

IMPROVING CUSTOMER ENGAGEMENT FOR A MINI SUPERMARKET USING CONSUMER PERSONALITY ANALYSIS

A PROJECT REPORT

in partial fulfillment for the award of the degree

of

MASTER OF BUSINESS ADMINISTRATION

in

BUSINESS ANALYTICS

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STATEMENT OF ORIGINALITY

In accordance with the requirements for the Degree of Master of Business Administration in BUSINESS ANALYTICS, in SCHOOL OF DATA SCIENCE AND FORECASTING, I present this report entitled IMPROVING CUSTOMER ENGAGEMENT FOR A MINI SUPERMARKET USING CONSUMER PERSONALITY ANALYSIS. This report is completed under the supervision of:

Prof. VANDIT HEDAU

Lecturer

I declare that the work presented in the report is my own work except as acknowledged in the text and footnotes, and that to my knowledge this material has not been submitted either in whole or in part, for any other degree at this University or at any other such institution.



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September 2021

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RECOMMENDATION

This dissertation entitled **IMPROVING CUSTOMER ENGAGEMENT FOR A MINI SUPERMARKET USING CONSUMER PERSONALITY ANALYSIS** towards the partial fulfillment of Degree of Master of Business Administration in Business Analytics of Devi Ahilya Vishwavidyalaya, Indore is a satisfactory account of his/her project work and is recommended for the award of degree.

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CERTIFICATE

This is to certify that the dissertation entitled “[Improving Customer Engagement for a Mini Supermarket Using Consumer Personality Analysis](#)” submitted by [Vedang Kulkarni](#) is approved for the award of Master of Business Administration in Business Analytics.

Prof. Vandit Hedau

Oct 2021

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I feel to acknowledge my indebtedness and gratitude to my friends for their valuable support and guidance throughout the degree course which shaped my present work.

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Vedang Kulkarni

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ABSTRACT

Customer Engagement is one of the key factors that is influencing businesses today. It is also the most crucial aspect of each and every industry. Customer Engagement acts as an emotional bridge between a customer and a brand. Customer Engagement develops loyalty and strengthens relationship with customers.

Today, many retail services such as mini supermarkets, are struggling to engage their customers. The reason is that there are many other options such as competitors, online retails etc., which act as hurdles in maintaining the customer engagement for these small and medium scale retailers.

This project focuses on improving customer engagement for small and medium scale retailers such as mini supermarkets. For fulfilling this objective, I have used Consumer Personality Analysis. Consumer Personality Analysis is an analysis which is performed in order to better understand the ideal customers of a company and it also makes it easier for a company to modify its products according to certain consumers. For example, instead of spending money to market a new product to each and every consumer, the company can use customer segments formed using consumer personality analysis to analyze customer segments which are most likely to purchase their new product.

Segmentation of customers on the basis of various personality attributes such as financial status, changing preferences, spending habits etc., is the main purpose of this project. This segmentation would definitely fulfill our objective of improving customer engagement. The dataset used in this project was taken from a marketing campaign on [kaggle.com](https://www.kaggle.com), which is secondary data in nature. The consumer personality analysis is done using python programming language.

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CHAPTER - 1

INTRODUCTION

Customer Engagement is one of the key factors that is influencing businesses today. It is also the most crucial aspect of each and every industry. Customer Engagement acts as an emotional bridge between a customer and a brand. Customer Engagement develops loyalty and strengthens relationship with customers.

Today, many retail services such as mini supermarkets, are struggling to engage their customers. The reason is that there are many other options such as competitors, online retails etc., which act as hurdles in maintaining the customer engagement for these small and medium scale retailers.

This project focuses on improving customer engagement for small and medium scale retailers. For fulfilling our objective, we have used Consumer Personality Analysis. Consumer Personality Analysis is an analysis which is performed in order to better understand the ideal customers of a company and it also makes it easier for a company to modify its products according to certain consumers. For example, instead of spending money to market a new product to each and every consumer, the company can use customer segments formed using consumer personality analysis to analyze customer segments which are most likely to purchase their new product.

The goal here is to clearly identify needs of consumers by knowing their interests, lifestyles, priorities, and learning about their spending habits, which would help to maximize the overall value of the customers to the business. There are some aspects which will be considered in order to fulfill the objective of this project. These include:

- Optimization of Price - By understanding the financial status of consumers, it will be easier to pace up with the price optimization.
- Enhancing Competitiveness - Improved customer engagement will generate more revenue and in turn enhances company competitiveness in the market.
- Retention and Acquisition - Better customer segmentation would definitely lead to better relationships with the prospective customers.
- Increase in Revenue - By tuning focused marketing strategies, targeting potential customers would be easier and in turn will generate more revenue.

1.1 Objectives of the project

The goal here is to clearly identify needs of consumers by knowing their interests, lifestyles, priorities, and learning about their spending habits, which would help to maximize the overall value of the customers to the business. There are some aspects which will be considered in order to fulfill the objective of this project. These include:

- Optimization of Price
- Enhancing Competitiveness
- Retention and Acquisition
- Increase in Revenue

For fulfilling the above objectives and properly analyzing the needs of the potential customers, I have selected some questions. Finding answers to below questions will definitely help in improving customer engagement by devising focused marketing strategies.

- What are the statistical attributes/characteristics of your consumers?
- How are there spending habits?
- Which product category needs more focused marketing strategies?
- How the marketing can be made more effective?

CHAPTER – 2

REVIEW OF LITERATURE

Review of literature in this study is as follows:

Customer Engagement - A Literature Review, ISSN 2347-8861, Volume 2, issue: 01, by Rohit Bansal & Dr. Kuldeep Choudhary, published in the Global International Research Thoughts, suggested that enhancing customer engagement by developing a rational and emotional connection with customers is an inimitable resource for businesses today.[1]

Customer engagement: A systematic review and future research priorities, by Sylvia C. Ng & Carolin Plewa, published in the Australasian Marketing Journal, Volume 28, Issue 4, November 2020, identified the leading conceptualizations and manifestations of customer engagement, and provided an extensive list of research priorities that were developed based on future contributions of 12 distinguished international experts.[2]

An exploratory study on the influence of social media marketing strategies on customer engagement, by Esther Hepziba & Dr. Florence John, published in the International Journal of Marketing and Human Resource Management, Volume 8, Issue 3, ISSN 0976-6421, identified that there is a massive shift in the basic thinking of current customers and marketers should venture into this quickly and establish their position.[3]

Personality Factors as Predictors of Online Consumer Engagement: An Empirical Investigation, by Rahman Z. & Hollebeek L., published in Academia.edu, provided insights into the relationship between consumer personality traits and consumer engagement in the online brand community context and examined the effect of consumer engagement on customers ensuing purchase intentions.[4]

Building relationships through customer engagement in Facebook brand pages, by Thanuka Mahesh, manuscript id MIP-02-2019-0085.R4 published in Academia.edu, provided a framework for building relationships through customer engagement in Facebook Brand Pages (FBPs).[5]

Executing on a customer engagement strategy, by Venkatesan R., published in the Journal of the Academy of Marketing Science, concluded that combining insights from several research streams including customer relationship management, customer experience, social media, and customer-centric organizations would be key to developing actionable frameworks and recognize the challenges presented in developing and executing a customer engagement.[6]

Factors Influencing Consumer Engagement on Instagram: A Perspective of Bereal.id, by Indra Kuntara, Betty Purwandari, Mardiana Purwaningsih & Larastri Kumaralalita, published in 2019 Fourth International Conference on Informatics and Computing (ICIC), analyzed factors influencing consumer engagement of Bereal.id social media as a case study to maintain and grow their market.[7]

Contribution of information technology through consumer engagement to improve market growth of credit union, by Edi Abdurahman & Stephanus Remond Waworunto, published in the 2017 5th International Conference on Cyber and IT Service Management (CITSM), formulated to produce new research on the influence of IT innovation, IT resource, IT service and the involvement of consumer in enhancing business growth by creating a hypothetical test design in order to know the influence of each variable in the research.[8]

CHAPTER – 3

PYTHON PROGRAMMING LANGUAGE

Python is an interpreted, high-level, dynamically typed, general-purpose programming language.

