

# Unveiling Market Insights: Analyzing Spending Behavior and Identifying Opportunities for Growth

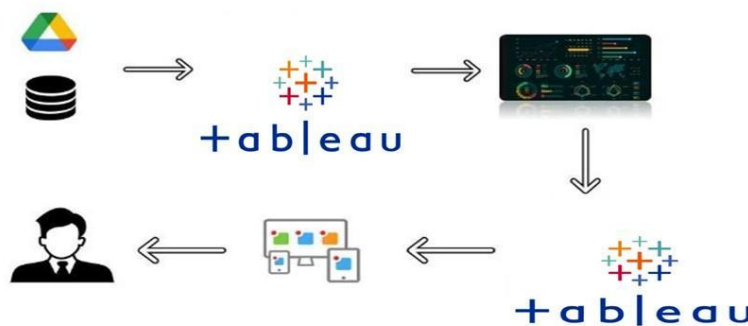
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"Unveiling Market Insights: Analyzing Spending Behavior and Identifying Opportunities for Growth" refers to the process of examining consumer spending patterns and understanding their preferences to uncover valuable information that can drive business growth. By analyzing market data and consumer behavior, businesses can gain valuable insights into customer needs, preferences, and purchasing habits. This information helps identify untapped opportunities for expansion, improve product offerings, and tailor marketing strategies to target specific customer segments effectively. By leveraging these market insights, businesses can make informed decisions, optimize resource allocation, and position themselves strategically to capitalize on potential growth opportunities.

Technical Architecture:



## Project Flow

To accomplish this, we have to complete all the activities listed below,

### **Define Problem / Problem Understanding**

- Specify the business problem
- Business requirements
- Literature Survey
- Social or Business Impact.

### **Data Collection & Extraction from Database**

- Collect the dataset,
- Connect IBM DB2 with IBM cognos

### **Data Preparation**

- Prepare the Data for Visualization

### **Data Visualizations**

- No of Unique Visualizations

### **Dashboard**

- Responsive and Design of Dashboard

### **Story**

- No of Scenes of Story

### **Report**

- Creating a report

### **Performance Testing**

- Amount of Data Rendered to DB ‘
- Utilization of Data Filters
- No of Calculation Fields
- No of Visualizations/ Graphs

### **Web Integration**

- Dashboard and Story embed with UI With Flask

### **Project Demonstration & Documentation**

- Record explanation Video for project end to end solution

- Project Documentation-Step by step project development procedure

## The Business Problem

The business problem in this project revolves around understanding consumer spending behavior and finding opportunities for business growth based on this analysis. This problem is typically encountered by companies seeking to gain a competitive edge in their respective markets by uncovering key insights into consumer preferences, purchasing patterns, and emerging trends.

Some specific challenges that businesses might face within this problem include:

- Lack of consumer understanding: Companies may struggle to gain a deep understanding of their target audience's spending habits, preferences, and motivations. This can hinder their ability to effectively tailor their products, services, and marketing efforts to meet customer needs.
- Identifying profitable customer segments: It can be difficult for businesses to identify the most profitable customer segments within their target market. Without a clear understanding of which groups of customers are most valuable and have the highest potential for growth, companies may struggle to allocate their resources effectively.
- Predicting future trends: Anticipating and adapting to changing consumer preferences and emerging market trends is essential for sustainable growth. However, accurately predicting these trends can be challenging without a comprehensive analysis of spending behavior and other relevant market data.
- Leveraging data effectively: Businesses often have access to vast amounts of data, but extracting meaningful insights from this data and translating them into actionable strategies can be a complex task. Companies may face challenges in collecting, organizing, and analyzing data to generate valuable insights that drive growth.

## Business Requirements:

The business requirements for this project can vary depending on the specific goals and needs of the company. However, here are some common business requirements that might apply:

Data Collection: The project requires collecting relevant data on consumer spending behavior. This may include transactional data, customer demographics, purchase history, online behavior, survey responses, and other sources of consumer data. The data collection process should be efficient, accurate, and comply with applicable data privacy regulations.

Data Integration and Management: The project requires integrating and managing the collected data from various sources. This involves organizing the data in a structured manner, ensuring data quality and consistency, and establishing appropriate data governance practices. It may also involve data cleansing, normalization, and creating a centralized data repository for analysis.

Analytics and Insights: The project requires employing advanced analytics techniques to analyze the collected data and derive meaningful insights. This may involve applying statistical analysis, data mining, machine

learning, and predictive modeling to uncover patterns, trends, and correlations in consumer spending behavior. The analysis should provide actionable insights that drive business growth and decision-making.

Trend Analysis and Forecasting: The project requires monitoring market trends, consumer preferences, and emerging industry developments. It involves tracking shifts in spending behavior, market dynamics, and technological advancements that may impact the business. Additionally, the project may involve developing predictive models to forecast future spending patterns and market trends.

Reporting and Visualization: The project requires creating reports, dashboards, and visualizations that effectively communicate the analyzed data and insights to stakeholders. This includes presenting key findings, performance metrics, trends, and growth opportunities in a clear and easily understandable manner. Visualization tools and techniques should be employed to enhance data interpretation and decision-making.

Security and Compliance: The project requires ensuring data security and compliance with applicable regulations, such as data privacy laws (e.g., GDPR, CCPA). The collected data should be protected from unauthorized access or misuse, and proper protocols and safeguards should be implemented to maintain data confidentiality and integrity.

