# Project: Analyzing a Market Test

## Step 1: Plan Your Analysis

1. **What is the performance metric you'll use to evaluate the results of your test?**

We can count on the total gross margin to measure the return on investment if sandwiches and limited wine are added to the menu list, at least 18% increase in profit growth compared to the comparative period while compared to the control stores.

2. **What is the test period?**

12 weeks starting from 29 April 2016 to 21 July 2016

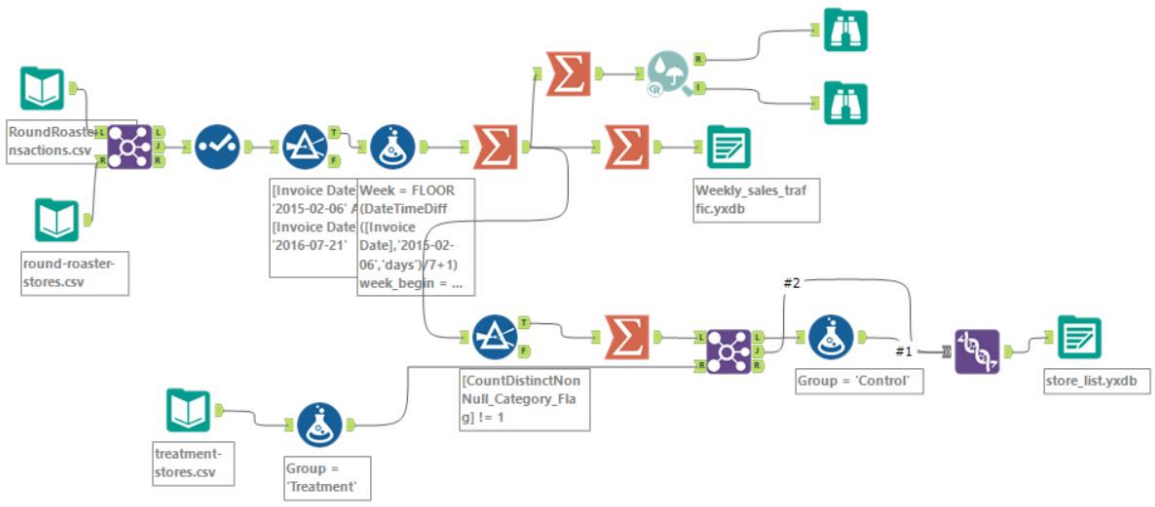
3. **At what level (day, week, month, etc.) should the data be aggregated?**

The data should be aggregated at the weekly level.

## Step 2: Clean Up Your Data

I have cleaned up, and blended input data and generated tow files as inputs for further process :

- Weekly_Sales_traffic: contains summations of sales, gross margins, number of invoices per week per store.
- Store_list: contains 133 stores, for each individual store we have average monthly sales, region (west or central) , group ( treatment or control)



## Step 3: Match Treatment and Control Units

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

   Possible control variables would be “AvgMonthSales” and “Sq_Ft”.

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

   The variable "AvgMonthSales" is highly correlated with "Gross Margin", the variable "Sq_Ft" has a low correlation with "Gross Margin".

**Pearson Correlation Analysis**

*Full Correlation Matrix*

| | AvgMonthSales | Sq_Ft | Sum_Sum_Gross.Margin |
|---|---|---|---|
| AvgMonthSales | 1.000000 | -0.046967 | 0.990982 |
| Sq_Ft | -0.046967 | 1.000000 | -0.024255 |
| Sum_Sum_Gross.Margin | 0.990982 | -0.024255 | 1.000000 |

*Matrix of Corresponding p-values*

| | AvgMonthSales | Sq_Ft | Sum_Sum_Gross.Margin |
|---|---|---|---|
| AvgMonthSales | | 0.59138 | 0.00000 |
| Sq_Ft | 0.59138 | | 0.78168 |
| Sum_Sum_Gross.Margin | 0.00000 | 0.78168 | |

3. **What control variables will you use to match treatment and control stores?**

I will use the “AvgMonthSales” variable as a control variable, together with the variables chosen by the AB Trend component.