Designed by	Guido Van Rossum
Developer	Python Software Foundation
First appeared	February 20, 1991
Stable release	3.9.7 (August 30, 2021)
Operating System	Windows, Linus/UNIX, MacOS and more
License	Python Software Foundation License
Filename extensions	.py, .pyi, .pyc, .pyd, .pyo
Website	https://www.python.org/

3.1 Why python programming language has been selected for this project?

The reasons for the selection of python programming language for this project are as follows:

- Python is a high-level programming language having syntax similar to English language paradigms which makes it easier to read and understand, even for non-coders.
- It is also a very productive language, due to its simplicity, developers can spend much more time in problem solving rather than spending hours in understanding the syntax or behaviour of the programming language
- Python comes under an OSI approved open-source license, which makes it free to use.
- The standard libraries of python are huge. You can find almost all the functions required for accomplishing your task.

3.2 Python libraries used in the project

The libraries which are used for this project are as follows:

NumPy - Numerical Python, is an open-source library which provides support for large, multi-dimensional arrays and matrices, and also provides tools for handling and working with these arrays. This library contains various packages that aid in scientific computing and various other mathematical operations.

The installation procedure and complete documentation for NumPy can be found at <https://numpy.org/>. [9]

Pandas - Python Data Analysis, is a very fast and powerful open-source library which provides flexible and expressive data structures designed for real-world data manipulation and analysis. It allows a wide range of operations on data such as merging, reshaping, selecting, and offers features for data wrangling and cleaning as well.

The installation procedure and complete documentation for NumPy can be found at <https://pandas.pydata.org/>. [10]

Matplotlib - A cross-platform and comprehensive library which is used for graphical plotting and static visualization of data. It offers a viable open-source alternative to MATLAB. Many developers use matplotlib's application programming interfaces to embed plots to various graphical user interfaces.

The installation procedure and complete documentation for NumPy can be found at <https://matplotlib.org/>. [11]

Seaborn - A statistical data visualization library based on Matplotlib, which is used to create interactive data visualizations and is integrated closely with Pandas data structures. Seaborn uses fewer syntax than matplotlib and has stunning default themes.

The installation procedure and complete documentation for NumPy can be found at <https://seaborn.pydata.org/>. [12]

Plotly - It is a high-level, interactive, open-source, browser-based, declarative charting and graphing library with over 30 chart types including 3D graphs, scientific charts, statistical graphs, SVG maps, and financial charts. It offers clean, simple, and beautiful visualization tool for data.

The installation procedure and complete documentation for NumPy can be found at <https://plotly.com/>. [13]

CHAPTER – 4

RESEARCH METHODOLOGY

4.1 Data Collection

The data for this project report has been collected from a secondary source.

Source link - <https://www.kaggle.com/datasets>

4.2 Data Dictionary

Attributes	Description
ID	Customer's unique identifier
Year_Birth	Customer's birth year
Education	Education qualification of customer
Marital_Status	Marital status of customer
Income	Annual household income of customer
Kidhome	No. of children in customer's household
Teenhome	No. of teenagers in customer's household
Dt_Customer	Date of enrollment of customer with the company
Recency	No. of days since customer's last purchase
MntWines	Amount spent on wine
MntFruits	Amount spent on fruits
MntMeatProducts	Amount spent on meat products
MntFishProducts	Amount spent on fish products
MntSweetProducts	Amount spent on sweet products
MntGoldProducts	Amount spent on gold products
NumDealsPurchases	No. of purchases during deals
NumWebPurchases	No. of purchases from web
NumCatalogPurchases	No. of purchases from catalogs
NumStorePurchases	No. of purchases from stores
NumWebVisitsMonth	No. of monthly web visits
AcceptedCmp1	Customer acceptance for campaign 1
AcceptedCmp2	Customer acceptance for campaign 2
AcceptedCmp3	Customer acceptance for campaign 3
AcceptedCmp4	Customer acceptance for campaign 4
AcceptedCmp5	Customer acceptance for campaign 5

CHAPTER – 5

DATA INTERPRETATION

5.1 Exploratory Data Analysis

1. Exploring the marital status of customers through visualizing it with the help of a pie diagram.

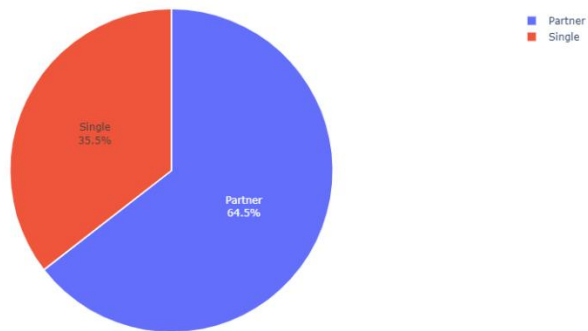


Fig. 5.1 Marital status of customers

Insights: Two-third of the customers are having a partner or are married, and one-third of the customers are single, divorced, or widows etc.

2. Plotting the spending on the basis of the marital status of the customers with the help of a horizontal bar chart.

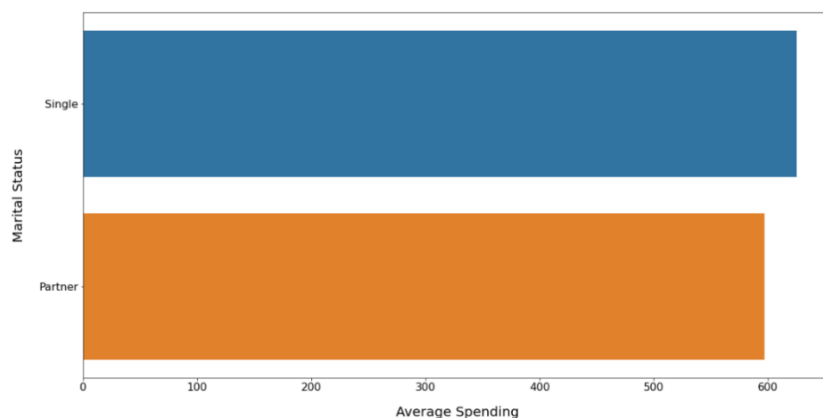


Fig. 5.2 Spending on the basis of marital status of customers

Insights: Despite being in minority, on an average Singles spend more money in comparison to those having Partners or are Married.