These business requirements provide a foundation for designing and implementing this project. Tailoring the requirements to the specific needs and goals of the company will ensure the project's success in addressing the business problem and driving growth.

## Literature Survey

- "Consumer Behavior: Buying, Having, and Being" by Michael R. Solomon: This book provides a comprehensive understanding of consumer behavior and its impact on marketing strategies. It covers various aspects of consumer decision-making, including psychological factors, social influences, and cultural implications. Understanding consumer behavior is essential for analyzing spending behavior and identifying opportunities for growth.
- "Data Mining Techniques: For Marketing, Sales, and Customer Relationship Management" by Michael J. A. Berry and Gordon S. Linoff: This book explores data mining techniques specifically relevant to marketing and customer relationship management. It covers methodologies for analyzing customer data, such as clustering, classification, and association analysis. The book provides practical examples and case studies that can be applied to uncover insights from consumer spending behavior.
- "Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie, or Die" by Eric Siegel: This book focuses on predictive analytics and its application in various industries, including marketing. It explains how to leverage predictive modeling techniques to anticipate consumer behavior, including spending patterns. The book emphasizes the importance of using data-driven insights to identify growth opportunities and make informed business decisions.
- "Competitive Strategy: Techniques for Analyzing Industries and Competitors" by Michael E. Porter: This classic work by Porter introduces concepts and frameworks for analyzing competition within industries. It provides tools for understanding competitor behavior, assessing market dynamics, and identifying opportunities for differentiation and growth. The book offers valuable insights for conducting competitor analysis as part of the project.
- "Big Data: A Revolution That Will Transform How We Live, Work, and Think" by Viktor Mayer-Schönberger and Kenneth Cukier: This book explores the impact of big data on various aspects of society, including business and marketing. It highlights the importance of harnessing large datasets

for uncovering meaningful insights and identifying emerging trends. The book discusses the role of data analysis in understanding consumer behavior and leveraging it for growth opportunities.

- "Market Research in Practice: An Introduction to Gaining Greater Market Insight" by Paul Hague, Julia Cupman, and Matthew Harrison: This practical guidebook provides an overview of market research techniques and their application in gaining market insights. It covers topics such as designing surveys, conducting focus groups, and analyzing qualitative and quantitative data. The book offers valuable guidance for collecting and analyzing data on consumer spending behavior.
- "Customer Analytics for Dummies" by Jeff Sauro: This book offers a beginner-friendly introduction to customer analytics and its role in business growth. It covers topics such as customer segmentation, customer lifetime value, and measuring customer satisfaction. The book provides practical tips and techniques for analyzing customer data and using it to identify growth opportunities.

## Social Or Business Impact

- **Enhanced Customer Experience:** By analyzing spending behavior, businesses can gain a deeper understanding of their customers' preferences, needs, and expectations. This allows them to tailor their products, services, and marketing efforts to provide a more personalized and relevant customer experience. Customers benefit from receiving offerings that align with their preferences, leading to increased satisfaction and loyalty.
- **Improved Product Development:** Analyzing spending behavior helps businesses identify gaps in the market and understand emerging trends. This knowledge can guide product development efforts, enabling companies to introduce innovative offerings that address customers' evolving needs. As a result, consumers benefit from improved and more relevant products and services.
- **Targeted Marketing Strategies:** Insights derived from spending behavior analysis enable businesses to develop targeted marketing strategies. By understanding consumer segments, businesses can create tailored campaigns and messages that resonate with specific groups. This leads to more efficient marketing spend, increased customer engagement, and higher conversion rates.
- **Business Growth and Profitability:** Identifying opportunities for growth based on spending behavior analysis allows businesses to allocate resources effectively. By focusing on the most profitable customer segments and emerging trends, companies can optimize their strategies and drive revenue growth. This, in turn, contributes to the overall economic growth and stability of the business.
- **Competitive Advantage:** Analyzing spending behavior not only helps businesses understand their own customers but also provides insights into competitors' customer bases. This allows companies to identify areas where competitors are excelling and potential gaps in the market that can be exploited. By leveraging these insights, businesses can gain a competitive advantage and strengthen their market position.
- **Economic Impact:** The project's outcomes can have broader economic implications. By identifying growth opportunities, businesses can expand their operations, hire more employees, and contribute to job creation and economic growth. Additionally, by better understanding consumer spending behavior, companies can optimize pricing strategies and resource allocation, leading to increased efficiency and productivity.
- **Data-Driven Decision Making:** The project promotes the use of data-driven decision-making processes. By leveraging data analytics and insights, businesses can make informed strategic decisions rather than relying solely on intuition or assumptions. This increases the likelihood of success and minimizes the risks associated with decisions based on limited information.

- **Ethical Considerations:** It is essential for businesses to handle customer data in an ethical and responsible manner. Safeguarding customer privacy and complying with relevant data protection regulations is crucial. The project should prioritize data security and privacy to ensure the ethical use of consumer data and maintain trust with customers.

