BIG DATA AND BUSINESS INTELLIGENCE

CIS4008-N-BF1-2020

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SECTION 1 – BUSINESS INTELLIGENCE DESIGN

1 Data Source Description and Business Questions

1.1 Dataset Information

The dataset is about coffee house chain in United States of America. The dataset focus of this project as it contains important information with over 4,000 rows and 20 columns. The columns of the dataset is including Area Code, Date, Market, Market Size, Product, Product Line, Product Type, State, Type, Budget Cost of Goods Sold, Budget Margin, Budget Profit, Budget Sales, Cost of Goods Sold, Inventory, Margin, Marketing, Profit, Sales, and Total Expenses.

Area Code	Date	Market	Market Size	Product	Product Line	Product Type	State
563	40909	Central	Small Market	Caffe Mocha	Beans	Espresso	Iowa
563	40909	Central	Small Market	Decaf Espresso	Beans	Espresso	Iowa
978	40940	East	Major Market	Green Tea	Leaves	Tea	Massachusetts
603	40940	East	Small Market	Green Tea	Leaves	Tea	New Hampshire
702	40940	West	Small Market	Caffe Latte	Beans	Espresso	Nevada

Type	Budget COGS	Budget Margin	Budget Profit	Budget Sales	COGS	Inventory	Margin
Regular	220	330	250	550	239	1262	325
Regular	270	400	280	670	284	2108	428
Regular	110	160	120	270	104	871	152
Regular	110	160	120	270	104	821	152
Regular	110	-50	-180	60	121	1673	-52

Marketing	Profit	Sales	Total Expenses
66	235	564	90
99	276	712	152
29	112	256	40
29	111	256	41
109	-195	69	143

1.2 Dataset Description

The dataset is for the coffee chain that take place in the different states of United States of America and each type of product's statistics in 2012-2013. It is taken from the webpage, www.dataplusscience.com, and the total weight of the data is 403kb in excel file.

The dataset is downloaded as below linkage.
(http://www.dataplusscience.com/files/Coffee.xlsx)

1.3 Business Questions

Why did you select this specific dataset?

This specific dataset is common in the commercial industry to analysis the company's sales and revenue in different sectors. We believe that it can train us to use Power BI to solve lots of problems once we face the same issue in our career.

Will this dataset help you in developing specific business skills?

This dataset can develop specific business skills, which is like Data Analysis, Communication, Problem Solving.

Data Analysis – The dataset will translate into actionable information, then the management team can make decision that will enhance profitability as much as possible. It will involve large amount of data and it can help to practice analytical skills.

Communication – Practicing how to describe this data, explain the result from data analysis, and then provide possible solutions and forecast. It is one of the most critical soft skill in commercial industry.

Problem Solving – Analysing this data is just part of the data analyst's skill, who also offer solutions to management team based on the dataset. Therefore, it is necessary come up with clear suggestions and high accuracy forecast to assist the company make better decisions.

What questions do you seek to answer with your BI project?

- What is the overall on an average sale of the products?
- What is the sales variance of each products?
- What are the total expenses versus profit for each product?
- What is the market size for each state with their sales?
- How is the key performance indicator of sales, profit and cost of goods sold?
- How is the sales forecast in 2014?

Which specific features are you going to focus on?

Interactive Power BI Desktop – It allows to build reports by accessing the data rapidly, even people do not have advanced skills to create a report with Power BI. This tool is free to download, and allow everyone to create report without processing any technical knowledge.

Customized Visualization – Power BI has a default standard, and it can customize some functions to process some complex data depends on everyone required. It can access the custom library of visualization easily and design a visualization that serves the people need.

Visibility – Making the data meaningful is the main purpose. Power BI can help to deliver actionable insights and simplify the task of data collaboration, analysis, and makes it to next high-standard level.

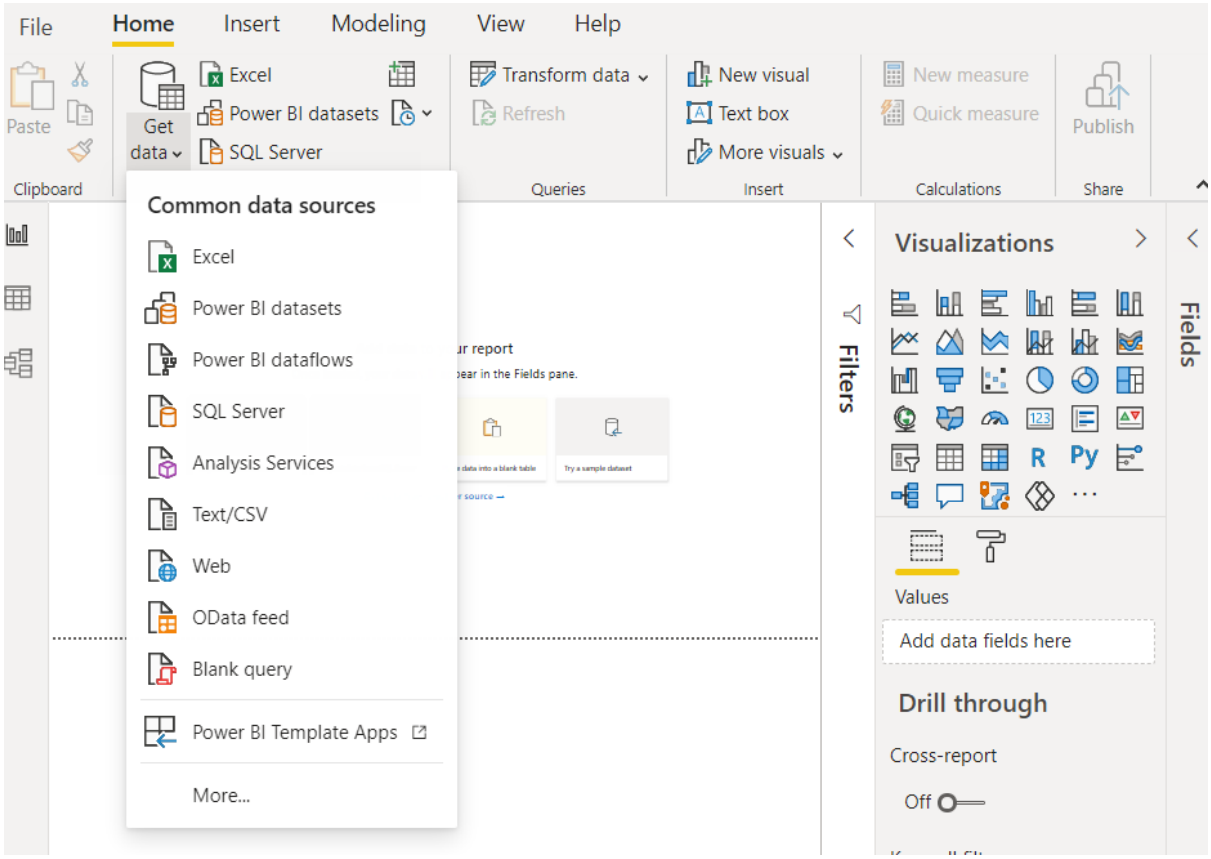
Does this dataset address the Big Data problem?

This dataset can address the big data problem. It requires to clean, edit and organise this data, then manage this dataset in Power BI and turn data into visualisation for the company. In addition, use it to provide valuable insights to management team and they can make decisions.

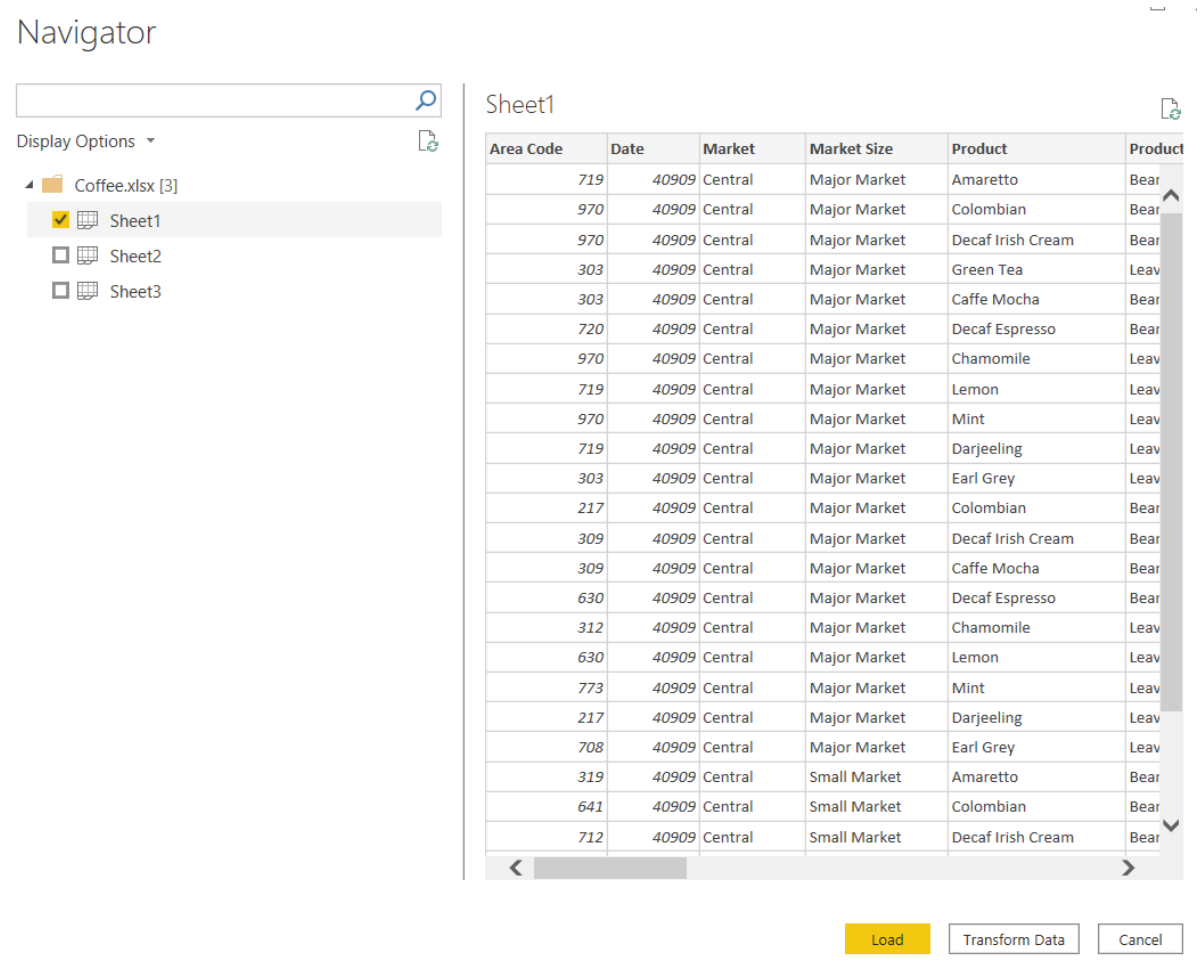
2 Data Pre-Processing and Data Cleansing

Power BI Desktop is able to input with different data source, which is like Excel, Text/CSV, Web, etc.

Loading data to the Power BI

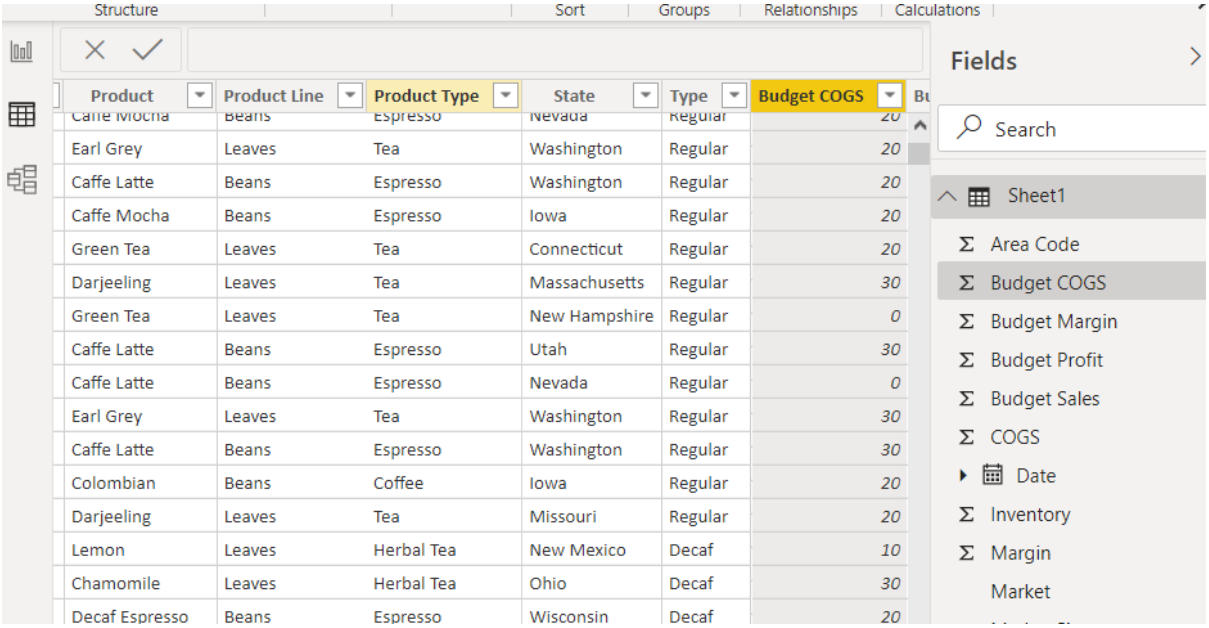


Selecting the data file ‘Sheet 1’ and click the load button to load the data.

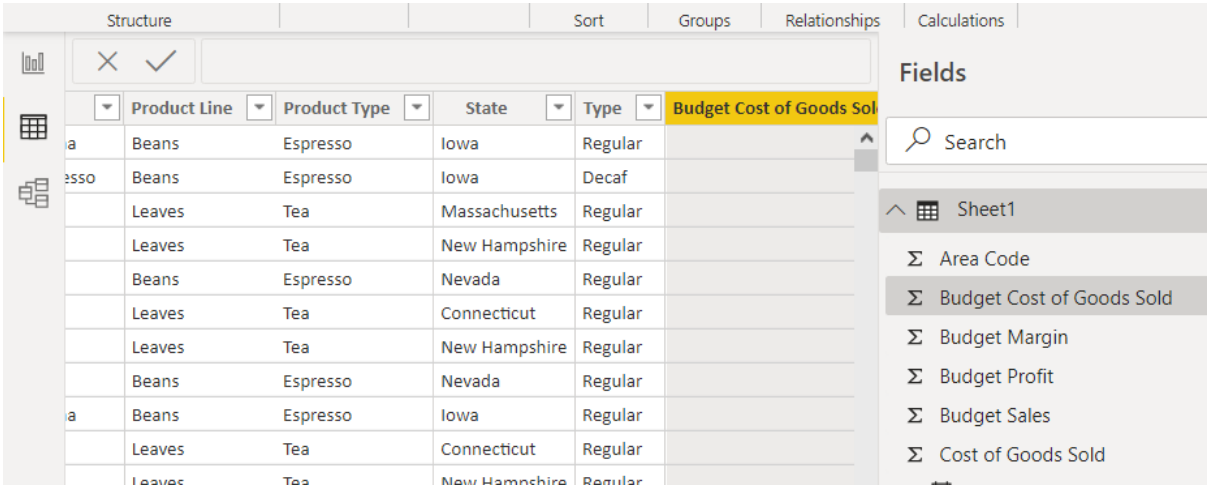


2.1 Renaming Columns

Once the data is loaded, double-click specify columns to rename in the “Fields” section. Now change the name of columns “Budget COGS” to “Budget Cost of Goods Sold”. Then use the same steps to change the two columns “COGS” and “Type” to “Cost of Goods Sold” and “Caffeine Type”.



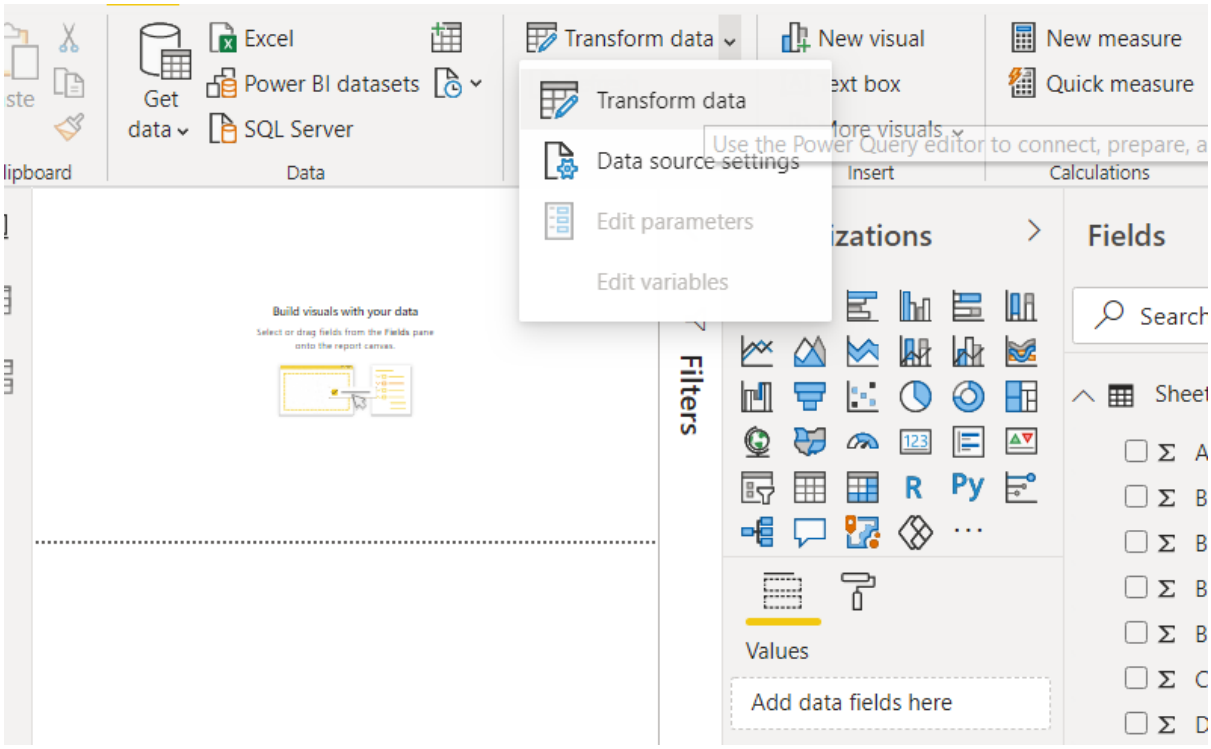
Product	Product Line	Product Type	State	Type	Budget COGS
Earl Grey	Leaves	Tea	Washington	Regular	20
Caffe Latte	Beans	Espresso	Washington	Regular	20
Caffe Mocha	Beans	Espresso	Iowa	Regular	20
Green Tea	Leaves	Tea	Connecticut	Regular	20
Darjeeling	Leaves	Tea	Massachusetts	Regular	30
Green Tea	Leaves	Tea	New Hampshire	Regular	0
Caffe Latte	Beans	Espresso	Utah	Regular	30
Caffe Latte	Beans	Espresso	Nevada	Regular	0
Earl Grey	Leaves	Tea	Washington	Regular	30
Caffe Latte	Beans	Espresso	Washington	Regular	30
Colombian	Beans	Coffee	Iowa	Regular	20
Darjeeling	Leaves	Tea	Missouri	Regular	20
Lemon	Leaves	Herbal Tea	New Mexico	Decaf	10
Chamomile	Leaves	Herbal Tea	Ohio	Decaf	30
Decaf Espresso	Beans	Espresso	Wisconsin	Decaf	20



