Northwind Traders Database

Project 2

Problem Statement

Statistical Analysis of Company Operations.

Influences on Customer Behaviour

Employee Performance

Perform an open ended statistical analysis of the Northwind traders Database
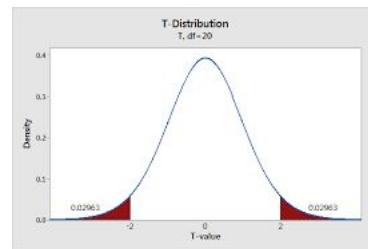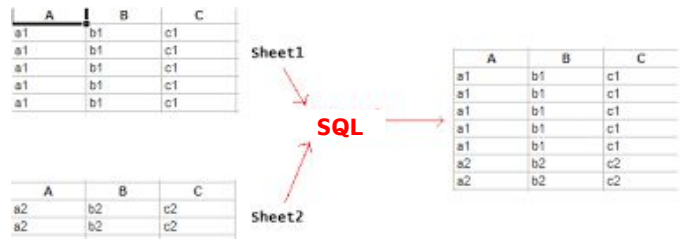Interpret influences on customer behaviour
Measures of employee performance
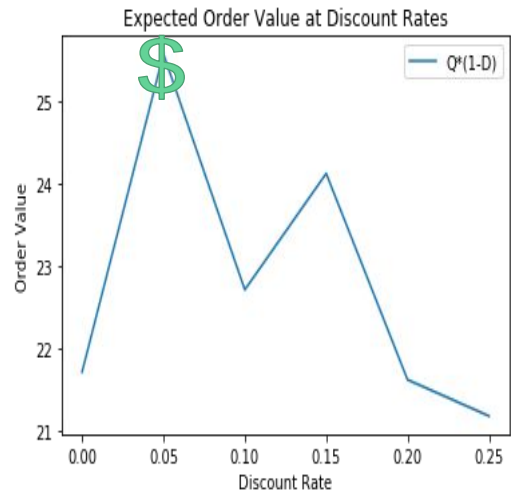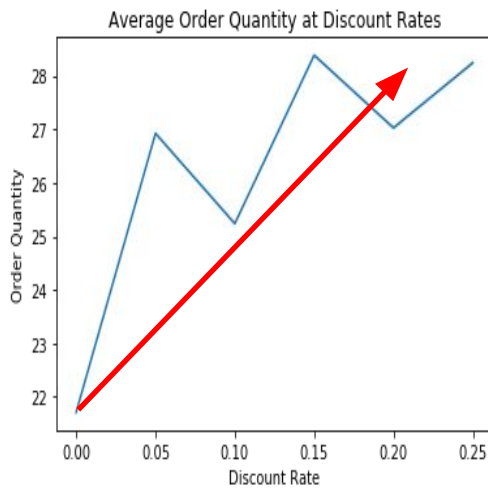
Methodology

SQL → Pandas

Welch's t-test

ANOVA tables

Relevant data obtained from database tables using SQL
Exploration of data using Pandas
A/B hypothesis testing by welch's t-test and ANOVA tables

Effect of Discounts

Do discounts have a statistically significant effect on the number of products customers order? If so, at what level(s) of discount?
Discounts lead to a higher average sales quantities at all discount levels
Peak Return at discount rate 0.05.
At discount rate 0.2 and beyond effect of discount overpowers increase in sales volume

Sales: America vs. Europe

PRODUCE
Mean Order Quantity
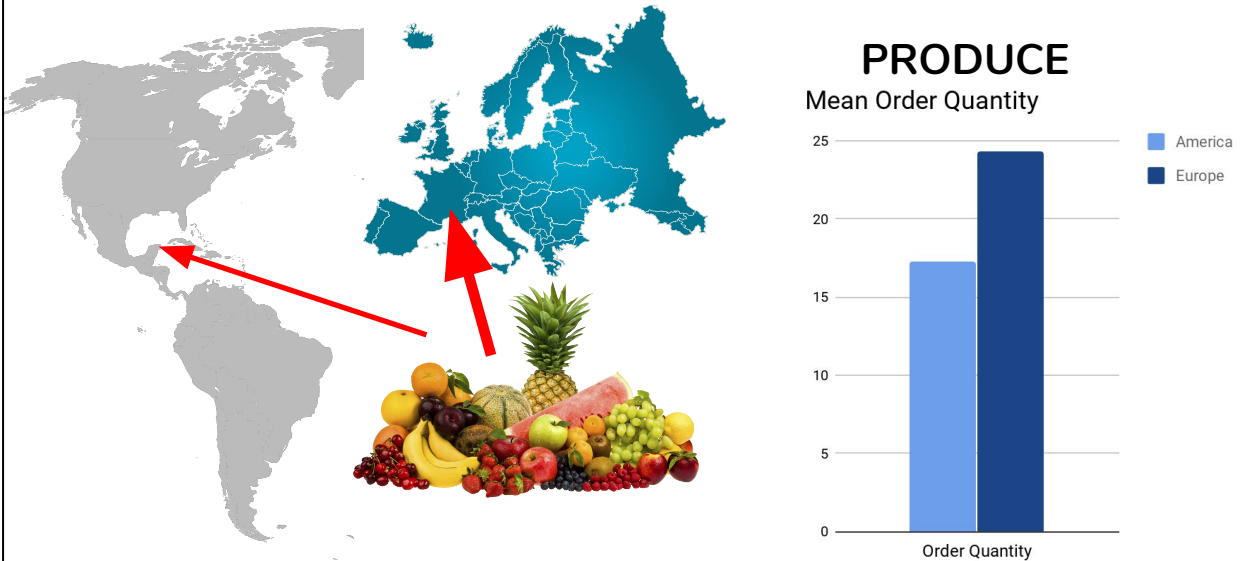
Difference in sales patterns by continent
8 categories - No statistical difference in order patterns for most product categories
Produce Category mean order quantity difference 17.3 to 24.3 unit