## Data Collection & Extraction From Database

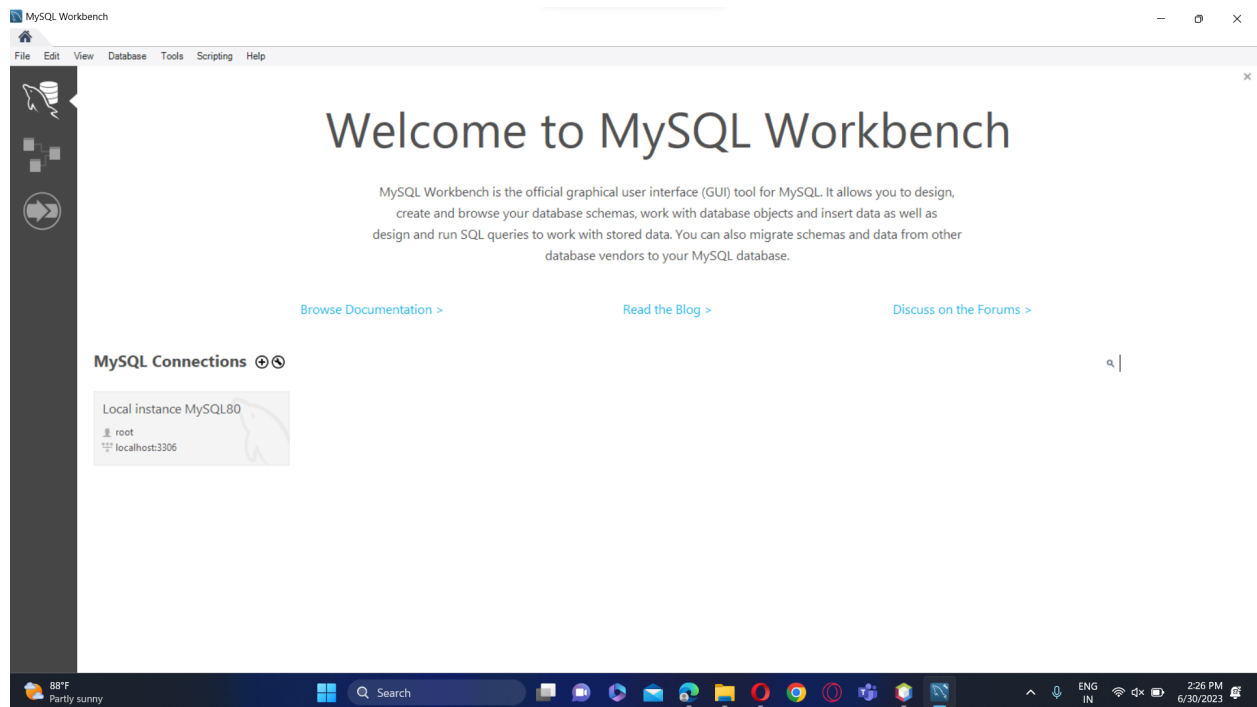
Data collection is the process of gathering and measuring information on variables of interest in an established, systematic fashion that enables one to answer stated research questions, test hypotheses, evaluate outcomes, and generate insights from the data.

## Collect The Dataset

### Activity 1.1: Understand the data

Check out the below link to understand the dataset in detail:

[https://www.kaggle.com/datasets/rodsaldanha/arketing-campaign?select=marketing\\_campaign.csv](https://www.kaggle.com/datasets/rodsaldanha/arketing-campaign?select=marketing_campaign.csv)



### Activity 2: Connect MySQL and Tableau with the dataset

MySQL

GeneralInitial SQL

Serverlocalhost

Port3306

Databasemarketing\_campaign

Usernameroot

PasswordOptional

☐ Require SSL

Sign In

Tableau - Book2[1]

DataServerWindowHelp

connectionsAdd

marketing\_campaignText file

files

☐ Use Data InterpreterData Interpreter might be able to clean your Text file workbook.

marketing\_campaign.csv

New Union

New Table Extension

marketing\_campaign

marketing\_campaign.csv

Need more data?  
Drag tables here to relate them. [Learn more](#)

Connection: ☒ Live ☐ Extract

Filters: 0 | [Add](#)

marketing\_campaign.csv 32 fields 8960 rows 100 rows

Name	marketing_campaign.csv
marketing_campaign.csv	

Type	Field Name	Physical Table	Rem...
#	ID	marketing_campaign...	ID
#	Year Birth	marketing_campaign...	Year...
Abc	Education	marketing_campaign...	Educa...

#	marketing_campaign.csv	Year Birth	Education	Marital Status	Income	Kidhome
	5524	1957	Graduation	Single	58,138	
	5524	1957	Graduation	Single	58,138	
	5524	1957	Graduation	Single	58,138	
	5524	1957	Graduation	Single	58,138	
	2174	1954	Graduation	Single	46,344	
	2174	1954	Graduation	Single	46,344	

The screenshot shows the Tableau interface with a data source named 'marketing\_campaign' connected. The main view displays a preview of the data with the following table:

ID	Year Birth	Education	Marital Status	Income	Kidhome
5524	1957	Graduation	Single	58,138	
5524	1957	Graduation	Single	58,138	
5524	1957	Graduation	Single	58,138	
5524	1957	Graduation	Single	58,138	
2174	1954	Graduation	Single	46,344	
2174	1954	Graduation	Single	46,344	

The bottom pane shows various data source options: Data Source, Purchase type, Distribution according to campa..., Marital Status of customers, Spending by Age Group, Spending by product, Education to Income ratio, Join date and purchase type, Purchase Type, Age and Marital ..., and Number.

## Data Preparation

Data preparation for Tableau involves the process of organizing, cleaning, and transforming raw data into a format that can be effectively visualized and analyzed within the Tableau software. This includes tasks such as data cleaning, data integration, data formatting, and data aggregation. The goal is to ensure that the data is accurate, consistent, and structured in a way that enables meaningful insights and visualizations in Tableau.