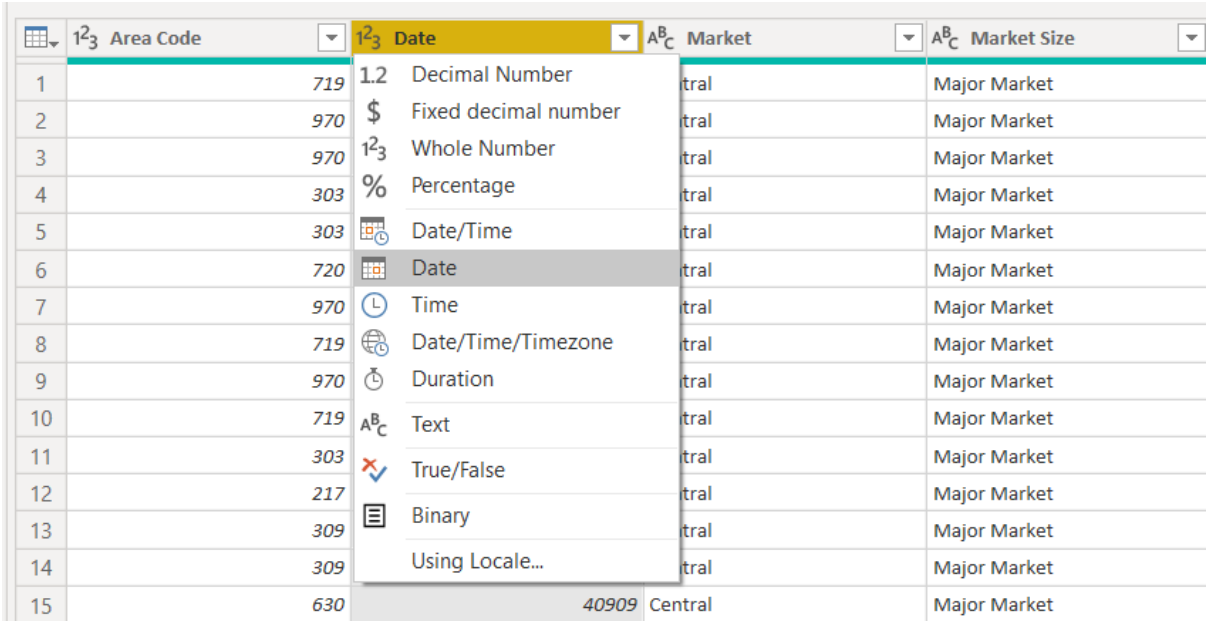
Product Line	Product Type	State	Type	Budget Cost of Goods Sol
Beans	Espresso	Iowa	Regular	
Beans	Espresso	Iowa	Decaf	
Leaves	Tea	Massachusetts	Regular	
Leaves	Tea	New Hampshire	Regular	
Beans	Espresso	Nevada	Regular	
Leaves	Tea	Connecticut	Regular	
Leaves	Tea	New Hampshire	Regular	
Beans	Espresso	Nevada	Regular	
Beans	Espresso	Iowa	Regular	
Leaves	Tea	Connecticut	Regular	

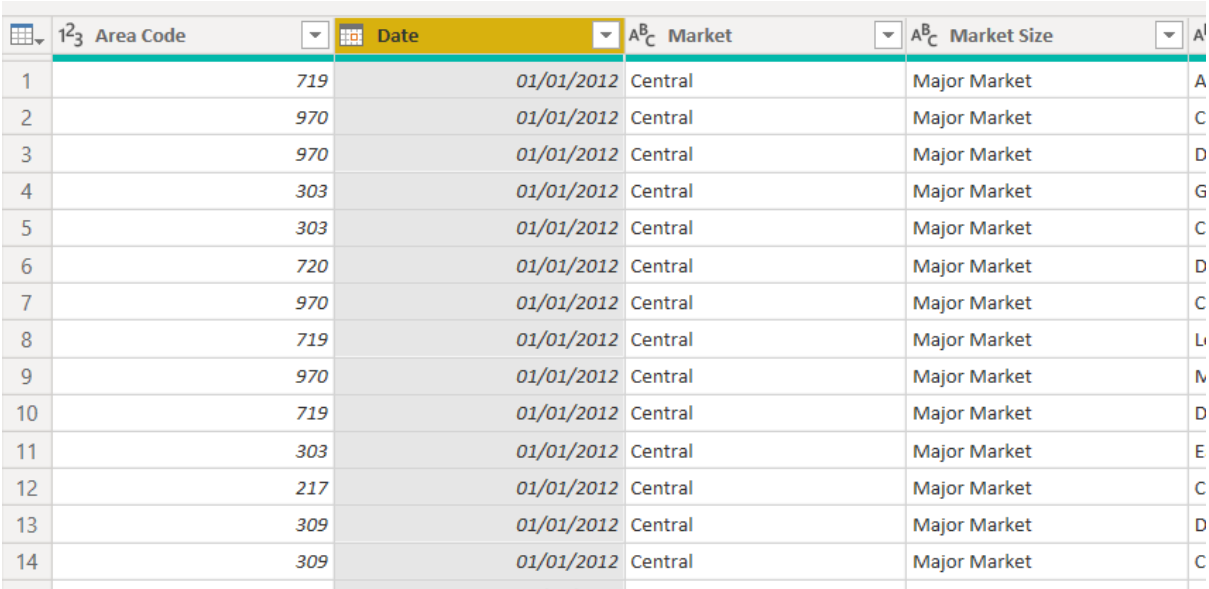
2.2 Changing Data Types

After changing the name of columns, the next step is change the data type in “Transform Data”.



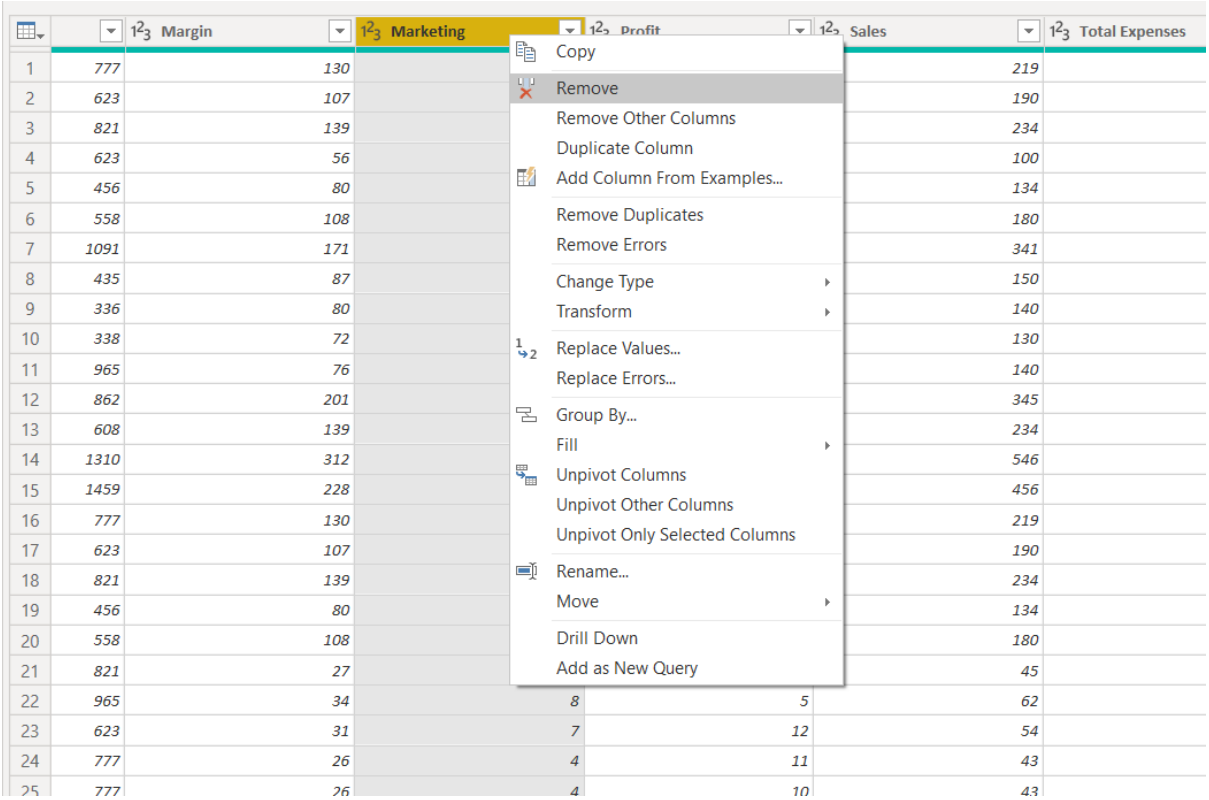
Click the logo which is located in the left of the name's column and change to "Date".

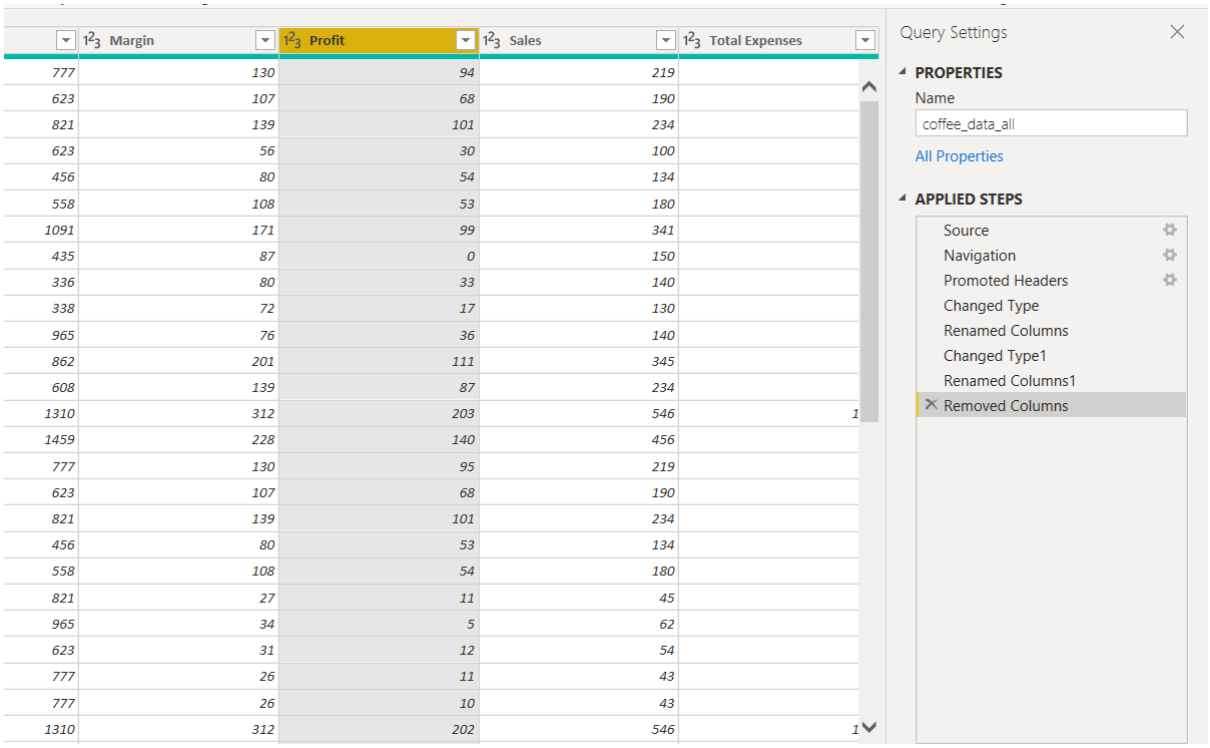




2.3 Removing Columns

Also, the value of “Marketing” column is not necessary and we should delete it. Right-click of the column and select “Remove”. After that, click “Close & Supply” to save the changes.





	Margin	Profit	Sales	Total Expenses
777	130	94	219	
623	107	68	190	
821	139	101	234	
623	56	30	100	
456	80	54	134	
558	108	53	180	
1091	171	99	341	
435	87	0	150	
336	80	33	140	
338	72	17	130	
965	76	36	140	
862	201	111	345	
608	139	87	234	
1310	312	203	546	1
1459	228	140	456	
777	130	95	219	
623	107	68	190	
821	139	101	234	
456	80	53	134	
558	108	54	180	
821	27	11	45	
965	34	5	62	
623	31	12	54	
777	26	11	43	
777	26	10	43	
1310	312	202	546	1

Query Settings

PROPERTIES

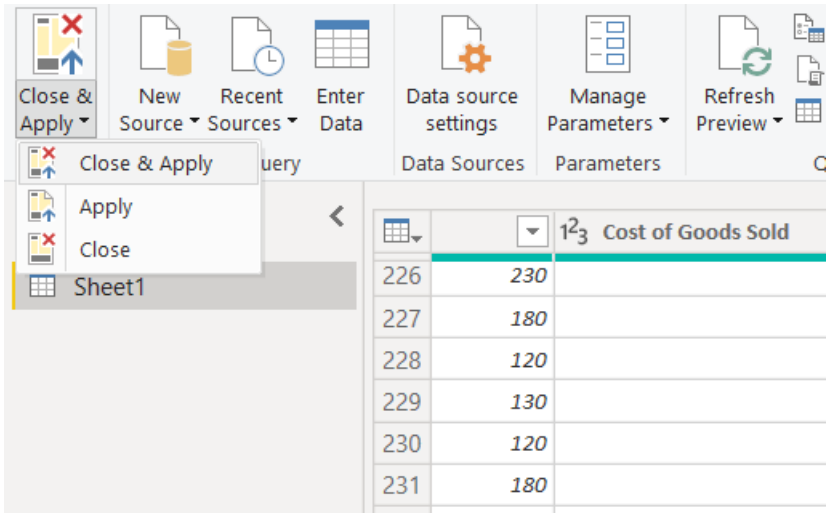
Name

coffee_data_all

All Properties

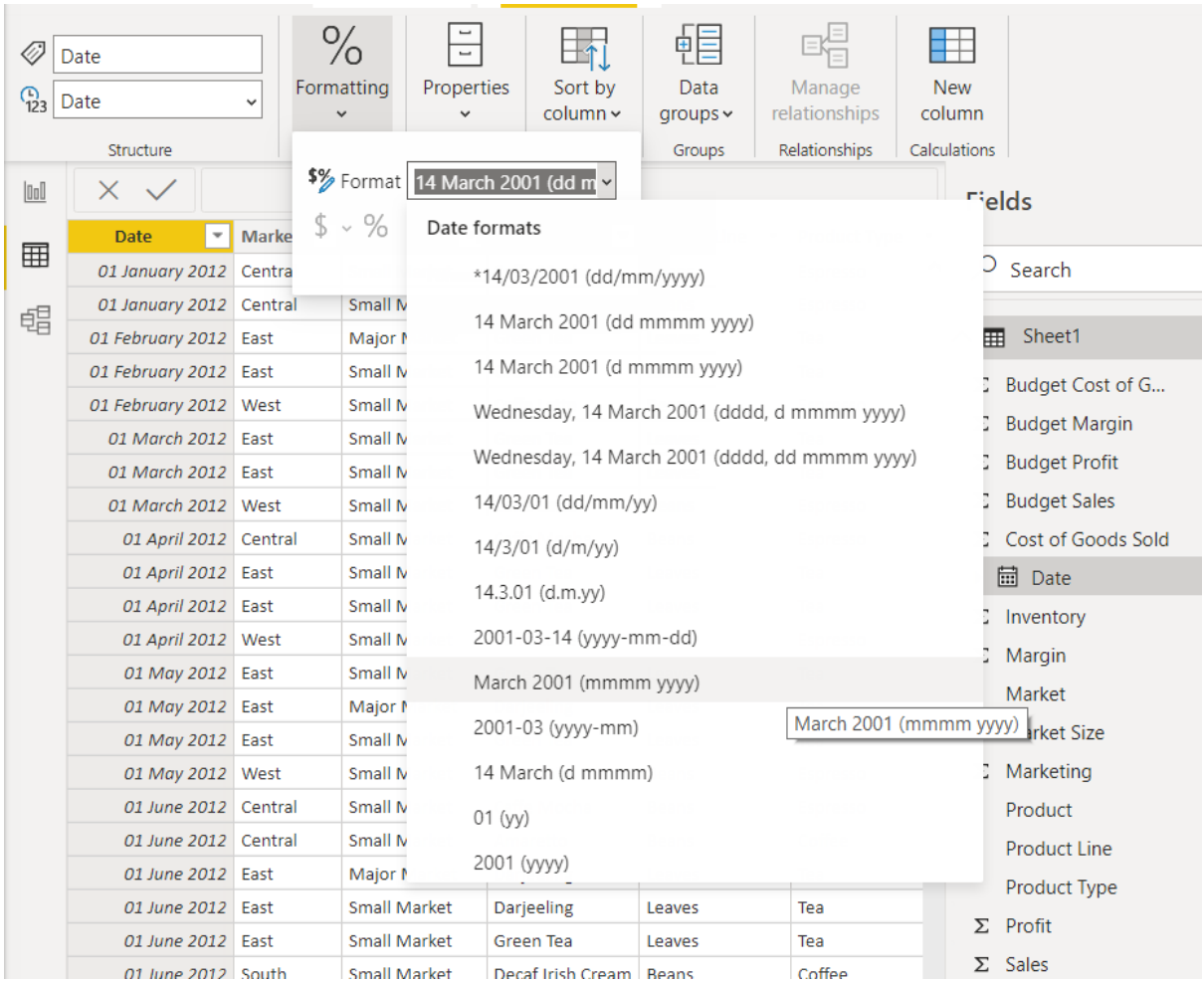
APPLIED STEPS

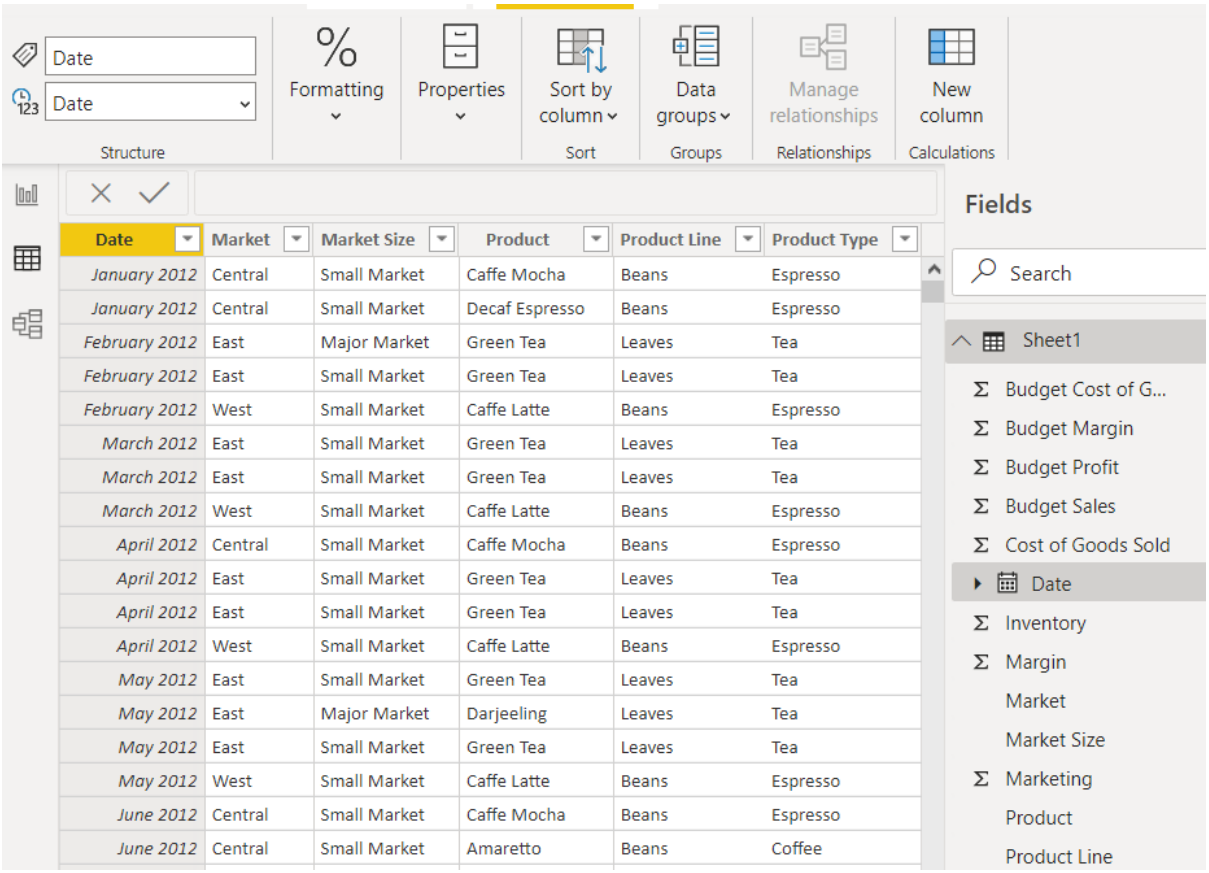
- Source
- Navigation
- Promoted Headers
- Changed Type
- Renamed Columns
- Changed Type1
- Renamed Columns1
- Removed Columns



2.4 Changing Format

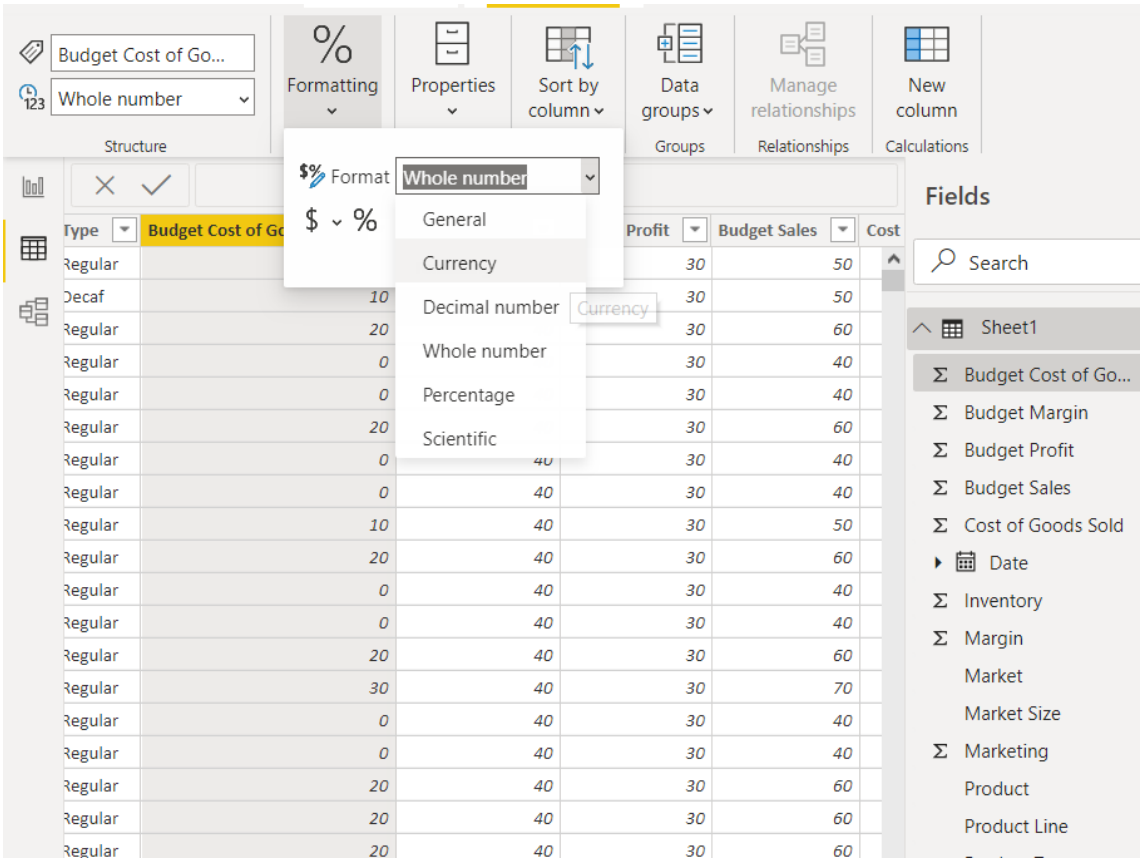
After all the adjustments, move to select “Data” section on the left and click to highlight “Date” column. Select “Formatting” and revise the format to “(mmmm yyyy)”.