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** | 2568 | 9081 |
| **2293** | 12219 | 9524 |
| **2301** | 3102 | 9238 |
| **2322** | 2409 | 3235 |
| **2341** | 2383 | 2341 |

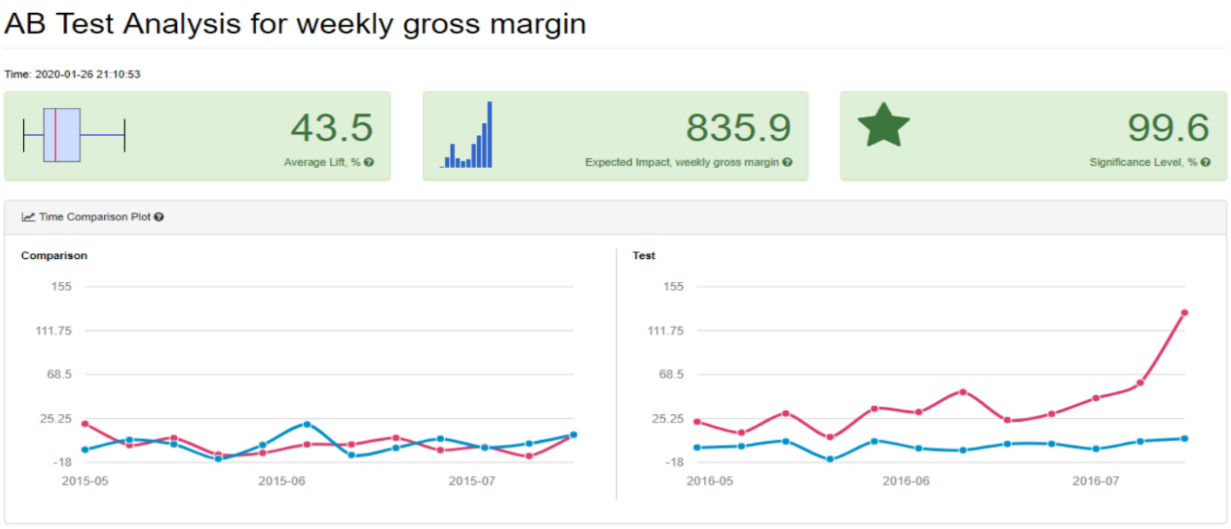
## Step 4: Analysis and Writeup

1. **What is your recommendation - Should the company roll out the updated menu to all stores?**

It is strongly recommended to apply the new menu to all stores of the company, since the gross sales margin exceeds the 18% established by the company as a minimum to generate profit.

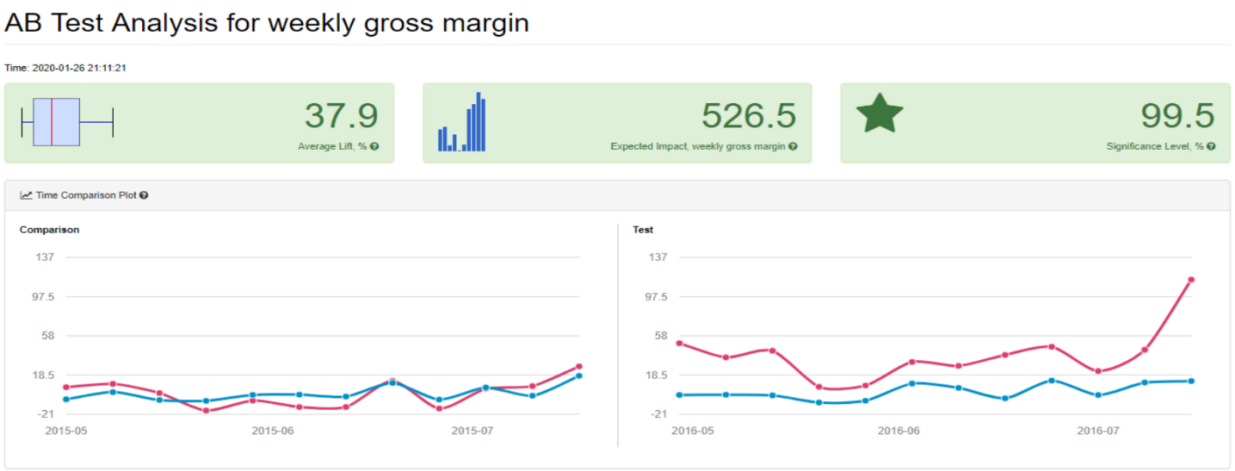
2. **What is the lift from the new menu for West and Central regions (include statistical significance)?**