## Prepare The Data For Visualization

Preparing the data for visualization involves cleaning the data to remove irrelevant or missing data, transforming the data into a format that can be easily visualized, exploring the data to identify patterns and trends, filtering the data to focus on specific subsets of data, preparing the data for visualization software, and ensuring the data is accurate and complete. This process helps to make the data easily understandable and ready for creating visualizations to gain insights into the performance and efficiency.

## Data Visualization

Data visualization is the process of creating graphical representations of data in order to help people understand and explore the information. The goal of data visualization is to make complex datasets more accessible, intuitive, and easier to interpret. By using visual elements such as charts, graphs, and maps, data visualizations can help people quickly identify patterns, trends, and outliers in the data.



## No Of Unique Visualizations (Filters Applied)

The number of unique visualizations that can be created with a given dataset. Some common types of visualizations that can be used to analyze the data include bar charts, line charts, heat maps, scatter plots, pie charts, maps, etc. These visualizations can be used to compare performance, track changes over time, show distribution, and show relationships between variables.

1. We use filters to remove redundant and useless data. Eg: Here, Both education and Marital Status had unusable portions.

Filter [Education]

General Wildcard Condition Top

☒ Select from list ☐ Custom value list ☐ Use all

Enter search text

☐ 2n Cycle  
☒ Basic  
☒ Graduation  
☒ Master  
☒ PhD

Filter [Marital Status]

General Wildcard Condition Top

☒ Select from list ☐ Custom value list ☐ Use all

Enter search text

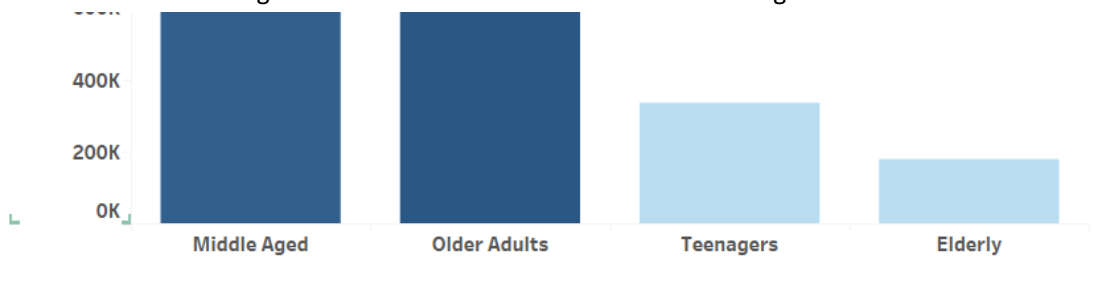
☒ Absurd  
☒ Alone  
☐ Divorced  
☐ Married  
☐ Single  
☐ Together  
☐ Widow  
☒ YOLO

2. We use calculated fields for age.

Age  marketing\_campaign

2023 - [Year Birth]

3. We use aliases to changes names of variable for easier understanding.



AcceptedCmp1 - 1 if customer accepted the offer in the 1st campaign, 0 otherwise

AcceptedCmp2 - 1 if customer accepted the offer in the 2nd campaign, 0 otherwise

AcceptedCmp3 - 1 if customer accepted the offer in the 3rd campaign, 0 otherwise

AcceptedCmp4 - 1 if customer accepted the offer in the 4th campaign, 0 otherwise

AcceptedCmp5 - 1 if customer accepted the offer in the 5th campaign, 0 otherwise

Response (target) - 1 if customer accepted the offer in the last campaign, 0 otherwise

Complain - 1 if customer complained in the last 2 years

DtCustomer - date of customer's enrolment with the company

Education - customer's level of education

Marital - customer's marital status

Kidhome - number of small children in customer's household

Teenhome - number of teenagers in customer's household

Income - customer's yearly household income

MntFishProducts - amount spent on fish products in the last 2 years

MntMeatProducts - amount spent on meat products in the last 2 years

MntFruits - amount spent on fruits products in the last 2 years

MntSweetProducts - amount spent on sweet products in the last 2 years

MntWines - amount spent on wine products in the last 2 years

MntGoldProds - amount spent on gold products in the last 2 years

NumDealsPurchases - number of purchases made with discount

NumCatalogPurchases - number of purchases made using catalogue

NumStorePurchases - number of purchases made directly in stores

NumWebPurchases - number of purchases made through company's web site

NumWebVisitsMonth - number of visits to company's web site in the last month

Recency - number of days since the last purchase

- # AcceptedCmp1
- # AcceptedCmp2
- # AcceptedCmp3
- # AcceptedCmp4
- # AcceptedCmp5
- # Age
- # Complain
- # Income
- # Kidhome
- # Mnt Fish Products
- # Mnt Fruits
- # Mnt Gold Prods
- # Mnt Meat Products
- # Mnt Sweet Products
- # Mnt Wines
- # PurchaseTypeAmount
- # Recency
- # Response
- # Teenhome
- # Total number of custo...
- # Total Spending
- # Z CostContact
- # Z Revenue
- # *marketing\_campaign.c...*
- # *Measure Values*

- .||. Age (bin)
- 🔗 Age (group)
- 📅 Dt Customer
- Abc Education
- # ID
- Abc Marital Status
- # Num Web Visits Month
- Abc PurchaseType
- # Year Birth
- Abc *Measure Names*

