e.g., Kidhome) can be used to segment the customer base for targeted product development and marketing strategies.
  - Tailoring offerings based on household dynamics (e.g., families with children) can enhance product relevance and appeal to specific customer segments.

## 6. Key Findings

### 6.1 Visualizations to Showcase Trends and Patterns

#### 6.1.1 Analyzing Customer Behavior and Market Trends

##### a. Customer Segment Analysis



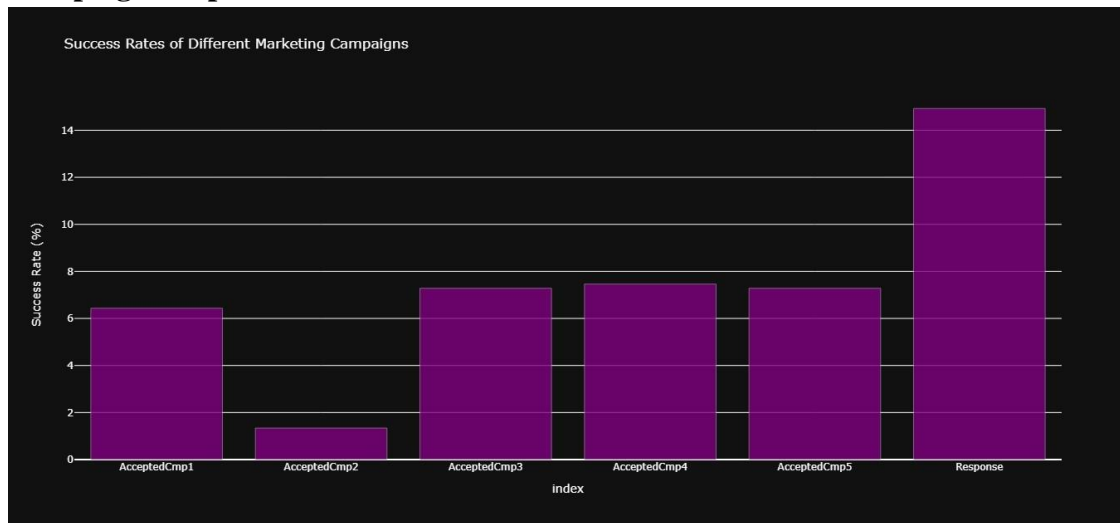
- Education Level and Income:
  - The data shows a range of education levels from Basic to PhD, with corresponding income levels.
  - Generally, higher education levels (PhD, Master, Graduation, 2n Cycle) correspond to higher income levels, which is expected.
- Spending Patterns Across Education Levels:
  - Customers with higher education levels (PhD, Master, Graduation, 2n Cycle) tend to spend more across all product categories compared to those with lower education levels (Basic).
  - For example, customers with a PhD and Master's degree exhibit significantly higher spending across all product categories compared to customers with Basic education.
- Product Category Spending:
  - Across all education levels, the highest spending is observed in categories like Meat Products, Wines, and Fish Products, which are generally higher-ticket food and beverage items.
  - Customers with higher education levels and presumably higher income levels (PhD, Master, Graduation) show substantial spending on these luxury categories (e.g., Wines, Gold Prods).



- Income and Spending Relationships:
  - The data suggests a positive correlation between income and spending across different product categories.
  - Higher income customers (e.g., Graduation, PhD) tend to allocate more budget towards premium items like Wines, Meat Products, and Gold Prods compared to lower income segments.
- Marketing and Targeting Strategies:
  - Understanding spending patterns across education levels and income brackets can inform targeted marketing strategies.
  - Maven Marketing can tailor promotions, offers, and messaging to appeal to different customer segments based on their education level, income, and spending preferences.
- Customer Segmentation:
  - The data allows for segmentation of customers based on education level, income, and spending behavior.
  - Maven Marketing can leverage this segmentation to identify high-value customer segments (e.g., Graduation with high income) for focused acquisition and retention efforts.

In summary, customers with higher education levels (PhD, Master, Graduation) generally have higher incomes and exhibit more significant spending across various product categories, particularly on premium items like Meat Products, Wines, and Gold Products. On the other hand, customers with lower education levels (Basic, 2n Cycle) typically have lower incomes and spend less on luxury items. This analysis helps to identify potential trends and patterns in consumer behavior based on education and income levels.

### c. Campaign Response Rates



### c. Complaints and Responses

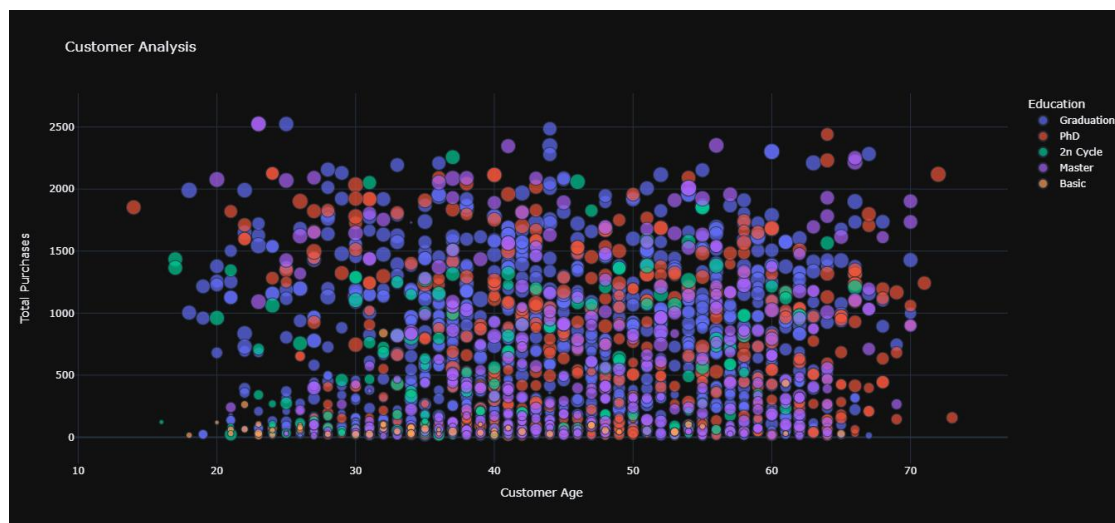
- Complaints vs. Response:
  - Total Complaints: 20
  - Total Positive Responses: 334
- Implication of Complaints on Response:
  - The presence of complaints (20 in total) does not necessarily correlate directly with a negative impact on response to marketing campaigns.
  - Despite the complaints, a considerable number of customers (334) responded positively to the campaigns.
- Customer Engagement and Satisfaction:
  - The data suggests that while some customers may have expressed complaints, the majority of customers still responded positively to the marketing efforts.
  - This indicates that Maven Marketing's campaigns were effective in generating positive responses overall, despite a small number of complaints.

- Areas for Improvement:
  - Maven Marketing can use the complaints received as valuable feedback to identify areas for improvement in products, services, or communication strategies.
  - Addressing and resolving customer complaints promptly and effectively can enhance overall customer satisfaction and loyalty.
- Customer Retention and Relationship Management:
  - Despite complaints, the positive response from a larger group of customers underscores the importance of maintaining strong customer relationships.
  - Maven Marketing should continue to prioritize customer satisfaction and engagement strategies to retain existing customers and attract new ones.

### Insights and Recommendations:

- Proactive Customer Service: Implement proactive customer service measures to address and resolve complaints swiftly, demonstrating responsiveness and care towards customer concerns.
- Continuous Improvement: Use customer feedback from complaints to drive continuous improvement in products, services, and marketing strategies.
- Emphasize Positive Engagement: Focus on strengthening positive engagement with customers through effective marketing campaigns and personalized experiences.

### d. Customer Insight Analysis: Education, Purchases, Recency, Age, and Marital Status



- Education Level Insights:
  - PhD: Customers with a PhD education have the highest total purchases, especially those who are married, followed by those who are single or together.
  - Master's Degree: Customers with a Master's degree also show substantial total purchases, particularly those who are married or together.
  - Graduation (Bachelor's Degree): Graduates have a significant range of total purchases across different marital statuses, with married individuals showing the highest purchases.
  - Basic and 2n Cycle: Customers with lower education levels (Basic and 2n Cycle) generally have lower total purchases compared to higher education levels.
- Marital Status Impact:
  - Married Customers: Across all education levels, married individuals tend to have the highest total purchases, indicating potential household spending patterns.
  - Single and Together: Customers who are single or in a relationship (together) also show substantial total purchases, particularly among those with higher education levels (PhD and Master's).
- Age and Recency Trends:
  - Age Influence: Age varies significantly across education levels and marital statuses, with no clear direct correlation to total purchases.
  - Recency of Purchase: Recency (days since last purchase) varies among different segments, potentially influencing total purchases and customer engagement levels.
- Segmentation and Targeting Opportunities:
  - Targeting High-Value Segments: Focus on married individuals across all education levels, as they consistently demonstrate higher total purchases.
  - Engaging Singles and Those Together: Implement tailored marketing strategies to engage single individuals and those in relationships, especially among higher education groups.
  - Customer Retention and Reactivation: Leverage recency data to target customers who have been inactive (higher recency) with reactivation campaigns to boost repeat purchases.
- Personalization and Campaign Optimization:
  - Use insights from education, marital status, age, and recency to personalize marketing campaigns and offers.

