### **Problem**

The primary issue this project addresses is the assessment of marketing campaign success for Maven Marketing. With a dataset comprising 2,240 customer profiles, it is essential to determine which factors influence campaign effectiveness and customer engagement. Key problems include identifying null values and outliers that could skew results, understanding the aspects of web purchases, and evaluating the success rates of various marketing campaigns. the analysis seeks to pinpoint which products and channels perform best and which ones require improvement.

**Background**

Maven Marketing's dataset includes information on 2,240 customers, covering demographics, product preferences, and campaign responses. The data allows for a comprehensive analysis of marketing campaign performance, including channel effectiveness and product success.

### **Solution**

**Data Analysis**

* **Handling Null Values and Outliers**:
  + **Null Values**: Identified and addressed missing data through imputation techniques and careful analysis to maintain data integrity.
  + **Outliers**: Detected and managed outliers to ensure accurate statistical analysis, employing methods such as z-score analysis and IQR filtering.
* **Factors Related to Web Purchases**:
  + Conducted a multivariate analysis to identify significant predictors of web purchases, including demographic factors, past purchase behavior, and campaign engagement metrics.
* **Campaign Success Evaluation**:
  + Utilized metrics like conversion rates, engagement rates, and ROI to determine the most successful marketing campaigns.
  + Compared performance across different campaigns to highlight best practices and areas for improvement.

**Data-Driven Insights**

* **Customer Profile**:
  + Defined the average customer as born between 1963 and 1982, married, a graduate, and earning between $151,000 and $167,000 annually.
  + This demographic insight informs targeted marketing strategies.
* **Product Performance**:
  + Analyzed sales data to identify top-performing products, focusing on those with the highest purchase frequencies and customer satisfaction ratings.
* **Channel Performance**:
  + Assessed the effectiveness of various marketing channels, identifying underperforming ones through KPIs such as engagement rates, conversion rates, and cost per acquisition.
  + Recommended reallocating resources to more successful channels.

**Stakeholder Engagement**

* **Reporting and Communication**:
  + Developed comprehensive reports and visualizations to communicate findings effectively to stakeholders.
  + Used data storytelling techniques to ensure insights are clear and actionable.
* **Actionable Recommendations**:
  + Provided specific, data-backed recommendations for optimizing marketing campaigns and channel strategies.
  + Suggested continuous monitoring and iterative testing to refine strategies based on ongoing data collection and analysis.

.**Project scope**

* **Product:** Analyze and identify top-performing products.
* **Price:** Evaluate the impact of pricing strategies.
* **Promotion**: Assess the effectiveness of different promotional campaigns.
* **Place**: Examine the performance of various marketing channels.
* **People**: Understand customer demographics and behaviors.

### **Methodology**

### **Data sources**

### SQL

### AWS

### Data Scraping

### Local data sources

### **Data wrangling**

### Data understanding

### Data cleaning

### Data merging and joining

### Data manipulation

### **Data analysis**

### Finding the trends and patterns

### **Data visualization**

### **Goals and KPIs**

**Goals:**

1. **Increase Web Purchases**: Enhance the effectiveness of marketing campaigns to drive more online sales.
2. **Boost Website Traffic**: Attract more visitors to the website through optimized marketing strategies.
3. **Improve Campaign Response Rate**: Increase the engagement and response rate of customers to marketing campaigns.
4. **Maximize Revenue**: Increase total revenue generated from marketing efforts.

**Key Performance Indicators (KPIs):**

1. **Total Web Purchases**: Measure the total number of purchases made through the website as a result of marketing campaigns.
2. **Total Web Visits**: Track the number of visitors to the website to assess the reach and effectiveness of marketing efforts.
3. **Response Rate**: Calculate the percentage of customers who respond to marketing campaigns, indicating engagement and interest.
4. **Total Revenue**: Monitor the total revenue generated from all marketing campaigns to evaluate financial success and ROI.

### **Technical Processes**

**VLOOKUP**:

* **Application to Project**: Utilized the VLOOKUP function in Excel to merge datasets and retrieve additional information, such as campaign details or product attributes, from separate tables into the main dataset of customer profiles and campaign results.
* **Example**: Used VLOOKUP to match each customer's campaign response with the corresponding marketing campaign details, enabling analysis of campaign success rates.

**Pandas Data Cleaning**:

* **Application to Project**: Employed Pandas library in Python for data cleaning tasks such as handling null values, removing duplicates, and standardizing data formats.
* **Example**: Used Pandas to identify and handle null values in the dataset of customer profiles and campaign results, ensuring data integrity before analysis.

### **Business Concepts Used**

**Market Understanding**:

* **Use**: Employed to gain insights into market trends, customer preferences, and competitive landscape.
* **Application to Project**: Analyzed marketing campaign data to understand market dynamics, identify customer preferences, and assess the effectiveness of marketing strategies.

**Customer Demographic**:

* **Use**: Utilized to segment customers based on demographic attributes such as age, gender, income, and location.
* **Application to Project**: Analyzed customer profiles to identify demographic trends and tailor marketing campaigns to specific customer segments.

**Customer Behavior**:

* **Use**: Applied to understand how customers interact with products, services, and marketing campaigns.
* **Application to Project**: Analyzed customer behavior data to identify patterns, preferences, and trends, informing marketing strategies and campaign optimization efforts.

**Customer Retention**:

* **Use**: Employed to maintain and enhance relationships with existing customers, encouraging repeat purchases and loyalty.
* **Application to Project**: Evaluated customer retention rates and campaign effectiveness to identify strategies for retaining existing customers and maximizing lifetime value.

**New Customer Acquisition**:

* **Use**: Utilized to attract and acquire new customers to expand the customer base and drive business growth.
* **Application to Project**: Analyzed new customer acquisition strategies and campaign performance to identify opportunities for reaching and attracting new customers effectively.

### **Recommended Analysis:**

**Handling Missing Data and Outliers:**

* Identified missing values and outliers in the income column.
* Imputed missing income values using the mean and addressed outliers by replacing extreme values with the second-highest income value.

**Factors Related to Web Purchases:**

* Factors significantly related to the number of web purchases include year of birth, education background, marital status, and income.

**Most Successful Marketing Campaign:**

* Determined the most successful campaign based on customer acceptance of the offered discount, as indicated by the highest response rate, which corresponds to the last campaign known as the "Response" campaign.

**Average Customer Profile:**

* Defined the average customer as born between 1963 and 1982, married, with higher education, and an annual income ranging between $151,000 and $167,000.

**Best-Performing Products:**

* Identified wines as the best-performing product category based on total spending amounts in the last two years.

**Underperforming Channels:**

* Identified underperforming marketing channels by examining the total number of discount purchases, highlighting channels with the lowest engagement rates.

### **Project owner**

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