MARKETING / PREDICTIVE ANALYSIS OF FOLGERS COFFEE PRODUCT WIDTH

PROJECT REPORT

GROUP 1

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1. Introduction

Folgers are one of the top most brands in the field of Coffee market in the United States. In this project, our primary objective or goal is to find the insights from the data. Our central focus of this project will be to improve on Marketing in areas that are doing not so well. Also, come up with recommendations to increase the lead for Folgers as the industry leaders.

About data:

There are two basic types of scanner data used to analyze: (1) store-level and (2) household-level scanner data. Store data contains all sales in a given store or collection of stores over a period of time (mostly weekly periods). The data contains aggregate sales from all consumers shopping in that store/collection of stores. Household data provides information on individual household purchases.

We will be using descriptive and statistical analysis to study the market scenarios of given year data and effect of demographics of the panelist on the sales of coffee industry.

2. Problem Statement

Objective - Develop robust marketing strategy to increase revenues of Folgers Coffee Brand (Ground Coffee-Category). This report presents the predictive and exploratory analysis performed with a goal to boost sales of Folgers and provide strategic insights to the marketing team. We have done series of studies and came up with actionable ideas presented in this report. Below are some highlights with regards to above statement.

1. Perform sales forecasting for Folgers to identify the sales pattern. Compare this pattern with the sales trend in the coffee industry.
2. To compare the market share of competitors with Folgers and check the effect of feature and display in small and large Store chains for Folgers
3. Providing RFM model to brand manager to get an overview of the customer that is needed to be targeted based on different behaviors
4. Relate elasticity of Price, display, feature and Price reduction to sales for Folgers

MARKET SHARE

Folgers are leaders in coffee industry with close to 26% market share. They are followed by Maxwell House and Private Labels. In this report we will be analyzing some of the exploratory variables and their contribution to sales (from both Panel and Scanner data).

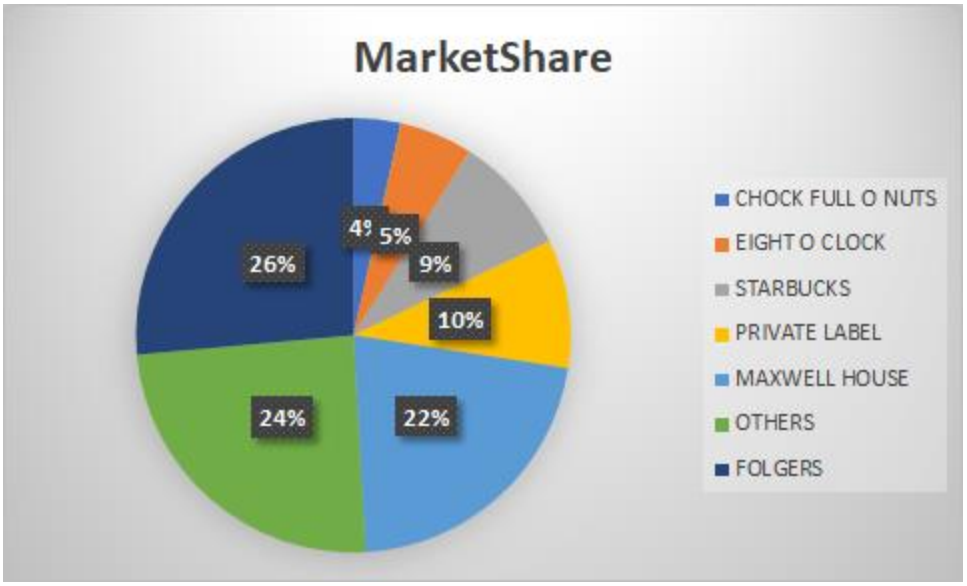

Figure1 – Percentage of Market share of top-6 Brands (Store-level data)

The unit of analysis of the data is the purchase occasion. Household data comprises more information than store data and is therefore potentially more useful for the analysis of sales promotion reactions of individual buyers (or households). The big advantage is that it represents actual behavior of consumers. It offers the opportunity to observe the longitudinal choice behavior of each panel member and a number of environmental variables.

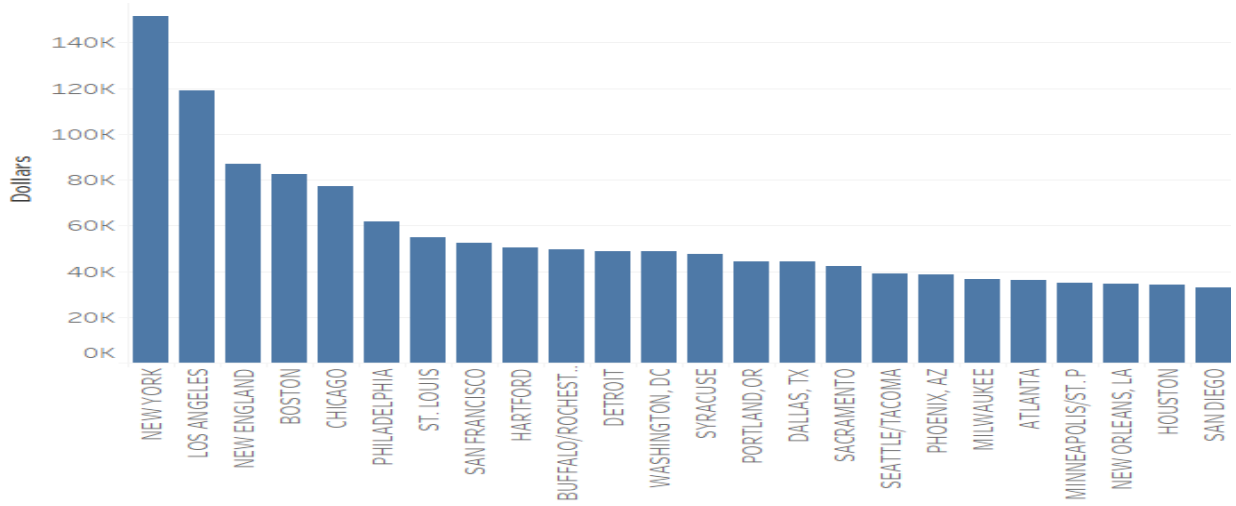

Figure2-Market Distribution – Store-level Data (All brands together)

From the above bar graph, we can see that the New York, Los Angeles and New England are the top cities in The United States where a brand manager should focus on citied based on the past year sales records of the product coffee.