- Test and optimize different messaging and promotions based on customer segments to maximize ROI and customer satisfaction.

#### **e. Country-Level Insights:**

##### **1. Country Distribution:**

- Spain (España):
  - Count: 1,091 customers
  - Spain has the highest representation in the dataset, with a significant number of customers.
- Saudi Arabia (السعودية):
  - Count: 335 customers
  - Saudi Arabia also has a notable presence in the dataset, reflecting a sizeable customer base.
- USA (United States):
  - Count: 108 customers
  - The United States has a moderate number of customers represented in the dataset.
- India:
  - Count: 146 customers
  - India is also represented in the dataset, though with a smaller number compared to Spain and Saudi Arabia.
- Canada:
  - Count: 267 customers
  - Canada has a substantial number of customers in the dataset.
- Australia:
  - Count: 160 customers
  - Australia is also represented, with a noteworthy customer count.
- Germany (Deutschland):

- Count: 120 customers
- Germany has a smaller but still significant presence among the customer base.
  - Mexico:
- Count: 3 customers
- Mexico has a very small representation in the dataset.

## 2. Recency (Days Since Last Purchase):

- Mexico: Mexico has the lowest recency (80 days), indicating more recent customer activity.
- USA and Germany: Customers from the USA and Germany have the shortest recency periods (5,432 and 5,928 days respectively), suggesting potential opportunities for re-engagement and retention efforts.

## 3. Response Rates:

- Spain: Spain also shows the highest response rate (176), reflecting strong customer engagement with marketing campaigns.
- Canada: Canada and Saudi Arabia follow with notable response rates (38 and 52 respective).

## d. Total Purchases (Aggregate Spending):

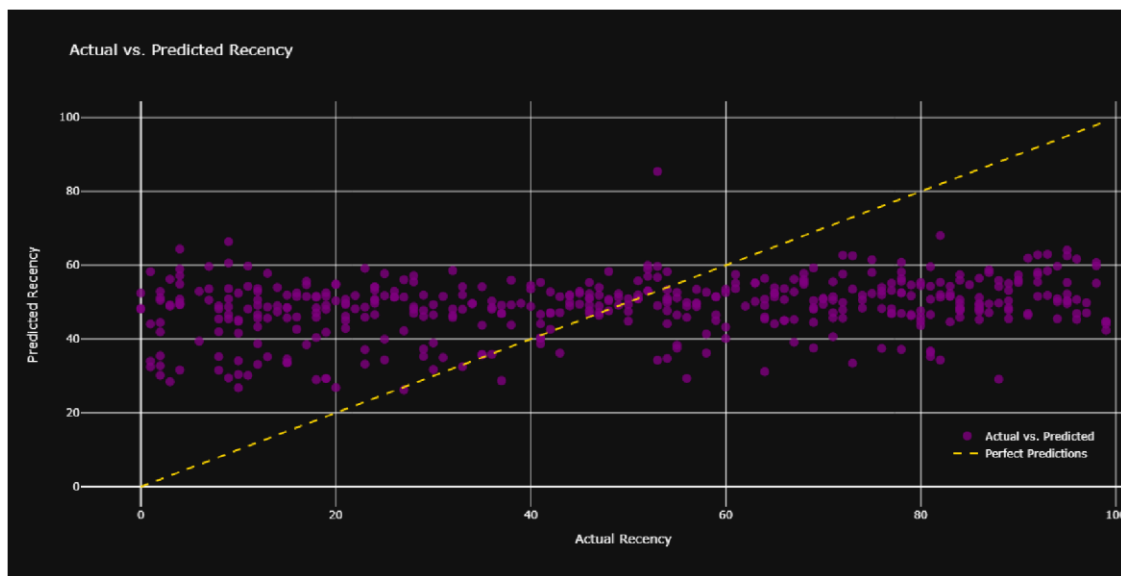
- Spain: Spain leads in total purchases with a significant aggregate spending of 661,771 units.
- Canada: Canada ranks second in total purchases (168,524 units), indicating a substantial market for Maven Marketing.

## 4. Insights and Recommendations:

- Market Focus: Given the high customer count and response rates in Spain, Maven Marketing should continue to prioritize and invest in this market to maximize customer engagement and sales.

- **Opportunities in North America:** The USA, Canada, and Mexico present opportunities for targeted marketing efforts, especially considering the relatively recent recency in Mexico and the sizable customer base in the USA and Canada.
- **International Expansion:** Saudi Arabia, India, and Australia represent markets with potential for growth and increased customer engagement. Maven Marketing can explore tailored strategies to boost response rates and total purchases in these regions.
- **Customer Retention Strategies:** Implement personalized marketing campaigns and retention initiatives, particularly focusing on customers with longer recency periods (e.g., USA, Germany) to encourage repeat purchases and foster customer loyalty.

### 6.1.2 Actual and Predicted Customer Recency



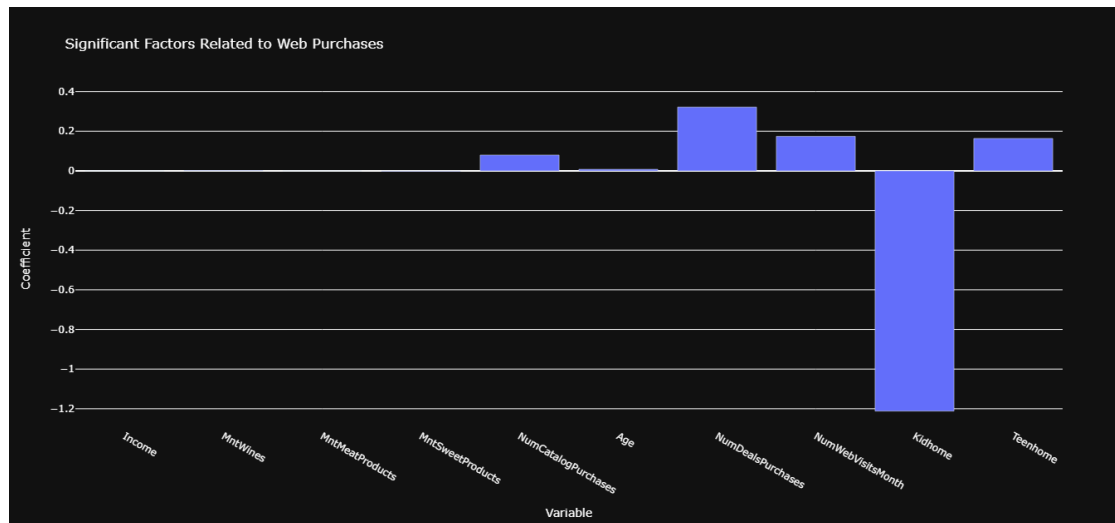
- **Understanding Predicted Recency Values:**
  - The predicted Recency values range from approximately 26 to 85 days, indicating varying levels of customer interaction and activity.
  - Some customers are predicted to have engaged recently (around 26 days), while others have longer durations since their last interaction (around 85 days).
- **Customer Engagement Patterns:**
  - **Low Predicted Recency (Recent Interactions):**

- Customers with lower predicted Recency values represent active and engaged segments.
- Strategies: Target these customers with loyalty rewards, personalized offers, or exclusive promotions to maintain their engagement and encourage repeat purchases.
- High Predicted Recency (Longer Inactivity):
  - Customers with higher predicted Recency values indicate lapsed or less engaged segments.
  - Strategies: Implement reactivation campaigns, special incentives, or targeted outreach to win back these customers and encourage them to make purchases again.
- Segmentation and Targeting Opportunities:
- Use Predicted Recency Values for Segmentation:
  - Segment customers into groups based on their predicted Recency values.
  - Create targeted marketing campaigns tailored to each segment's engagement level.
- Actionable Campaign Ideas:
- Segment-Specific Campaigns:
  - Create campaigns specifically designed for customers with different Recency profiles.
  - For active customers (low Recency), focus on appreciation and loyalty-building efforts.
  - For inactive customers (high Recency), emphasize incentives and compelling offers to reignite their interest.
- Continuous Monitoring and Optimization:
- Regularly monitor customer behavior and adjust strategies based on evolving engagement patterns.
- Continuously optimize segmentation criteria and campaign tactics to maximize effectiveness and ROI.
- Data-Driven Decision Making:
- Leverage predictive analytics and customer insights to inform strategic decisions and resource allocation.



- Use advanced data analysis to refine customer segmentation and targeting strategies over time.

