ANALYSING MARKET TEST

SWAPNIL

Project: Analyzing a Market Test

The Business Problem

Round Roasters is an upscale coffee chain with locations in the western United States of America. The past few years have resulted in stagnant growth at the coffee chain, and a new management team was put in place to reignite growth at their stores.

The first major growth initiative is to introduce gourmet sandwiches to the menu, along with limited wine offerings. The new management team believes that a television advertising campaign is crucial to drive people into the stores with these new offerings.

However, the television campaign will require a significant boost in the company's marketing budget, with an unknown return on investment (ROI). Additionally, there is concern that current customers will not buy into the new menu offerings.
To minimize risk, the management team decides to test the changes in two cities with new television advertising. Denver and Chicago cities were chosen to participate in this test because the stores in these two cities (or markets) perform similarly to all stores across the entire chain of stores; performance in these two markets would be a good proxy to predict how well the updated menu performs.

The test ran for a period of 12 weeks (2016-April-29 to 2016-July-21) where five stores in each of the test markets offered the updated menu along with television advertising.

The comparative period is the test period, but for last year (2015-April-29 to 2015-July-21).

You've been asked to analyze the results of the experiment to determine whether the menu changes should be applied to all stores. The predicted impact to profitability should be enough to justify the increased marketing budget: at least 18% increase in profit growth compared to the comparative period while compared to the control stores; otherwise known as *incremental lift*. In the data, profit is represented in the *gross_margin* variable.

You have been able to gather three data files to use for your analysis:

- Transaction data for all stores from 2015-January-21 to 2016-August-18
- A listing of all-Round Roasters stores
- A listing of the 10 stores (5 in each market) that were used as test markets.

Step 1: Plan Your Analysis

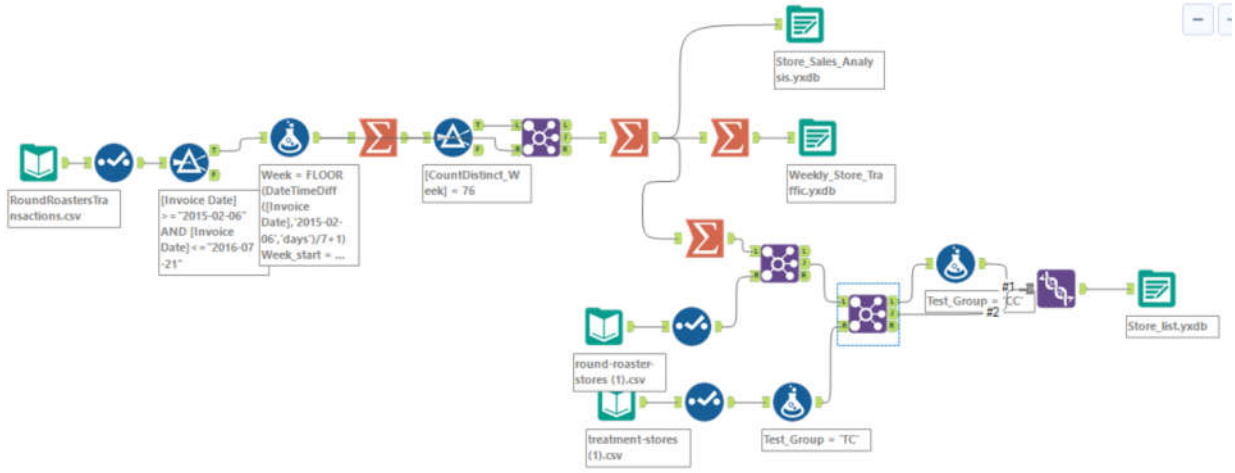
1. What is the performance metric you'll use to evaluate the results of your test?
   Increasing profit(Gross Margin) is the performance metric used to evaluate the results of the test. The predicted impact to profitability should be enough to justify the increased marketing budget: at least 18% increase in profit growth compared to the comparative period while compared to the control stores; otherwise known as incremental lift. In the data, profit is represented in the gross_margin variable.

2. What is the test period?
   The test period if 12 weeks between 2016 April 29 to 2016 July 21.

3. At what level (day, week, month, etc.) should the data be aggregated?
   Data should be aggregated on weekly level.

Step 2: Clean Up Your Data

Following Alteryx Workflow has been used to clean up data.