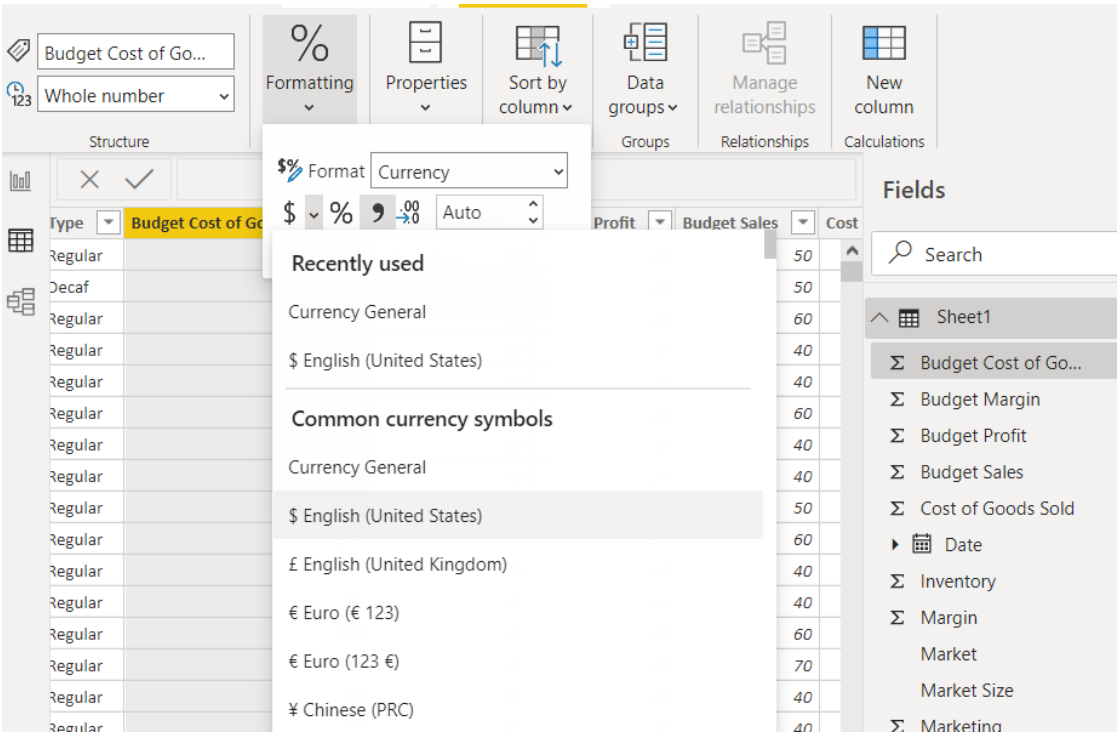


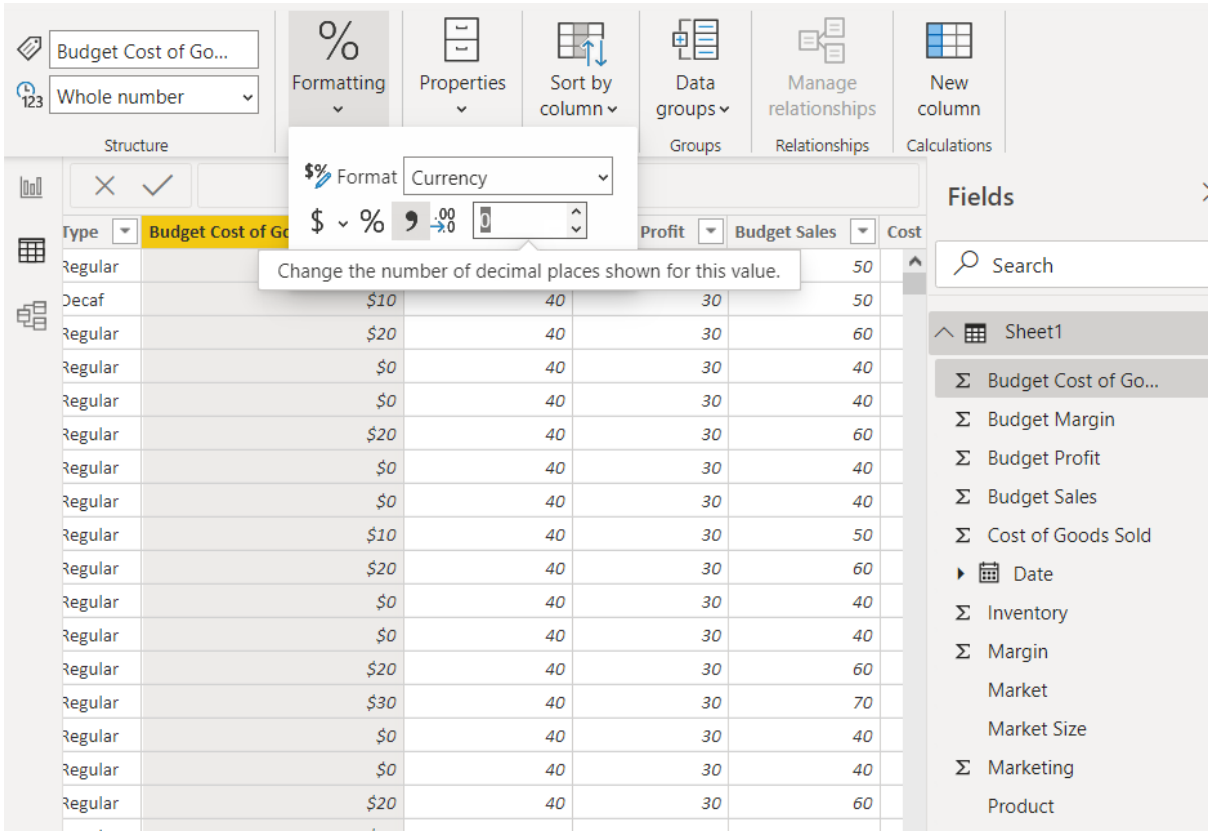


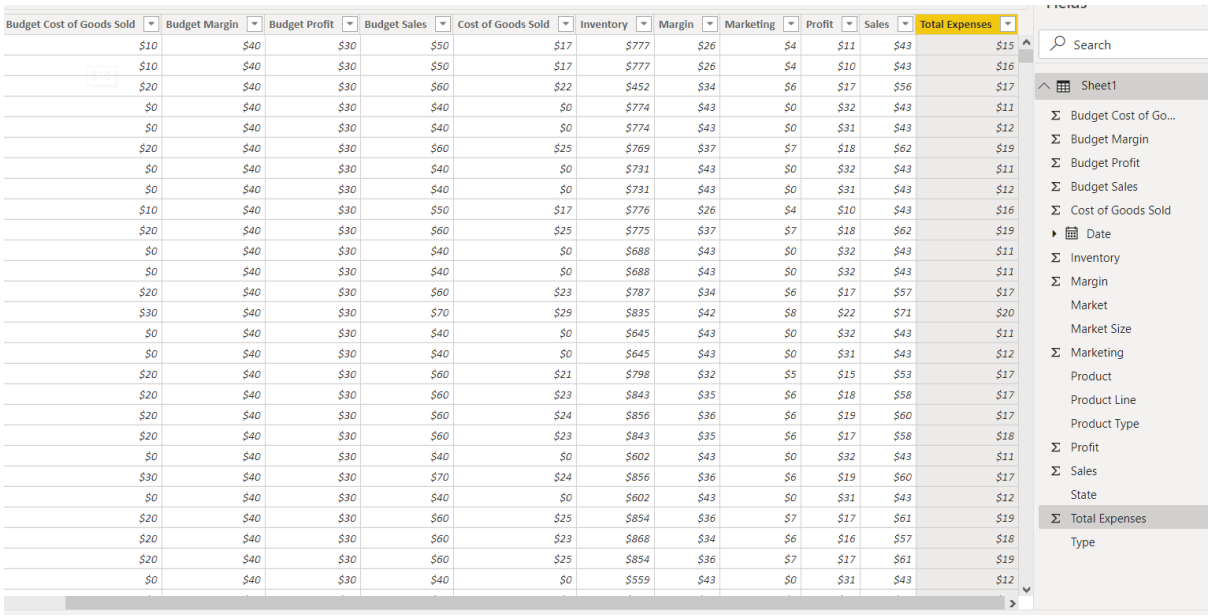
Date	Market	Market Size	Product	Product Line	Product Type
January 2012	Central	Small Market	Caffe Mocha	Beans	Espresso
January 2012	Central	Small Market	Decaf Espresso	Beans	Espresso
February 2012	East	Major Market	Green Tea	Leaves	Tea
February 2012	East	Small Market	Green Tea	Leaves	Tea
February 2012	West	Small Market	Caffe Latte	Beans	Espresso
March 2012	East	Small Market	Green Tea	Leaves	Tea
March 2012	East	Small Market	Green Tea	Leaves	Tea
March 2012	West	Small Market	Caffe Latte	Beans	Espresso
April 2012	Central	Small Market	Caffe Mocha	Beans	Espresso
April 2012	East	Small Market	Green Tea	Leaves	Tea
April 2012	East	Small Market	Green Tea	Leaves	Tea
April 2012	West	Small Market	Caffe Latte	Beans	Espresso
May 2012	East	Small Market	Green Tea	Leaves	Tea
May 2012	East	Major Market	Darjeeling	Leaves	Tea
May 2012	East	Small Market	Green Tea	Leaves	Tea
May 2012	West	Small Market	Caffe Latte	Beans	Espresso
June 2012	Central	Small Market	Caffe Mocha	Beans	Espresso
June 2012	Central	Small Market	Amaretto	Beans	Coffee

Changing the format of “Budget Cost of Goods Sold” column from “Whole Number” to “Currency” and add common currency symbols to “$ English (United States). Also, change decimal places to “0”. Repeat the same step for the rest of columns of Budget Margin, Budget Profit, Budget Sales, Cost of Goods Sold, Inventory, Margin, Marketing, Profit, Sales, and Total Expenses.


Budget Cost of Go...
Whole number
Formatting
Properties
Sort by column
Data groups
Manage relationships
New column
Structure
Groups
Relationships
Calculations
Format
Whole number
$ %
General
Currency
Decimal number
Whole number
Percentage
Scientific
Fields
Search
Sheet1
Budget Cost of Go...
Budget Margin
Budget Profit
Budget Sales
Cost of Goods Sold
Date
Inventory
Margin
Market
Market Size
Marketing
Product
Product Line


Budget Cost of Go...
Whole number
Formatting
Properties
Sort by column
Data groups
Manage relationships
New column
Structure
Groups
Relationships
Calculations
Format
Currency
Auto
Recently used
Currency General
$ English (United States)
Common currency symbols
Currency General
$ English (United States)
£ English (United Kingdom)
€ Euro (€ 123)
€ Euro (123 €)
¥ Chinese (PRC)
Fields
Search
Sheet1
Budget Cost of Go...
Budget Margin
Budget Profit
Budget Sales
Cost of Goods Sold
Date
Inventory
Margin
Market
Market Size
Marketing

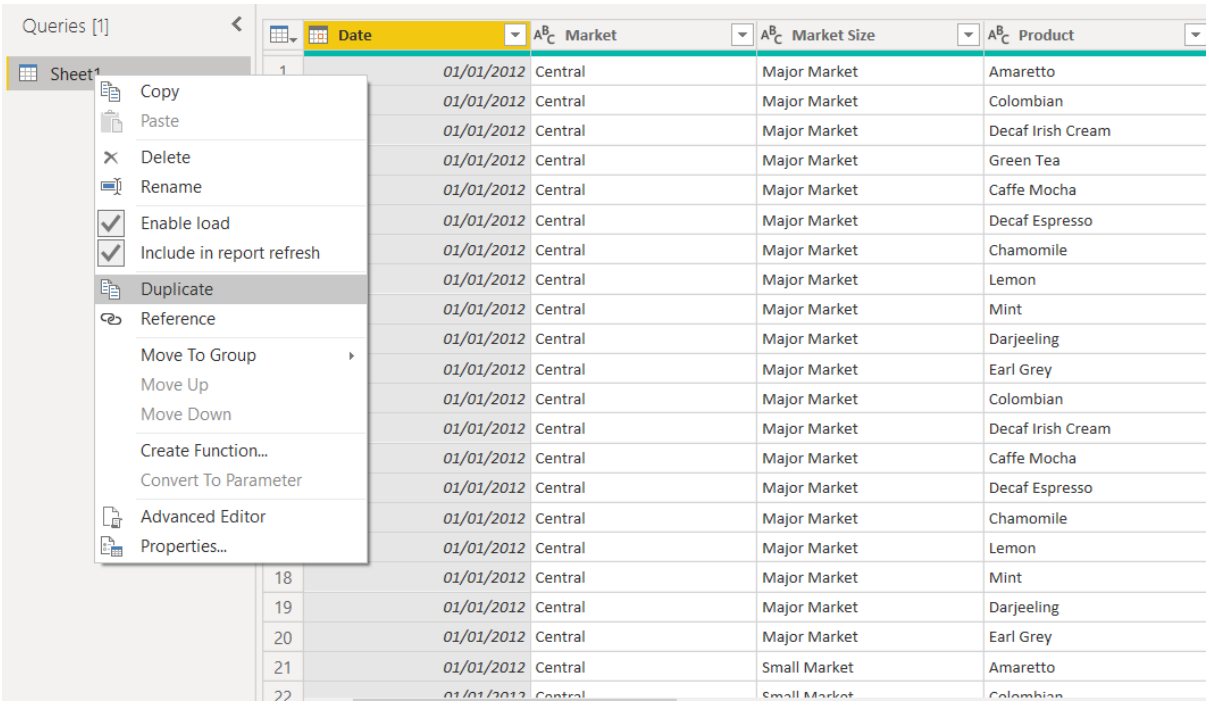

Budget Cost of Go...
Whole number
Structure
Formatting
Properties
Sort by column
Data groups
Manage relationships
New column
Groups
Relationships
Calculations
Format
Currency
Change the number of decimal places shown for this value.
Fields
Search
Sheet1
Budget Cost of Go...
Budget Margin
Budget Profit
Budget Sales
Cost of Goods Sold
Date
Inventory
Margin
Market
Market Size
Marketing
Product

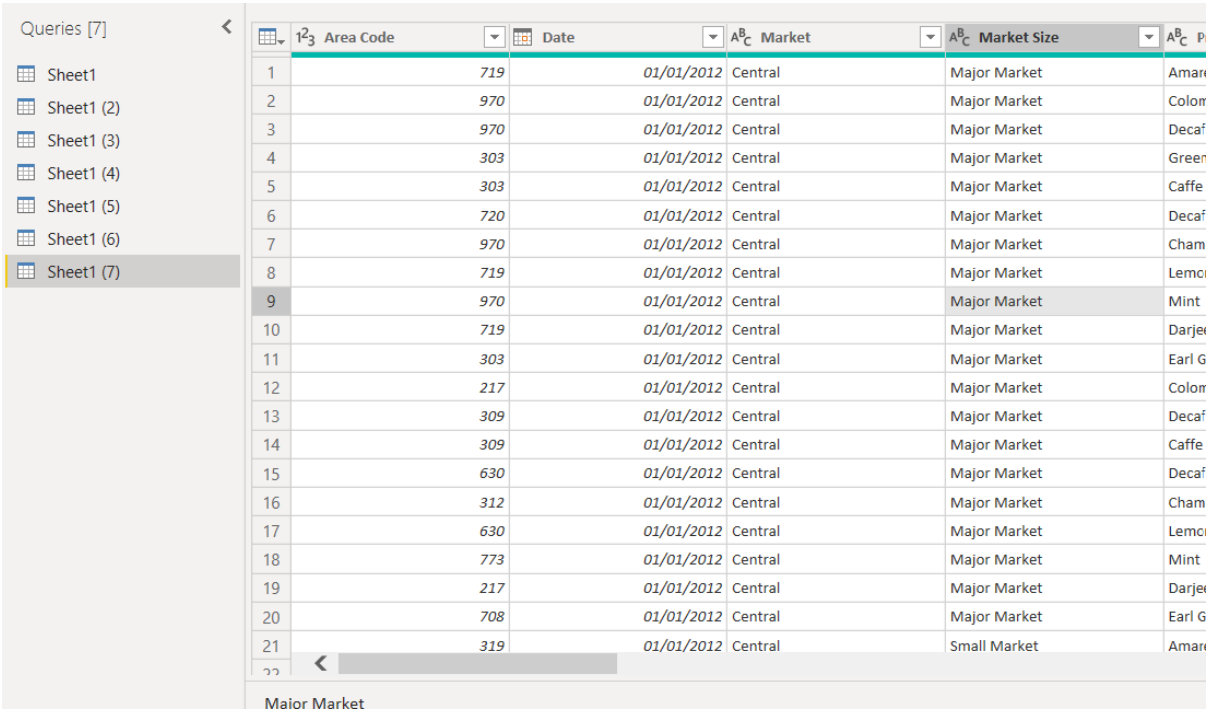

Budget Cost of Goods Sold
Budget Margin
Budget Profit
Budget Sales
Cost of Goods Sold
Inventory
Margin
Marketing
Profit
Sales
Total Expenses
Search
Sheet1
Budget Cost of Go...
Budget Margin
Budget Profit
Budget Sales
Cost of Goods Sold
Date
Inventory
Margin
Market
Market Size
Marketing
Product
Product Line
Product Type
Profit
Sales
State
Total Expenses
Type