## 6.2 Significant Factors Related to Web Purchases



- Income (Coefficient: 3.14e-05)
  - A higher income level is positively associated with an increase in web purchases, although the coefficient is relatively small.
- Amount Spent on Wines (MntWines) (Coefficient: 0.00180)
  - Customers who spend more on wines are more likely to make web purchases.
- Amount Spent on Meat Products (MntMeatProducts) (Coefficient: -3.85e-05)
  - Spending on meat products has a negligible negative association with web purchases.
- Amount Spent on Sweet Products (MntSweetProducts) (Coefficient: -0.00205)
  - Customers who spend more on sweet products are less likely to make web purchases.
- Number of Catalog Purchases (NumCatalogPurchases) (Coefficient: 0.080)
  - The number of catalog purchases has a strong positive association with web purchases.
- Age (Coefficient: 0.00765)
  - Older customers tend to make more web purchases, although the effect is relatively small.
- Number of Deals Purchases (NumDealsPurchases) (Coefficient: 0.322)
  - Customers who make more purchases with deals/discounts have a strong positive association with web purchases.

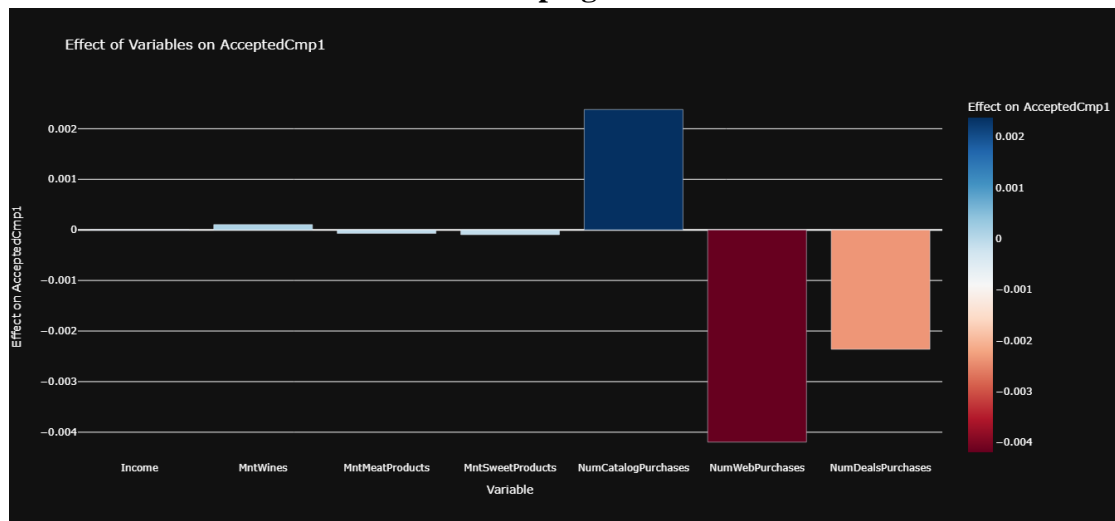
- Number of Web Visits per Month (NumWebVisitsMonth) (Coefficient: 0.174)
- The frequency of web visits per month is positively correlated with web purchases.
- Number of Children at Home (Kidhome) (Coefficient: -1.21)
- Having more children at home (Kidhome) is negatively associated with web purchases.
- Number of Teenagers at Home (Teenhome) (Coefficient: 0.163)
- Having teenagers at home (Teenhome) is positively associated with web purchases.

### Insights and Recommendations:

- Income, spending on wines, and age have relatively minor impacts on web purchases.
- Catalog purchases, deals purchases, and the frequency of web visits strongly drive web purchases.
- Spending on sweet products and the number of children at home have negative impacts on web purchases.

## 6.3 Most Significant Factors Related to Campaign Success

### a. Factors related to the success of campaign 1



- Income (Coefficient: 7.62e-07):
- The coefficient for Income is very small (7.62e-07), indicating a minimal impact on the likelihood of accepting Campaign 1.
- This suggests that income alone has a negligible effect on campaign acceptance for Campaign 1.

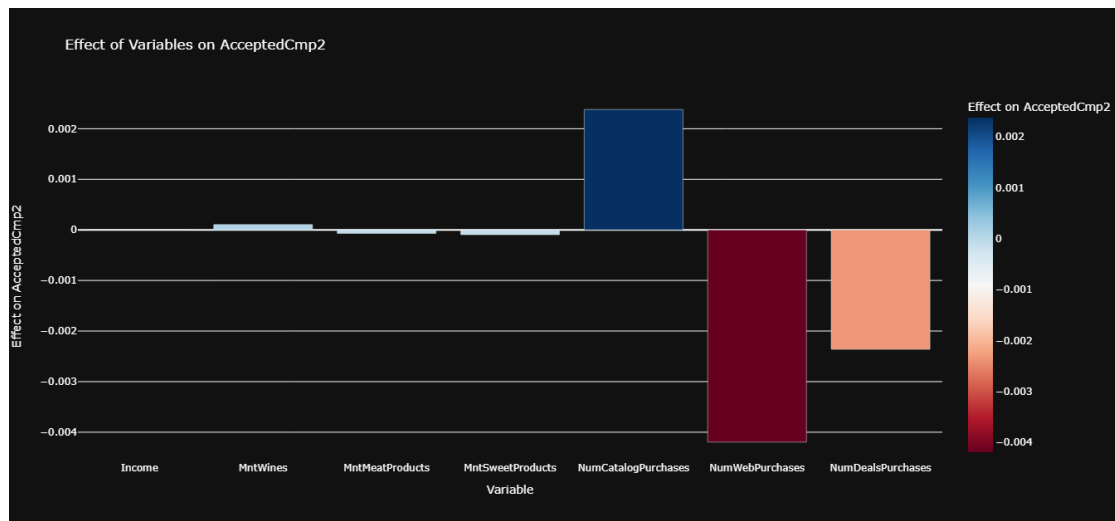
- Amount Spent on Wines (MntWines) (Coefficient: 0.000185):
  - A positive coefficient for MntWines suggests that customers who spend more on wines are slightly more likely to accept Campaign
  - This indicates that wine spending positively influences acceptance of Campaign 1.
- Amount Spent on Meat Products (MntMeatProducts) (Coefficient: 8.16e-05):
  - The coefficient for MntMeatProducts is positive but very small, indicating a slight positive influence on acceptance of Campaign
  - Customers who spend more on meat products are slightly more likely to accept Campaign 1.
- Amount Spent on Sweet Products (MntSweetProducts) (Coefficient: 0.000293):
  - A positive coefficient for MntSweetProducts suggests that customers who spend more on sweet products are more likely to accept Campaign 1.
  - Sweet product spending has a relatively stronger positive influence on campaign acceptance.
- Number of Catalog Purchases (NumCatalogPurchases) (Coefficient: 0.00345):
  - The coefficient for NumCatalogPurchases is notably positive, indicating that customers who make more catalog purchases are significantly more likely to accept Campaign 1.
  - Catalog purchases have a strong positive influence on campaign acceptance.
- Number of Web Purchases (NumWebPurchases) (Coefficient: -0.00538):
  - The negative coefficient for NumWebPurchases suggests that customers who make more web purchases are less likely to accept Campaign 1.
  - This indicates that web purchases have a negative influence on campaign acceptance for Campaign 1.
- Number of Deals Purchases (NumDealsPurchases) (Coefficient: -0.00911):
  - The negative coefficient for NumDealsPurchases indicates that customers who make more purchases with deals/discounts are less likely to accept Campaign 1.
  - Deal purchases have a notable negative influence on campaign acceptance.

### **Insights and Recommendations:**

- Campaign 1 (AcceptedCmp1) acceptance is positively influenced by higher spending on wines, meat products, and especially sweet products.

- Customers who make more catalog purchases are more likely to accept Campaign 1, suggesting that catalog-based marketing could be effective for this campaign.
- Conversely, higher numbers of web purchases and deal purchases negatively impact the acceptance of Campaign 1. Maven Marketing may need to adjust web-based and discount-oriented strategies for this campaign.