3. Exploring the education qualification of the customers by visualizing it with the help of a pie diagram.

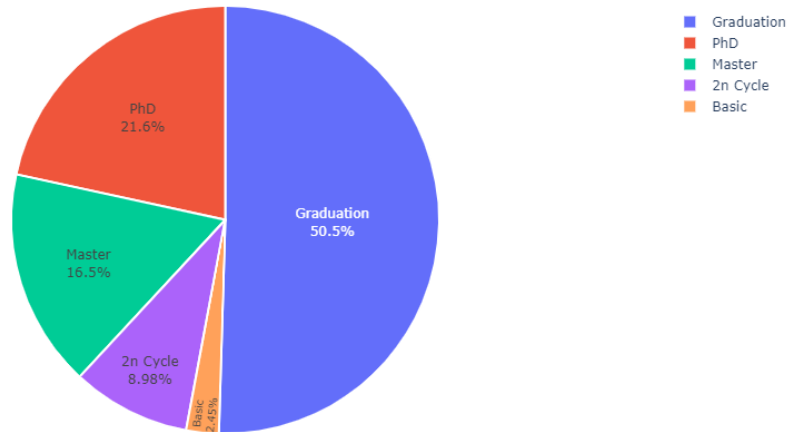


Fig. 5.3 Education qualification of customers

Insights: Half of the customers are university graduates. There are more customers who hold PhD degrees than the customers who did masters.

4. Plotting the number of dependents or children of the customers in order to analyze their dependency.

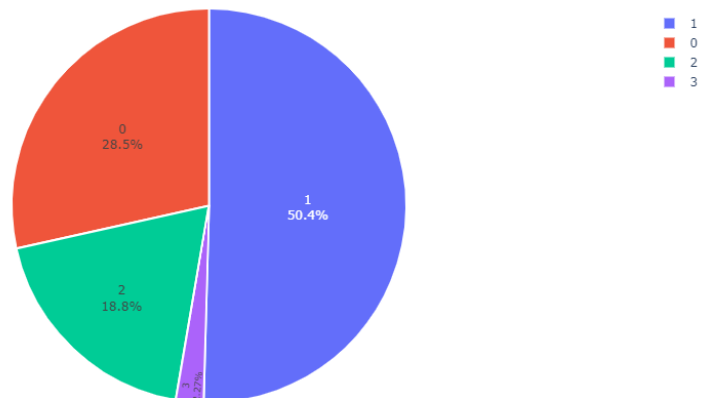


Fig. 5.4 Number of dependents or children

Insights: About 50% of the customers have only one child. 28% of the customers do not have any dependents at home while 19% of them have 2 children.

5. Exploring the average spending of the households on the basis of the number of dependents or children.

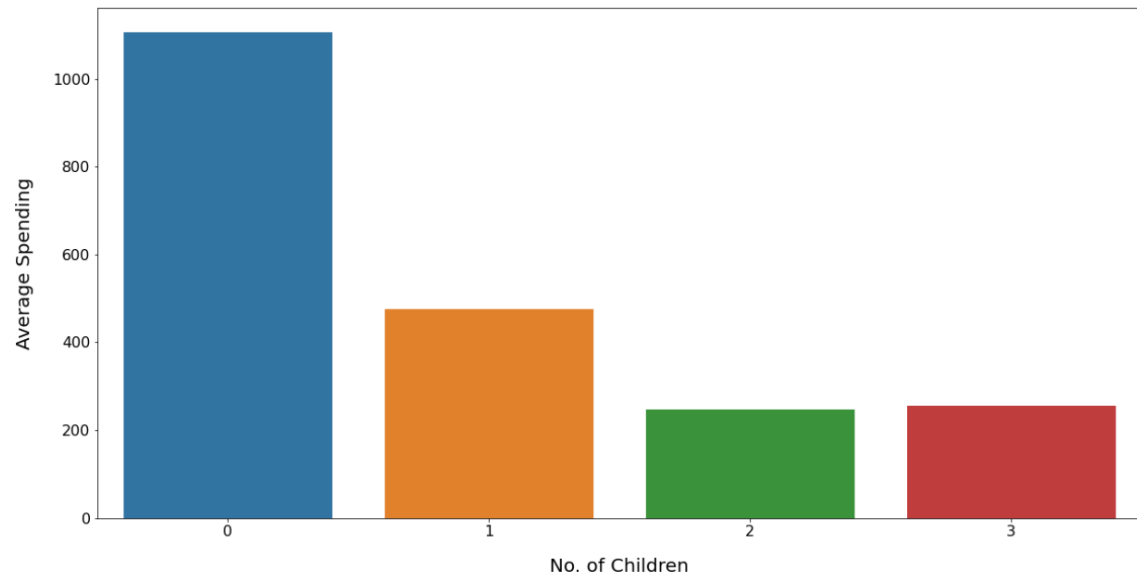


Fig. 5.5 Average household spending on the basis of no. of dependents or children

Insights: Customers who don't have any dependents or children are spending much more than those having dependents at home.

6. Exploring the age of the customers by plotting it using a normal distribution.

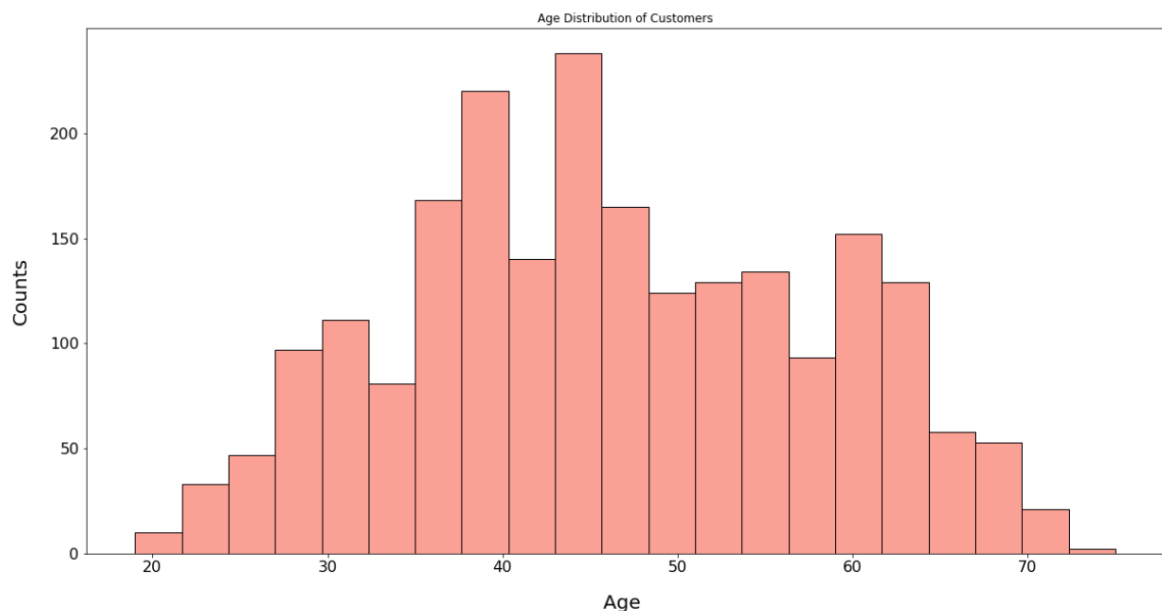


Fig. 5.6 Age distribution of customers

Insights: The age of the customers is nearly normally distributed, with most of the customers aged between 35 to 65.