3 Data Modelling – Star Schema Facts and Dimensions

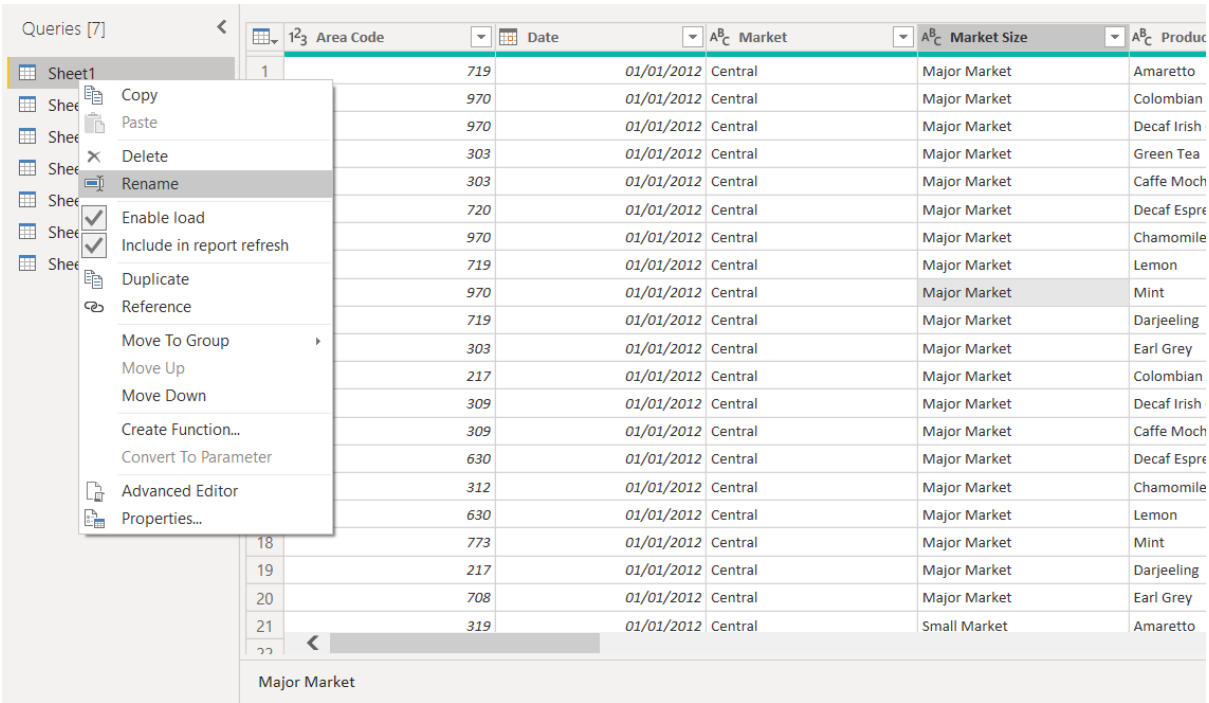
3.1 Splitting tables

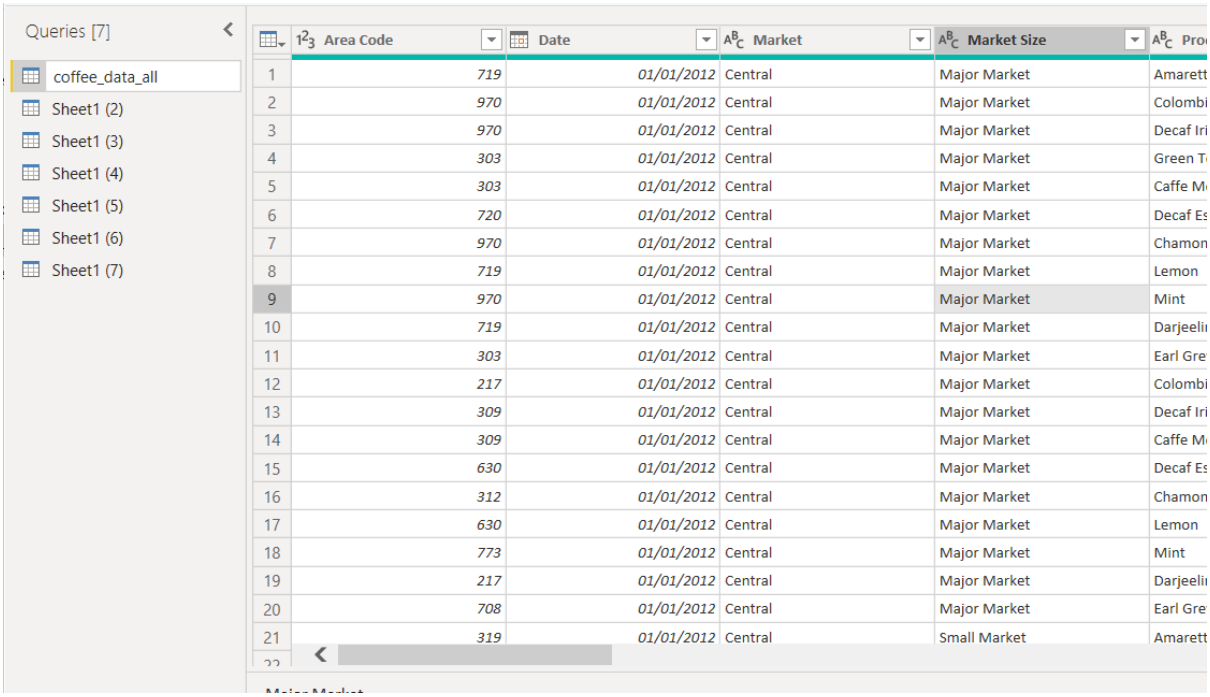
In this dataset, try to split seven tables to normalise data. So, click “Transform data” and the “Power Query Editor” come up. After that, right-click “Sheet1” in Queries section and duplicate six tables for further usage.



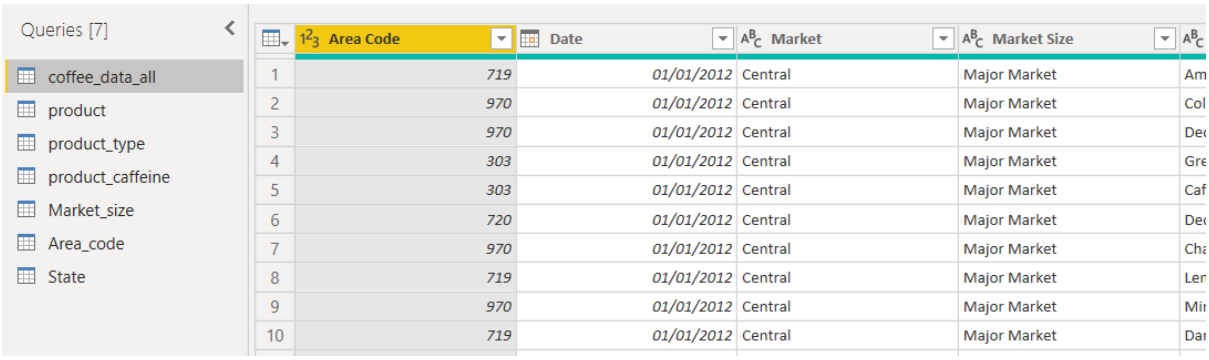


Right-click “Sheet1” in the Queries section and choose “Rename”. Change the name from “Sheet1” to “coffee_data_all”.



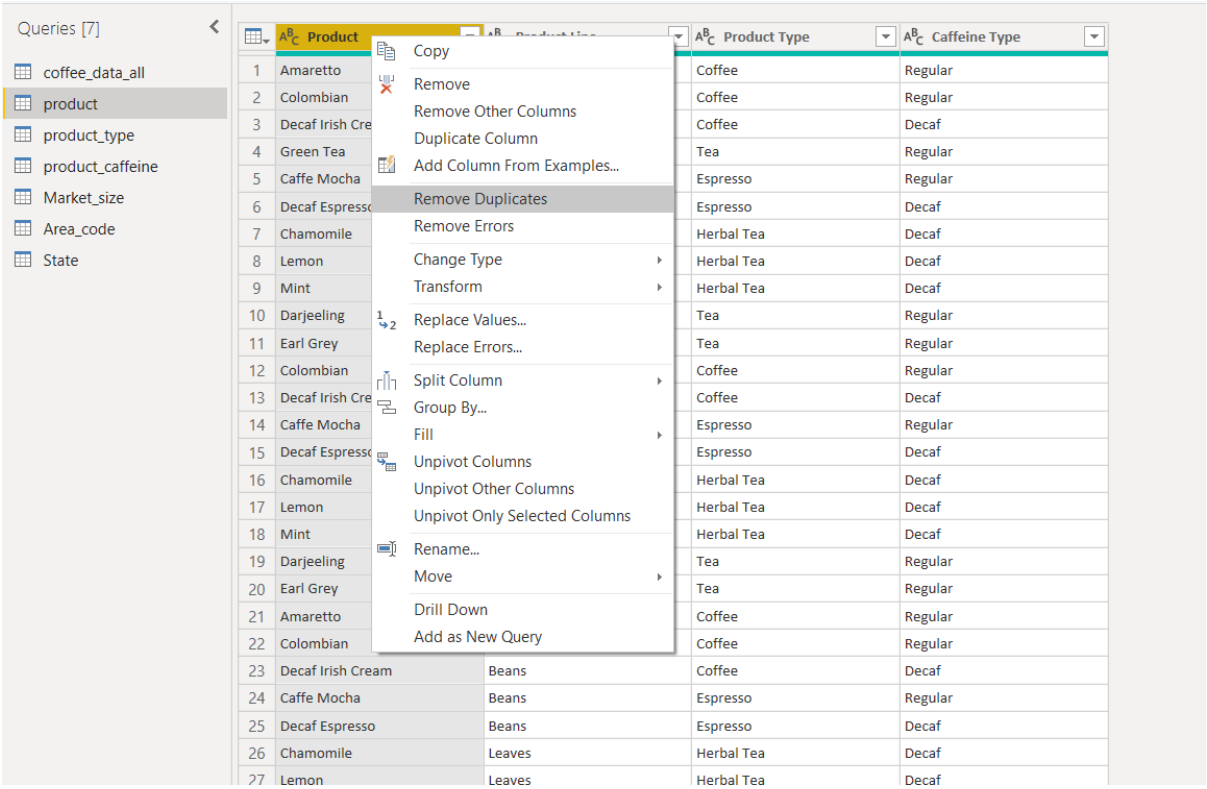


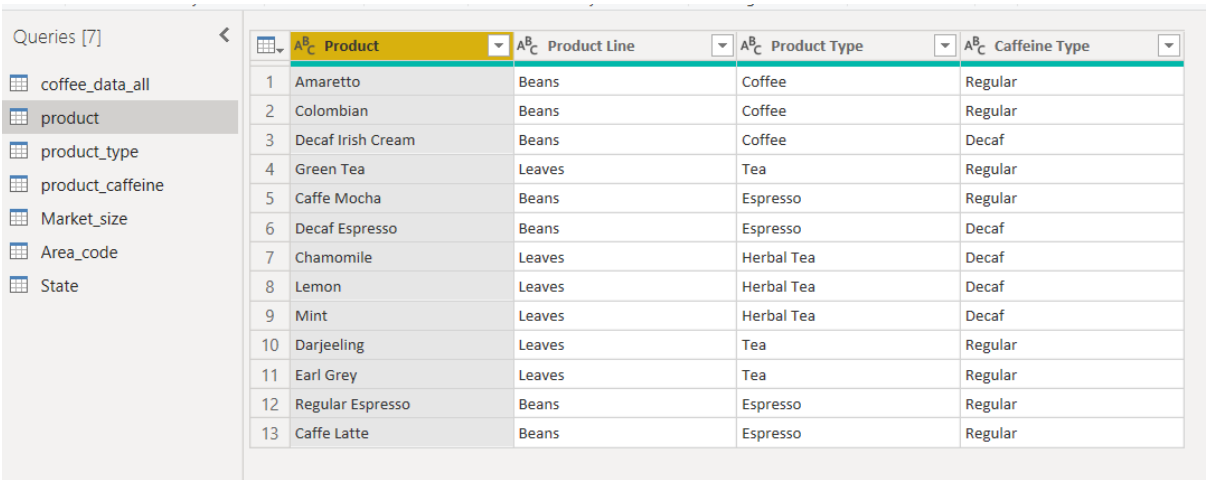
Repeat all the same steps and change the rest of sheet's name to "product", "product_type", "product_caffeine", "Market_size", Area_code", State".



3.2 Remove Duplicate items

Once select “product” column, there are many duplicates items in the “Product” column and need to remove all of it because it can prevent many-to-many relationship happen. So, right-click “Product” column and choose “Remove Duplicates”.



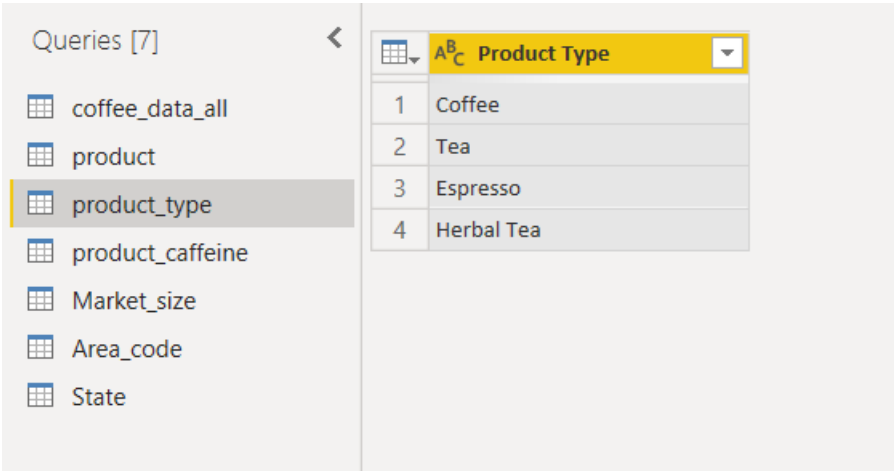


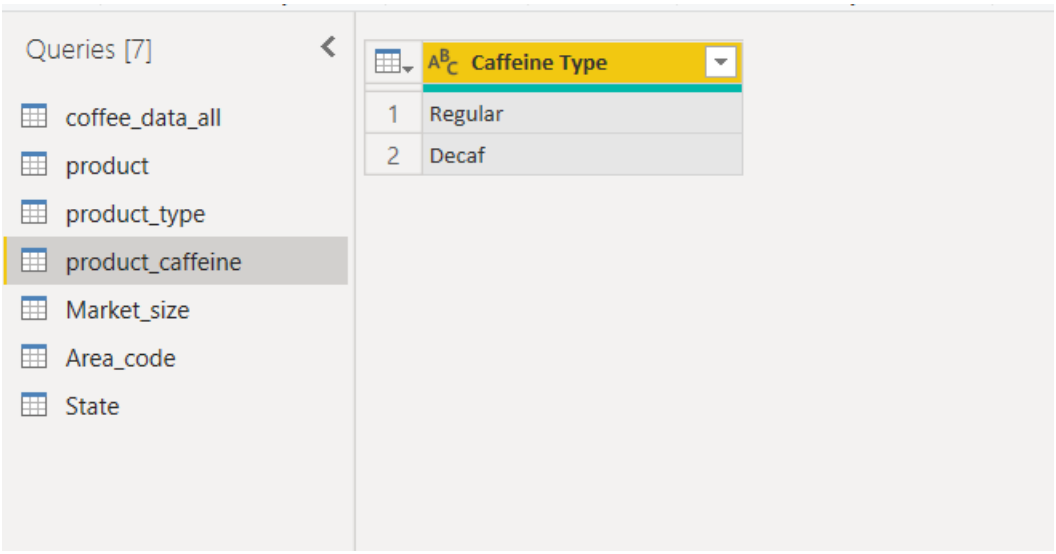
Queries [7]

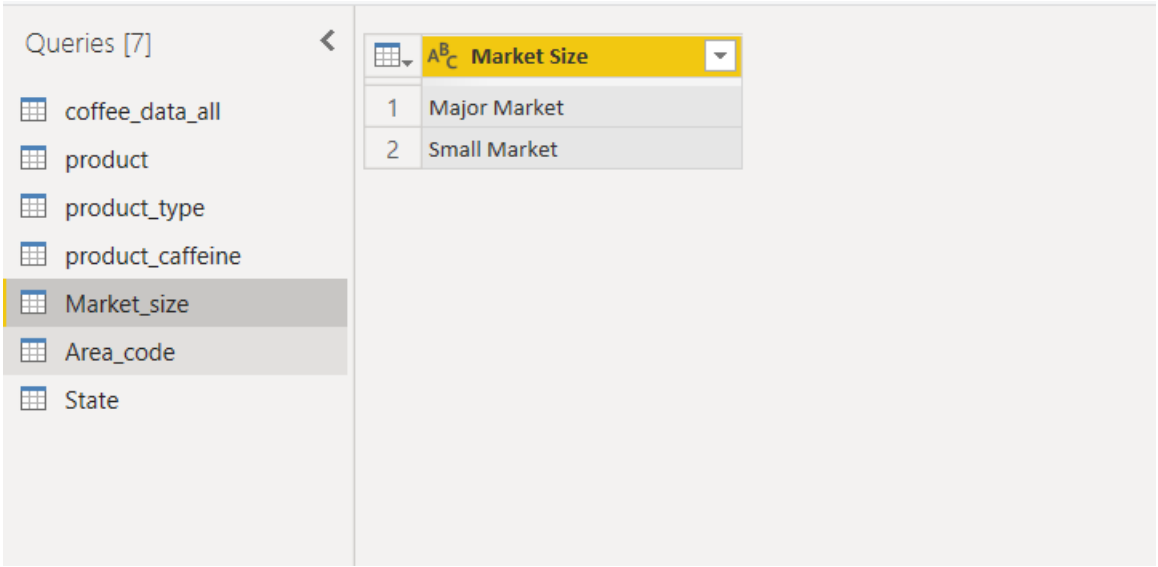
coffee_data_all
product
product_type
product_caffeine
Market_size
Area_code
State

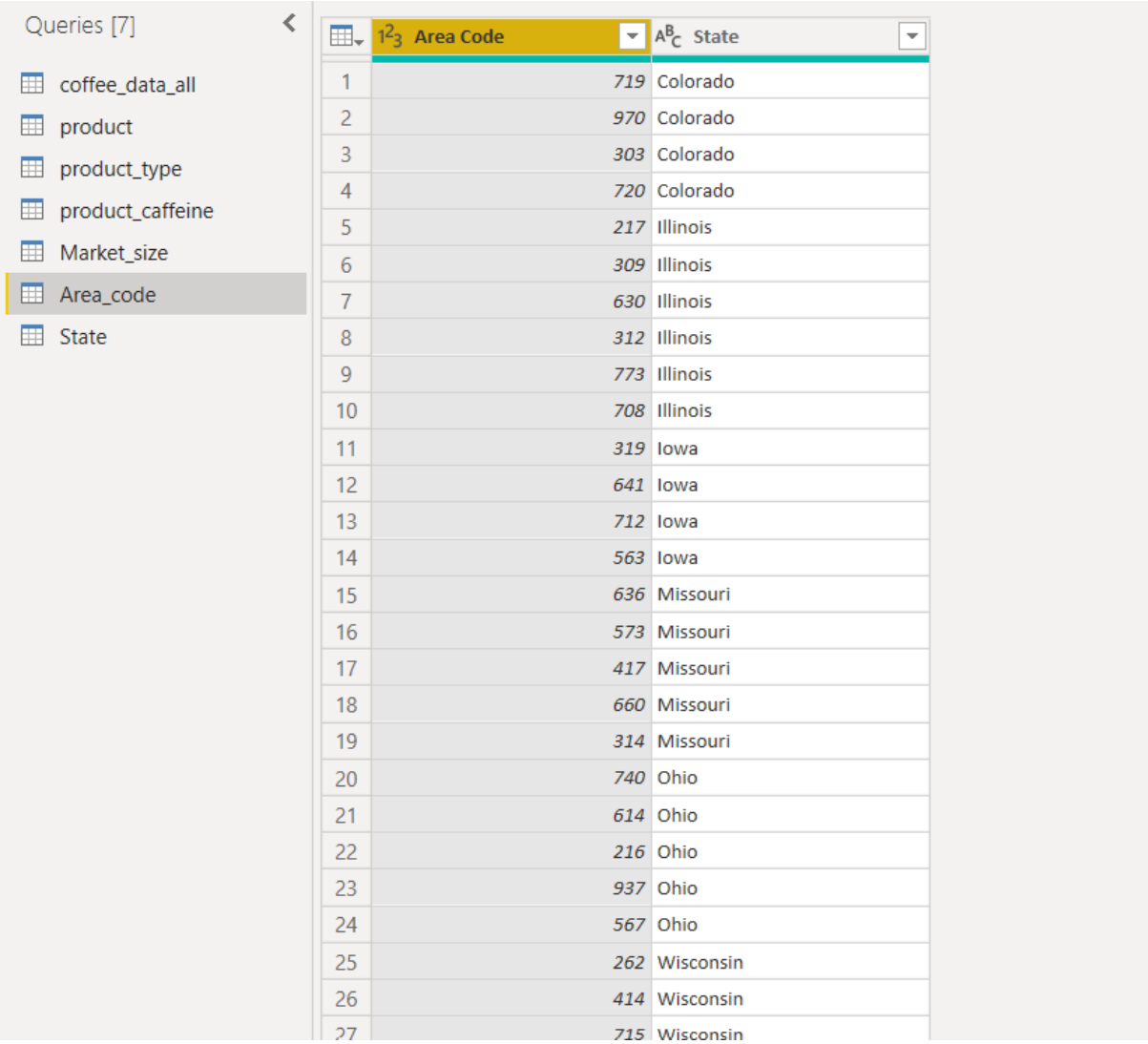
	Product	Product Line	Product Type	Caffeine Type
1	Amaretto	Beans	Coffee	Regular
2	Colombian	Beans	Coffee	Regular
3	Decaf Irish Cream	Beans	Coffee	Decaf
4	Green Tea	Leaves	Tea	Regular
5	Caffe Mocha	Beans	Espresso	Regular
6	Decaf Espresso	Beans	Espresso	Decaf
7	Chamomile	Leaves	Herbal Tea	Decaf
8	Lemon	Leaves	Herbal Tea	Decaf
9	Mint	Leaves	Herbal Tea	Decaf
10	Darjeeling	Leaves	Tea	Regular
11	Earl Grey	Leaves	Tea	Regular
12	Regular Espresso	Beans	Espresso	Regular
13	Caffe Latte	Beans	Espresso	Regular

Repeat the same steps for the rest of columns. Then click “Close & Apply” to save all the changes.