#### b. Factors related to campaign 2's success



- Income (Coefficient: 5.93e-08):
  - The coefficient for Income is very small (5.93e-08), indicating a minimal impact on the likelihood of accepting Campaign 2.
  - Income alone has a negligible effect on campaign acceptance for Campaign 2.
- Amount Spent on Wines (MntWines) (Coefficient: 0.000105):

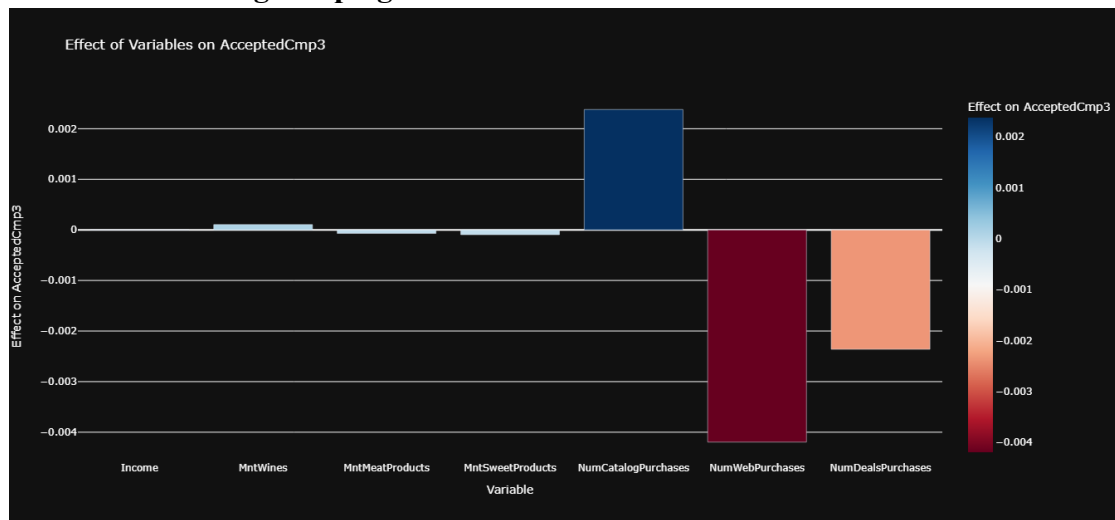
- The positive coefficient for MntWines suggests that customers who spend more on wines are slightly more likely to accept Campaign 2.
- Wine spending has a modest positive influence on campaign acceptance.
  - Amount Spent on Meat Products (MntMeatProducts) (Coefficient: -7.00e-05):
- The negative coefficient for MntMeatProducts indicates that customers who spend more on meat products are less likely to accept Campaign 2.
- Meat product spending has a small negative influence on campaign acceptance.
  - Amount Spent on Sweet Products (MntSweetProducts) (Coefficient: -9.52e-05):
- The negative coefficient for MntSweetProducts suggests that customers who spend more on sweet products are less likely to accept Campaign 2.
- Sweet product spending has a slight negative influence on campaign acceptance.
  - Number of Catalog Purchases (NumCatalogPurchases) (Coefficient: 0.00238):
- The positive coefficient for NumCatalogPurchases indicates that customers who make more catalog purchases are significantly more likely to accept Campaign 2.
- Catalog purchases have a strong positive influence on campaign acceptance.
  - Number of Web Purchases (NumWebPurchases) (Coefficient: -0.00420):
- The negative coefficient for NumWebPurchases suggests that customers who make more web purchases are less likely to accept Campaign 2.
- Web purchases have a notable negative influence on campaign acceptance.
  - Number of Deals Purchases (NumDealsPurchases) (Coefficient: -0.00236):
- The negative coefficient for NumDealsPurchases suggests that customers who make more purchases with deals/discounts are less likely to accept Campaign 2.
- Deal purchases have a negative influence on campaign acceptance.

### **Insights and Recommendations:**

- Campaign 2 (AcceptedCmp2) acceptance is positively influenced by higher catalog purchases.
- Wine spending (MntWines) has a modest positive influence on campaign acceptance.

- Conversely, higher spending on meat products (MntMeatProducts) and sweet products (MntSweetProducts) has a slight negative influence on campaign acceptance.
- Maven Marketing should focus on promoting catalog-based offerings and optimize strategies to mitigate the negative impact of web and deal-based purchases on Campaign 2 acceptance.

### c. Factors affecting campaign 3's success



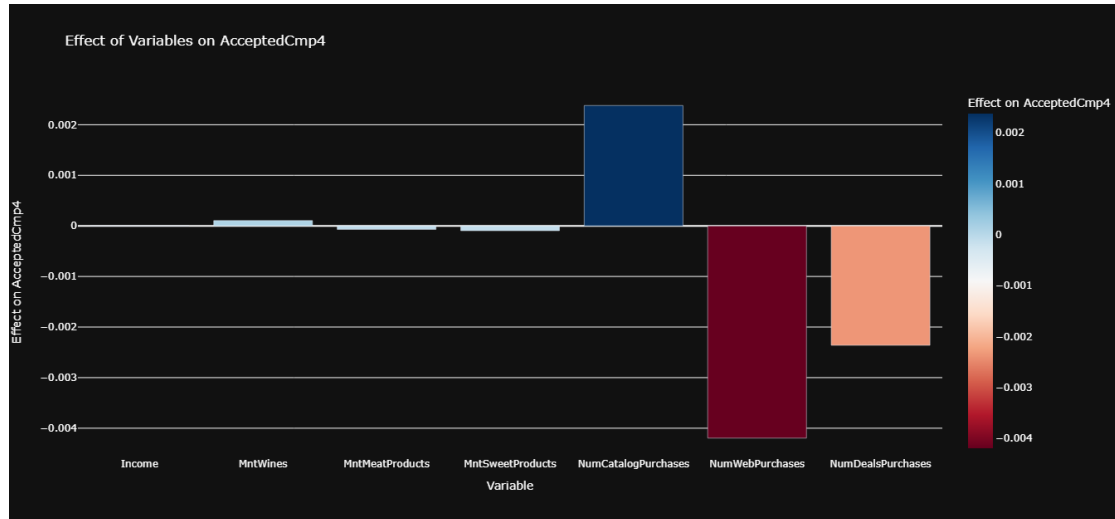
- Income (Coefficient: -2.28e-06):
  - The negative coefficient for Income suggests that higher income levels are associated with a lower likelihood of accepting Campaign 3.
  - Income alone has a negative influence on campaign acceptance for Campaign 3.
- Amount Spent on Wines (MntWines) (Coefficient: 1.47e-05):
  - The positive coefficient for MntWines suggests that customers who spend more on wines are slightly more likely to accept Campaign 3.
  - Wine spending has a small positive influence on campaign acceptance.
- Amount Spent on Meat Products (MntMeatProducts) (Coefficient: -7.58e-05):
  - The negative coefficient for MntMeatProducts indicates that customers who spend more on meat products are less likely to accept Campaign 3.
  - Meat product spending has a negative influence on campaign acceptance.
- Amount Spent on Sweet Products (MntSweetProducts) (Coefficient: -0.000209):

- The negative coefficient for MntSweetProducts suggests that customers who spend more on sweet products are significantly less likely to accept Campaign 3.
- Sweet product spending has a notable negative influence on campaign acceptance.
  - Number of Catalog Purchases (NumCatalogPurchases) (Coefficient: 0.02489):
- The strong positive coefficient for NumCatalogPurchases indicates that customers who make more catalog purchases are significantly more likely to accept Campaign 3.
- Catalog purchases have a strong positive influence on campaign acceptance.
  - Number of Web Purchases (NumWebPurchases) (Coefficient: 0.00460):
- The positive coefficient for NumWebPurchases suggests that customers who make more web purchases are slightly more likely to accept Campaign 3.
- Web purchases have a modest positive influence on campaign acceptance.
  - Number of Deals Purchases (NumDealsPurchases) (Coefficient: -0.00701):
- The negative coefficient for NumDealsPurchases suggests that customers who make more purchases with deals/discounts are less likely to accept Campaign 3.
- Deal purchases have a negative influence on campaign acceptance.

### **Insights and Recommendations:**

- Campaign 3 (AcceptedCmp3) acceptance is strongly influenced by higher catalog purchases and moderately influenced by web purchases.
- Wine spending (MntWines) has a small positive influence on campaign acceptance, while spending on sweet products (MntSweetProducts) has a notable negative influence.
- Higher income levels negatively impact acceptance for Campaign 3, suggesting that this campaign may resonate more with customers from lower income brackets.

#### d. Factors affecting campaign 4's success



- Income (Coefficient: 1.12e-06):
  - The positive coefficient for Income suggests that higher income levels are associated with a slightly higher likelihood of accepting Campaign 4.
  - Income has a very small positive influence on campaign acceptance for Campaign 4.
- Amount Spent on Wines (MntWines) (Coefficient: 0.000409):
  - The positive coefficient for MntWines indicates that customers who spend more on wines are more likely to accept Campaign 4.
  - Wine spending has a notable positive influence on campaign acceptance.
- Amount Spent on Meat Products (MntMeatProducts) (Coefficient: -0.000200):
  - The negative coefficient for MntMeatProducts suggests that customers who spend more on meat products are less likely to accept Campaign 4.
  - Meat product spending has a negative influence on campaign acceptance.
- Amount Spent on Sweet Products (MntSweetProducts) (Coefficient: -0.000525):
  - The negative coefficient for MntSweetProducts suggests that customers who spend more on sweet products are significantly less likely to accept Campaign 4.
  - Sweet product spending has a notable negative influence on campaign acceptance.