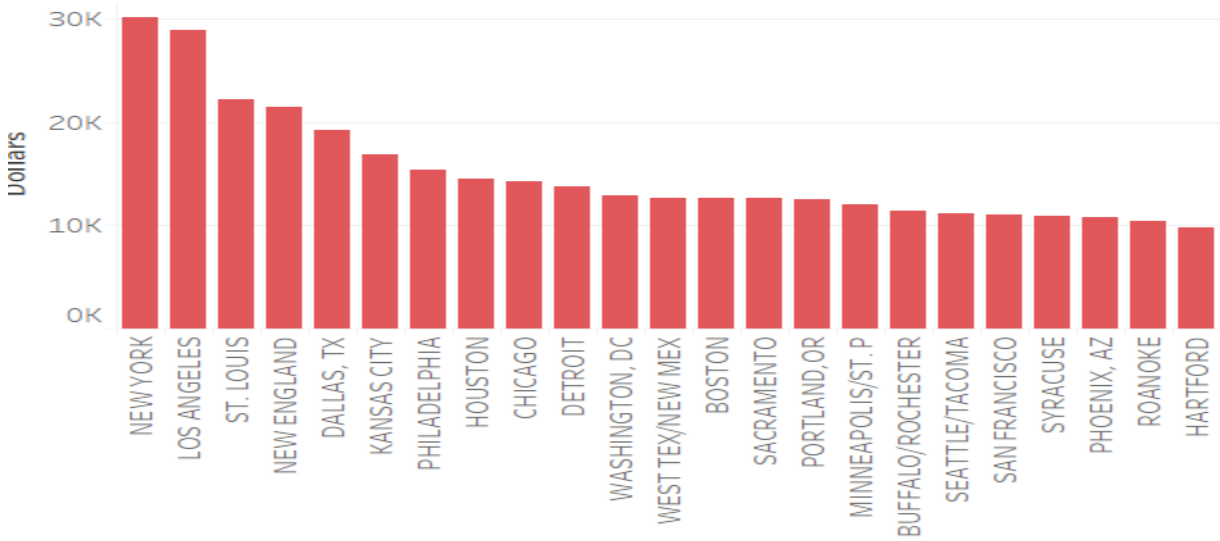

Figure 3- Folgers Market Distribution – Store-Level Data (All categories)

Above graph shows us the market distribution for all categories of coffee for brand Folgers. We can observe that Folgers brand is already leading in the top two cities. Could be clearly seen that, Folgers can improve sales in top coffee markets like Boston, Chicago and San Francisco.

Sales Forecasting Using ARIMA model

It's always important to understand the growth pattern of the brand against the trend in the industry before we examine different characteristics that affects the sales.

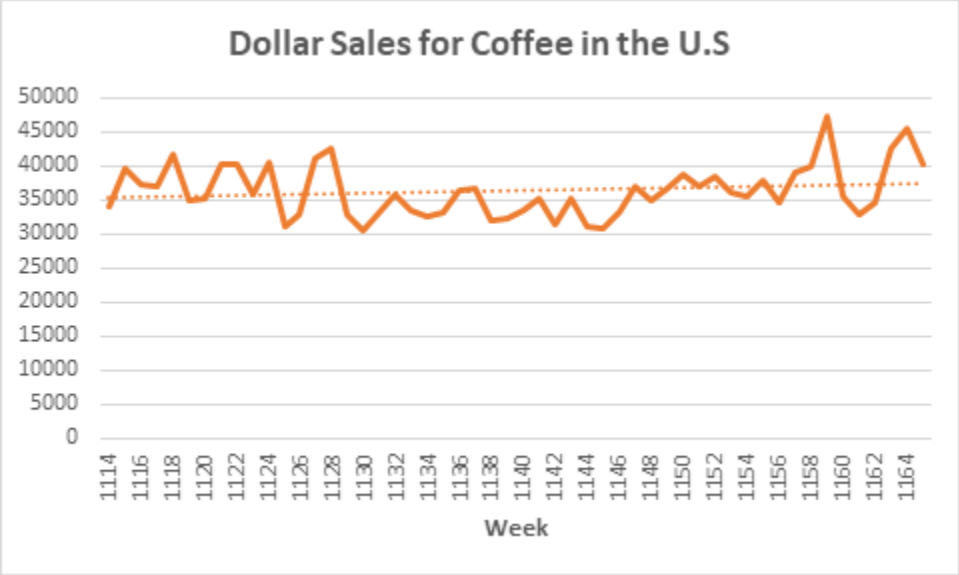

Figure 4 -Dollars Sales for Coffee in the US (Scanner Data-All Brands)

We were able to observe that the over-all sales of coffee in the US for 2001 were increasing and our model exposed a similar trend.

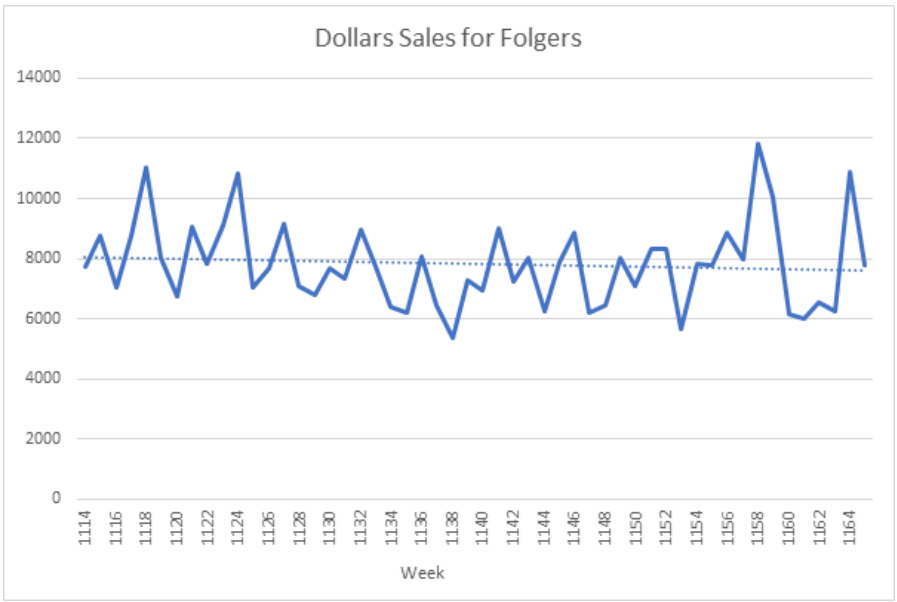

Figure 5 -Dollar Sales for Folgers (Scanner Data)