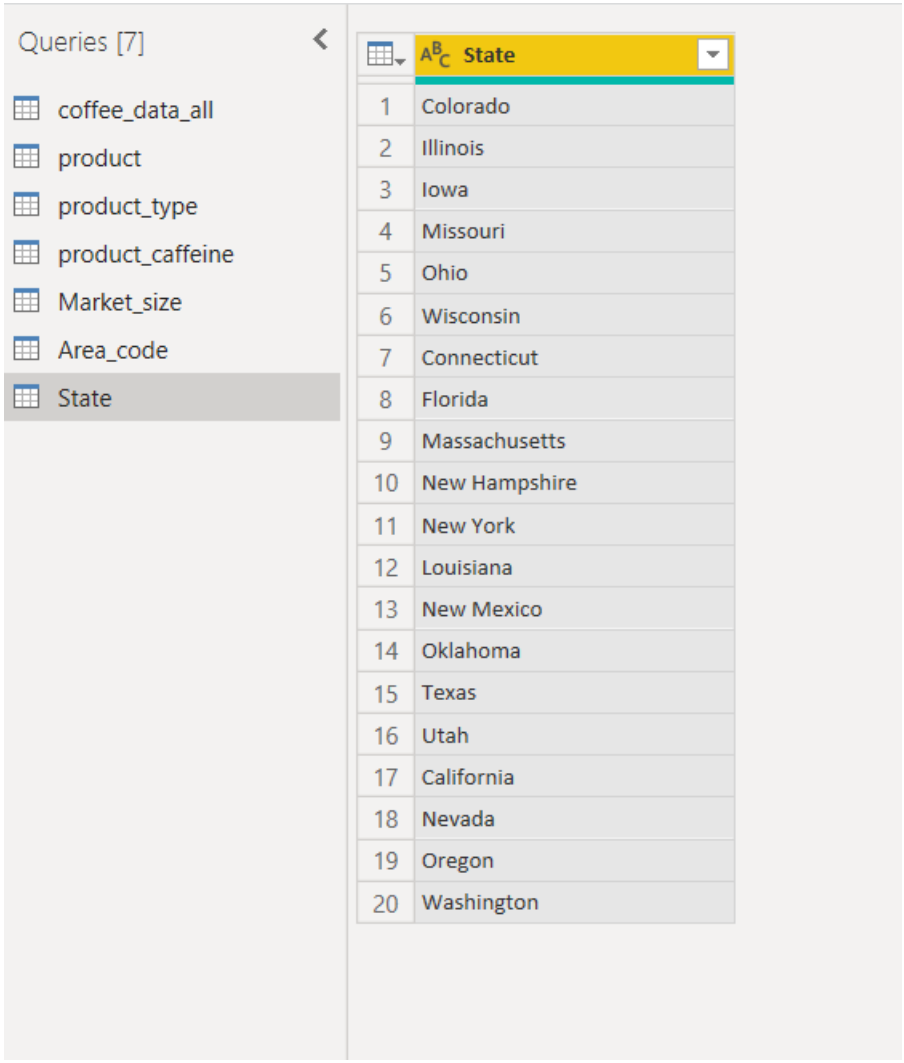

Queries [7]
coffee_data_all
product
product_type
product_caffeine
Market_size
Area_code
State
Product Type
1 Coffee
2 Tea
3 Espresso
4 Herbal Tea


Queries [7]
coffee_data_all
product
product_type
product_caffeine
Market_size
Area_code
State
Caffeine Type
1 Regular
2 Decaf


Queries [7]
coffee_data_all
product
product_type
product_caffeine
Market_size
Area_code
State
Market Size
1 Major Market
2 Small Market



	Area Code	State
1	719	Colorado
2	970	Colorado
3	303	Colorado
4	720	Colorado
5	217	Illinois
6	309	Illinois
7	630	Illinois
8	312	Illinois
9	773	Illinois
10	708	Illinois
11	319	Iowa
12	641	Iowa
13	712	Iowa
14	563	Iowa
15	636	Missouri
16	573	Missouri
17	417	Missouri
18	660	Missouri
19	314	Missouri
20	740	Ohio
21	614	Ohio
22	216	Ohio
23	937	Ohio
24	567	Ohio
25	262	Wisconsin
26	414	Wisconsin
27	715	Wisconsin


Queries [7]
coffee_data_all
product
product_type
product_caffeine
Market_size
Area_code
State
State
1 Colorado
2 Illinois
3 Iowa
4 Missouri
5 Ohio
6 Wisconsin
7 Connecticut
8 Florida
9 Massachusetts
10 New Hampshire
11 New York
12 Louisiana
13 New Mexico
14 Oklahoma
15 Texas
16 Utah
17 California
18 Nevada
19 Oregon
20 Washington

3.3 M Language and Create New Column

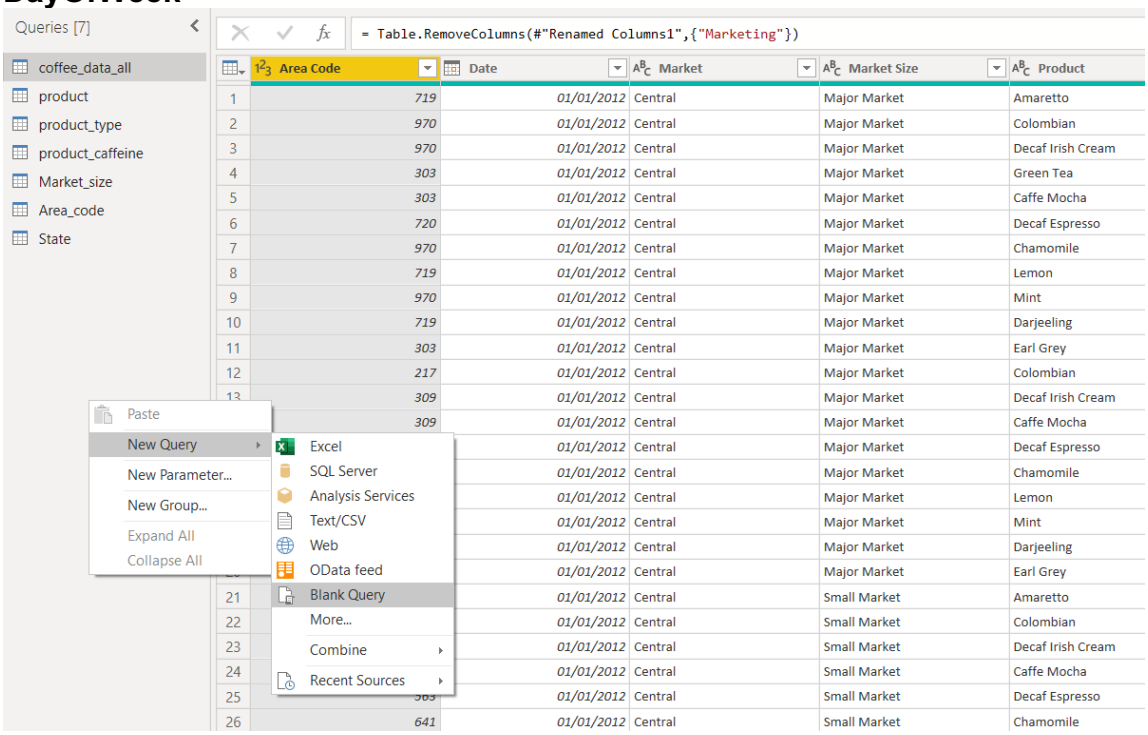
The following paragraph will describe a few steps to create a calendar table by day, year, quarter, week number, month number, month, and day of week.

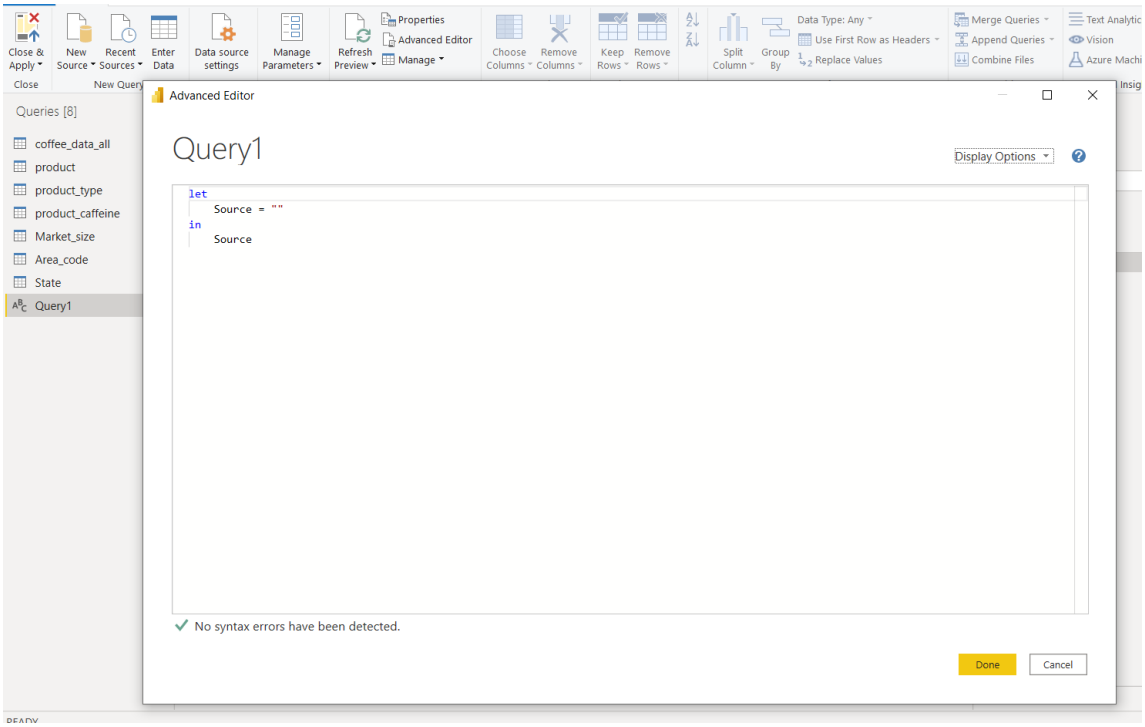
In the left-hand side of queries, right-click and create “Blank Query”. Choose “Advanced Editor” and write the following code in Query1.

```
#create date dimension
(StartDate as date, EndDate as date)=>

let
#date ranges from parameters
StartDate = #date(Date.Year(StartDate), Date.Month(StartDate),
Date.Day(StartDate)),
EndDate = #date(Date.Year(EndDate), Date.Month(EndDate),
Date.Day(EndDate)),

#the number of dates required for the table
GetDateCount = Duration.Days(EndDate - StartDate),

#Take count of dates and get it into a list of dates
GetDateList = List.Dates(StartDate, GetDateCount,
#duration(1,0,0,0)),

#Convert the list into a table
DateListToTable = Table.FromList(GetDateList,
Splitter.SplitByNothing(), {"Date"}, null, ExtraValues.Error),

#Add year column
YearNumber = Table.AddColumn(DateListToTable, "Year",
each Date.Year([Date])),

#Add quarter number column
QuarterNumber = Table.AddColumn(YearNumber , "Quarter",
each "Q" & Number.ToText(Date.QuarterOfYear([Date]))),

#Add week number column
WeekNumber= Table.AddColumn(QuarterNumber , "Week Number",
each Date.WeekOfYear([Date])),

#Add month number column
MonthNumber = Table.AddColumn(WeekNumber, "Month Number",
each Date.Month([Date])),
```

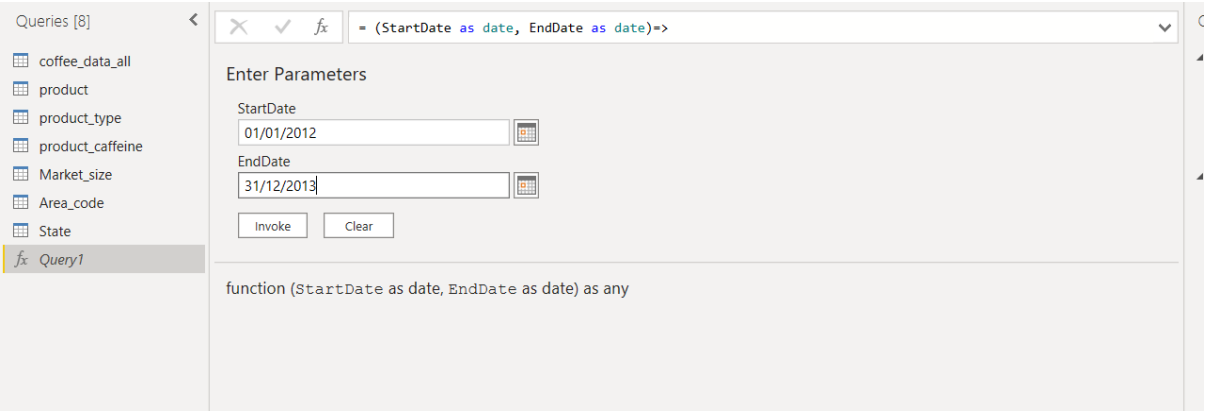
#Add month column
MonthName = Table.AddColumn(MonthNumber , "Month", each Date.ToText([Date],"MMMM")),

in
DayOfWeek

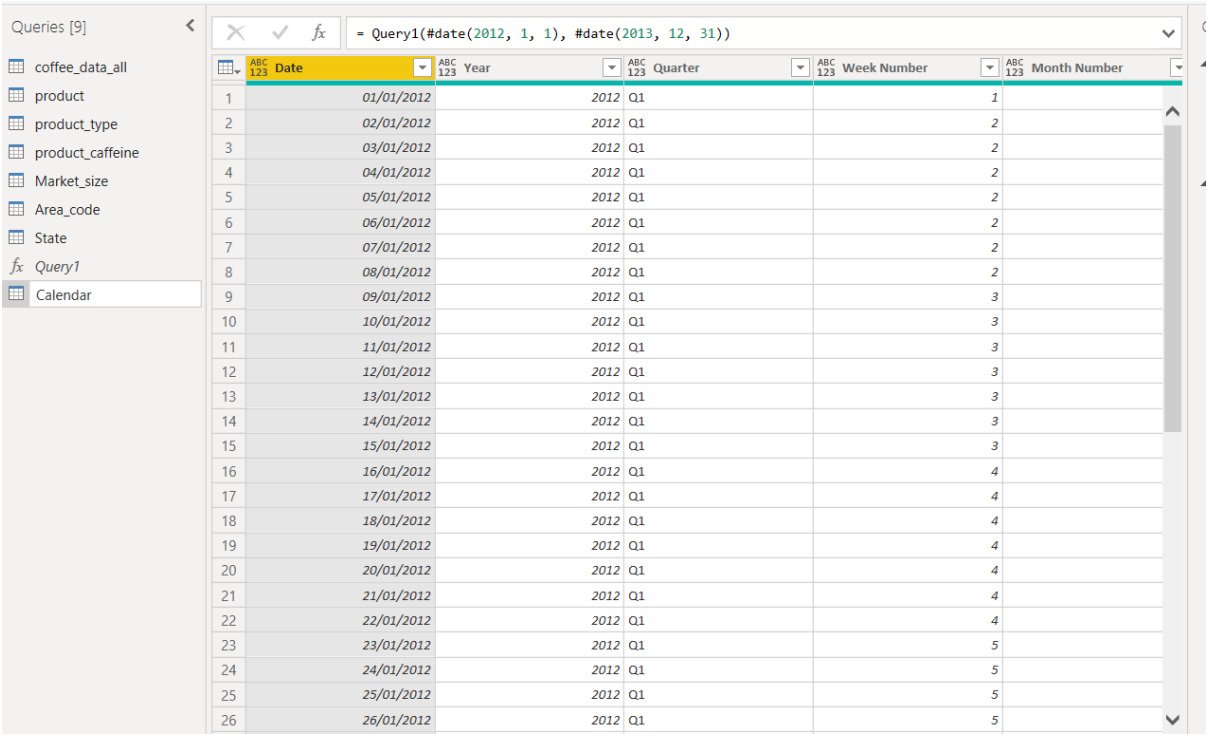


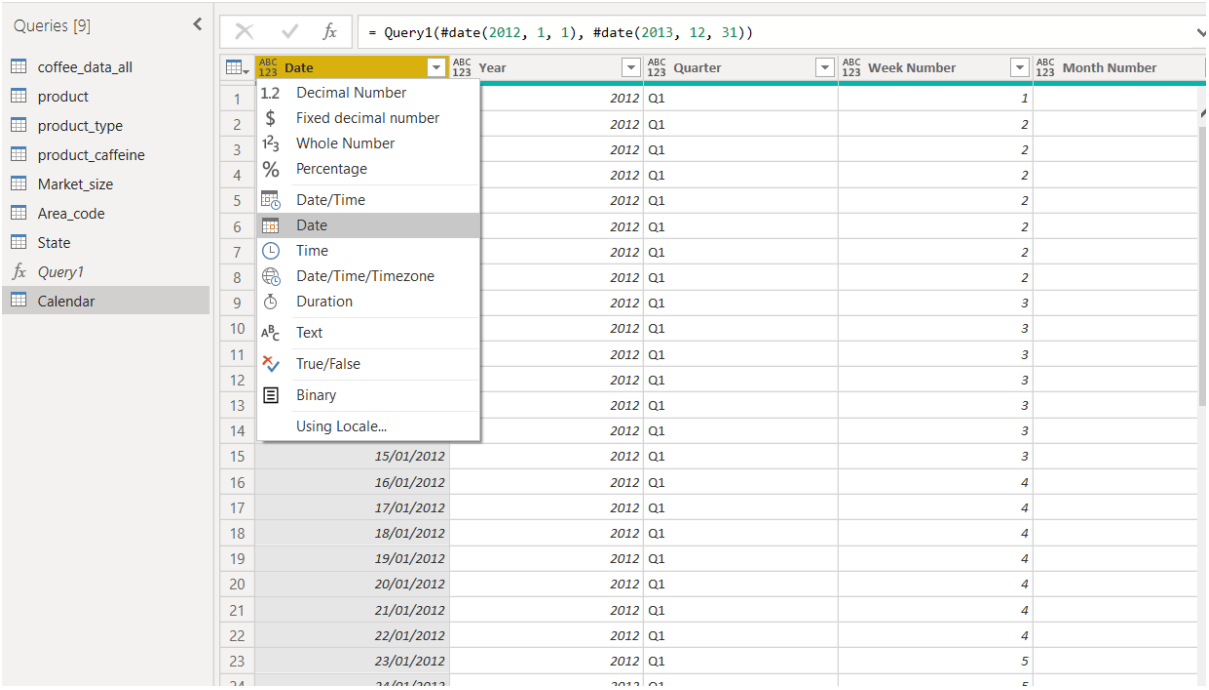


Once click “Done”, parameters are required to input the date. According to our dataset, the start date is 01/01/2012, and the end date is 31/12/2013.



The new table is created in “Queries” and rename the table as “Calendar”. Change the first column of type to “Date” for further usage.





3.4 Data Model

Now look at the “Model” section, which are eight tables. It shows their structure for each table as below.