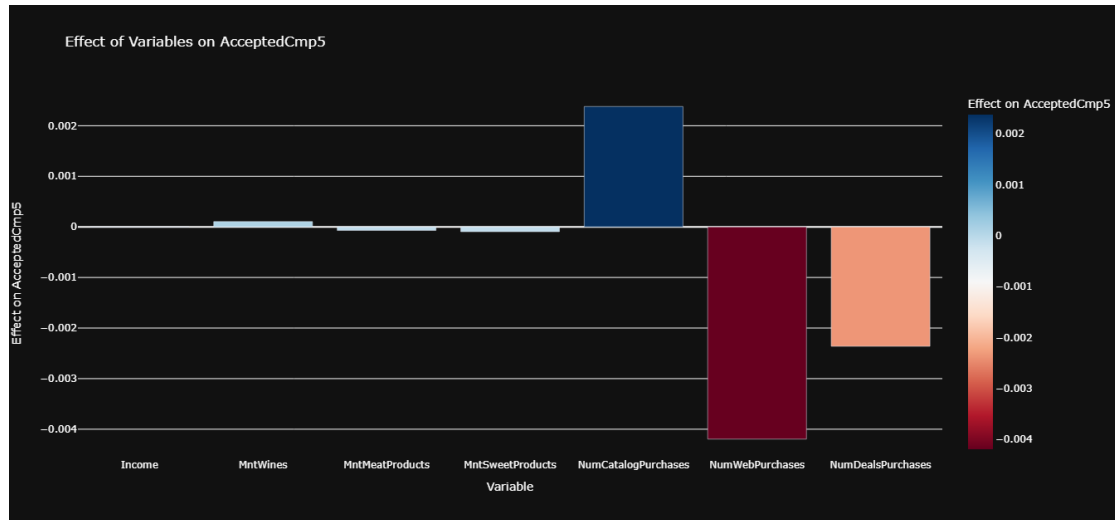


- Number of Catalog Purchases (NumCatalogPurchases) (Coefficient: -0.00653):
  - The negative coefficient for NumCatalogPurchases suggests that customers who make more catalog purchases are less likely to accept Campaign 4.
  - Catalog purchases have a negative influence on campaign acceptance.
- Number of Web Purchases (NumWebPurchases) (Coefficient: -0.00675):
  - The negative coefficient for NumWebPurchases suggests that customers who make more web purchases are less likely to accept Campaign 4.
  - Web purchases have a negative influence on campaign acceptance.
- Number of Deals Purchases (NumDealsPurchases) (Coefficient: 0.00168):
  - The positive coefficient for NumDealsPurchases suggests that customers who make more purchases with deals/discounts are slightly more likely to accept Campaign 4.
  - Deal purchases have a modest positive influence on campaign acceptance.

#### **Insights and Recommendations:**

- Campaign 4 (AcceptedCmp4) acceptance is positively influenced by higher income levels, spending on wines (MntWines), and deals purchases (NumDealsPurchases).
- Conversely, spending on meat products (MntMeatProducts), sweet products (MntSweetProducts), catalog purchases (NumCatalogPurchases), and web purchases (NumWebPurchases) negatively impact campaign acceptance for Campaign 4.

### e. Factors affecting campaign 5's success



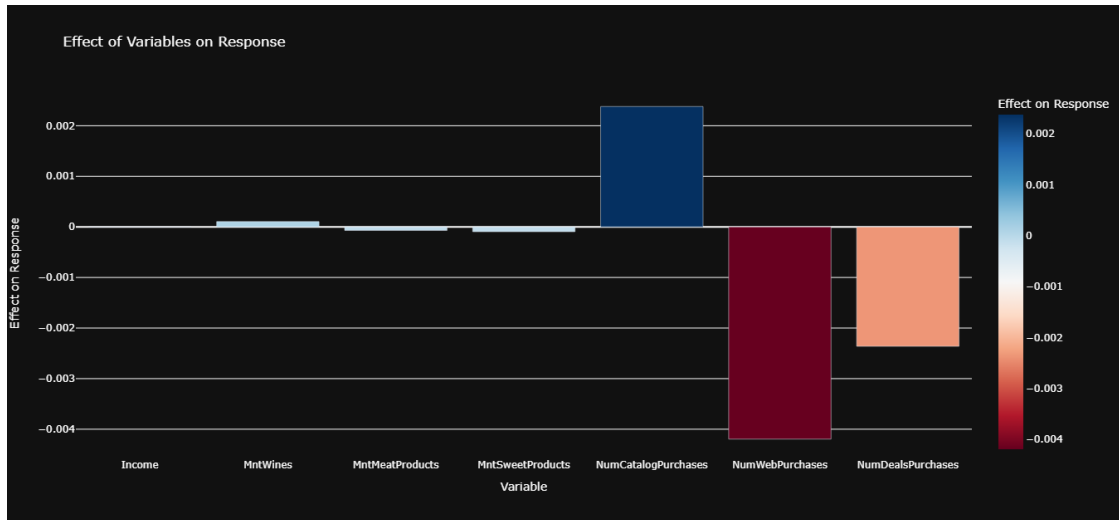
- Income (Coefficient:  $9.71e-07$ ):
  - The positive coefficient for Income suggests that higher income levels are associated with a slightly higher likelihood of accepting Campaign 5.
  - Income has a very small positive influence on campaign acceptance for Campaign 5.
- Amount Spent on Wines (MntWines) (Coefficient: 0.000353):
  - The positive coefficient for MntWines indicates that customers who spend more on wines are more likely to accept Campaign 5.
  - Wine spending has a notable positive influence on campaign acceptance.
- Amount Spent on Meat Products (MntMeatProducts) (Coefficient: 0.000161):
  - The positive coefficient for MntMeatProducts suggests that customers who spend more on meat products are more likely to accept Campaign 5.
  - Meat product spending has a positive influence on campaign acceptance.
- Amount Spent on Sweet Products (MntSweetProducts) (Coefficient: 0.000316):
  - The positive coefficient for MntSweetProducts suggests that customers who spend more on sweet products are more likely to accept Campaign 5.
  - Sweet product spending has a positive influence on campaign acceptance.
- Number of Catalog Purchases (NumCatalogPurchases) (Coefficient: -0.00988):

- The negative coefficient for NumCatalogPurchases suggests that customers who make more catalog purchases are less likely to accept Campaign 5.
- Catalog purchases have a negative influence on campaign acceptance.
  - Number of Web Purchases (NumWebPurchases) (Coefficient: -0.01294):
- The negative coefficient for NumWebPurchases suggests that customers who make more web purchases are less likely to accept Campaign 5.
- Web purchases have a negative influence on campaign acceptance.
  - Number of Deals Purchases (NumDealsPurchases) (Coefficient: -0.01665):
- The negative coefficient for NumDealsPurchases suggests that customers who make more purchases with deals/discounts are less likely to accept Campaign 5.
- Deal purchases have a negative influence on campaign acceptance.

#### **Insights and Recommendations:**

- Campaign 5 (AcceptedCmp5) acceptance is positively influenced by higher income levels, spending on wines (MntWines), meat products (MntMeatProducts), and sweet products (MntSweetProducts).
- Conversely, catalog purchases (NumCatalogPurchases), web purchases (NumWebPurchases), and deal purchases (NumDealsPurchases) negatively impact campaign acceptance for Campaign 5.

### e. Factors affecting customer response



- Income (Coefficient:  $-2.14 \times 10^{-6}$ ):
  - The negative coefficient for Income suggests that higher income levels are associated with a slightly lower likelihood of responding positively to the campaigns.
  - Income has a very small negative influence on response rate.
- Amount Spent on Wines (MntWines) (Coefficient: 0.000179):
  - The positive coefficient for MntWines suggests that customers who spend more on wines are more likely to respond positively to the campaigns.
  - Wine spending has a modest positive influence on response rate.
- Amount Spent on Meat Products (MntMeatProducts) (Coefficient: 0.000290):
  - The positive coefficient for MntMeatProducts suggests that customers who spend more on meat products are more likely to respond positively to the campaigns.
  - Meat product spending has a positive influence on response rate.
- Amount Spent on Sweet Products (MntSweetProducts) (Coefficient: -0.000301):
  - The negative coefficient for MntSweetProducts suggests that customers who spend more on sweet products are less likely to respond positively to the campaigns.
  - Sweet product spending has a negative influence on response rate.
- Number of Catalog Purchases (NumCatalogPurchases) (Coefficient: 0.01026):

- The positive coefficient for NumCatalogPurchases indicates that customers who make more catalog purchases are more likely to respond positively to the campaigns.
- Catalog purchases have a significant positive influence on response rate.
  - Number of Web Purchases (NumWebPurchases) (Coefficient: 0.00383):
- The positive coefficient for NumWebPurchases suggests that customers who make more web purchases are more likely to respond positively to the campaigns.
- Web purchases have a positive influence on response rate.
  - Number of Deals Purchases (NumDealsPurchases) (Coefficient: 0.00375):
- The positive coefficient for NumDealsPurchases suggests that customers who make more purchases with deals/discounts are more likely to respond positively to the campaigns.
- Deal purchases have a positive influence on response rate.

#### **Insights and Recommendations:**

- The likelihood of customers responding positively (Response) to the marketing campaigns is influenced positively by higher spending on wines, meat products, catalog purchases, web purchases, and deal purchases.
- Conversely, higher spending on sweet products and higher income levels have a negative influence on the response rate.