**Explanation video link :**

<https://drive.google.com/drive/folders/1O4Rt0OIS2J-cVRFnYP31gqX5ttFkdSVD?usp=sharing>

# Dashboard

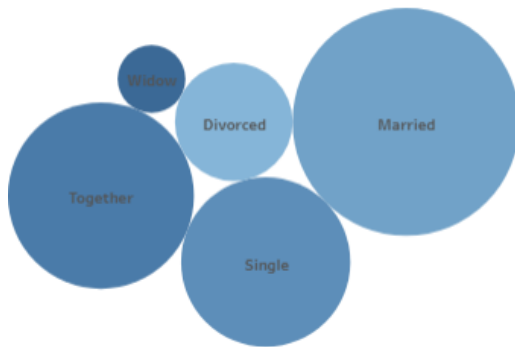
By using the dashboard businesses can harness customer data and enhance their tactics. It begins by collecting relevant customer data from various sources such as CRM systems, transaction records, and online analytics. This data is then integrated and organized within the dashboard for easy analysis and visualization. Key performance indicators (KPIs) are identified to align with business objectives.

Through visual representation such as charts and graphs, the dashboard allows for the identification of trends, patterns, and insights. Businesses can segment customers based on demographics, behavior, or preferences to tailor marketing campaigns and personalize experiences. By continuously monitoring performance and making data-driven decisions, businesses can optimize tactics, improve customer satisfaction, and drive growth. The iterative process of refining strategies based on dashboard insights enables businesses to stay agile and responsive in a dynamic market.

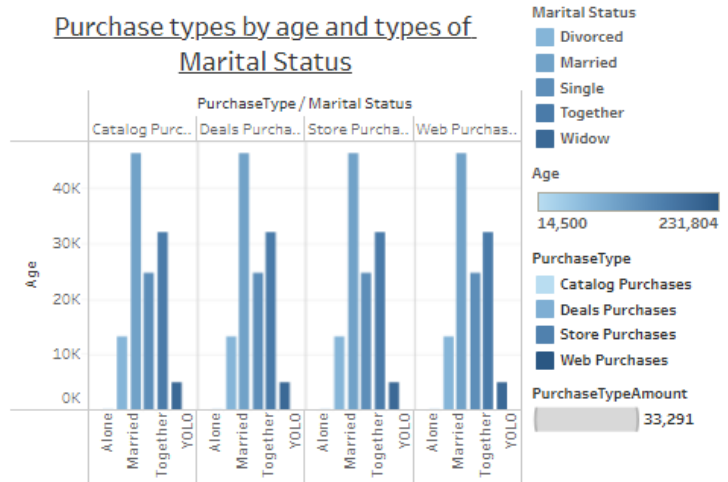
**Explanation video link:**

<https://drive.google.com/drive/folders/1O4Rt0OIS2J-cVRFnYP31gqX5ttFkdSVD?usp=sharing>

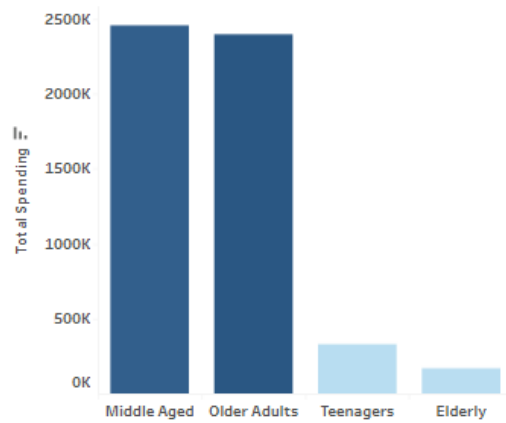
Marital status of all the customers



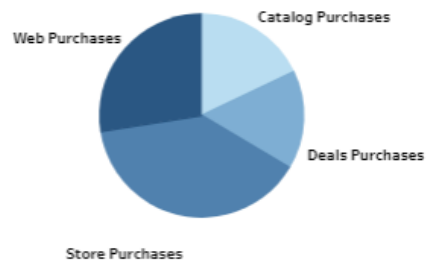
Purchase types by age and types of Marital Status

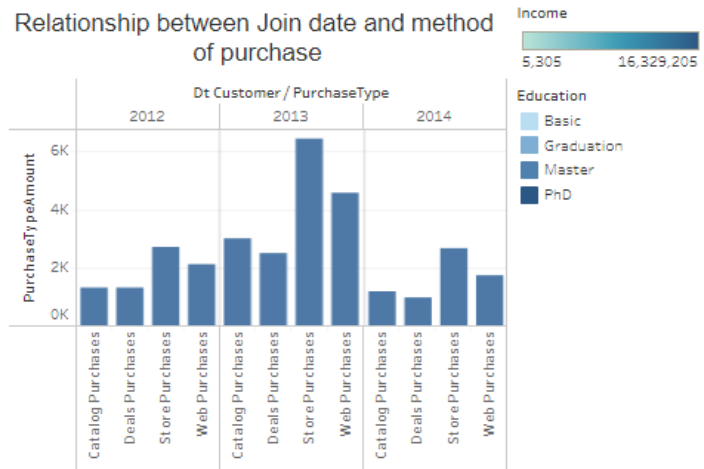
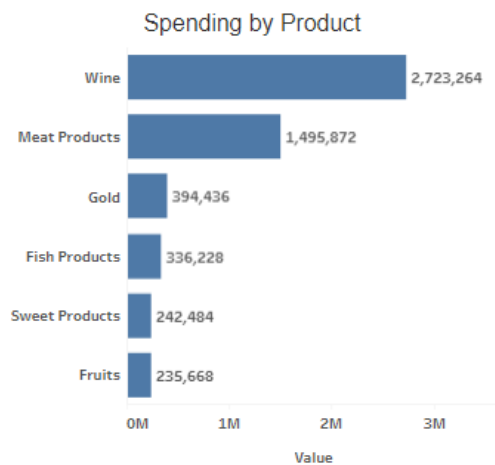