After analyzing the pattern in coffee sales in Folgers, we found that the overall sales in 2001 were declining by a small margin. This is a negative indicator for the brand in Ground Coffee category. This could be due to some of the reasons like -

1) Consumers not responding to current Folgers' marketing strategies.
2) Increase in number of competitors and newer flavors.
3) Consumers shifting to decaffeinated coffee
4) More number of national Private Label brands during the last one year

We performed Dicky-Fuller test, we found that our data is stationary and we used ARIMA (2,0,3) model to forecast sales for the next few weeks. This model fits our data well and below is the forecasted results for the next 5 weeks.

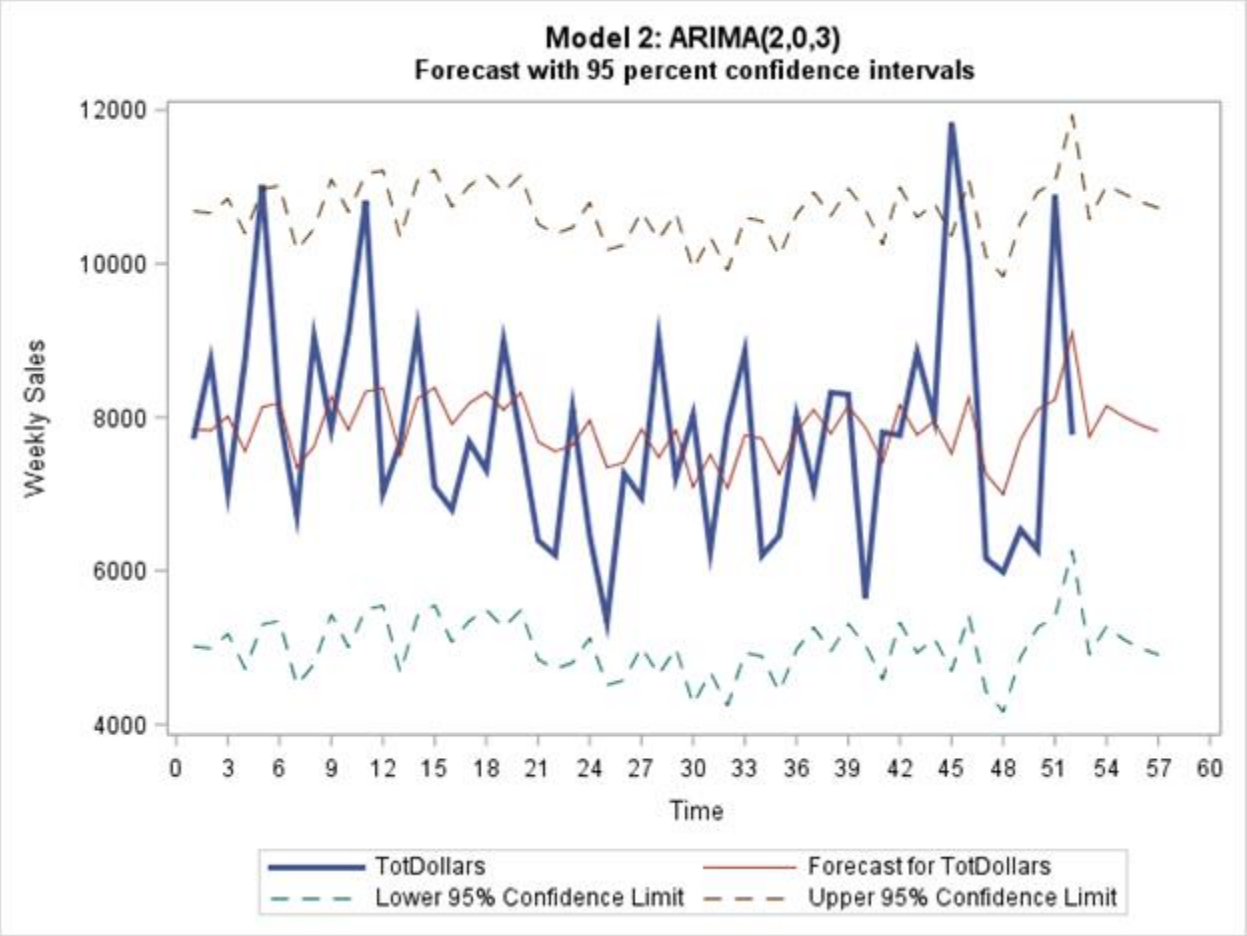

Figure 6- Time Series Forecasting for next 5 weeks

It is important to know that ARIMA model only considers the weekly sales of the previous weeks to make predictions for the upcoming weeks. i.e. it does not depend on any other independent variable. So, our forecasting could be inaccurate to a certain level once we bring in the other factors on which the weekly sales could depend upon.

Comparing the market share of competitors with Folgers

On learning that the sales of Folgers were declining, we took a look at the household panel data to understand purchase behaviors.

Panel data is tied to individual buying households. With panel data, we looked at the consumer dynamics underlying our sales patterns. Panel data can tell the demographics of your buyers, how often they buy, how loyal they are, and what other products they purchase.

Below table shows the comparison of some of the key household panel measures with our competitors.