Do late deliveries effect Customer's ordering?

Statistically distinct groups but further analysis of cause and effect needed
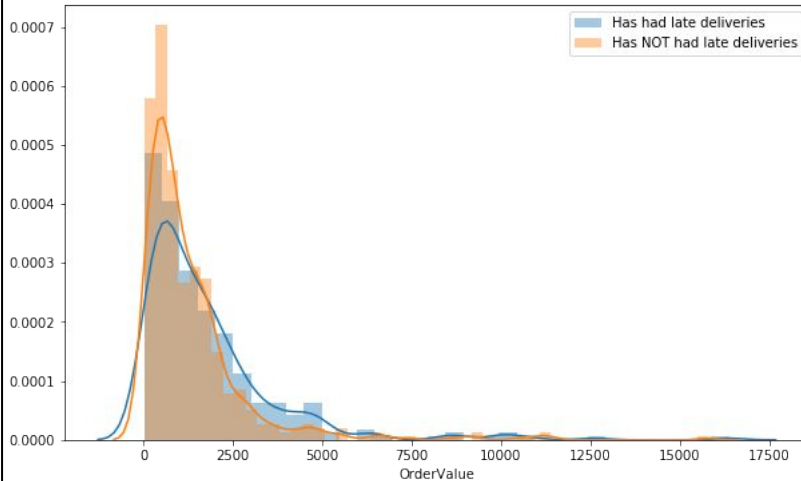
Different expected order value for customers when grouped by whether they had received an order late
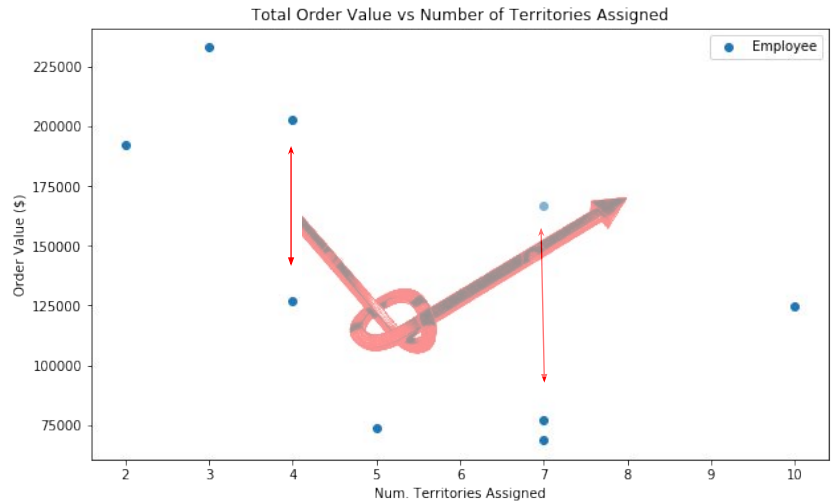Does not consider orders before and after late order differently
Expected order value actually higher for customers that have had late orders
Further analysis necessary

Does Number of Territories for each employee affect their sales figures?

No clear correlation

No clear dependency or correlation
Not a good measure for employee performance

Future Work:

Devil is in the Discounts (and the details)

- By Customer
- By Product
- By Region

More detailed analysis of discount levels by product type or region or customer to tailor discounts to maximise Order Value

Future Work

Sell that Produce!

- Produce Sells better in Europe
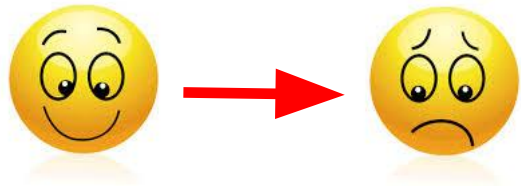 - Why?
  - How can we improve American sales?

Difference in sales volumes between Americas and Europe begs further investigation.
What is going right in Europe and/or what is going wrong in America?
Break it down further

Future Work

Late Orders:

- Before/After ordering patterns
- Types of orders that are more likely to be late?

Differing order volumes of customers that have had late order can be interpreted as cause or effect:
Order was late because of volume/mix/country of origin of products OR products are ordered because customer has received late orders

Future Work

Distribution of Territories - How to carve up the map?

New employee metrics

Employee performance metrics should not necessarily be based on number of Territories assigned to Employee.

The distribution of Territories to Employees still needs to be determined