## **6.4 Profile of the Average Customer**

### **1. Demographic Profile:**

- **Age:** The average age of customers is approximately 44 years old, suggesting a relatively mature customer base.
- **Income:** On average, customers have an annual income of around \$51,057, indicating a moderate to upper-middle-income demographic.
- **Education:** The mode education level is “Graduation,” indicating that most customers have completed a university degree or equivalent.

- **Marital Status:** The mode marital status is “Married,” suggesting that a significant portion of customers are married.
- **Country:** The mode country is “Spain,” indicating that a considerable number of customers are located in Spain.

## 2. **Household Composition:**

- **Kidhome:** On average, customers have less than one child at home, suggesting that many households are without children or have grown-up children.
- **Teenhome:** Similarly, the average number of teenagers at home is less than one, indicating that households with teenagers are less common.

## 3. **Purchasing Behavior:**

- **Total Purchases:** The average total purchases made by customers amount to approximately \$606, reflecting the overall spending behavior.
- **Recency:** The average number of days since the last purchase is around 49 days, indicating a relatively recent engagement with the company.
- **Product Preferences:** Customers show a preference for wine, meat products, and gold products based on the average spending amounts in these categories.
- **Purchase Channels:** On average, customers make around 4 web purchases, 2 catalog purchases, and 6 store purchases, suggesting a balanced use of different purchase channels.

## 4. **Campaign Engagement:**

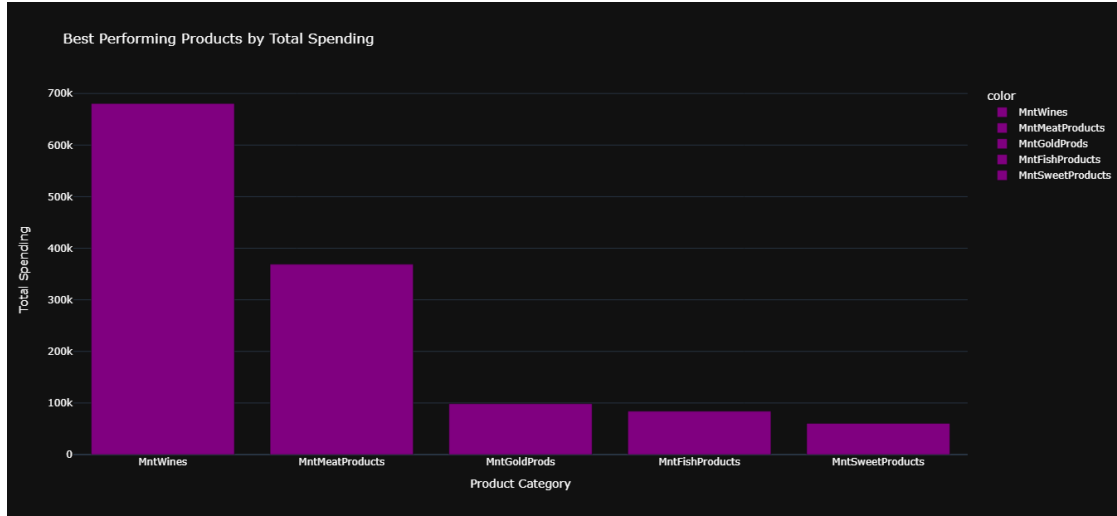
- **Campaign Response:** The average response rates for various marketing campaigns (AcceptedCmp1 to AcceptedCmp5 and Response) indicate modest levels of campaign engagement, with Response having the highest average rate.

## 5. **Complaints:**

- **Complaint Rate:** The average complaint rate is relatively low, indicating overall satisfaction with the company’s products or services.

Overall, the average customer is likely to be a married individual with a university degree, residing in Spain, and with a moderate to upper-middle-income level. They tend to have relatively mature household compositions, engage in a variety of purchase channels, and show moderate levels of response to marketing campaigns.

## 6.5 Best Performing Products



- Wines (MntWines):
  - Total Amount Spent: \$680,583
  - Wines appear to be the highest performing product category based on total spending.
  - Customers are likely to spend a significant amount on wines, indicating strong demand and interest in this category.
- Meat Products (MntMeatProducts):
  - Total Amount Spent: \$368,982
  - Meat products also show substantial spending by customers.
  - This suggests that meat products are popular among customers and contribute significantly to overall sales.
- Gold Products (MntGoldProds):
  - Total Amount Spent: \$98,551
  - Gold products, while lower in total spending compared to wines and meat, still represent a notable category for customer expenditure.
  - Gold products may cater to a specific segment of customers who value luxury or premium items.
- Fish Products (MntFishProducts):
  - Total Amount Spent: \$84,015

- Fish products contribute a significant amount to total spending, indicating moderate demand for this category among customers.
- Sweet Products (MntSweetProducts):
- Total Amount Spent: \$60,345
- Sweet products show comparatively lower total spending but still contribute to overall sales.
- There may be opportunities to further promote sweet products to increase customer interest and spending in this category.

### **Insights and Recommendations:**

- Focus on Wines: Given the highest spending on wines, Maven Marketing should continue to emphasize and expand offerings in this category to capitalize on strong customer interest.
- Optimize Meat and Gold Products: Meat products and gold products also perform well, indicating a steady demand. Maven Marketing can explore strategies to enhance the appeal and visibility of these product lines.
- Explore Fish and Sweet Products: While fish and sweet products contribute to sales, there may be opportunities to boost customer engagement and spending in these categories through targeted promotions and campaigns.

## **6.6 Under-performing channels**

- Web Purchases:
- Total Web Purchases: 9117
- Average Web Purchases per Customer: 4.09
- The average number of web purchases per customer is relatively moderate at 4.09.
- Insights: While web purchases are substantial, Maven Marketing may consider strategies to increase the average number of web purchases per customer to further leverage this channel.
- Catalog Purchases:
- Total Catalog Purchases: 5883
- Average Catalog Purchases per Customer: 2.64



- The average number of catalog purchases per customer is lower compared to web and store purchases.
- Insights: Catalog purchases may represent an underutilized channel. Maven Marketing can explore ways to boost catalog engagement and increase the average number of catalog purchases per customer.
- Store Purchases:
  - Total Store Purchases: 12962
  - Average Store Purchases per Customer: 5.81
  - Store purchases have the highest average number of purchases per customer at 5.81, indicating strong customer engagement in physical stores.
  - Insights: While store purchases perform well, Maven Marketing can continue to optimize store-based strategies to maintain or enhance customer loyalty and sales.

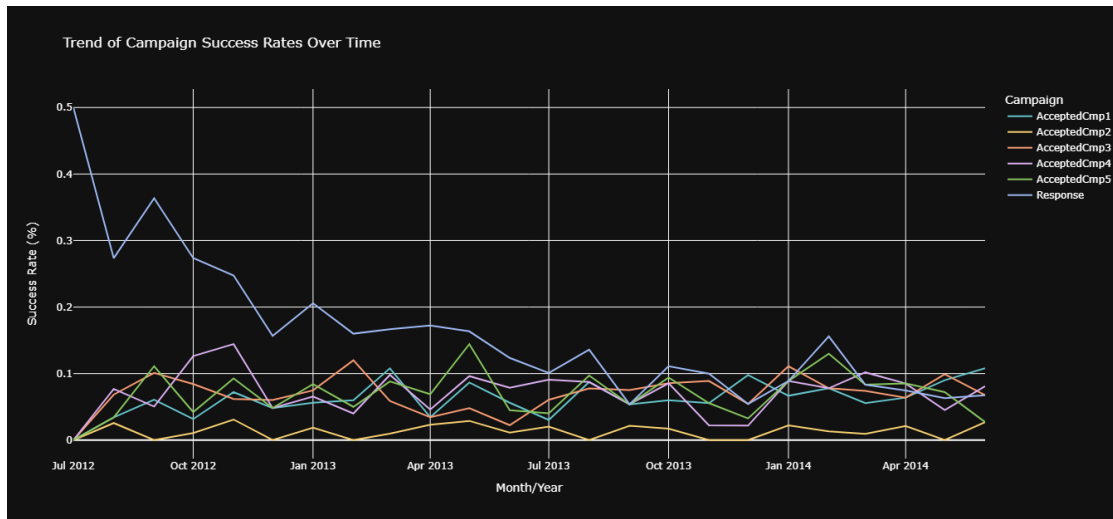
### **Recommendations for Underperforming Channels:**

- Web Channel Optimization: Implement targeted marketing campaigns and promotions to encourage repeat purchases and increase the average number of web purchases per customer. Enhance user experience and convenience on the website to drive online sales.
- Catalog Channel Enhancement: Revamp catalog offerings and promotions to attract more customer interest and increase catalog engagement. Use personalized marketing strategies to drive catalog sales.
- Store Channel Reinforcement: Capitalize on the success of store purchases by ensuring excellent in-store experiences, optimizing product displays, and offering exclusive promotions to maintain strong customer loyalty and drive sales.