Top Brands	FOLGERS	MAXWELL HOUSE	PRIVATE LABEL
% HH Penetration	28.65%	24.64%	11.40%
Market Share	29.17%	23.55%	11.44%
Ounce Rate	18.27	16.27	17.57
Dollar Rate per Ounce	$0.25	$0.25	$0.20
Dollars per pound (per 16 ounces)	$3.98	$4.01	$3.13
Purchase Frequency	4.65/yr	4.56/yr	5.26/yr

- Penetration is the percentage of households that have purchased the brand product. The annual penetration of Folgers brand in the EAU Claire and Pittsfield market (combined) is 28.65%, it means that 28.65% of all households in the EAU Claire and Pittsfield market (combined) purchased Brand Folgers at least once during the year. Folgers have the highest penetration rate in these two markets.
- Ounce Rate is the total amount of products in terms of ounce (volume) purchased by the average buying household over the entire analysis period. The annual ounce rate for Brand Folgers is 18.27, it means that each household who bought Brand Folgers bought, on average, a total of 18.27 ounces over the course of the year. Folgers have the highest Ounce rate among all the brands in the market in Ground coffee category.
- Purchase Frequency is the number of times the average buying household purchased product over a whole time period (usually a year). Purchase Frequency remains the same regardless of which sales measure is used (dollars, units or EQ volume). Purchase Frequency can also be called Trips per Buyer. The annual purchase frequency for Brand Folgers is 4.65, it means that each household who bought Brand Folgers, on average, bought it 4.65 times over the course of the year. Private Label brand has higher purchase frequency than Folgers.

Brands	% Repeat Purchasers
CHOCK FULL O NUTS	30.195%
EIGHT O CLOCK	39.802%
FOLGERS	52.828%
MAXWELL HOUSE	47.285%
OTHERS	48.224%
PRIVATE LABEL	39.236%
STARBUCKS	40.869%

The above table shows brands and the percentage of repeat purchases. This is a very important metrics, which can be considered very close to Brand Loyalty. Folgers have around 53% repeat purchases. It means

that each household who bought Brand Folgers are 53% more likely to buy Folgers the next time they purchase coffee.
Analysis could be made to target customers who buy brands that have less Percentage Repeat purchases. This can help in acquiring customers and increase sales for Folgers.
Another analysis could be to increase the percentage repeat purchases for Folgers.

Analyze the effect of Price, feature and display in small and large Store chains for Folgers

We begin to analyze (Store-level data) the effects of Price, Feature and Display in Smaller and larger store chains by writing a few hypothesis

Hypothesis 1:

H0: There is no significant difference in Average price for Large stores and Small stores for Folgers

H1: Average Price for Large stores is lesser than Average Price for Smaller stores for Folgers

After conducting the necessary T-tests, we found that the average price is smaller for large stores and higher for small stores. We could relate the large stores being an EDLP (Everyday low price) store and the smaller store to be an HLP (High Low Price) store. Although the actual price for any one time at an EDLP store may not be significantly different from an HLP store. The price for a basket of items at an EDLP store is lesser than the HLP store. Our analysis shows similar results. In order to understand how to manage price at an EDLP and HLP store, let's look at few other Hypothesis that explains the effect of display and Feature in Large (EDLP) and small stores (HLP). Price sensitive customers would be more inclined to buy from an EDLP store than from an HLP store.

Hypothesis 2:

H0: There is no significant difference in Average feature for Large stores and Small stores for Folgers

H1 : Average Feature for Large stores is lesser than Average Feature for Smaller stores for Folgers.

The T-tests proved to rejects the null hypothesis and state that the Average Feature for Large stores is lesser than Average Feature for Smaller stores for Folgers. We could further relate this to the Average price being higher at small stores. The HLP stores may be improving their advertising in order to account for the higher average price. Now lets look at one more dimension – "Display".

Hypothesis 3:

H0: There is no difference in Average Display for Large stores and Small stores for Folgers

H1 : Average Display for Large stores is lesser than Average Display for Smaller stores for Folgers.

The T-tests further helped us to prove as to why smaller stores have higher display. In order for the small stores to improve their sales, they would have to increase their display and attract more customers. These tests helped us understand the difference in behaviors for different stores – EDLP and HLP.

We recommend to increase the display and feature at the HLP stores in order to increase sales and attract more price sensitive customers.

RFM Analysis

Lets try to understand the distributions of some of the demographics from the panel data.

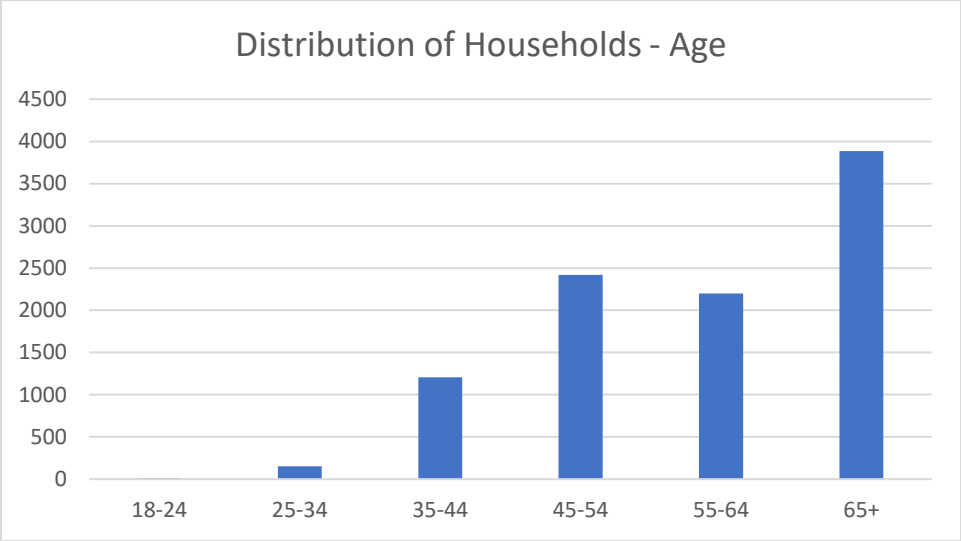

Figure 7: Distribution of Households by Age (Panel Data)

Figure 7 clearly indicates that households over 35 years of age consume more Folgers coffee. Hence it is important to make sure that this segment of customers are maintained while offering discounts to households less than 35 years of age. Households less than 35 years might represent Students and unmarried people.

