

# Northwind Company

*"Statistical Analysis"*

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Sep 2019

Hello, My name is Filiz Camuz

I worked on the Northwind Company dataset and I will share my findings on a few topics with you, today.

## Problem Statement

How to make good use of discounts?

Is there a generation gap to fill in the performance?

Where and when to start offering new cheese types?

I looked in to 3 main questions . First, How discounts affect the sale's quantity and overall profit for the company.

Second, does employees from different generations perform equally well.

Third, Northwind is planning to start selling new line of cheese. They want to know where and when to offer first to get the best idea of customer reaction.

# Business Value

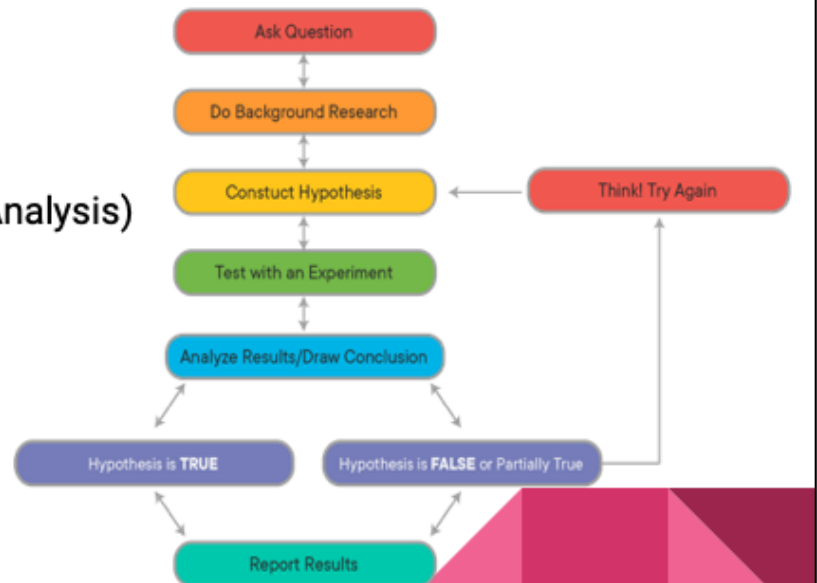
Increase the amount of sale and profit.



# Methodology

## Scientific Method EDA (Exploratory Data Analysis)

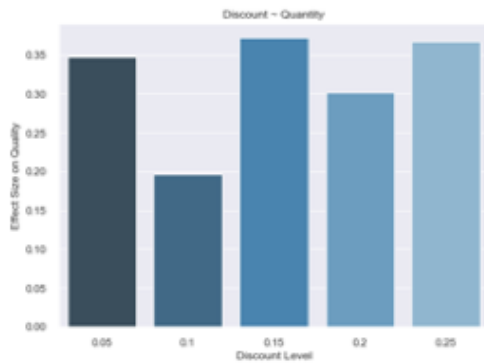
### The Scientific Method



<https://towardsdatascience.com/5-steps-of-a-data-science-project-lifecycle-28c50372h492>

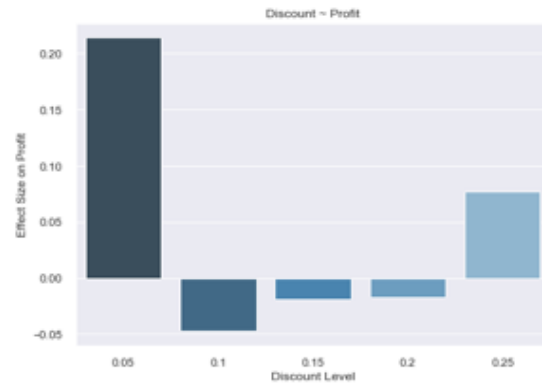
I followed scientific method for hypothesis testing. I also used Exploratory Data Analysis (**EDA**) approach to do the statistical analysis within the hypothesis testing process.

# Discounts



Different levels of discount effects on average quantity in an order

Different levels of discount effects on average Profit in an order



About the discount effects.

These 2 charts show the effects of discount levels on quantity (on the left) and profit (on the right), comparing to the sales with no discount.

