Module 3
Project Presentation

North Wind Database - Maximizing Company's Profit

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My name is Hyungjun Kang, and will be going over Module 3 project, Northwind database.

Problem Statement

How to Maximize Company's Profit?

Today's problem statement is how to maximize company's profit.
We will be discussing how to maximize the gains and minimize the loss for the most amount of profit.
Utilizing obtained data, hypothesis testing was performed and there were important foundings from it.

Image source: http://www.tamicannizzaro.com/decision-time-what-to-do-with-multiple-job-offers/

Business Value

➢Increasing Revenue

➢Saving cost

➢Right amount of inventory
   a. Is there difference in demand for produce for each month?
   b. Is there enough of amount of meat pie stocked in the inventory?

By the hypothesis testing, company will be able to increase the revenue while saving the cost, and will be able to have right amount of inventory to provide the products on time.

Methodology

- Statistical Testing

➢ T-Test
➢ ANOVA
➢ Multiple Comparison Test
➢ Kruskall-Wallis Test

Following tests were used to test if there was statistically significant difference between sample groups to support the suggestion I will give at the end of the slides.

Question 1

- Does discount amount have a statistically significant effect on the quantity of a product in an order?

Average product sold with discount = 27.110   Average product sold without discount 21.715

Discount v.s. No Discount Average Quantity of Product Per Order =
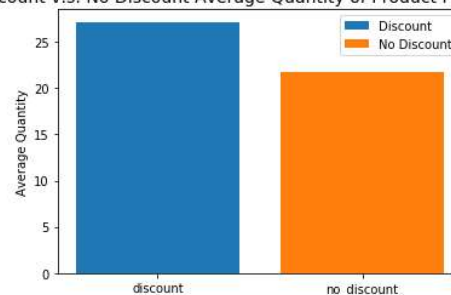
First business value was about increasing the revenue. Easiest way to increase the revenue is selling more products to the customers.

Customers love discounts. People would even buy things that they don't even need when there's discount is applied.

There's even famous quote, "Saving money by spending money" T-test was conducted and the result was there's significant level of difference between the quantity sold for the products when there was discount applied and no discount applied. Putting discounts on the products would increase the revenue.

Roughly 6 more items were sold when there was discount was applied.

Question 2

- Is there difference between number of product sold when different levels of discount was applied?

Discount	count	mean	std	min	25%	50%	75%	max
0.00	1317.0	21.715262	17.507493	1.0	10.0	18.0	30.0	130.0
0.01	1.0	2.000000	NaN	2.0	2.0	2.0	2.0	2.0
0.02	2.0	2.000000	1.414214	1.0	1.5	2.0	2.5	3.0
0.03	3.0	1.666667	0.577350	1.0	1.5	2.0	2.0	2.0
0.04	1.0	1.000000	NaN	1.0	1.0	1.0	1.0	1.0
0.05	185.0	28.010811	22.187685	1.0	14.0	20.0	40.0	120.0
0.06	1.0	2.000000	NaN	2.0	2.0	2.0	2.0	2.0
0.10	173.0	25.236994	21.186503	2.0	10.0	20.0	30.0	130.0
0.15	157.0	28.382166	20.923099	2.0	15.0	21.0	40.0	100.0
0.20	161.0	27.024845	18.832801	2.0	12.0	21.0	40.0	100.0
0.25	154.0	28.240260	20.120570	2.0	15.0	25.0	36.0	120.0

If more products were sold when discount was applied, then what would be the best level of the discount to apply? Which level of discount would make the customers want to buy products from the company? The answer was there's no significant difference between the discount levels. It means that with small amount of discount, similar number of items will be sold. There's no need to apply higher percentage of discounts on the items. It will decrease company's profit.
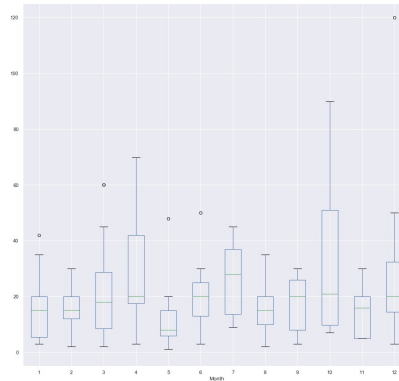
Question 3

- Does different shipper have different freight cost ?
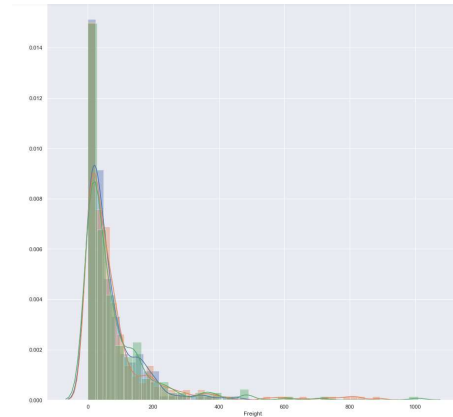
Customers wants to save money. Freight cost can't be ignored. Many other competitors offers the free shipping these days. In order to keep up, we also need to minimize the shipping cost. If our company decides to also provide free shipping occasionally, cheapest one should be selected in order to maximize the profit. This test would save both company and customer's money. The result of the testing was all three main shipping company cost about the same. Either of three can be used for any customers.

Question 4

- **Is there a statistically significant difference in demand of produce each month?**

Having right amount of inventory is important for keep the products fresh. Especially, produce is one of the most sensitive item among all. Testing showed that there's no significant different on the demand for each of the month.

Question 5

- **Is 'Pâté chinois' as known as "Meat Pie", stocked enough?**
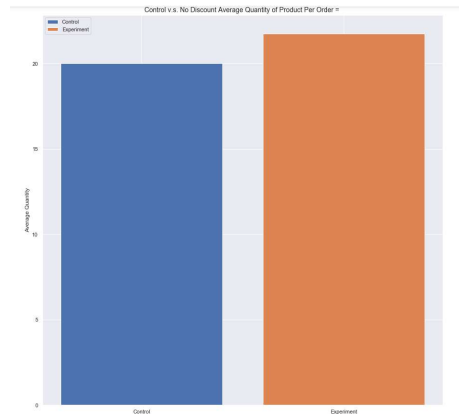
Meat pie was one of the best selling item among the meat/poultry category. Test came out as that there's right amount of the meat pie stocked. Customer's demand was little bit higher than the re-order level, but accounting the margin of error, it's negligible.

Summary

- Applying discounts increased sales.
- There's no difference between discount amount.
- Pick any of the major shipper.
- There's no need to increase the re-order level for the meat pie.

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Future Work

- Employee's Performance:
  - Any difference in performance with salary amount?
- Where would be the best location for next office
  - Closer to customers

Many different topics was covered but there was no employee related one. It would be benefit company to filter good/bad employee, and reward or lay them off. The other good topic to cover is to research about possible location for new office. It's always better to be where the customer and resources are. I would like to research about these topics in the future to increase company's profit even more.

Thank you!

Thank you for listening and please ask me any questions.