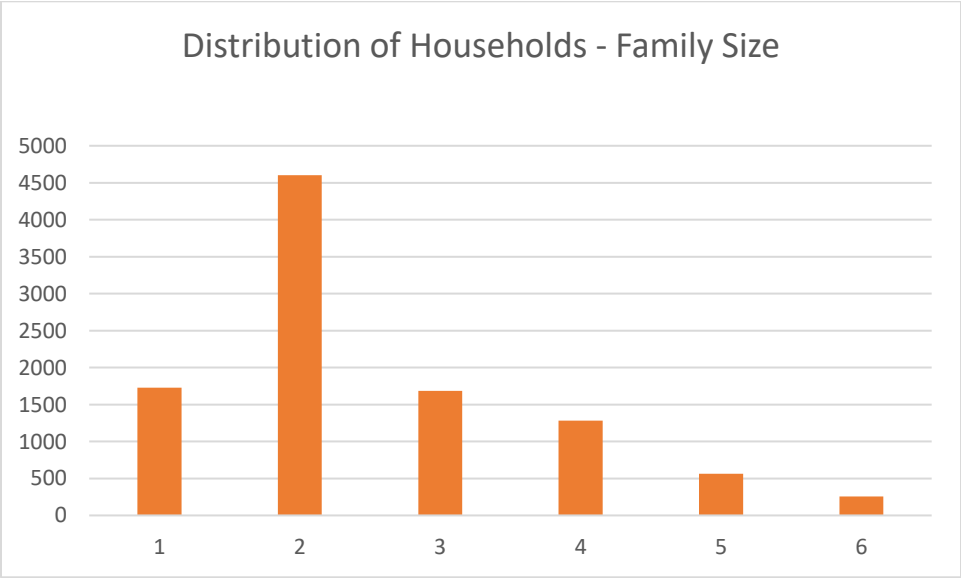

Figure 8: Distribution of Households by Family Size (Panel Data)

Figure 8 shows the family size that consumes the most coffee. This indicates the couples are more likely to consume more coffee. Combining both the graphs obtained we can indicate that in order to increase sales, Folgers must target couples who are 35+ years.

Our Marketing strategy is to increase the sales and to make that one approach is to segment the customers by performing RFM Analysis. Regency (R), Frequency (F) and Monetary (M) describe customer's historical purchase behavior.

RFM Analysis can help us to:

1. Decide which customers to give offers based on the likelihood and find ways to increase their spending.
2. Target lost customers and/or retain the existing customers by providing them incentives.

Further, another reason to perform RFM Analysis is to find that minority of customers who are responsible for a majority of our business. Our Panel data contains information of customer orders for one year who purchased coffee in 3 different outlets Drug, Grocery, and Mass.

With the help of SAS and R, we created a new dataset which has Customer ID, Recent Purchase Week, Number of Transactions, and Total Transaction Amount. Then we assigned a rank to each customer on a scale of 1 –5.
We created Score variable by concatenating Recency, Frequency and Monetary Scores which will be used to cluster the customers.

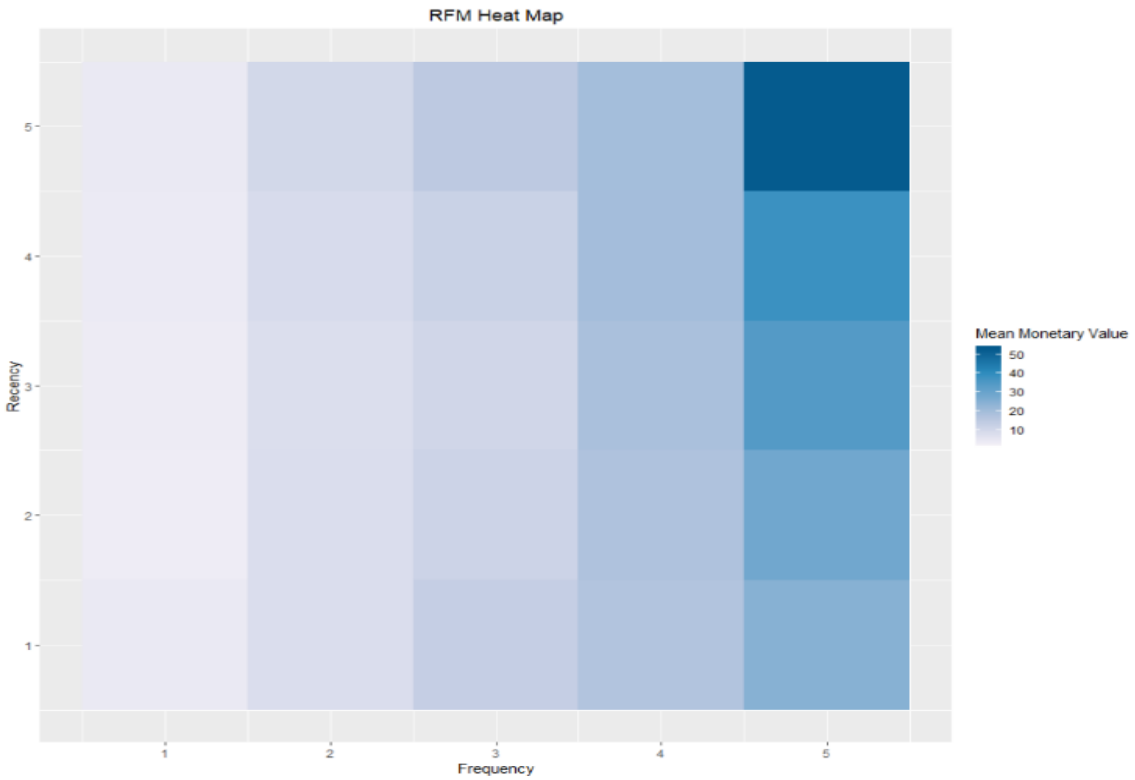

Figure 9: RFM Heat Map

The above figure represents the average monetary value for different categories of recency and frequency scores. Highest scores of frequency and recency are categorized by higher average monetary value as indicated by the darker areas in the heat map. In our scenario, the average monetary value varies between $10-$50.