7. Plotting the age of the customers with respect to spending in order to explore any relation between the attributes.

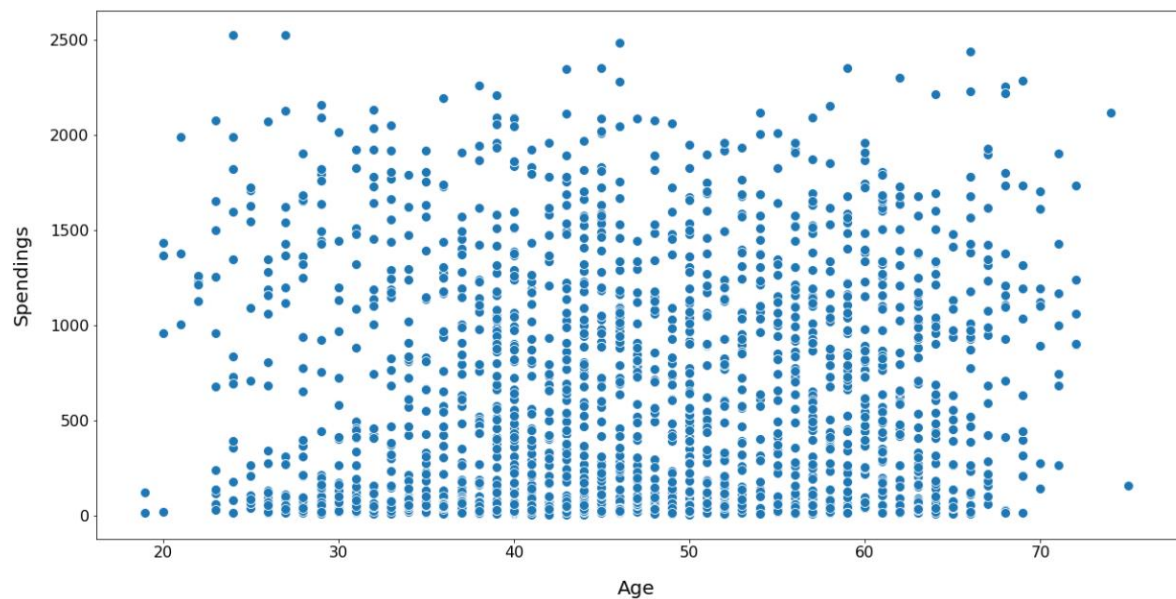


Fig. 5.7 Age vs Spending

Insights: It seems that there is no clear relationship between the age of the customers and their spending habits.

8. Exploring various age-groups of customers by segmenting on the basis of customer age with the help of a pie diagram.

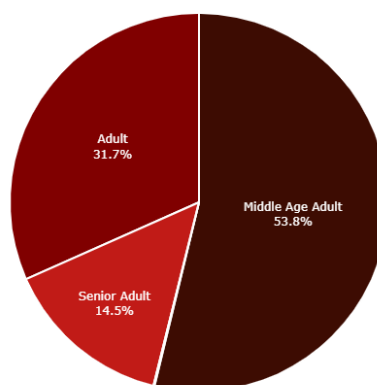


Fig. 5.8 Segmentation on the basis of age of the customer

Insights: More than 50% of the customers are middle-aged adults aged between 40 and 60.

9. Analyzing the average spending of various age groups by plotting it on a horizontal bar chart in order to know the spending habits of customers.

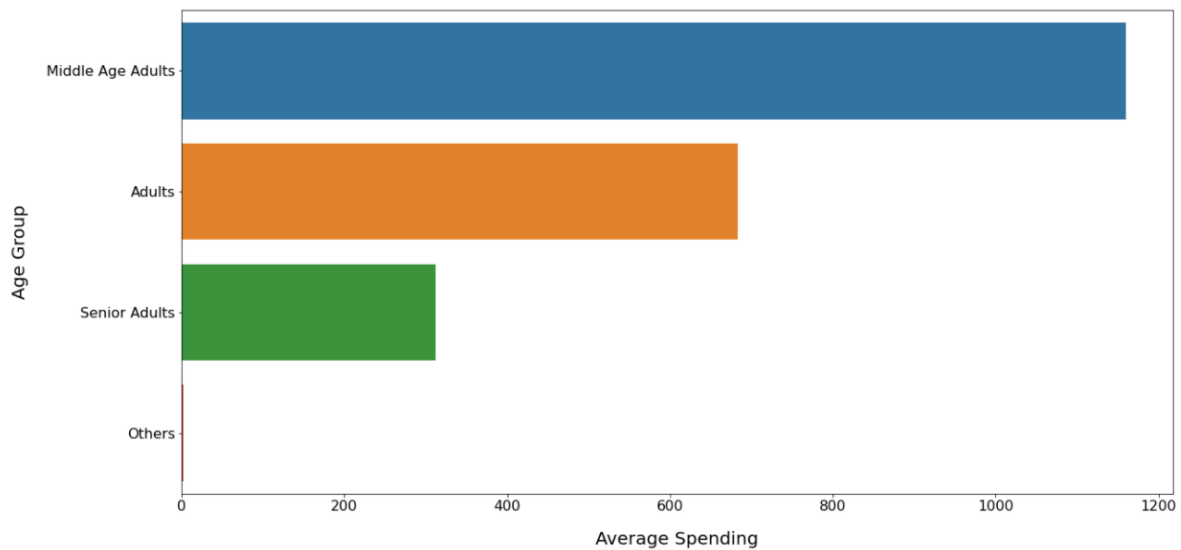


Fig. 5.9 Average Spending vs Age groups

Insights: The customers having age between 35 and 60 i.e., middle aged adults have spent much more than other age groups.

10. Analyzing the income distribution of customers using a normal distribution curve, which will be very beneficial for retailers to identify key customers.

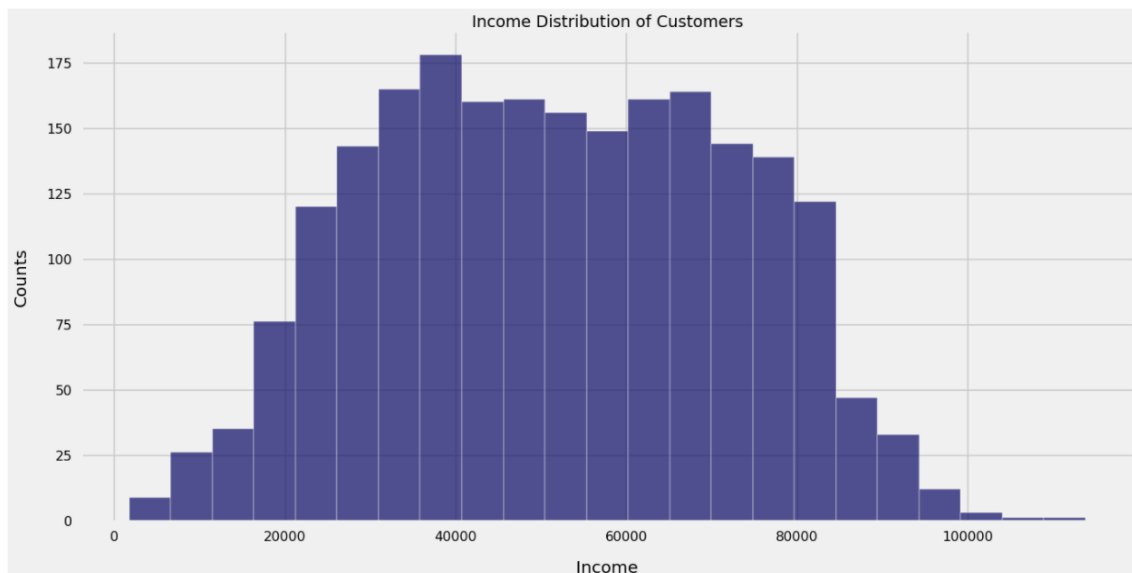


Fig. 5.10 Income distribution of customers

Insights: The salaries of the customers have normal distribution with most of the customers earning between 25,000 and 80,000.