**<u>Central Region lift:</u>**




The treatment-control comparison shows an average increase in the gross margin for treatment units over control units of 43.5 %. The introduction of new menu would increase the gross margin by $835.9 per week, on average. The test can be interpreted since it is highly significant (%99.6).

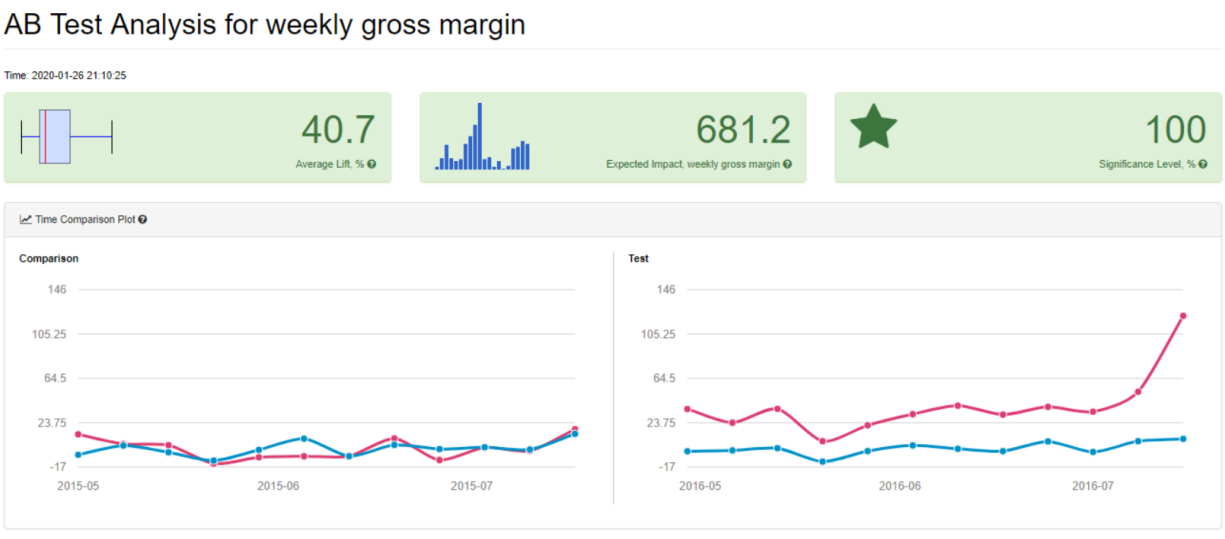
**West Region Lift:**




The treatment-control comparison shows an average increase in the gross margin for treatment units over control units of 37.9%. The introduction of new menu would increase the gross margin by $526.5 per week, on average. The test can be interpreted since it is highly significant.

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

**Overall Lift:**




The treatment-control comparison shows an average increase in the gross margin per week for treatment units over control units of 40.7% during the experiment. The introduction of new menu would increase the gross margin by $681.2 per week, on average. The test can be interpreted since it is highly significant, it is highly unlikely the new menu launch did not increase sales.