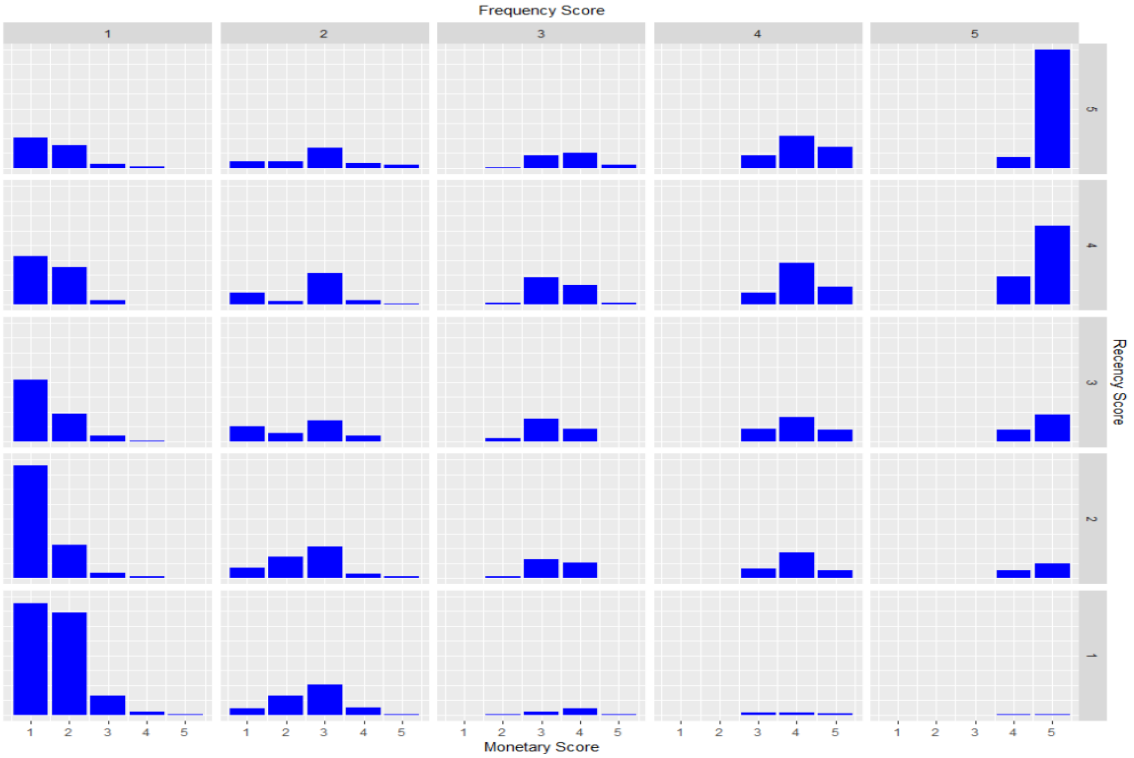

Figure 10: Distribution of monetary scores for the different combinations of frequency and recency scores.

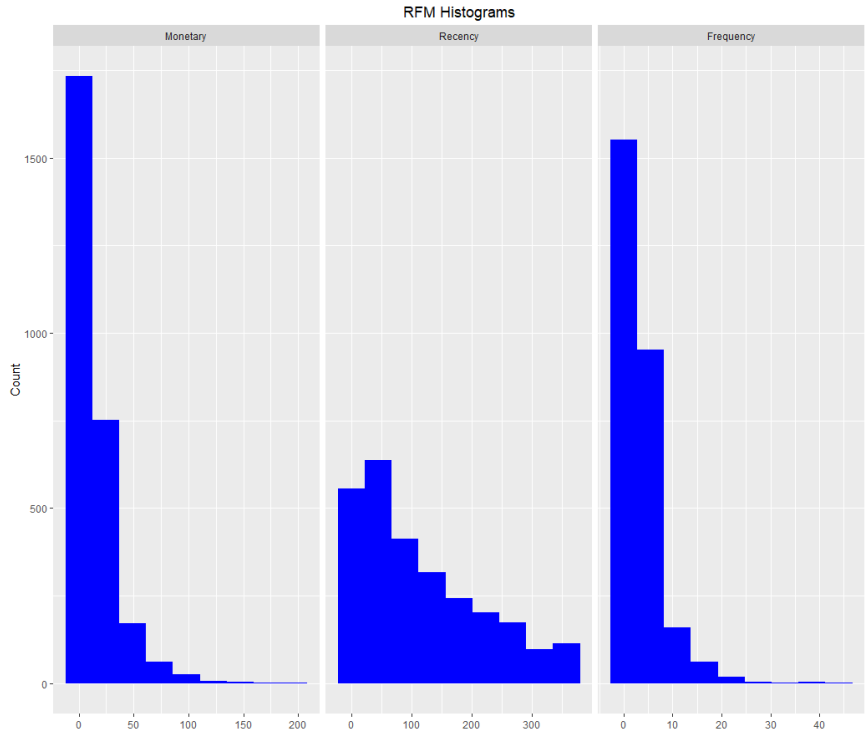

Figure 11: Relative Distribution of monetary, recency and frequency values.