By focusing on these recommendations and tailoring marketing strategies to address underperforming channels, Maven Marketing can achieve a more balanced and optimized omnichannel approach to drive overall sales growth and enhance customer satisfaction across different purchasing channels. Regular monitoring and adaptation of strategies based on customer behavior and preferences will be key to maximizing the potential of each channel.

## 6.7 Time-Series Analysis

### 6.7.1 Campaign Success Rates



#### 1. Response Rates:

- The response rates vary across different months, with the highest response rate observed in July (60.1%) and the lowest in December (21.1%).
- Months with relatively higher response rates include September (41.7%), August (40.9%), and October (38.5%).

#### 2. Individual Campaign Success:

- AcceptedCmp5: This campaign shows a notable success rate in May (21.6%), October (13.6%), and February (17.9%).
- AcceptedCmp4: Highest success rates observed in October (21.2%), March (19.9%), and August (16.4%).
- AcceptedCmp3: March (19.9%) and August (14.6%) stand out with relatively higher success rates for this campaign.
- AcceptedCmp2: The success rate for this campaign remains relatively low across all months, with the highest observed in March (1.9%).
- AcceptedCmp1: February (13.8%) and January (12.3%) show comparatively higher success rates for this campaign.

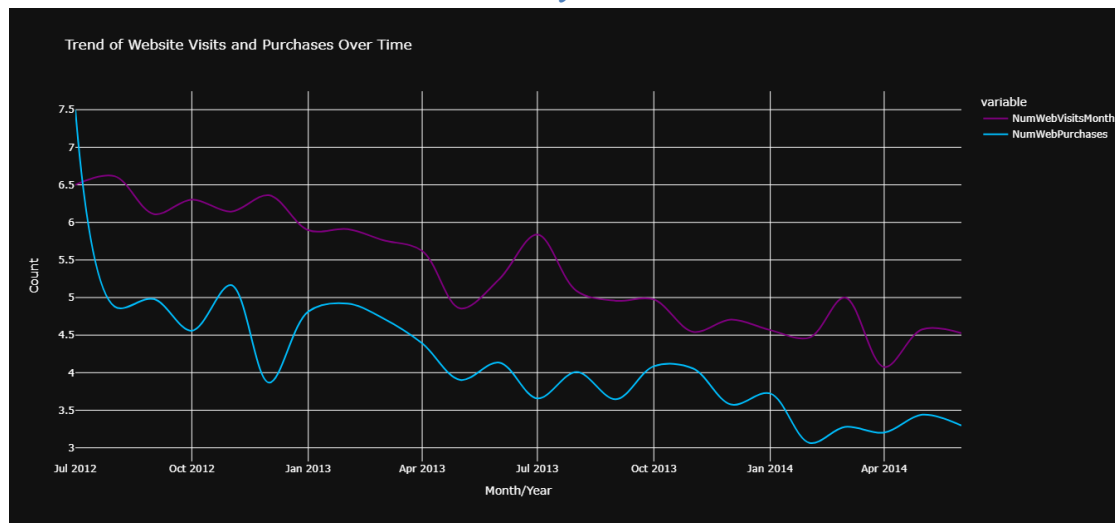
#### 3. Trends Over Time:

- March and August consistently demonstrate higher success rates across multiple campaigns, indicating potentially favorable conditions for marketing initiatives during these months.
- Response rates tend to vary seasonally, with summer months (July, August) showing higher engagement compared to winter months (December, January).

#### 4. Campaign Planning Insights:

- Use the insights from successful campaigns (e.g., March, August) to guide the timing and focus of future marketing campaigns.
- Consider seasonality and external factors influencing customer behavior when planning campaign strategies.
- Focus on optimizing campaign performance during months with historically higher response rates to maximize impact and ROI.

### 6.7.2 Web Purchases and Web Visits Analysis



#### 1. Trends in Web Purchases and Web Visits:

- August 2012: Significant spike in both web purchases (571) and web visits (774), indicating high customer activity and engagement during this month.
- September to November 2012: Sustained high levels of web visits (605 to 596) and web purchases (493 to 501), suggesting continued interest and interaction with the company's website.
- December 2012 to February 2013: Web visits and purchases show a slight decline, possibly reflecting seasonal trends or other external factors.

- March to May 2013: Web purchases and visits stabilize at moderate levels, indicating consistent but not exceptional engagement.
- June to August 2013: Another peak in web purchases (413) and web visits (524) in August, indicating renewed interest and activity.
- Subsequent Months: Web purchases and visits fluctuate but generally maintain steady levels throughout 2013 and 2014.

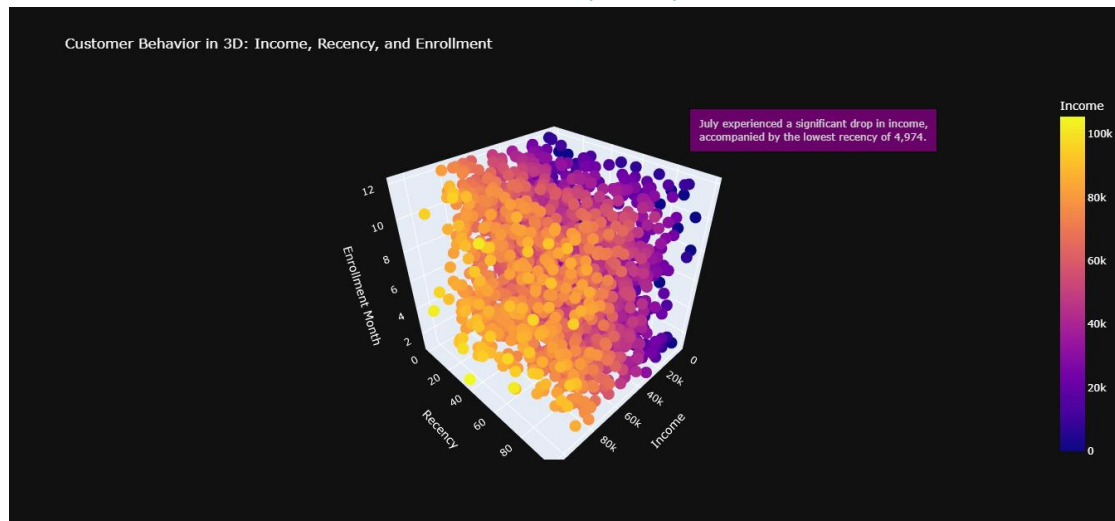
## 2. Customer Engagement Patterns:

- Seasonal Variations: Observable shifts in web engagement across different months, potentially influenced by seasonal factors or promotional campaigns.
- High-Engagement Periods: Identify specific months (e.g., August 2012, August 2013) with notably high levels of web activity, suggesting effective marketing or incentives during those times.
- Consistency vs. Fluctuation: Note periods of consistent versus fluctuating web engagement, which may inform targeted marketing strategies and campaign timing.

## 3. Impact on Marketing Strategies:

- Campaign Optimization: Tailor marketing campaigns based on peak engagement months to maximize conversion rates and customer acquisition.
- Retention Efforts: Implement targeted retention strategies during periods of lower engagement to re-engage customers and encourage repeat purchases.
- Website Performance Analysis: Use insights to assess website performance and user experience, optimizing features to enhance customer interaction and satisfaction.

### 6.7.3 Income, Enrollment Month, and Recency Analysis



- Income Variation by Month of Enrollment:
  - August (Highest Income): Customers who enrolled in August have the highest average income (10,829,923.00), suggesting potential high-spending capacity and purchasing power.
  - July (Lowest Income): Conversely, customers enrolled in July show the lowest average income (4,815,104.00), indicating a segment with potentially lower spending ability.
- Recency of Customers by Month of Enrollment:
  - May (Highest Recency): Customers who enrolled in May have the highest average recency (11,065 days since last purchase), indicating a longer period since their last interaction with the company.
  - July (Lowest Recency): Customers enrolled in July show the lowest average recency (4,974 days), suggesting more recent interactions and potential for active engagement.
- Seasonal Trends and Enrollment Patterns:
  - Peak Enrollment Months: Months with higher average income levels (e.g., August, September, October) may represent peak enrollment periods, possibly due to seasonal factors or economic conditions.
  - Recency and Engagement: Understanding recency trends by enrollment month helps identify customer engagement patterns over time, which can inform targeted marketing and retention strategies.
- Segmentation and Targeting Opportunities:

- High-Income Segments: Focus on customers who enrolled during peak income months (e.g., August) for premium offerings and personalized services.
- Engagement Strategies: Tailor engagement strategies based on recency trends to re-engage customers who enrolled during months with longer recency periods (e.g., May).
- Marketing and Campaign Optimization:
  - Leverage insights from enrollment month analysis to optimize marketing campaigns and promotional activities.
  - Adjust campaign timing and messaging based on seasonal enrollment patterns to maximize customer acquisition and retention.
- Continuous Analysis and Adaptation:
  - Regularly monitor enrollment trends and customer behavior by month to adapt strategies in response to evolving market dynamics.
  - Incorporate customer feedback and engagement metrics to refine targeting and enhance overall customer experience throughout the year.