1) Market_size

Column	Description
Market Size	Market size of USA

2) State

Column	Description
State	State name of USA

3) Area_code

Column	Description
Area Code	Area code of USA
State	State name of USA

4) Product_caffeine

Column	Description
Caffeine Type	Type of caffeine of products

5) product_type

Column	Description
Product Type	Type of products

6) product

Column	Description
Product	Name of products
Product Line	Original material of products
Product Type	Type of products
Caffeine Type	Type of caffeine of products

7) Calendar

Column	Description
Date	Date of purchasing
Year	Year of purchasing
Quarter	Quarter of purchasing

Week Number	Week number of the year
Month Number	Month number of the year
Month	Month of the year
Day of Week	Day of week of the year

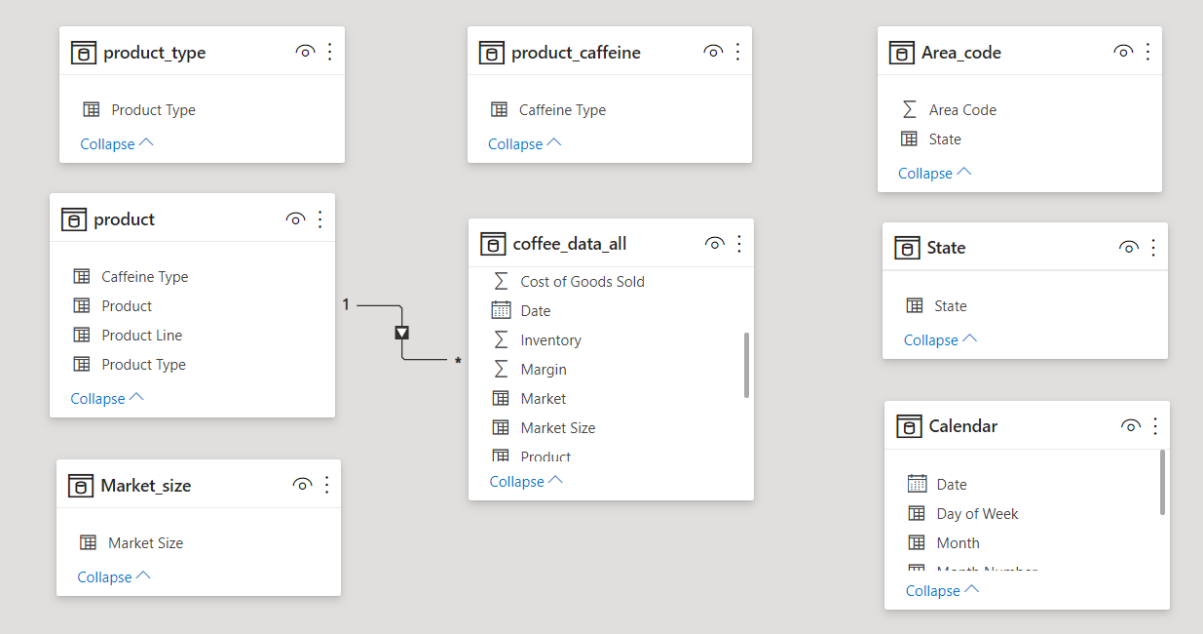
8) coffee_data_all

Column	Description
Date	Date of purchasing
Market	Location of market
Market Size	Size of market
Product	Name of products
Product Line	Original material of products
Product Type	Type of products
State	Location of state in USA
Caffeine Type	Type of caffeine of products
Budget Cost of Goods Sold	Budget cost of goods sold
Budget Margin	Budget margin of products
Budget Profit	Budget profit of products
Budget Sales	Budgets sales of products
Cost of Goods Sold	Cost of goods sold
Inventory	Inventory of products
Margin	Margin of products
Marketing	Marketing expenses of products
Profit	Profit of products
Sales	Sales of products
Total Expenses	Total expenses of products

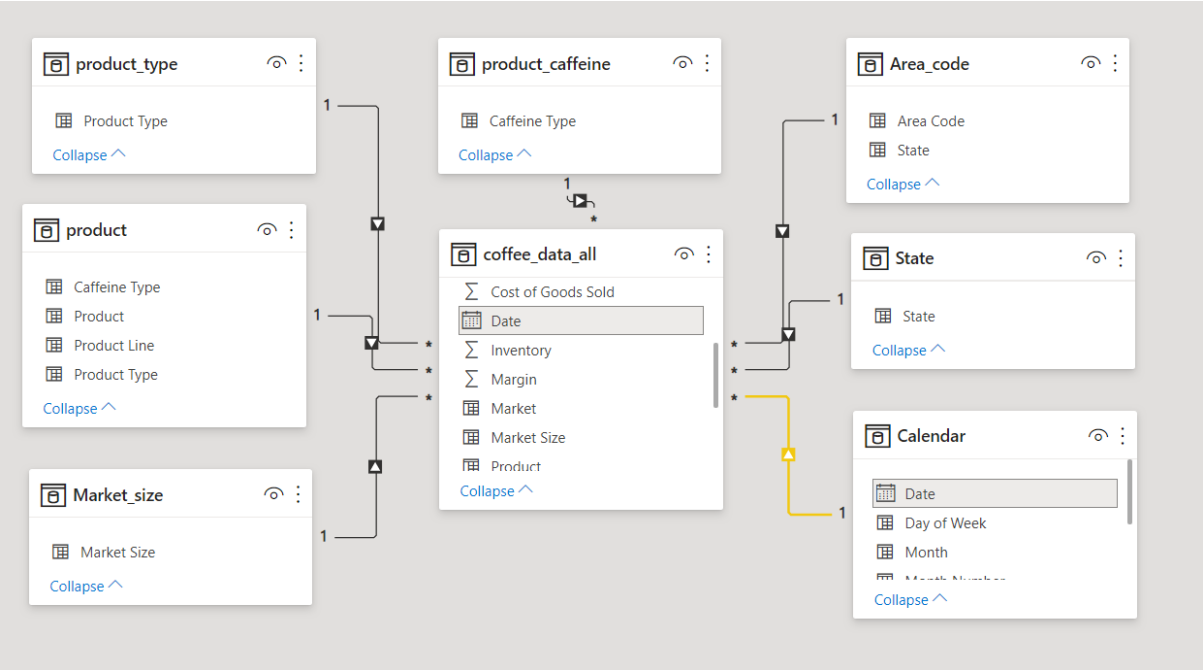
3.5 Schema and Relationships

We can find that all tables have not any relationship and Star schema format will be used to create relationship and link up together. In the dataset, “coffee_data_all” table is the main one and it relates with all other tables.

For creating relationship with “product” and “coffee_data_all”, click “Product ” of “product” table, then hold and drag to “Product” of “coffee_data_all” table.



Use the same steps for the rest of the model, and look at the relationship as below. As all tables of duplicated items are removed before, so it do not have any many-to-many relationship issue happened.


product_type
Product Type
Collapse
product_caffeine
Caffeine Type
Collapse
Area_code
Area Code
State
Collapse
product
Caffeine Type
Product
Product Line
Product Type
Collapse
coffee_data_all
Cost of Goods Sold
Date
Inventory
Margin
Market
Market Size
Product
Collapse
State
State
Collapse
Market_size
Market Size
Collapse
Calendar
Date
Day of Week
Month
Collapse
1
*

SECTION 2 – BUSINESS INTELLIGENCE SOLUTION

COFFEE CHAIN ANALYSIS IN 2012-2013

1 Executive Summary

Background – Coffee is one of most important beverages for most people during the day. Believe that it should be a huge market over the world and specially people who live in North America. The dataset of coffee chain house is the best choice and create data visualisation to identify data patterns. Exploring this dataset and find out an underlying issue. Sales amount, profit, expense for each product in different states will be a main concern which it will focus on.
The aim of this report will provide vital sights on how to improve the sales volume and profit. Sales and marketing team can setup marketing plan and sales strategy based on this business report to improve overall revenue.

2 Key Findings

- Most of tea product's sales volume is better than expected and it has over 15% positive variance. However, coffee product's performance is totally out of expectation and some product's sales volume are also overestimated.
- The profit margin of coffee products is much better than tea products. The profit of Colombian and Regular Espresso nearly double of total expenses.
- The state of Iowa is a small market compare with other big cities, but the profit volume is much better the other major market, like Florida and New York.
- Caffe Mocha is the most popular product in the major market of Illinois in 2012 and 2013.

PRODUCT SALES ANALYSIS

Product	Budget Sales	Sales	Variance %
Earl Grey	$50,900	$66,772	24%
Green Tea	$25,340	$32,850	23%
Darjeeling	$57,360	$73,151	22%
Mint	$28,320	$35,710	21%
Lemon	$78,300	$95,926	18%
Chamomile	$63,840	$75,578	16%
Caffe Latte	$30,540	$35,899	15%
Regular Espresso	$22,620	$24,031	6%
Decaf Espresso	$75,720	$78,162	3%
Caffe Mocha	$84,600	$84,904	0%
Amaretto	$27,200	$26,269	-4%
Colombian	$134,380	$128,311	-5%
Decaf Irish Cream	$67,040	$62,248	-8%
Total	**$746,160**	**$819,811**	**9%**

3 Recommendations

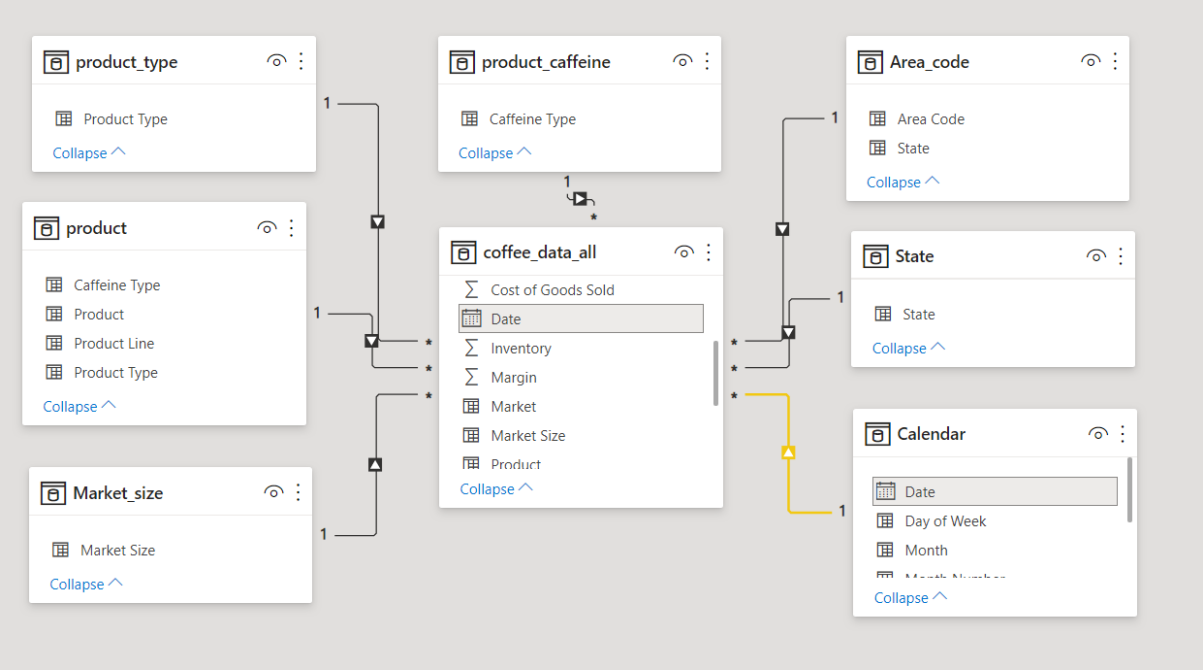
- Boosting sales of coffee products.
- Finding the solutions to control the cost of tea products.
- Providing suggestion for the market team about the marketing plan.

4 Data Description

The dataset is for the coffee chain that take place in the different states of United States of America and each type of product's statistics in 2012-2013. It is taken from the webpage, www.dataplusscience.com, and the total weight of the data is 403kb in excel file.

5 Data Model

The data model is shown as below and the table of "coffee_data_all" is the key element with all the other table. Basically, it separates with products type, product, market size, caffeine type, area code, state, and calendar.



6 Introduction

The business report is including three sections, which are sales summary, sales insight, and sales forecast and artificial intelligence. The following section will describe of this dataset and provide some basic understanding to target audience. Then the other section will compare the data between 2012 and 2013, which it will find some insights of different states. For the last section, it tries to forecast the upcoming sales volume and use artificial intelligence tool to find out some relationships with sales aspect.

7 Finding based on analysis and evaluation – 1

7.1 Matrix and Key Finding From The Visual

PRODUCT SALES ANALYSIS

Product	Budget Sales	Sales	Variance %
Earl Grey	$50,900	$66,772	24%
Green Tea	$25,340	$32,850	23%
Darjeeling	$57,360	$73,151	22%
Mint	$28,320	$35,710	21%
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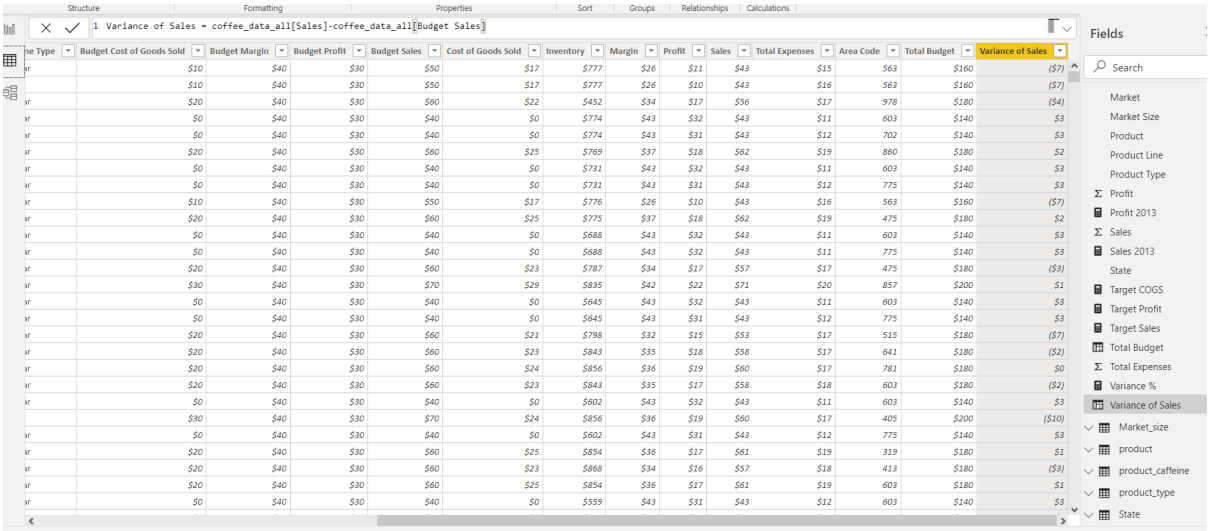
Caffe Mocha	$84,600	$84,904	0%
Amaretto	$27,200	$26,269	-4%
Colombian	$134,380	$128,311	-5%
Decaf Irish Cream	$67,040	$62,248	-8%
Total	**$746,160**	**$819,811**	**9%**

It mentioned before in the key finding for this chart. It shows the variance of budget sales and sales with each product. Most of tea product's sales volume is better than expected and it has over 10% positive variance. However, coffee product's performance is totally out of expectation and some product's sales volume are also overestimated.

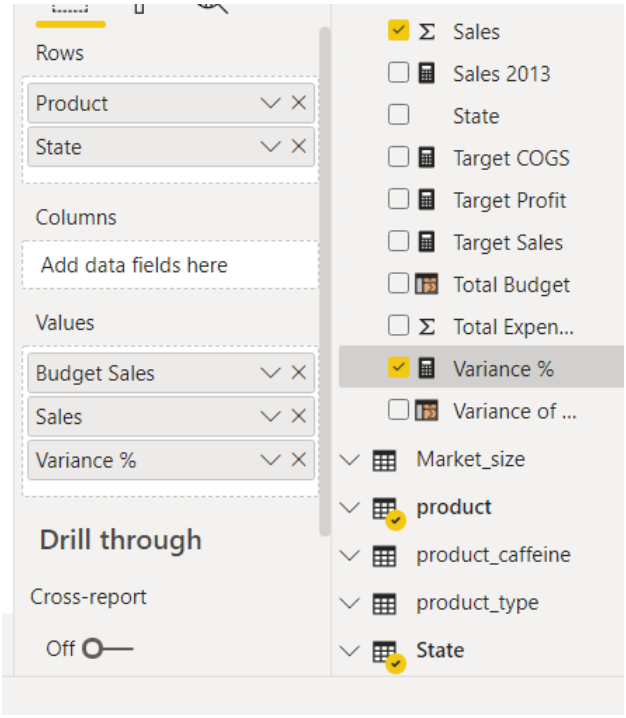
7.1.1 DAX Expressions – 1 and New Calculated Measure Add Into The Model

The percentage of variance is good to illustrate about the difference. However, it requires to create a new column of the model in the Data section and use DAX language to calculate the variance of sales. The formula shows the value of sales subtracts budget sales and it is shown as below.

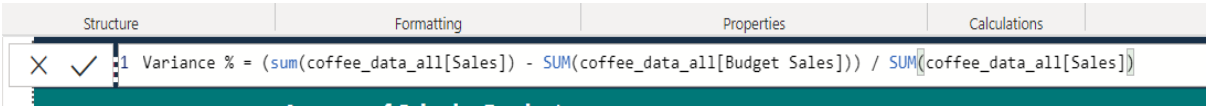
Variance of Sales = coffee_data_all[Sales]-coffee_data_all[Budget Sales]



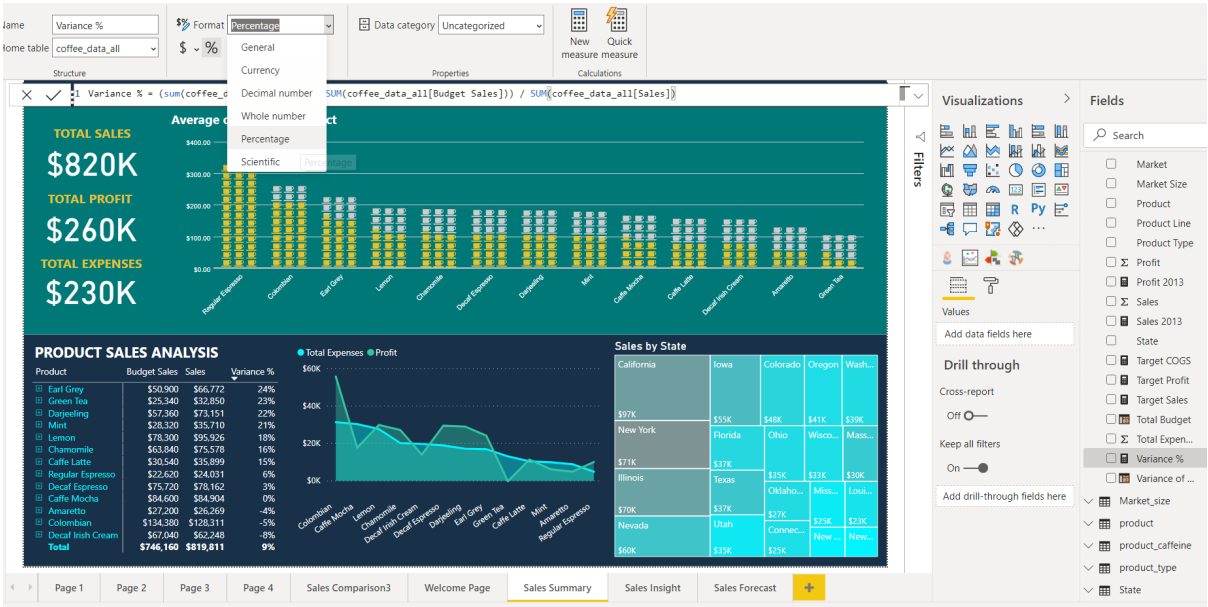
Then, move back to report section that create a new measure and input the formula to calculate the percentage of variance between the budget sales and sales. The formula is shown as below.



Variance % = (sum(coffee_data_all[Sales]) - SUM(coffee_data_all[Budget Sales])) / SUM(coffee_data_all[Sales])



We have to sum up the total of sales and subtract the sum of the budget sales, then divide by the sum of sales again. After that, change the format from “General” to “Percentage” for this measure.


Variance %
coffee_data_all
Format
Percentage
General
Currency
Decimal number
Whole number
Percentage
Scientific
Data category
Uncategorized
New measure
Quick measure
Structure
Properties
Calculations
Variance % = (sum(coffee_d
SUM(coffee_data_all[Budget Sales])) / SUM(coffee_data_all[Sales])
TOTAL SALES
$820K
TOTAL PROFIT
$260K
TOTAL EXPENSES
$230K
PRODUCT SALES ANALYSIS
Product
Budget Sales
Sales
Variance %
Earl Grey $50,900 $66,772 24%
Green Tea $25,340 $32,850 23%
Darjeeling $57,360 $73,151 22%
Mint $28,320 $35,710 21%
Lemon $78,300 $95,926 18%
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Regular Espresso $22,620 $24,031 6%
Decaf Espresso $75,720 $78,162 3%
Caffe Mocha $84,600 $84,904 0%
Amaretto $27,200 $26,269 -4%
Colombian $134,380 $128,311 -5%
Decaf Irish Cream $67,040 $62,248 -8%
Total $746,160 $819,811 9%
Total Expenses
Profit
Sales by State
California
Iowa
Colorado
Oregon
Florida
Ohio
Illinois
Texas
Nevada
Utah
Visualizations
Fields
Search
Market
Market Size
Product
Product Line
Product Type
Profit
Profit 2013
Sales
Sales 2013
State
Target COGS
Target Profit
Target Sales
Total Budget
Total Expen...
Variance %
Variance of ...
Market_size
product
product_caffeine
product_type
State
Values
Add data fields here
Drill through
Cross-report
Off
Keep all filters
On
Add drill-through fields here
Filters
Page 1
Page 2
Page 3
Page 4
Sales Comparison3
Welcome Page
Sales Summary
Sales Insight
Sales Forecast

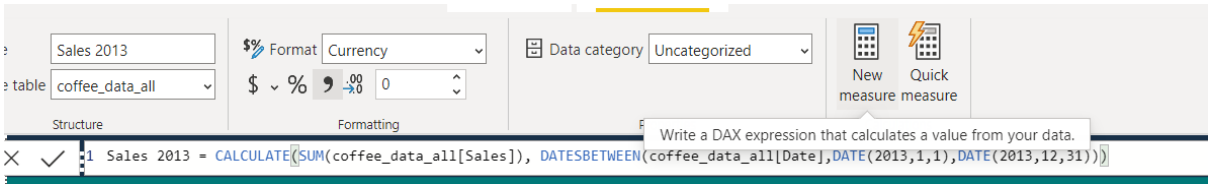
7.2 Key Performance Indicator (KPI)

Key Performance Indicator (KPI) can evaluate whether the current value is fulfilled our target or not. For a KPI visual, setup the target measure or value is necessary and compare the current value.

For the next graph, it will investigate a KPI of the Sales, Profit and Cost of goods sold in 2013. It will set the goal for each of value and it also have to write a formula in DAX language to filter the data for 2013 only.