Spending by Age Group

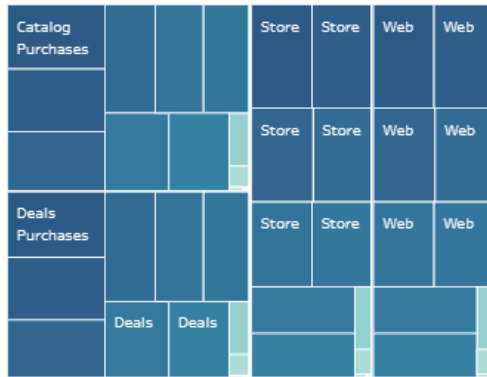


The type in which the purchase has been made compared to total purchases

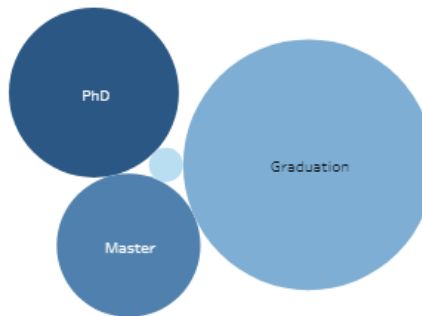




Relation between Number of Visits, Income and Purchase Type



Education to Income ratio



## Story

Using Tableau's powerful data visualization tools, the story unfolds with various interactive charts and graphs that showcase key market insights. The first visual highlights customer segments based on their spending habits, providing a clear understanding of the most profitable segments.

Moving forward, the story delves into the analysis of customer preferences and identifies popular product categories. Interactive heatmaps and bar charts showcase the distribution of spending across different product lines, giving the business a deeper understanding of customer preferences.

Finally, the story concludes by presenting actionable recommendations based on the insights gained. These recommendations include optimizing marketing strategies, tailoring product offerings, and targeting specific customer segments to maximize growth potential.

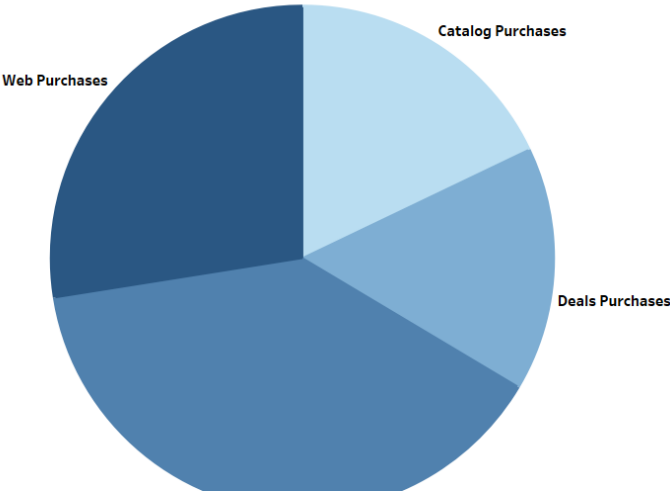
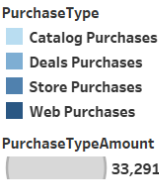
# No Of Scenes Of Story

There are 3 stories which we have created for this project each aiming at the key features of this project. The last one has 2 scenes in the story to explain the Dashboards.

## Priorities in Purchases

1/1

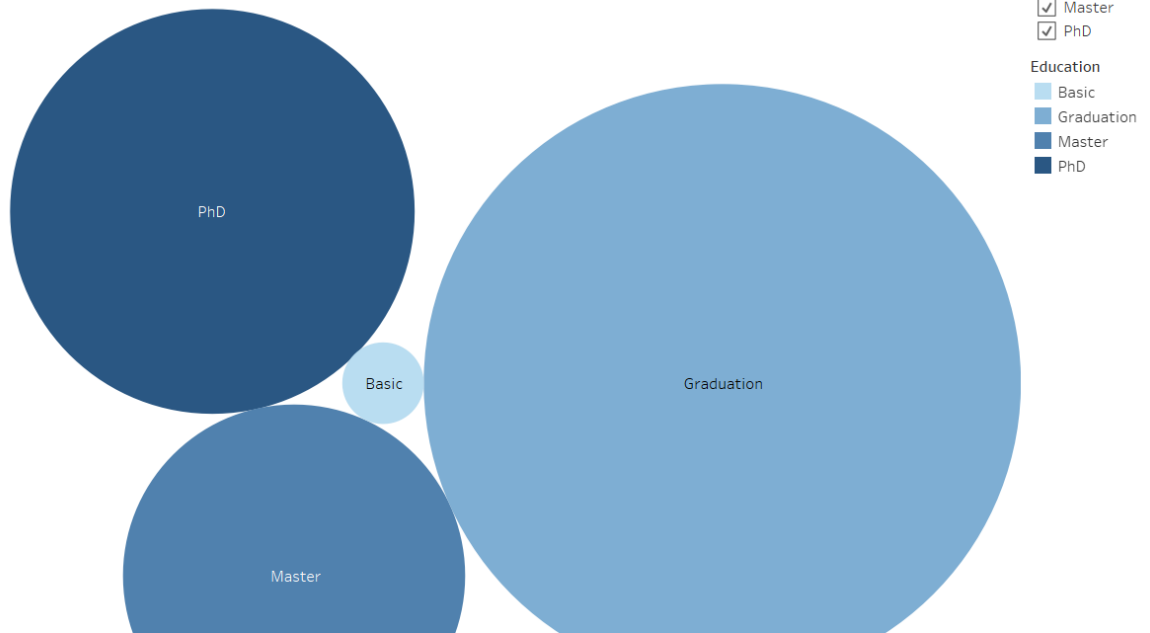
This shows us what are the type sof purchases that have been done with respect to other purchases