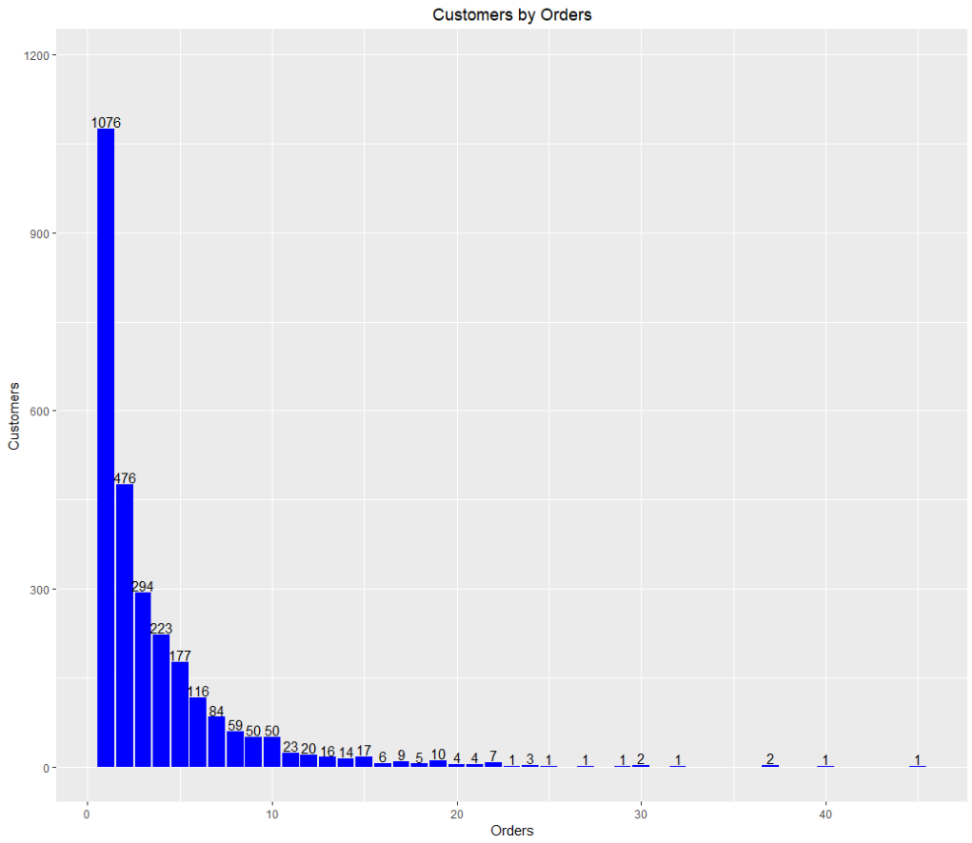

Figure 12: Distribution of Folgers' customers across orders

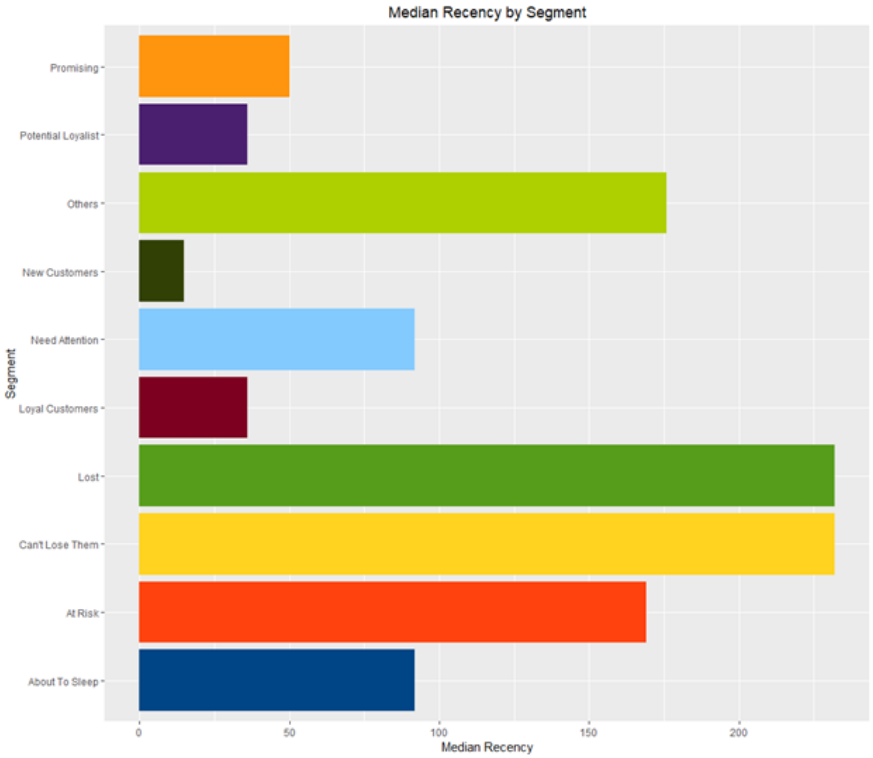

Figure 13: Median Recency by Segment

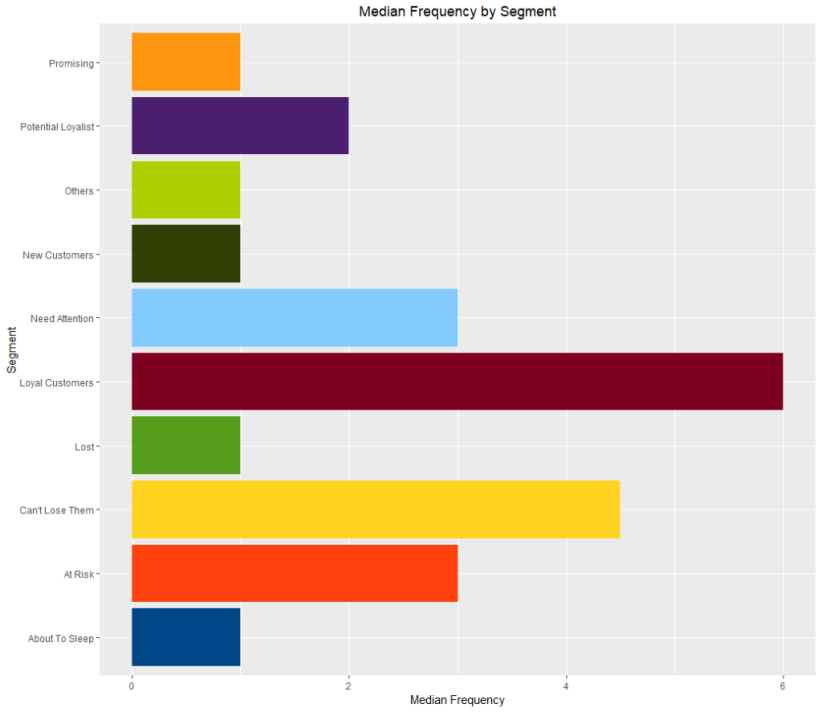

Figure 14: Median Frequency by Segment

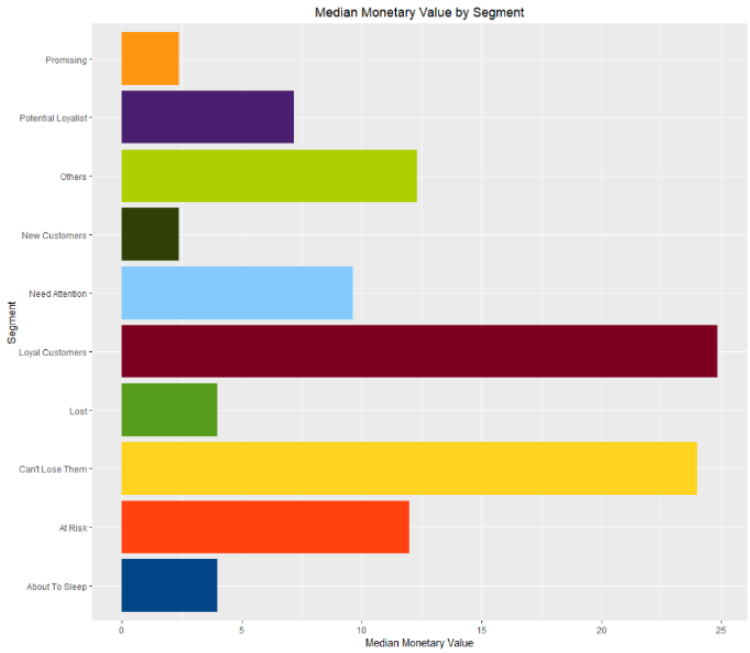

Figure 15: Median Monetary by Segment

Figure 13 – 15 : Segments based on Recency, Frequency and Monetary scores respectively.

```
segment_names <- c("Champions", "Loyal Customers", "Potential Loyalist",
                   "New Customers", "Promising", "Need Attention", "About To Sleep",
                   "At Risk", "Can't Lose Them", "Lost")

recency_lower <- c(4, 2, 3, 4, 3, 2, 2, 1, 1, 1)
recency_upper <- c(5, 5, 5, 5, 4, 3, 3, 2, 1, 2)
frequency_lower <- c(4, 3, 1, 1, 1, 2, 1, 2, 4, 1)
frequency_upper <- c(5, 5, 3, 1, 1, 3, 2, 5, 5, 2)
monetary_lower <- c(4, 3, 1, 1, 1, 2, 1, 2, 4, 1)
monetary_upper <- c(5, 5, 3, 1, 1, 3, 2, 5, 5, 2)

segments=rfm_segment(rfm_result, segment_names, recency_lower, recency_upper,
            frequency_lower, frequency_upper, monetary_lower, monetary_upper)
```

Snapshot of code for creation of segments

We have divided customers to 10 segments based on each – Recency, Frequency and Monetary median values.

- **Customer Targeting Strategy Recommendations:**
  Segments like ‘New’, ‘Can’t Lose them’, ‘Loyal Customers’, ‘Potential Loyalist’ and ‘Loyal Customers’ needs to be rewarded for their continues business with Folgers. The number of customers in these segments needs to be increased and this can happen through timely rewards.

- **Customer Retention:**
  Folgers should target customers who haven't recently purchased. These customers belong to 'At Risk', 'Need Attention', 'About to Sleep' and 'Lost'. It is quite possible that they are buying other brands. We need to give them some incentives so that they buy from us, giving them special offers/ coupons for instance. Folgers should provide updates on their new products, offers and promotions through the data that we have. Bringing them back to business would increase the sales and increase loyalty to our brand going forward.

Relate price elasticity to retailer displays and features for Folgers

Variable	Elasticity w.r.t Total Dollar Sales
Price	-0.5
Display	0.26
Price Cut	0.04
Feature	0.11
Display and Price Cut	-0.06
Display and Feature	-0.19
Display Feature and Price Cut	0.06

The above table shows the elasticities of variables with respect to the total dollar sales. This was achieved by performing regression with Total Dollar Sales being the dependent variable (Scanner Data).