Following files are generated in cleaning process:

- Weekly store traffic data for A/B Trend Tool: Produces our seasonality and trends indices to help us match our treatment and control stores
- Store list data for A/B Controls tool: Produces which control stores to match with our treatment stores along with results from the A/B Trends Tool
- Store sales analysis data for A/B Analysis tool: Produces the final results

Step 3: Match Treatment and Control Units

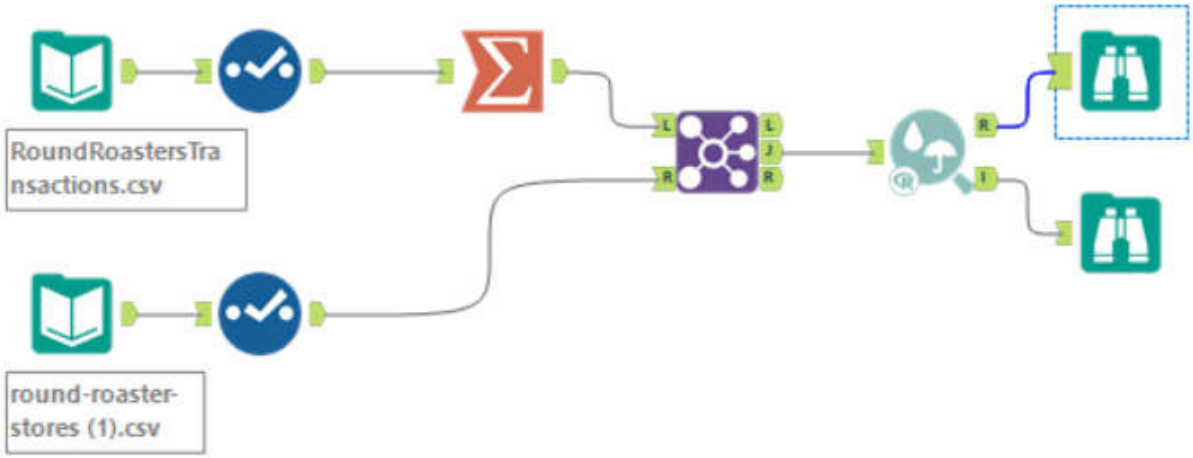
Apart from trend and seasonality...

1. What control variables should be considered? Note: Only consider variables in the RoundRoastersStore file.

   Based on data available in RoundRoastersStore file Sq_ft and Avg Monthly Sales are control variables should be considered.

2. What is the correlation between your each potential control variable and your performance metric?

As we found the gross margin of each store in the weekly_store_traffic file. We can use this data to find the correlation of Avg Monthly sales and Sq_ft on gross margin. I have used below workflow to find correlation.



We find that Sq_ft has a negative correlation of 0.020 and Average monthly sales has a positive correlation of 0.98. So in this case, we will just use the Average monthly sales (and Trend & Seasonality) as a control variable to match our treatment and control stores.

Pearson Correlation Analysis

Full Correlation Matrix

	Sum_Gross.Margin	Sq_Ft	AvgMonthSales
Sum_Gross.Margin	1.000000	-0.020322	0.988216
Sq_Ft	-0.020322	1.000000	-0.046967
AvgMonthSales	0.988216	-0.046967	1.000000

Matrix of Corresponding p-values

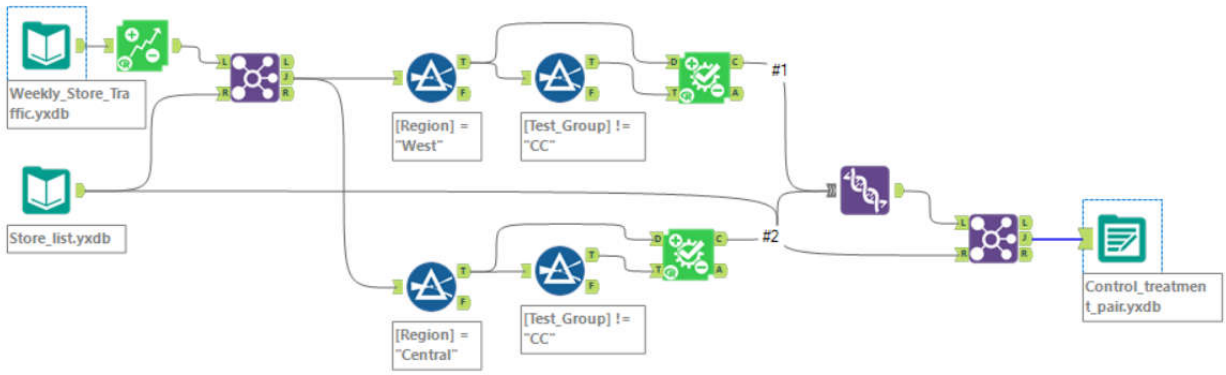
	Sum_Gross.Margin	Sq_Ft	AvgMonthSales
Sum_Gross.Margin		0.81640	0.00000
Sq_Ft	0.81640		0.59138
AvgMonthSales	0.00000	0.59138	