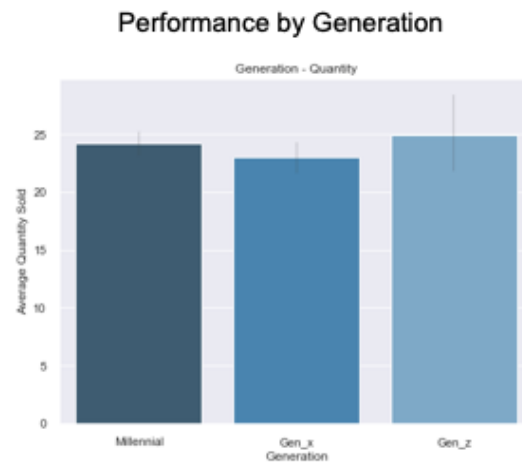
As it shows on the left chart, all discount levels increase the sale amount. However, for 10%, 15% and 20% discounts, the sale amount increases but that amount of sale does not compensate the decreased price (as you can see on the left chart). So the company makes less money than they would have made without discount. Simply put, if no (10, 15, 20%) discount would have applied, company would sell less product but make more profit.

According to this data, I would suggest to stick with the 5% and 25% discounts.

5% discount exceptionally works well for making more sale and more profit.

# Employee Generations

Generations - Number of Employees	
Generation X (38-53 years old)	420
Millennial (22-37 years old)	1628
Generation Z (0-21 years old)	107



Three different generations are working together at Northwind Company. Majority of the sale force population are millennials who are in between 22-37 years old. There are employees from Gen X and Gen Z as well. If there is any significant difference between the generations performances, the company would update their training strategies.

According to the result of the statistical tests, there is no significant difference between performances of different generations in the company. Employees from all ages would perform almost equally in terms of sales. We can confidently say that companies training policy is working across the generations.

That is good news.

We also observe experienced employees perform slightly better than the less experienced ones. Which is highly expected.

I would suggest mentorship program among the employees to support the young ones to catch up with the others.

The Silent Generation: Born 1928-1945 (73-90 years old)

Baby Boomers: Born 1946-1964 (54-72 years old)

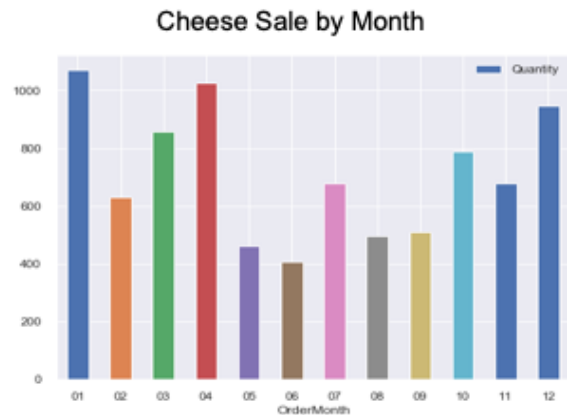
Generation X: Born 1965-1980 (38-53 years old)

Millennials: Born 1981-1996 (22-37 years old)

Post-Millennials: Born 1997-Present (0-21 years old)



# New Line of Cheese



The best month and the region to kick-off the sale :

**January in WESTERN EUROPE**

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Northwind is planning to offer new line of cheese and would like to know where and when to start selling it.

Company sells cheese in 8 regions year round. I have run some tests to see if there is any difference of the cheese sale in between regions. Also tested the month of the years if there is any significant increase or decrease on the sales. Also tested if there is any best combination of the time of the year and the region.

Test results suggest that no significant difference between any of the region nor time of the year for cheese sales. Cheese is timeless :)

However, the largest volume of the cheese sale happens in the **Western Europe** and overall cheese sales are highest in the month of **January** . I would suggest to advertise and kick-off the sale in **January in Western Europe** region based on the historical data we have.

## Future Works

Detailed investigation of discounts

Progressive discount policy

Keep the profit on a certain level while giving more discount to most frequent buyers.

Eastern Europe region needs attention.

With this data, I could do other analysis if I would have time ;

- Discount levels can be investigated in individual category and even product level. So that we could get more insight of the details of the effect.
- Progressive discount policy can be applied instead of fix discounts.
- It prevents the profit to decrease lower than a certain level but also gives more discount to the most frequent and the most spending buyers. This approach requires sets of other statistics.
- Easter Europe is the lowest in sales among all the regions of Northwind. To increase the sales in that region we must dig deep down to reasons for less sales in that market. For that also different analysis should be done.

# THANK YOU

Please feel free reach me for any questions :

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Thank you for listening,

This the end of my presentation.

You may ask any question about Northwind findings or email me later on.