11. Analyzing the relationship between the income of customers and their spending with the help of a scatter plot, would definitely aid in identifying premium customers.

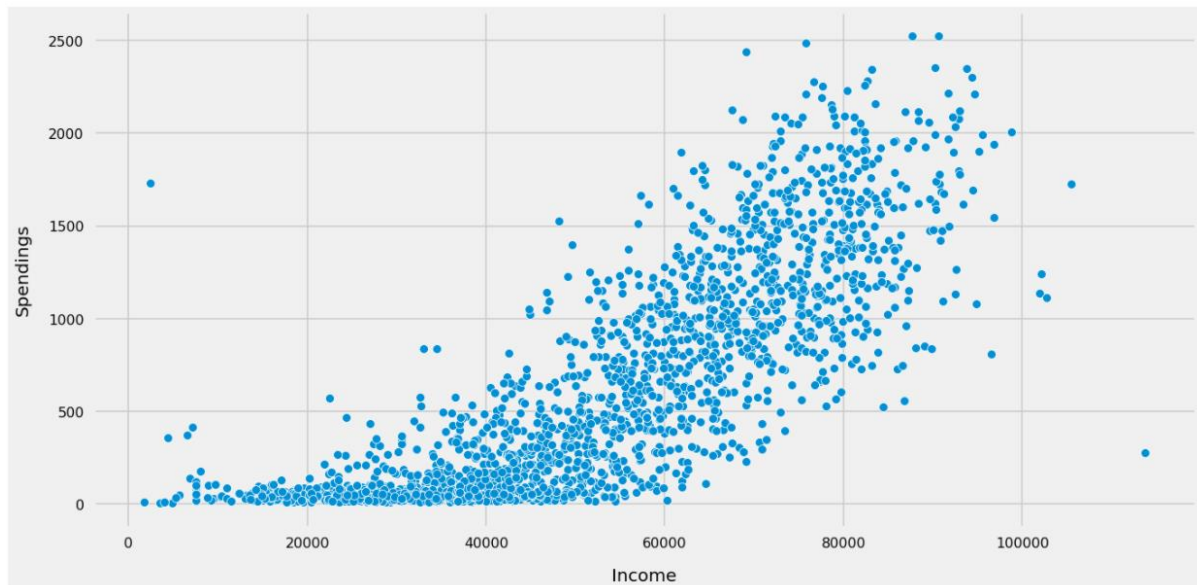


Fig. 5.11 Income vs Spending

Insights: The relationship is linear. Customers having higher salaries are spending more.

12. Analyzing the products which are most in demand by plotting the most bought products using a horizontal bar chart.

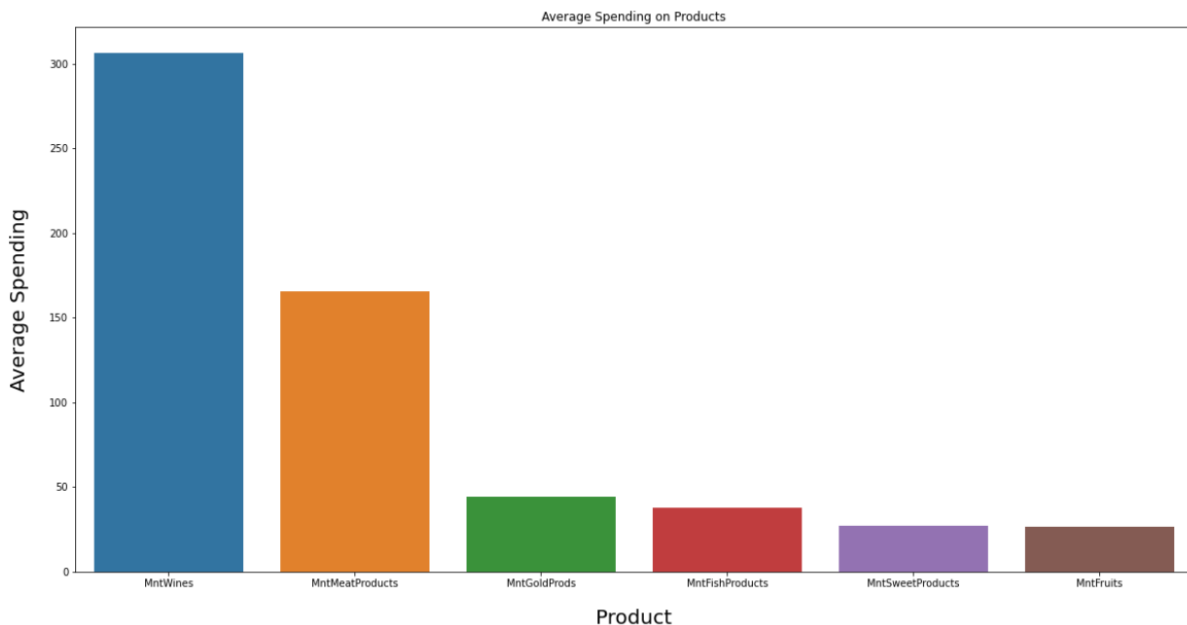


Fig. 5.12 Most bought products

Insights: Wine and meat are the most bought products.

5.2 Modelling Clusters

Let's find out the different segments of the customers based on different features of the customers data using the K-Means Clusters.