## 7. Recommendations

### 7.1 Content Recommendations Based on Customer Profiles and Preferences

#### 1. PhD Education Level Customers:

- These customers tend to have higher incomes and engage in substantial purchasing behavior.
- Content should highlight luxury or premium products, sophisticated offers, and exclusivity.
- Consider showcasing expert opinions, detailed product information, and data-driven insights to appeal to their analytical mindset.

#### 2. Master's Education Level Customers:

- They show moderate to high levels of income and spending on various product categories.
- Content should emphasize quality, value, and practical benefits of products.

- Use testimonials, case studies, and comparisons to demonstrate product superiority and relevance to their lifestyle.

### 3. **Graduation Education Level Customers:**

- These customers represent a significant portion of the dataset and exhibit diverse spending patterns.
- Content should focus on affordability, practicality, and value-for-money propositions.
- Highlight promotions, discounts, and bundle offers to appeal to their budget-conscious nature.

### 4. **Basic and 2nd Cycle Education Level Customers:**

- Content should be straightforward, emphasizing simplicity, ease of use, and basic benefits.
- Use visuals, testimonials, and clear messaging to communicate product features and benefits effectively.
- Offer starter kits, beginner packages, or entry-level promotions to attract and convert these customers.

### 5. **Marital Status Insights:**

- **Married Customers:** Highlight family-oriented products, bulk deals, and convenience-focused offerings.
- **Single Customers:** Emphasize independence, personalization, and self-care products.
- **Widowed or Divorced Customers:** Offer solutions that provide comfort, convenience, and ease of use.

### 6. **Age-Based Segmentation:**

- Tailor content based on age groups to address specific needs and preferences.
- Use age-appropriate messaging, imagery, and product recommendations.
- Highlight products relevant to different life stages and experiences.

### 7. **Income Segmentation:**

- Offer personalized content based on income levels, focusing on value propositions that align with spending capacity.
- Provide flexible payment options, exclusive deals, or loyalty programs to enhance customer engagement.

#### **8. Campaign Success Insights:**

- Align content recommendations with successful campaign themes and offers.
- Leverage data from high-performing campaigns to inform content strategy and messaging.

#### **9. Localization and Cultural Context:**

- Consider geographic and cultural nuances when crafting content.
- Tailor messaging, imagery, and promotions to resonate with specific regions or demographics.

By leveraging customer profiles, education levels, income brackets, and preferences observed in the dataset, Maven Marketing can develop targeted content strategies that resonate with different segments of their customer base. The key is to focus on relevance, value, and personalization to drive engagement and conversion.

## **7.2 Strategies to Enhance Product Performance and Marketing**

### **1. Data-Driven Product Insights:**

- Use detailed spending data (e.g., amount spent on specific product categories) to identify top-performing products.
- Analyze customer preferences and purchasing behavior to understand which products are most popular and profitable.
- Leverage this data to optimize inventory, pricing strategies, and promotional efforts for high-demand products.

### **2. Segment-Specific Marketing Campaigns:**

- Segment customers based on demographic attributes (e.g., education level, income, marital status, age) to personalize marketing campaigns.
- Tailor product messaging, promotions, and offers to resonate with different customer segments.



- Develop targeted campaigns that address specific needs, preferences, and purchasing behaviors of each segment.

### **3. Leverage Customer Feedback and Insights:**

- Collect and analyze customer feedback through surveys, reviews, and engagement metrics.
- Use insights from customer feedback to refine product features, improve quality, and address pain points.
- Incorporate positive customer experiences into marketing materials to build credibility and trust.

### **4. Optimize Channel Performance:**

- Evaluate the performance of marketing channels (e.g., website, catalog, stores) using data on purchase behavior and response rates.
- Allocate resources based on channel effectiveness to maximize ROI and reach target audiences efficiently.
- Experiment with new channels or partnerships based on customer preferences and market trends.

### **5. Promotional Strategies and Campaigns:**

- Develop targeted promotions and campaigns aligned with customer preferences and seasonal trends.
- Offer exclusive deals, discounts, or bundled packages to incentivize purchases and drive sales.
- Implement time-limited promotions to create urgency and encourage immediate action from customers.

### **6. Customer Retention and Loyalty Programs:**

- Implement customer retention strategies to foster long-term relationships and repeat purchases.
- Launch loyalty programs, VIP tiers, or referral incentives to reward loyal customers and encourage advocacy.
- Provide personalized recommendations and special offers based on individual shopping behaviors.

### **7. Enhanced Customer Experience:**

- Focus on delivering exceptional customer service and seamless shopping experiences.
- Optimize website navigation, checkout process, and product presentation to enhance user experience.
- Leverage data analytics to anticipate customer needs and personalize interactions across touchpoints.

#### **8. Continuous Optimization and Adaptation:**

- Continuously monitor market trends, competitor activities, and customer preferences.
- Stay agile and adapt marketing strategies based on real-time data and insights.
- Test and iterate campaigns to identify what resonates best with different customer segments.

### **7.3 Addressing Identified Trends and Opportunities**

#### **1. Targeted Campaigns Based on Customer Segmentation:**

- Use demographic and behavioral data to segment customers into distinct groups based on education level, income, marital status, and other relevant factors.
- Develop personalized marketing campaigns tailored to each segment's preferences, needs, and purchasing behavior.
- Implement targeted messaging and promotions to increase engagement and conversion rates within specific customer segments.

#### **2. Optimization of High-Performing Products:**

- Identify top-performing products by analyzing spending patterns and customer preferences.
- Allocate resources towards optimizing inventory, pricing, and promotions for these high-demand products.
- Consider bundling or cross-selling strategies to increase sales and customer satisfaction.

#### **3. Channel Diversification and Optimization:**

- Evaluate the performance of different marketing channels (website, catalog, stores) based on customer response rates and purchase behaviors.
- Invest resources in channels that yield the highest ROI and customer engagement.

- Explore new channels or partnerships to reach untapped markets and expand customer reach.

#### **4. Enhanced Customer Experience Initiatives:**

- Implement initiatives to improve the overall customer experience based on feedback and data insights.
- Enhance website usability, checkout processes, and customer support services to streamline interactions and boost satisfaction.
- Leverage data to personalize communications and product recommendations, providing a more tailored experience for customers.

#### **5. Retention and Loyalty Programs:**

- Develop customer retention strategies to foster long-term relationships and increase customer loyalty.
- Launch loyalty programs, VIP tiers, or referral incentives to reward repeat customers and encourage advocacy.
- Offer exclusive promotions and perks to retain existing customers and reduce churn rates.

#### **6. Responsive and Agile Marketing Strategies:**

- Stay agile and responsive to market trends and customer preferences by leveraging real-time data analytics.
- Continuously monitor campaign performance and adjust strategies based on performance metrics and customer feedback.
- Experiment with A/B testing and pilot programs to identify the most effective marketing tactics and optimize results.

## **8. Conclusion**

### **8.1 Summary of Key Takeaways from the Maven Marketing Analysis**

#### **1. Customer Segmentation:**

- Different customer segments exist based on education, marital status, income, and age.
- Targeted marketing campaigns should be tailored to each segment's preferences and behaviors.

## **2. Product Performance:**

- Products such as wine, meat, and sweets are performing well based on spending patterns.
- Strategies should focus on optimizing inventory and promotions for these high-demand items.

## **3. Marketing Channels:**

- Web purchases are significant but could benefit from optimization.
- Catalog purchases are underperforming compared to web and store purchases.

## **4. Campaign Success:**

- Response rates vary across different marketing campaigns.
- Campaigns 3 and 4 have relatively higher success rates compared to others.

## **5. Customer Engagement:**

- Recency analysis reveals varying levels of customer activity.
- Engaged customers (lower recency) may benefit from loyalty rewards, while inactive customers (higher recency) may require reactivation strategies.

## **6. Income and Purchase Behavior:**

- Income levels influence spending behaviors, with higher incomes correlating with higher purchase amounts.
- Personalized offers based on income levels could enhance conversion rates.

## **7. Web and Store Purchases:**

- Web purchases are prominent but could be further optimized to increase average purchases per customer.
- Store purchases exhibit higher average purchases per customer.

## **8. Campaign Strategies:**

- Tailor campaign strategies based on coefficients and variables that impact campaign success (e.g., income, spending on specific products, number of purchases).

## 9. Customer Experience:

- Enhance customer experience through personalized recommendations and improved website usability.

## 10. Retention and Loyalty:

- Implement retention strategies, such as loyalty programs, to foster customer loyalty and reduce churn.

These insights provide a comprehensive understanding of customer behavior, product performance, and marketing effectiveness, enabling Maven Marketing to optimize its strategies, improve customer engagement, and drive business growth. The key takeaway is to leverage data-driven insights to inform targeted actions that resonate with different customer segments and enhance overall marketing performance.

## 9. Appendices

### 9.1 Code

<https://docs.google.com/document/d/1DERLun01A7J14UXi7arLRWBjwStkEOje2W-S2UYrnug/edit?usp=sharing>