3. What control variables will you use to match treatment and control stores?
   Average monthly sales will be used to match treatment and control stores

4. Please fill out the table below with your treatment and control stores pairs:

Treatment Store	Control Store 1	Control Store 2
1664	7162	8112
1675	1580	1807
1696	1964	1863
1700	2014	1630
1712	8162	7434
2288	9081	2568
2293	12219	9524
2301	3102	9238
2322	2409	3235
2341	12536	2383

Alteryx workflow for control and treatment pairs

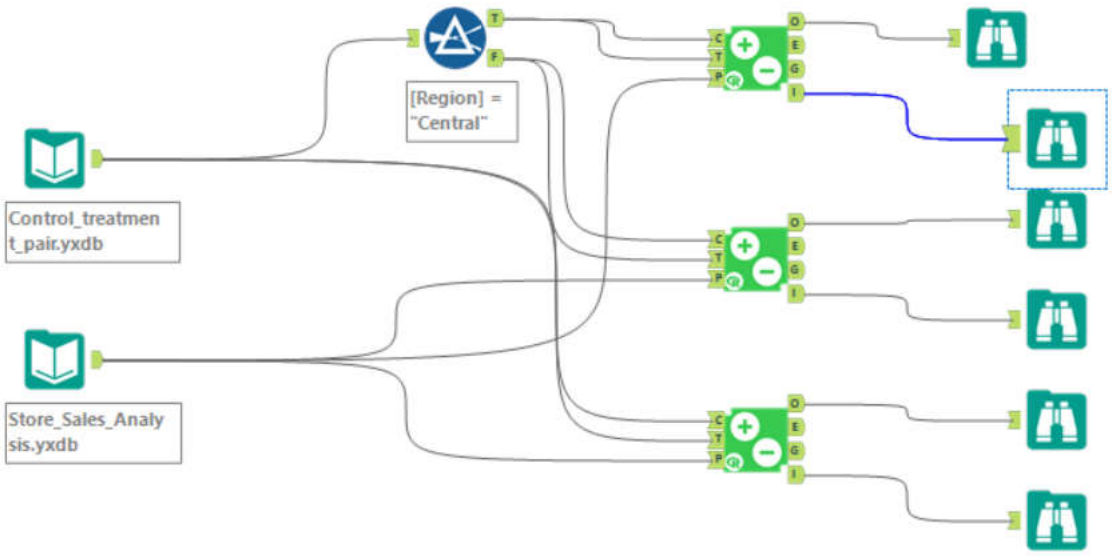


Step 4: Analysis and Writeup

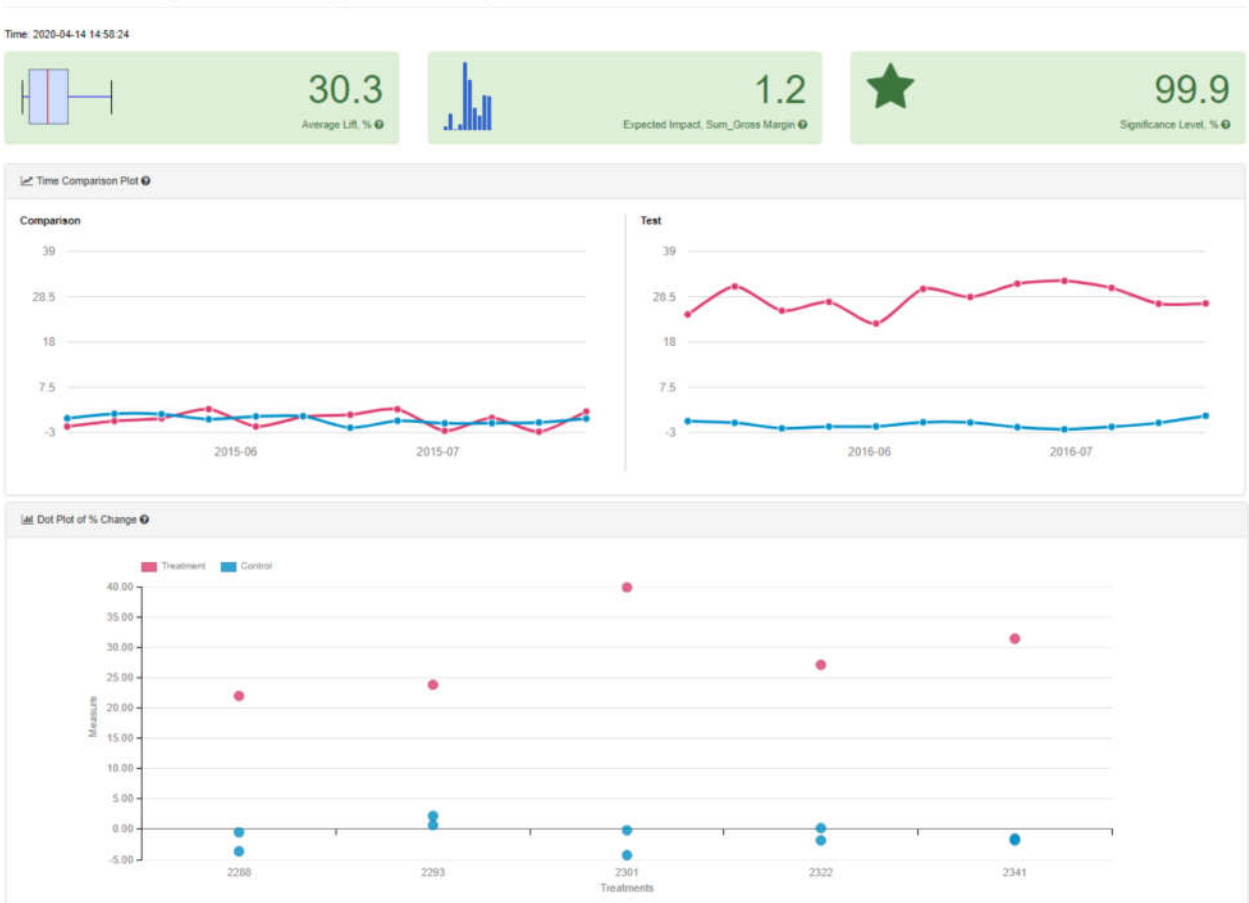
1. **What is your recommendation - Should the company roll out the updated menu to all stores?**
   The company should roll out the updated menu to all stores. As mentioned in project details the predicted impact to profitability should be enough to justify the increased marketing budget: at least 18% increase in profit growth compared to the comparative period while compared to the control stores. If we look at the result of average lift Central=37%, West=30% and overall= 34% each region and overall, they are all higher than 18%. Therefore, the company should roll out the updated menu.

2. **What is the lift from the new menu for West and Central regions (include statistical significance)?**

Alteryx workflow:

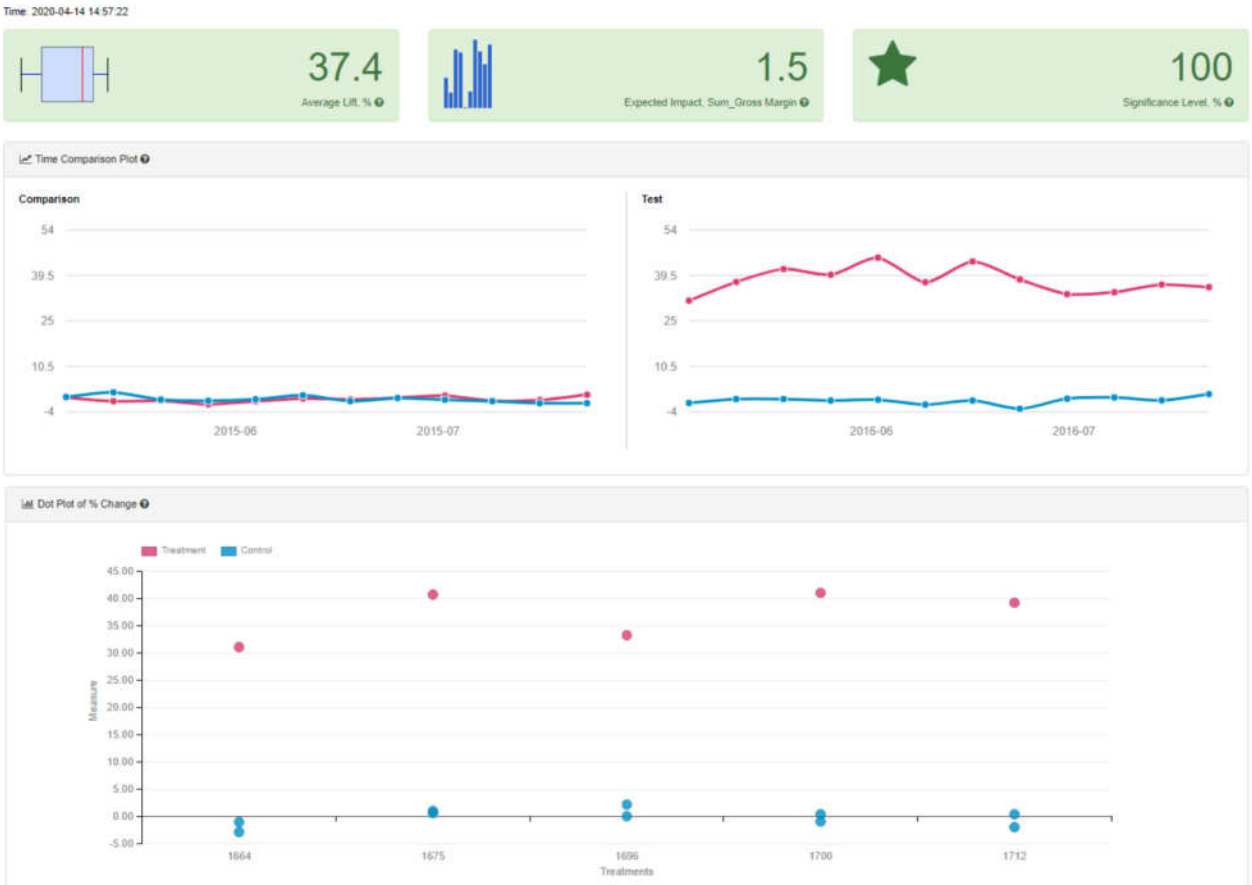


West region: The Average Lift is **30.3%**, expected impact on gross margin is **1.2** and the Significance Level is **99.9%**. See the A/B Test analysis model and report below:



Central region: The Average Lift is **37.9%** ,expected impact on gross margin is **1.5** and the

Significance Level is **100%**. See the A/B Test analysis model and report below:



3. What is the lift from the new menu overall?

The Average Lift is **33.9%**, expected impact on gross margin is **1.3** and the Significance Level is **100%**. See the A/B Test analysis model and report below:

AB Test Analysis for Sum_Gross Margin

Time: 2020-04-14 14:59:29

33.9

Average Lift, %

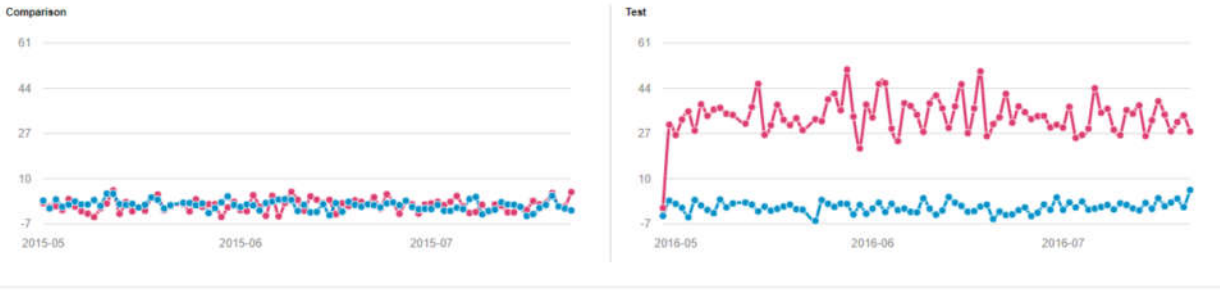
1.3

Expected Impact, Sum_Gross Margin

100

Significance Level, %

Time Comparison Plot



Dot Plot of % Change