## Income in different Occupation Sectors

1/1

We can see which groups of people to target based on the difference in education

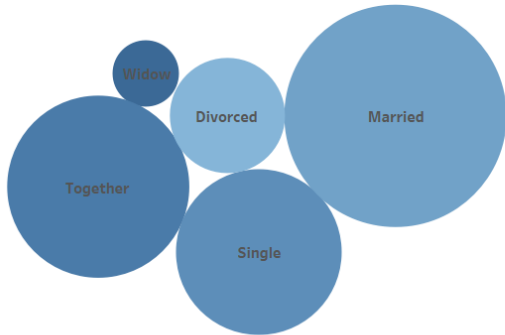




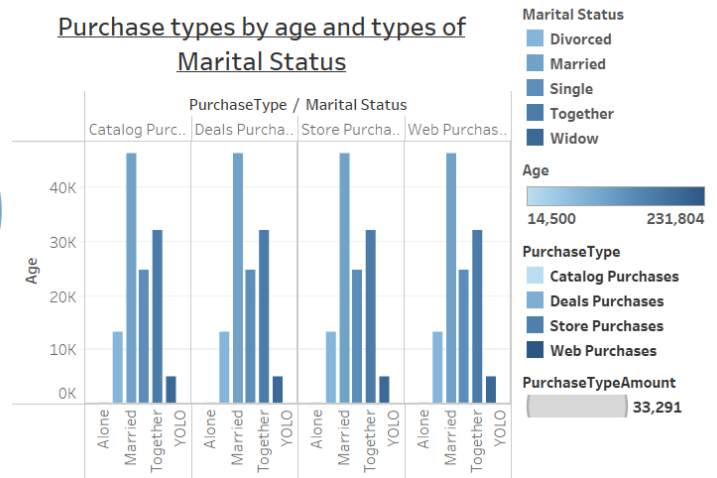
## Marketing Campaign

< 1/2 >

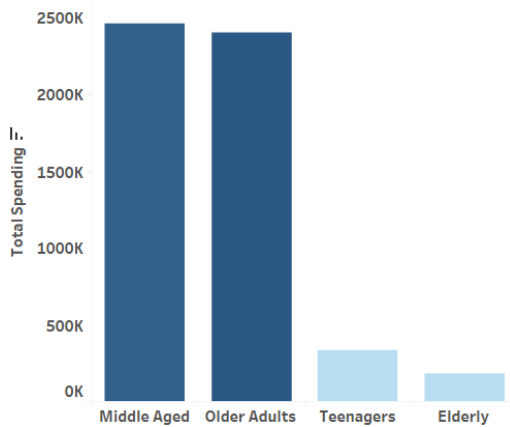
Marital status of all the customers



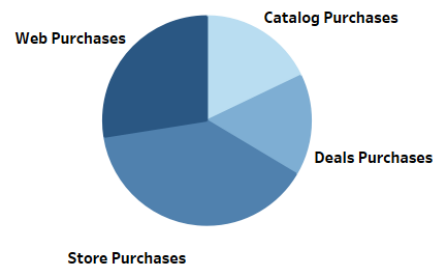
Purchase types by age and types of Marital Status