7.2.1 Dax Expression - 2

There are three KPI graphs to illustrate Sales and Profit are completed the goal and Cost of goods Sold is almost fulfilled the target. For those KPI setting, we create three measures and input the formulas as below:

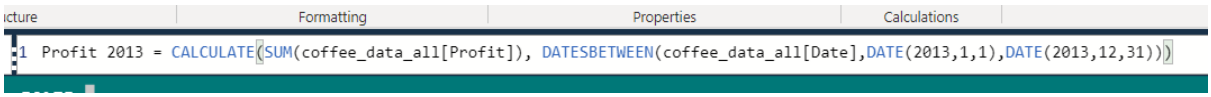


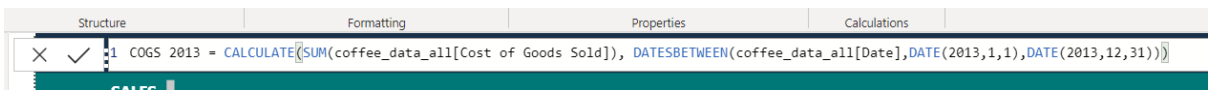
Sales 2013 = CALCULATE(SUM(coffee_data_all[Sales]), DATESBETWEEN(coffee_data_all[Date],DATE(2013,1,1),DATE(2013,12,31)))

Profit 2013 = CALCULATE(SUM(coffee_data_all[Profit]), DATESBETWEEN(coffee_data_all[Date],DATE(2013,1,1),DATE(2013,12,31)))

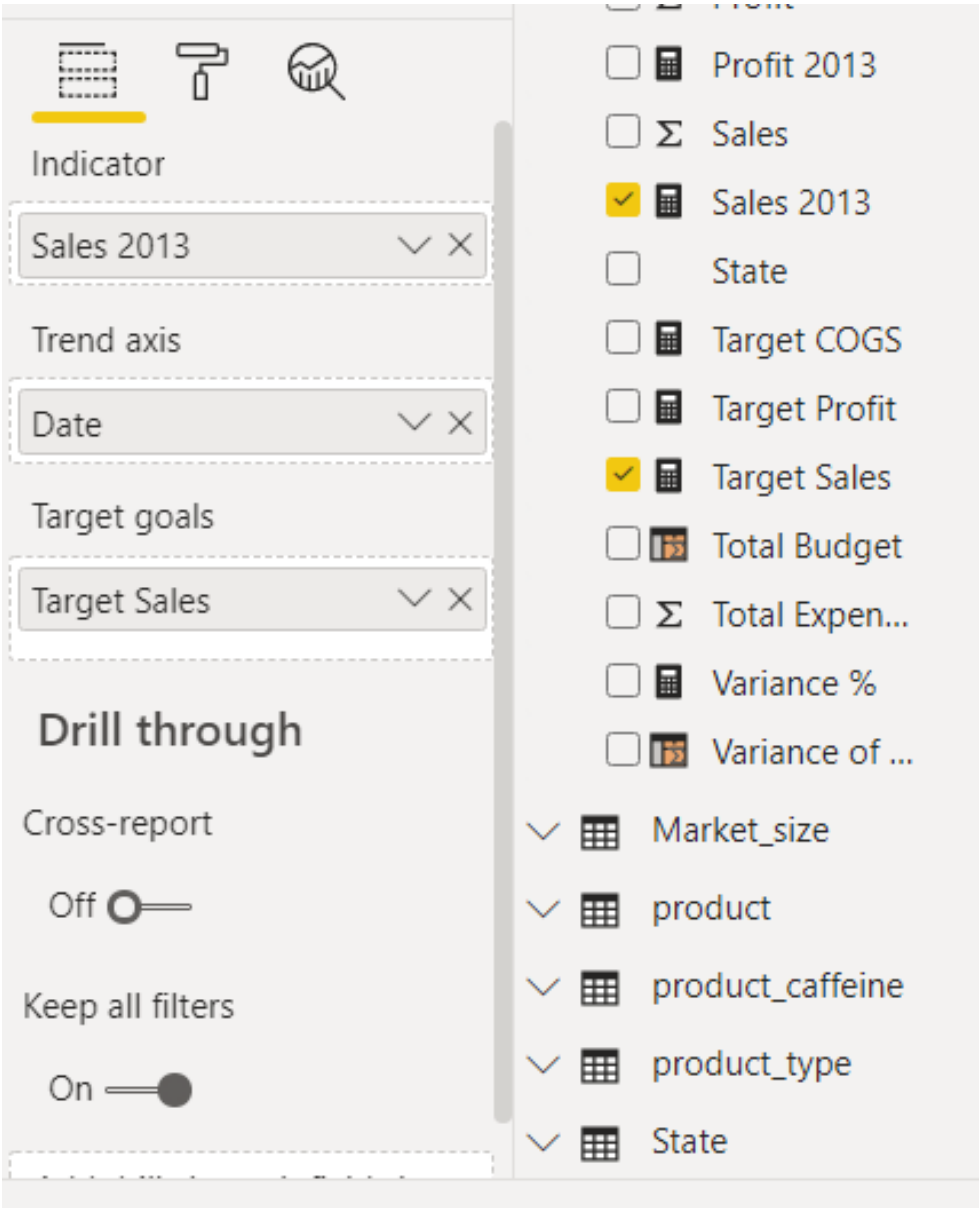
COGS 2013 = CALCULATE(SUM(coffee_data_all[Cost of Goods Sold]), DATESBETWEEN(coffee_data_all[Date],DATE(2013,1,1),DATE(2013,12,31)))

Those formulas calculate the sum of Sales, Profit and Cost of goods Sold. Then use “DATEBETWEEN” function to filter the period as we required.



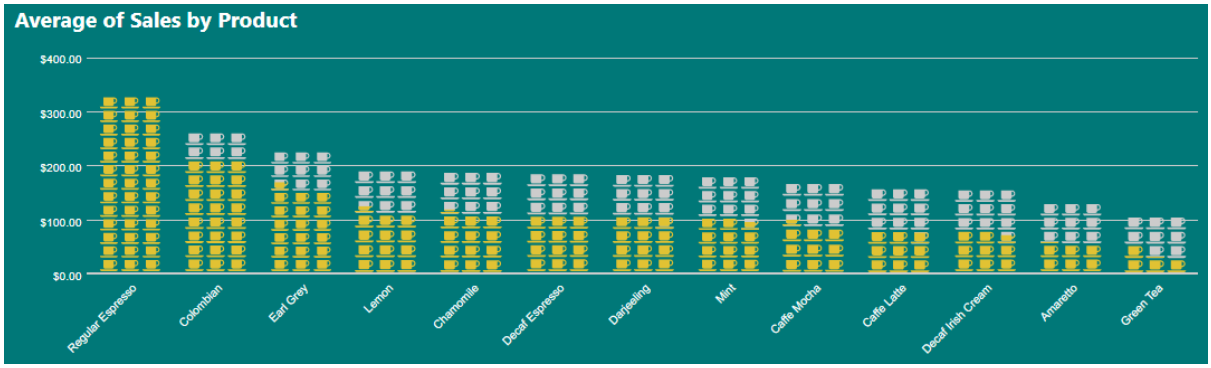


After that, it should be put those measures into “Indicator” and remember to set the target goal as required for KPI.



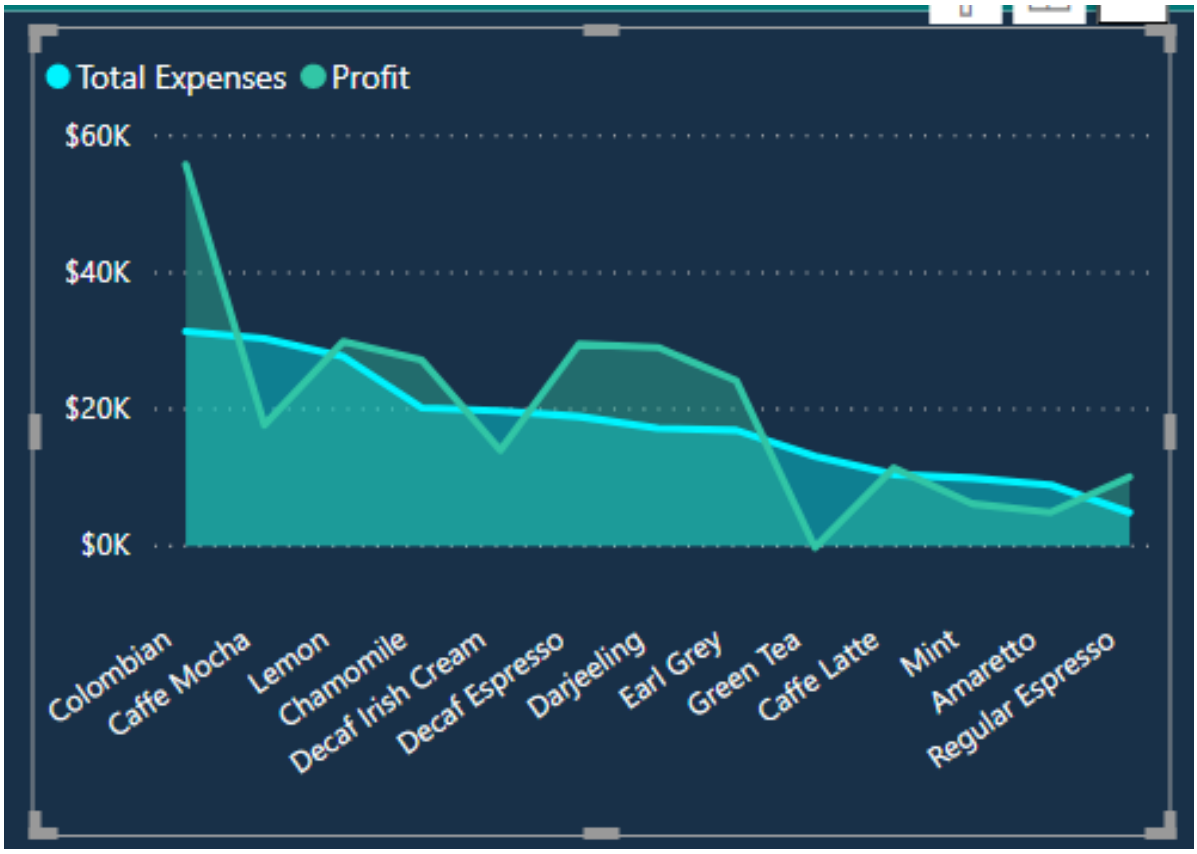
8 Finding based on analysis and evaluation - 2

8.1 Infographic



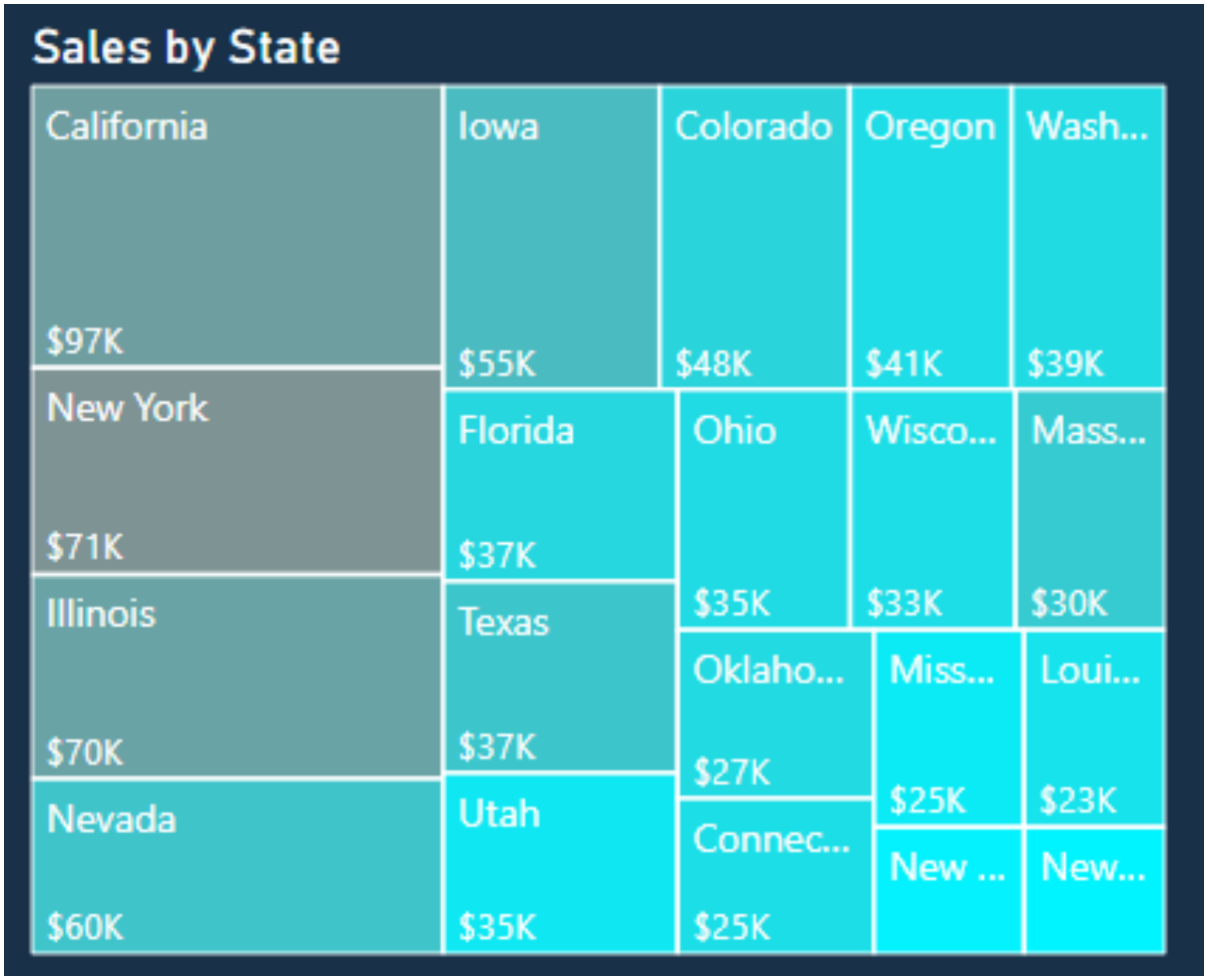
It can show about the information of the average of sales by product. Regular expresso is very popular product, which the average sales is over $300 USD. However, green tea is not many people to buy and it has around $100 USD sales only.

8.2 Area Chart and Key Finding From The Visual



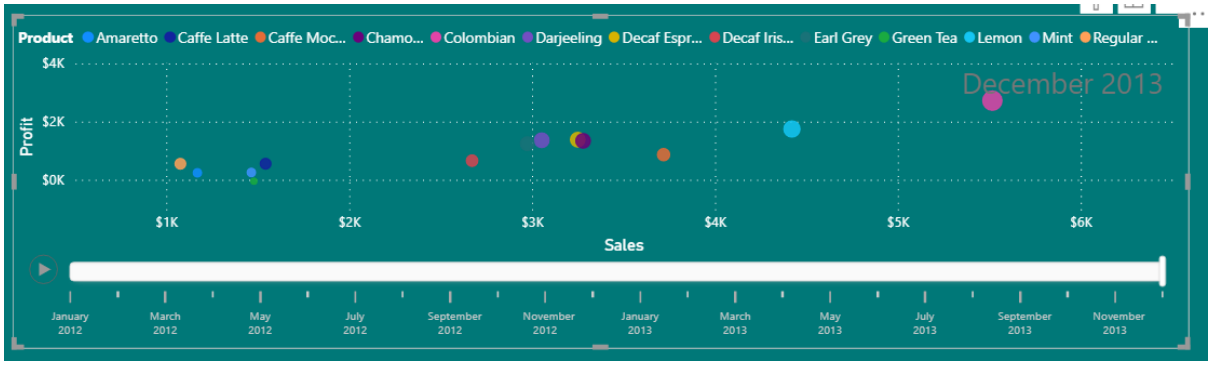
This data is also mentioned in the key finding before. Looking at the relationship with total expenses and profit in this chart. The profit margin of coffee products is much better than tea products. The profit of Colombian and Regular Espresso nearly double of total expenses. Also, it indicates some products lose profit, which is Caffe Mocha, Decaf Irish Cream, or Green Tea etc.

8.3 Treemap



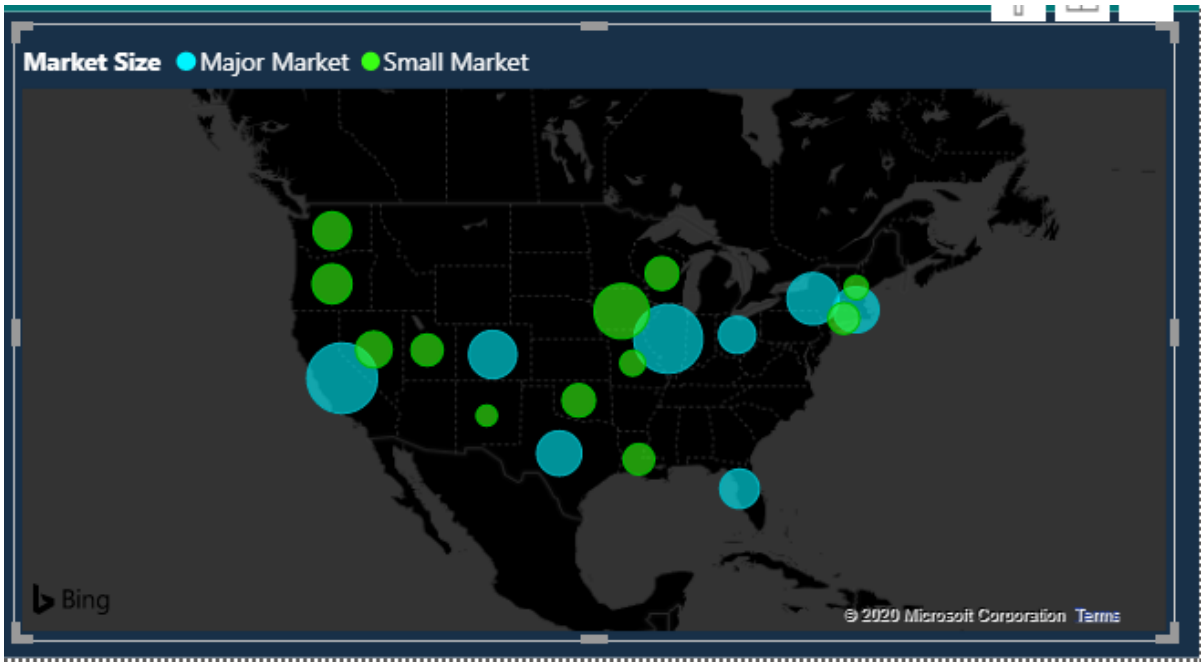
It represents the relationship with Sales and State in the treemap. California, New York, and Illinois are the highest sales in USA. If decision maker desires to find the other states, they can start exploring from left to right and up to down with descending order of sales.

8.4 Animated Chart

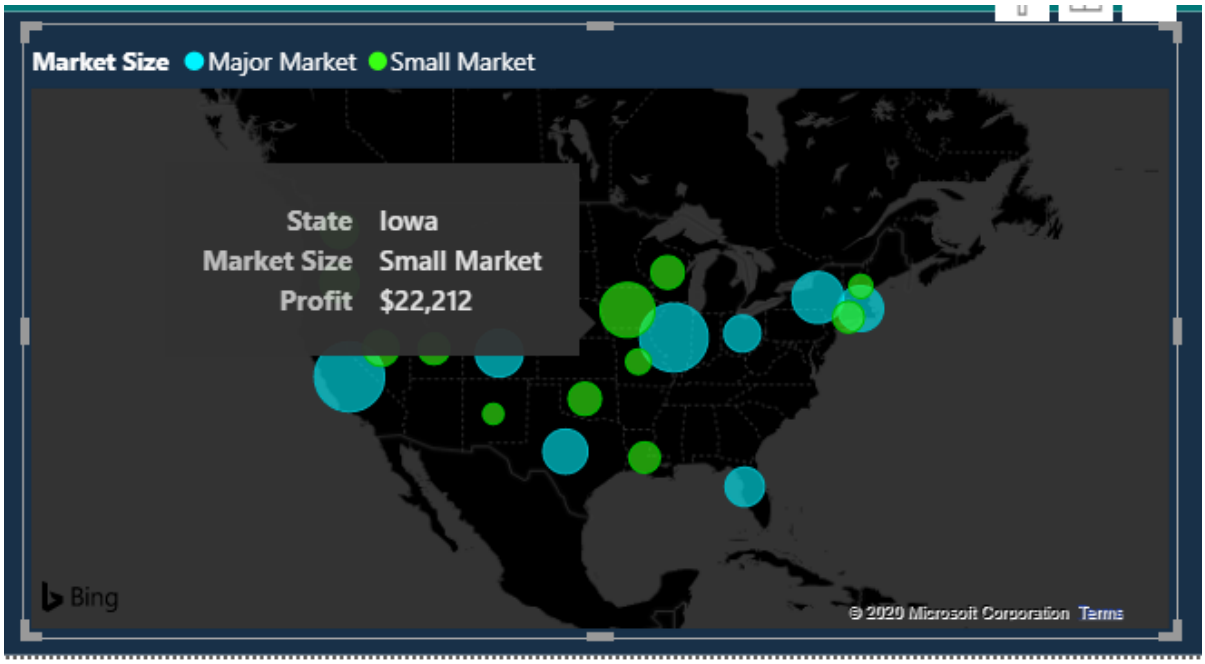


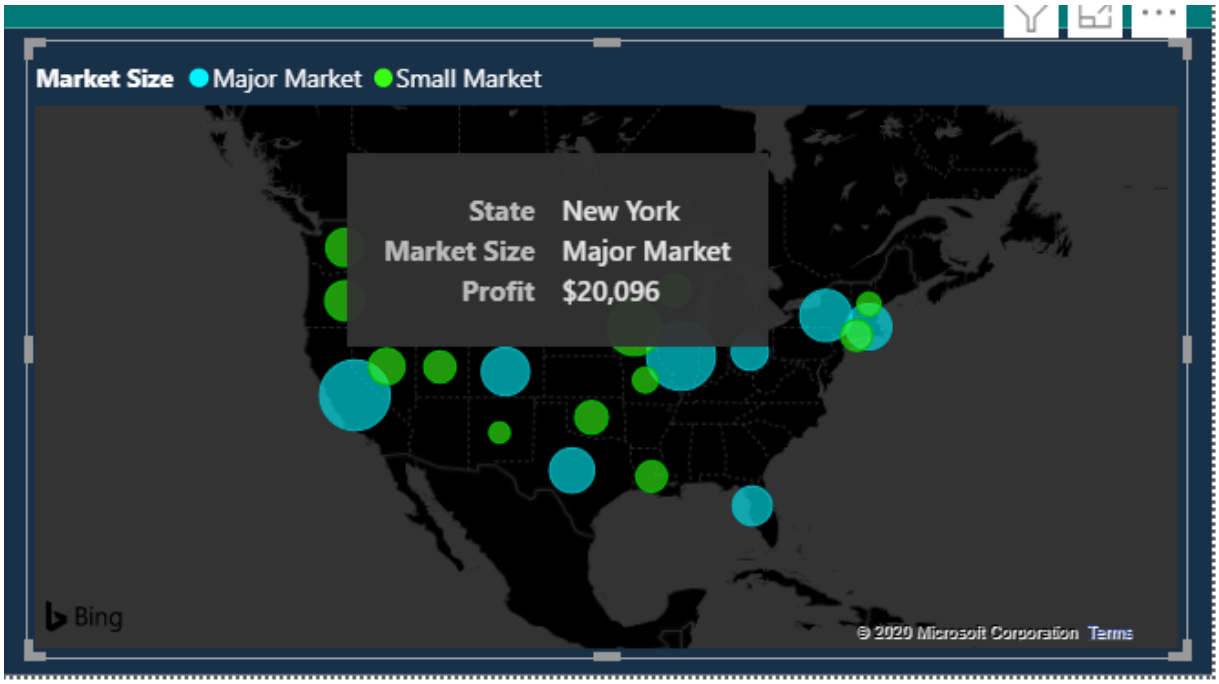
The main reason to use animated chart that it can draw the trend line by relationship changes over the period. It attempts to find the relationship between sales and profit with each product.