From the above table, we can say that Price has a higher effect on total dollar sales compared to other exploratory variables. Increasing the unit price per ounce by 1 percent would result in 0.5% of reduction in total dollar sales during that week.

Investing more budget on Display in stores would result in increase in dollar sales for Folgers brand. Increasing the number of Price reductions for Folgers product, we can expect the dollar sales increase by 0.06% .Looking at interaction terms, increasing both display and Features by 1%, the total dollar sales will decrease by 0.19%.

For example, a price reduction might induce a segment of consumers to switch brands with no effect on purchase timing and quantity, while encouraging another segment of brand-loyal consumers to buy early.

Hence, we can say that having a display and features individually, we can expect the total dollar sales. Having both display and feature together, it doesn't help to increase the total dollar sales.

Recommendations

Most important issue that needs to be addressed currently is to increase the number of sales of Folgers Ground coffee. Any more decline in the trend would result in losing the pole position in the leaderboard. Some of the recommendations are already being provided earlier, we would like to summaries them below –

- One way to increase sales of Folgers at larger stores (EDLP) is by decreasing price variations in these stores. As discussed earlier, larger stores (EDLP) are most likely to draw consumers with high regular price sensitivity. In contrast, smaller stores (HLP) will likely appeal to consumers who respond more to price cuts than they do to changes in regular price.
  Hence, reducing large price variations in EDLP and, improving the number of price cuts, displays and features in smaller stores (HLP) (the right combination) will increase the number of Folgers coffee purchases over time.

- Identifying the segment of customers that needs attention is key to improving the brand loyalty, percentage of Household penetration and market share. Also, rewarding or giving incentives to loyal customers would increase the percentage of repeat purchases and purchase frequency. We believe that increase in these numbers would improve the over sales of Folgers ground coffee. (Store-level and POS data would do better)
- Targeting customers who are 35+ years of age and who are married. These are the customers who love coffee more than customers who are single and (or) below 35 years of age.
- Also, analyzing sales over region would help Folgers target places where the sales are not doing so good.