Spending by Age Group



The type in which the purchase has been made compared to total purchases



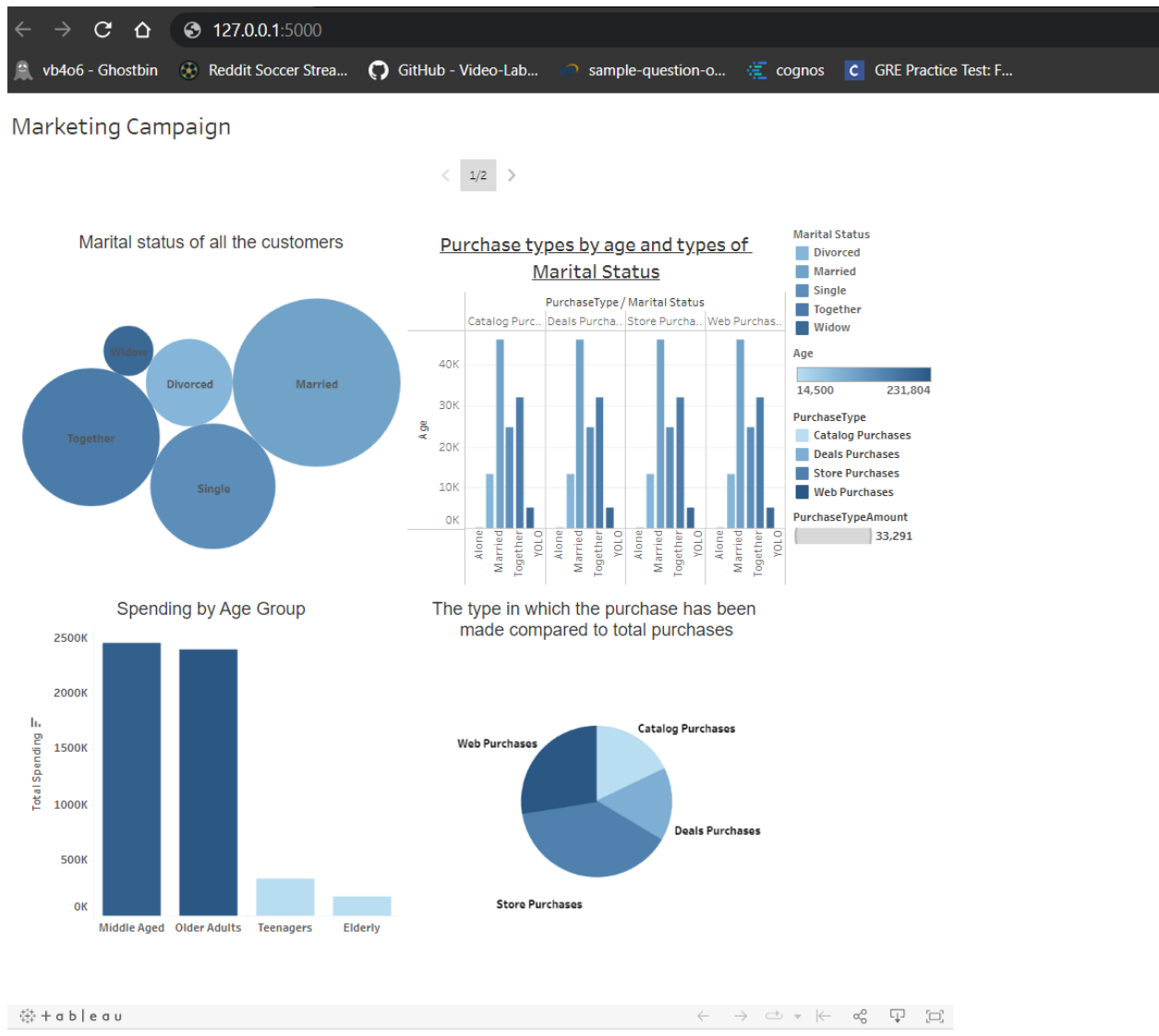
<https://drive.google.com/drive/folders/1O4Rt0OIS2J-cVRnYP31gqX5ttFkdSVD?usp=sharing>

**GitHub Link with all the Assignments and required files:**

<https://github.com/Suubuus/Data-Analysis>

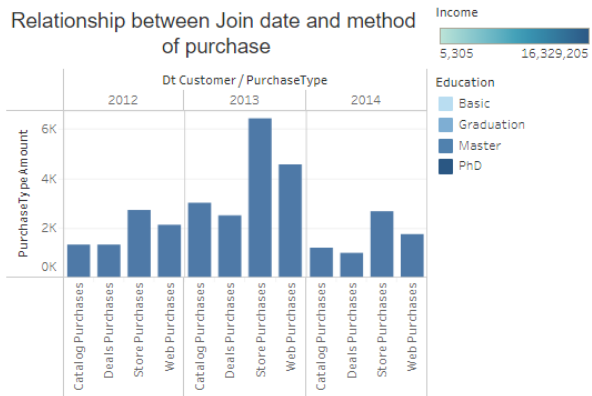
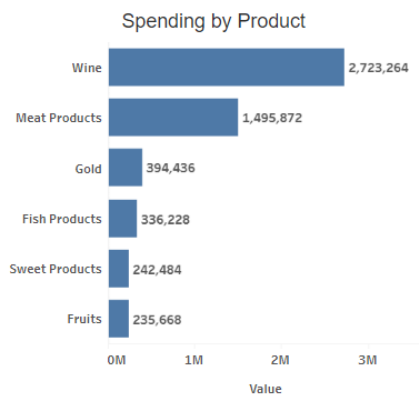
# Web Integration

We used the flask method to integrate the project into a website format. By creating a HTML file for the Story and Dashboard, we then integrate the embed link into this file. We then call this file using flask in Visual studio code and run the program to get the result.



## Marketing Campaign

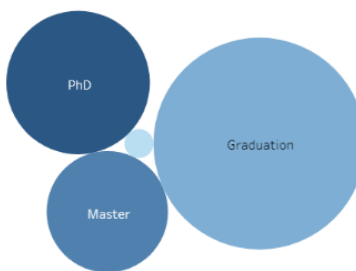
< 2/2 >



Relation between Number of Visits,  
Income and Purchase Type



Education to Income ratio



### Uploading The Link to our Tableau Public Story+Dashboard:

[https://public.tableau.com/shared/W3S6RD9B9?:display\\_count=n&:origin=viz\\_share\\_link](https://public.tableau.com/shared/W3S6RD9B9?:display_count=n&:origin=viz_share_link)

### Activity : Integrating with Tableau Public and Web Integration Using Flask:

<https://drive.google.com/drive/folders/1O4Rt0OIS2J-cVRFnYP31ggX5ttFkdSVD?usp=sharing>