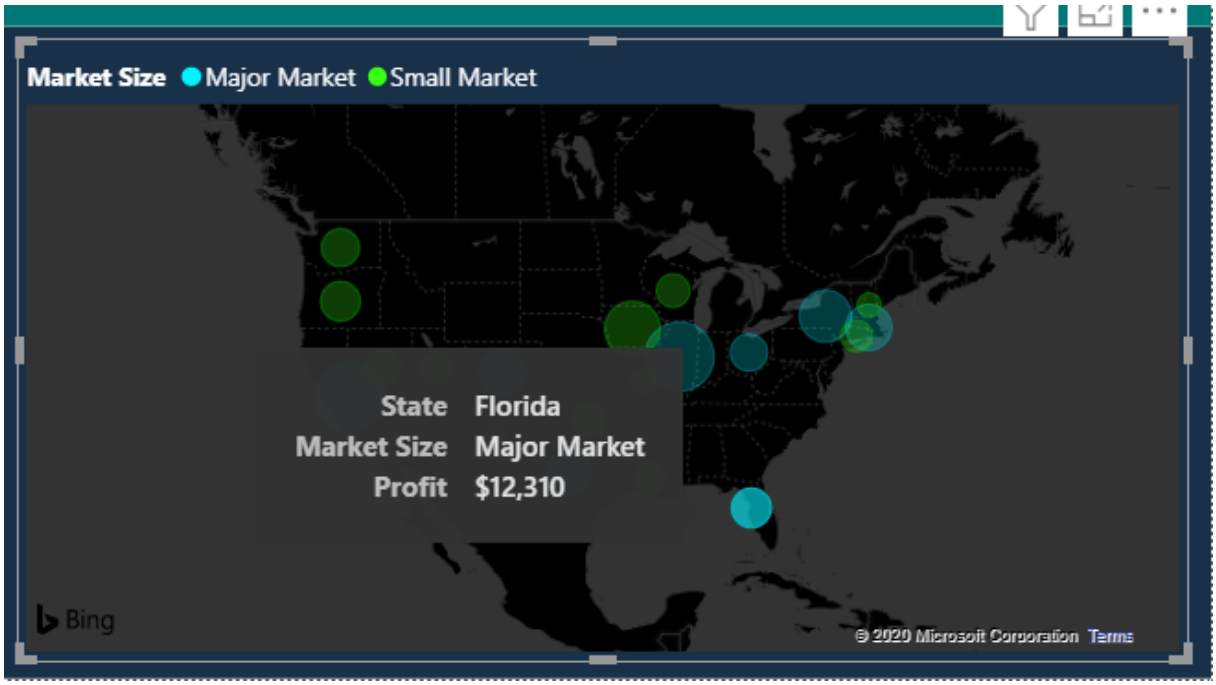
8.5 Map



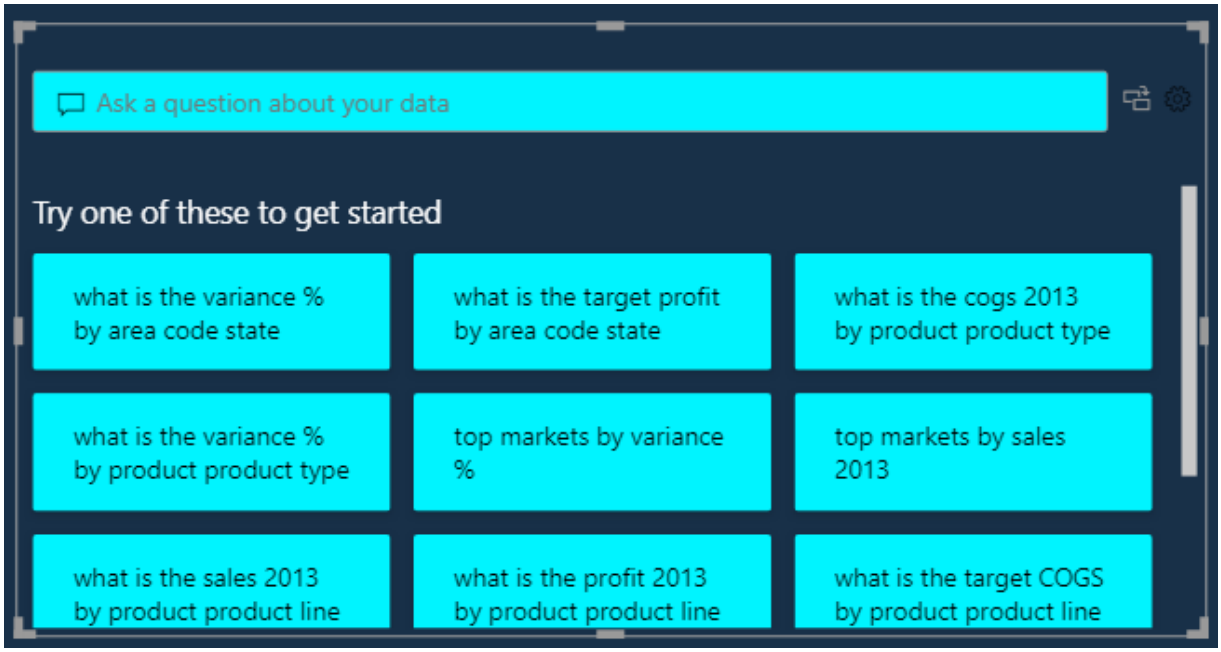
The map can show the distribution of market size and profit by state. It can be easy to find the size of profit depends on the bubble's size. The state of Iowa even is a small market compare with other big cities, but the profit volume is much better the other major market, like Florida and New York.




Market Size
Major Market
Small Market
State New York
Market Size Major Market
Profit $20,096
Bing
© 2020 Microsoft Corporation Terms


Market Size
Major Market
Small Market
State Florida
Market Size Major Market
Profit $12,310
Bing
© 2020 Microsoft Corporation Terms

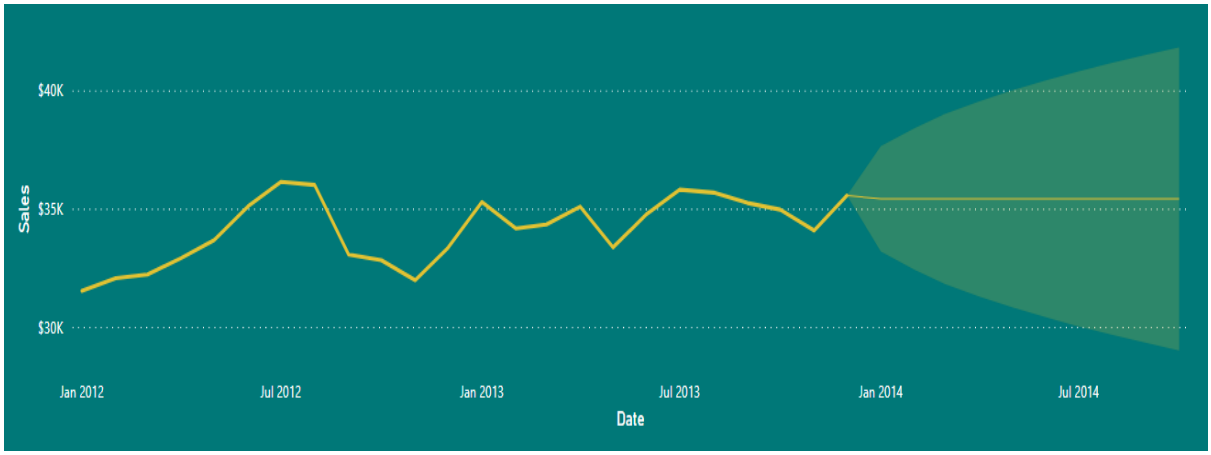
8.6 Ask a Question Tool



Ask a question tool is embedded into our dashboard and it is possible to type a question or click a question into the question tool to display the result that someone looking for.

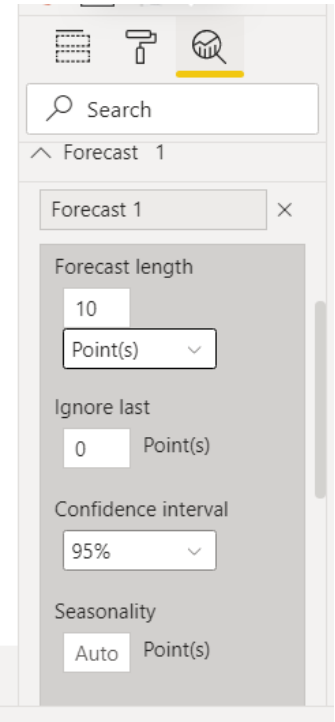
9 Data Analytics (Forecast, Analysing trends)

9.1 Forecast



Sales volume is one the most important thing that target audience would like to concern, as they desire to forecast the value for further action. Power BI can be able to apply forecasting function into the chart. It can use the data to analysis and predict the coming value for our reference.

Once created the chart, it is available to choose “Analytics” and add “Forecast”. Then, it has the extension at the end of the result, and it is a prediction for your reference. Also, look at the table with numbers which may use it for more details.

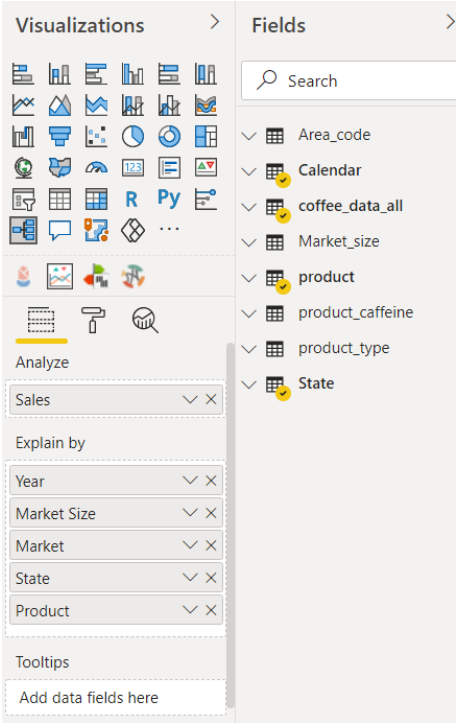


Date	Sales	forecastValue	confidenceHighBound	confidenceLowBound
November 2013	$34,103			
December 2013	$35,580	35580	35580	35580
January 2014		35441	37668	33215
February 2014		35441	38437	32446
March 2014		35441	39045	31838
April 2014		35441	39565	31318
May 2014		35441	40026	30857
June 2014		35441	40444	30438
July 2014		35441	40831	30052
August 2014		35441	41191	29692
September 2014		35441	41530	29353
October 2014		35441	41851	29032

9.2 Artificial Intelligence And Key Finding From The Visual

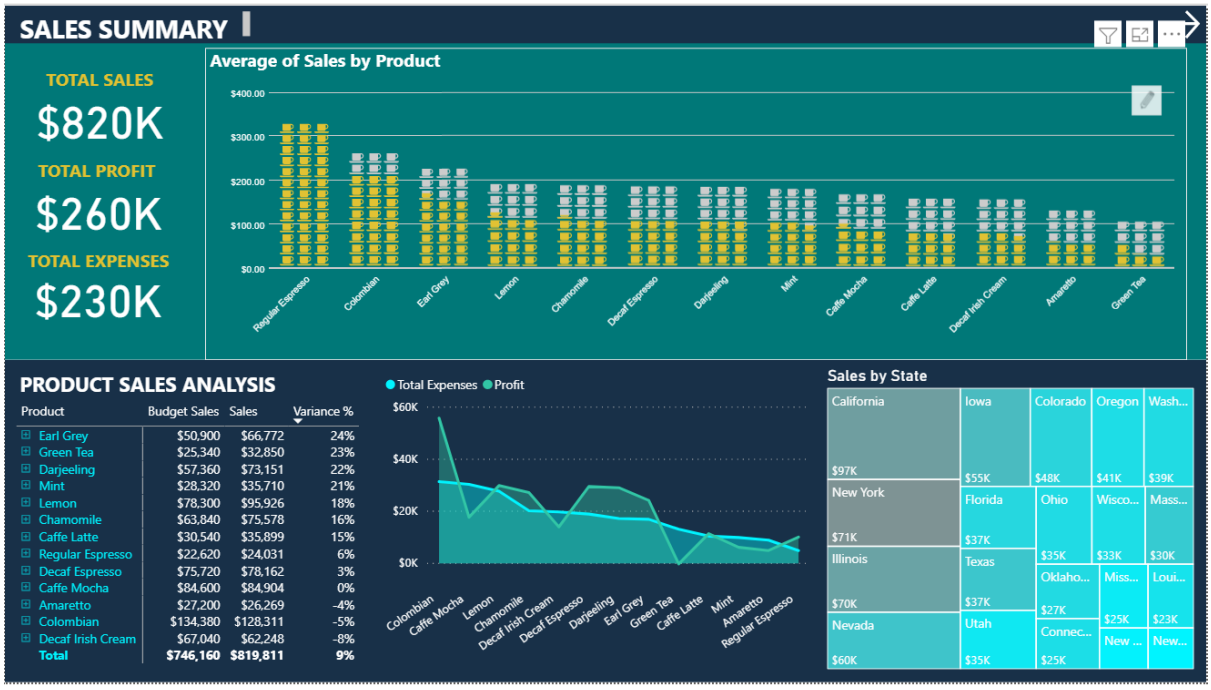
The decomposition tree can visualise data though many dimensions. It can aggregate data and able to drill down into the dimensions in any order automatically. It is an artificial intelligence visualisation, which finds the next dimension to drill down into based on specific criteria.

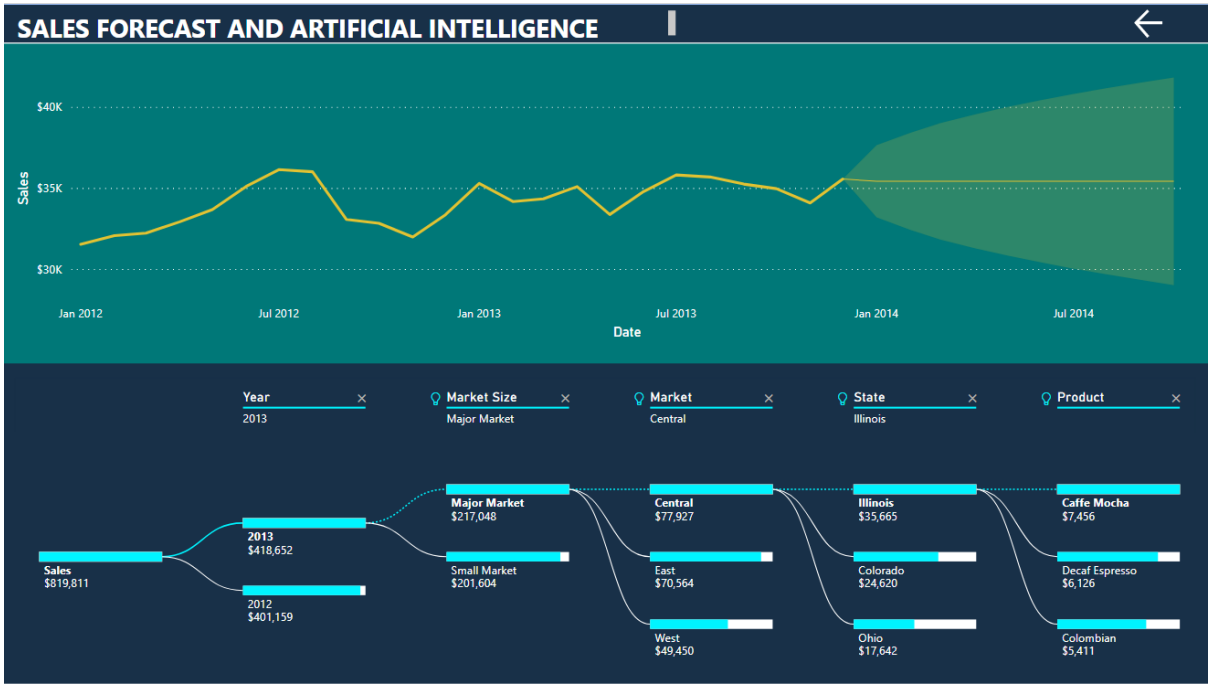
In the “Explain by” column, choose our own pattern and put the items that desire to analysis in “Analyze” column. As this graph mentioned in the key finding before, Caffe Mocha is the most popular product in the major market of Illinois in 2012 and 2013. Also, it is possible to find many relationships from decomposition tree with different mix and match.



10 Structure of the Dashboard

Try to structure the dashboard and the purpose to make it clean and easy to read. It attempts to keep colour and background consistently. Also, it is necessary to put the most important chart on the top and place the others for the rest of area, which it can capture audience attention.




SALES FORECAST AND ARTIFICIAL INTELLIGENCE
$40K
$35K
$30K
Sales
Jan 2012
Jul 2012
Jan 2013
Jul 2013
Jan 2014
Jul 2014
Date
Year
2013
Market Size
Major Market
Market
Central
State
Illinois
Product
Sales
$819,811
2013
$418,652
2012
$401,159
Major Market
$217,048
Small Market
$201,604
Central
$77,927
East
$70,564
West
$49,450
Illinois
$35,665
Colorado
$24,620
Ohio
$17,642
Caffe Mocha
$7,456
Decaf Espresso
$6,126
Colombian
$5,411

11 Conclusion

In this report, it can find some insights with different attributes, which is like the average of sales by product, the variance between budget sales and sales. Also, it illustrates about the relationship with total expenses and profit, and key performance indicator in the dashboard. Sales forecast and artificial intelligence can provide different ideas for management team to make decision. Also, the structure of dashboard can make target audience easy to understand the dataset in a short time.

12 Recommendations

From the report, it indicates some products are losing money, which is most of tea products are facing this situation. The possible suggestions may discuss with suppliers, which it may try to control the cost of tea products, or it may consider changing the other products if it does not have good sales volume. A marketing team may also think about a promotion to have a bundle package with coffee and tea, maybe it can boost the sales volume and use the other profit to cover the loss.

13 Personal Conclusions

Thank you so much for my module leader Annalisa Occhipinti and module tutor Vishalkumar Thakor with their valuable support and let me know how to make my ICA better.

When I started to do the element one, I faced the problem about making relationship with models. I tried to search from internet and watched the video from Blackboard, but it cannot make me understand to apply in my case. The problem was still not yet solved until my tutor gave me some advices. As I did not have any experience about database, so it was a tough mission for me, and I tried to enquire my tutor. He was using many examples to let me understand and he did not mind following up my process all the time. He makes me learn a lot from his advice and make me feel more comfortable for the ICA.

On the other hand, finding dataset is also one of the most difficult tasks in ICA. The main problem is my first task to do Power BI report and it will be very challenge if I find a dataset's structure is not well organised and data volume is too large. I attempt to look for the dataset from Microsoft website, but most of datasets for education use only. It is clean and tidy, which means it will be too easy for us to make a report and it cannot fit on the ICA requirement.

14 Reference

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