14. Determining the optimum number of clusters using elbow method, for customer segmentation.

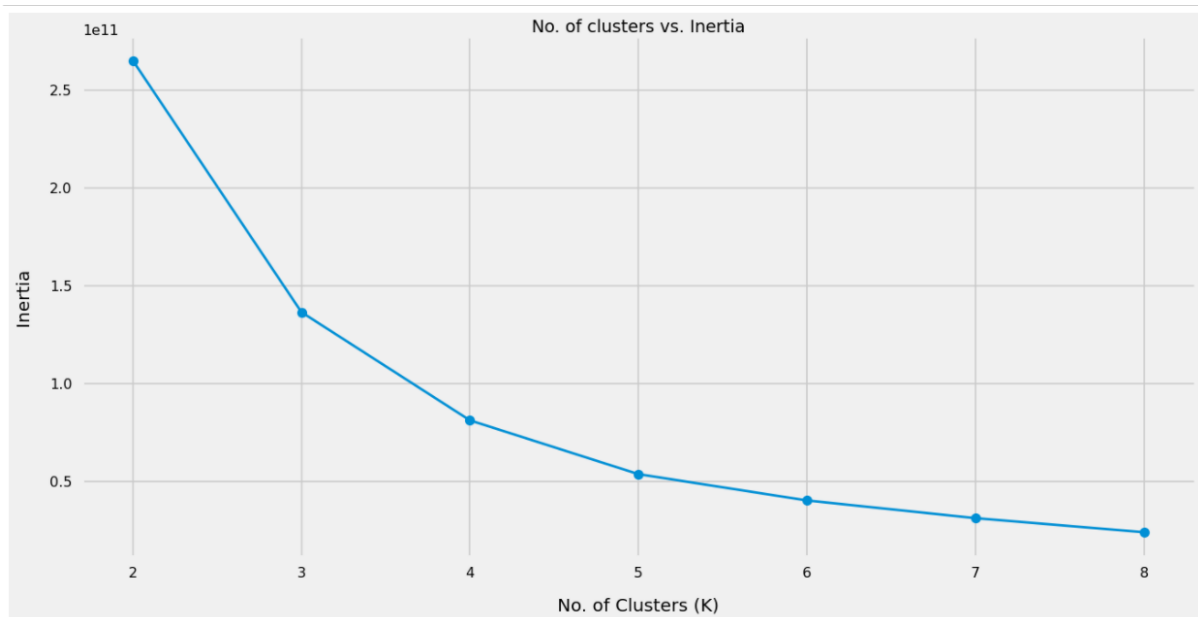


Fig. 5.13 Optimum number of clusters using elbow method

Insights: Based on the above plot we will segment the customers into 4 clusters since the inertia value does not decrease much after 4 clusters.

15. Identification of clusters based on income and spending of customers using a box plot.

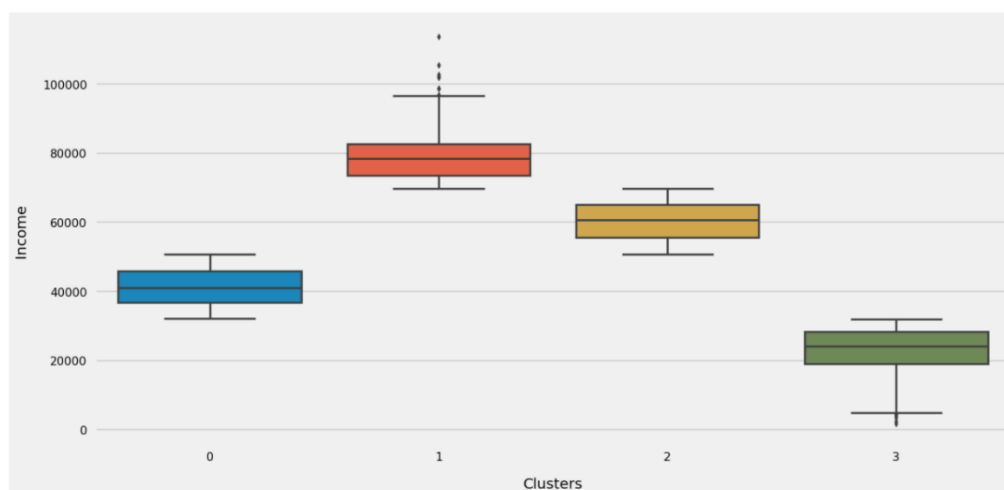


Fig. 5.14 Clusters based on income of customer

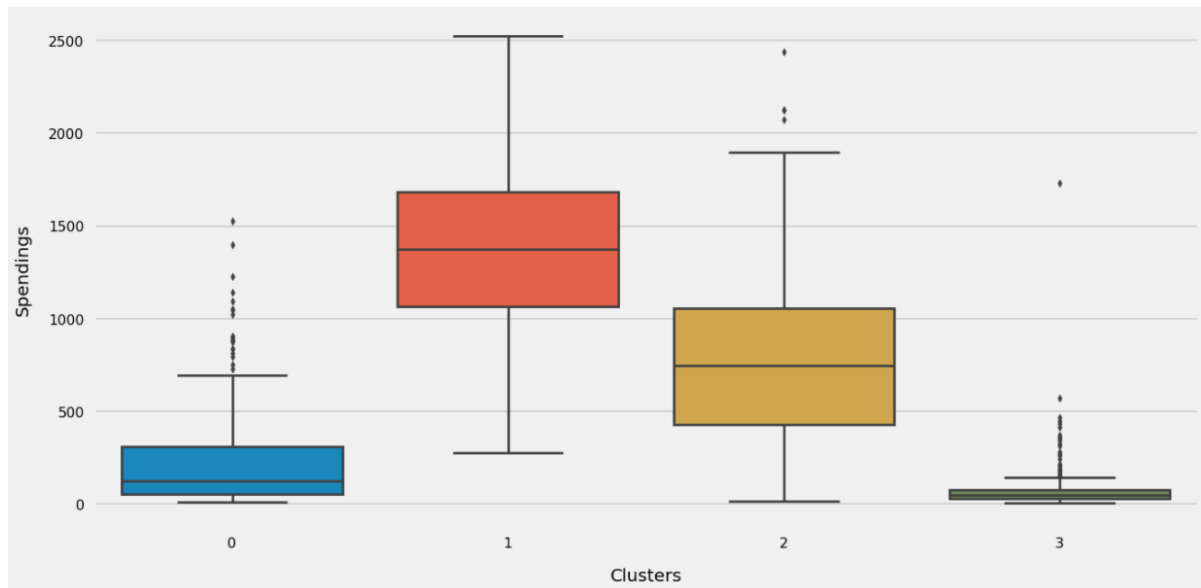


Fig. 5.15 Clusters based on spending of customer

From the above analysis we can segment the customers into 4 groups based on their income and total spending:

Platinum: Customers with highest earnings and highest spending.

Gold: Customers with high earnings and high spending.

Silver: Customers having low salary and less spending.

Bronze: Customers having lowest salary and least spending.

16. Exploring customers on the basis of above clusters to get an idea of premium and good customers.

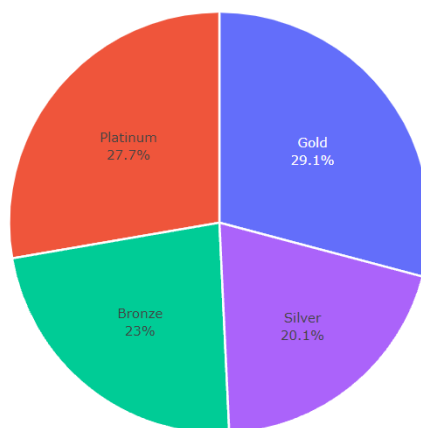


Fig. 5.16 Customer distribution based on clusters

17. Analyzing the relationship between income of customer and their spending with respect to the clusters would give us an idea about spending habits of customers from different clusters.

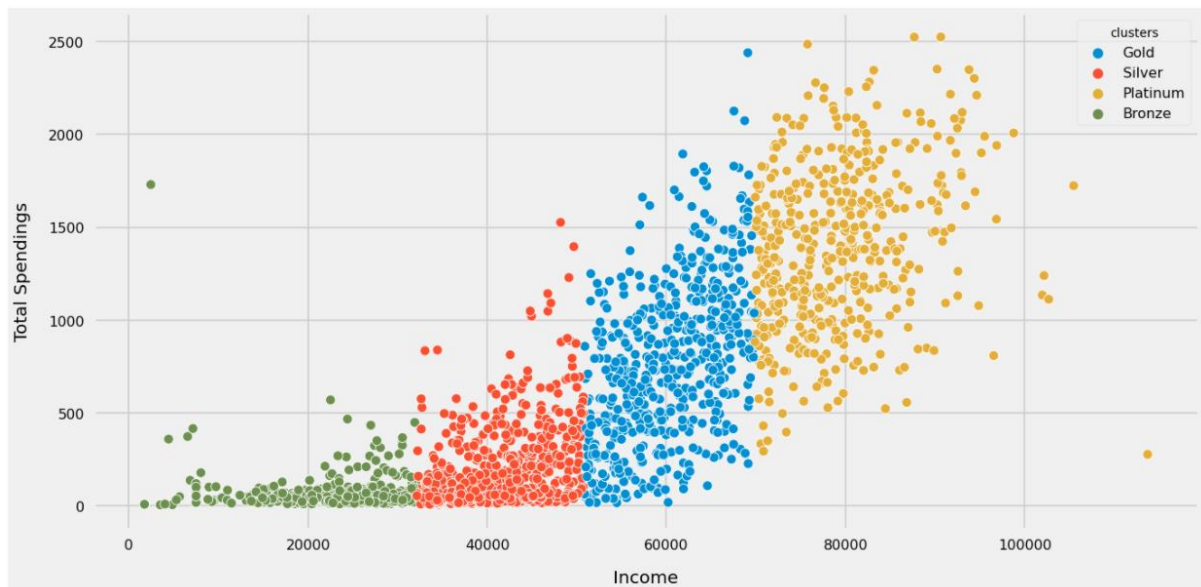


Fig. 5.17 Income vs Spending wrt Clusters

Insights: The above plot clearly shows a linear relationship. Those earning more are spending more.

18. Analyzing the spending habits of customers with respect to the cluster on various products.

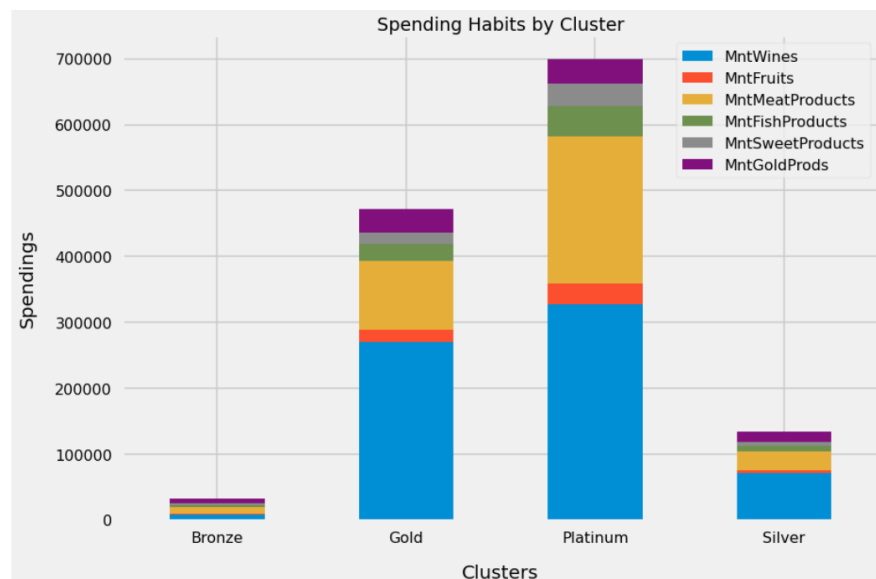


Fig. 5.18 Spending on products vs Clusters

Insights: Customers from all the segments have spent most of their money on Wine and Meat products.

19. Analyzing the purchasing habits of customers would help the retailers to provide deals and benefits on various sources of purchase i.e., online, catalogues etc.

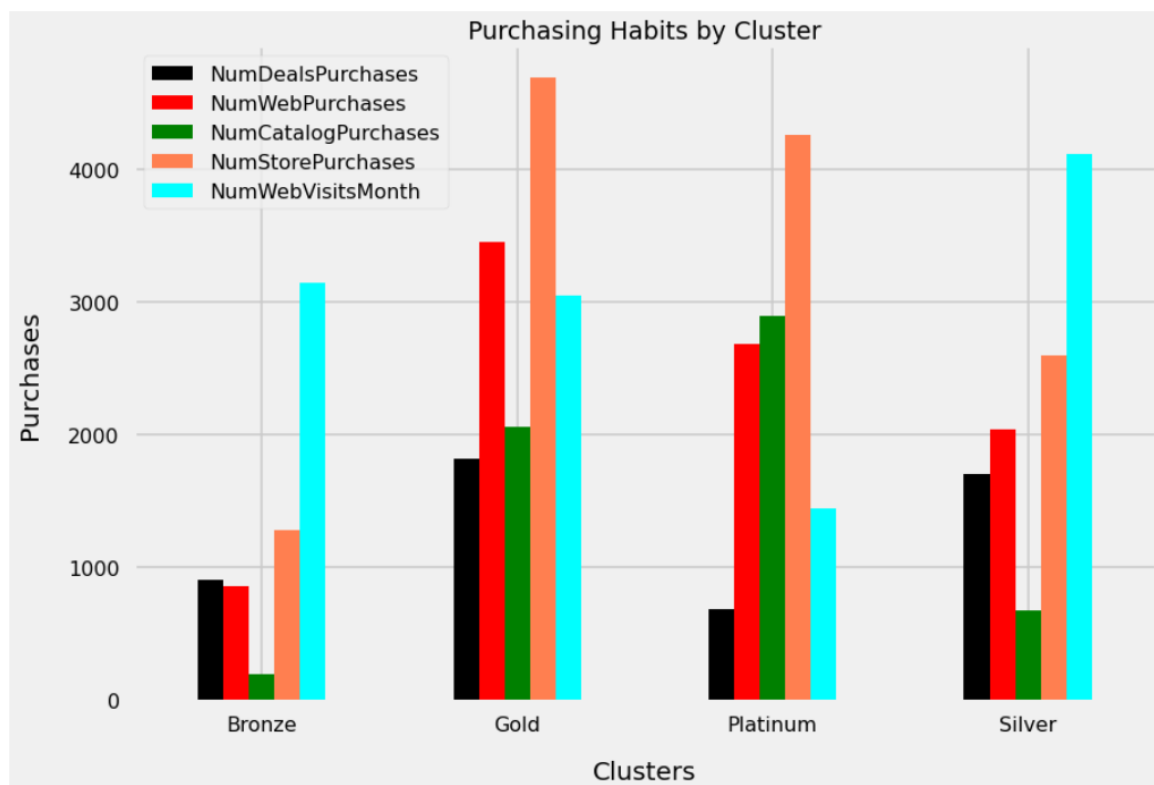


Fig. 5.19 Purchases vs Clusters

Insights:

- Platinum and Gold Customers mostly likely to do store purchasing.
- Most of the web and catalogue purchases are also done by the customers from Platinum and Gold segments.
- Silver and Gold categories also like to buy from the stores.
- Deal purchases are common among the gold and silver customers.
- Silver category customers made the most number of web visits while customers from Platinum segment have least web visits.

20. Analyzing customers based on clusters with respect to their acceptance of various campaigns conducted.

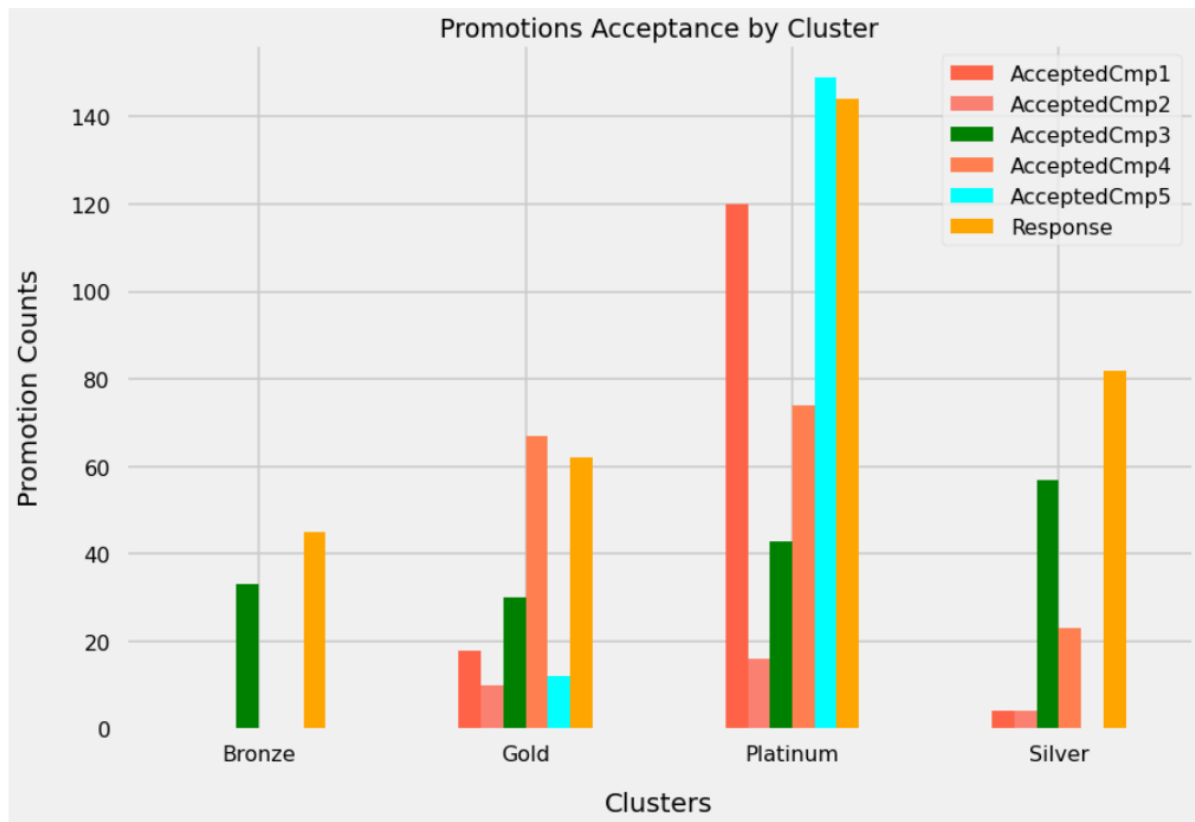


Fig. 5.20 Promotions Acceptance by clusters

Insights:

- Customers clustered in platinum segment accepted the most of the offers from the company.
- Campaign 4 and 5 were the most successful ones.
- Bronze category showed the least interest in the promotion campaigns of the company.

CHAPTER – 6

INFERENCES & CONCLUSIONS

Inferences –

1. Most of the customers are graduates.
2. Most of the customers are having a partner or are married.
3. Those customers who are single or are living alone have spent more than those who live with partners or are married.
4. Most of customers are having only one dependent or one child.
5. Those customers who have no dependents or children have spent more.
6. Middle aged adults having age between 35 and 60, are famous age group category.
7. On an average, Middle aged adults are spending much more than other age groups.
8. Earnings for most of the customers lie between 25000 and 80000.
9. Wine and meat products are most in demand among the customers.
10. Customers were segmented into 4 clusters on the basis of their income and spending, i.e., Gold, Silver, Platinum and Bronze.
11. Most of the customers were from the gold and silver segment.
12. Those customers having more income had more spending.
13. Most of the customers preferred to buy from the store and then online from the web.
14. Platinum customers segment showed more acceptance towards promotional campaigns, while bronze segment was least interested in those campaigns.

Conclusions –

Answering the questions included in the project objective would definitely help in improving the customer engagements.

- What are the statistical attributes/characteristics of your consumers?

Most customers are having partners or are married. There are more middle-aged customers, aged between 35 and 60 and most of the customers are having only one dependent or one child. Most of the customers are university graduates and have their earnings between 25000 and 80000.

- How are there spending habits?

Customers have spent more on wine and meat products. Those customers who have no dependents or having no children have spent more than those having dependents or children. Singles or unmarried customers are spending more than those having dependents or partners. Middle aged adults have spent more than those of other age groups. Store shopping is more preferred channel of purchase among the customers. Web and Catalogue purchases also have some preference.

- Which product category needs more focused marketing strategies?

Sweets and Fruit products need some more effort in marketing. The company needs to run more effective promotional campaigns for these products in order to increase the overall revenue from these products. The company can also combine the least selling products with the most selling one's for effective marketing.

- How the marketing can be made more effective?

As a marketing recommendation, company can give coupons for deals and promotions to the bronze segment of customers. Marketing the cheap and on-offer products to the low income and low spending customers to generate their interests. Web purchasing has some potential, which can be unlocked by providing big deals and discounts to the customers who have more website visits.

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 - [4] [\(PDF\) Personality factors as predictors of online consumer engagement: an empirical investigation | Linda D Hollebeek - Academia.edu](#)
 - [5] [\(PDF\) Building relationships through customer engagement in Facebook brand pages | Thanuka M A H E S H A de Silva - Academia.edu](#)
 - [6] [Executing on a customer engagement strategy | SpringerLink](#)
 - [7] [Factors Influencing Consumer Engagement on Instagram: A Perspective of Bereal.id | IEEE Conference Publication | IEEE Xplore](#)
 - [8] [Contribution of information technology through consumer engagement to improve market growth of credit union | IEEE Conference Publication | IEEE Xplore](#)
 - [9] [NumPy](#)
 - [10] [pandas - Python Data Analysis Library \(pydata.org\)](#)
 - [11] [Matplotlib: Python plotting — Matplotlib 3.4.3 documentation](#)
 - [12] [seaborn: statistical data visualization — seaborn 0.11.2 documentation \(pydata.org\)](#)
 - [13] [Plotly: The front end for ML and data science models](#)
- Dataset source - [Store Customers Clustering Analysis | Kaggle](#)