

Northwind Trading Company

Data Science Recommendations - 2019





Hello!

*I am **Pedro Jofre Lora***

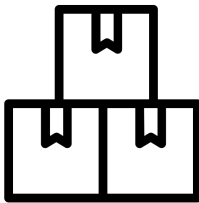
I am a member of the Data Science department.

You can find me at **@pjofrelora**

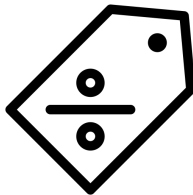
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Problem Statement

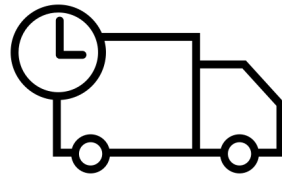
Improve Performance



Volume



Discounts



Shipping

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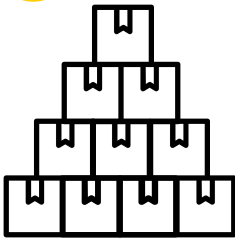
The overarching problem that *everyone* is attending to is, “how do we improve performance?”. The data science team identified three areas of improvements

1. We haven’t optimized for order/product volume. There are multiple things we can do to improve the volume of goods that we move.
2. We don’t have a robust policy for discounts. The current framework is piecemeal, which has worked well but is not optimized.
3. We have large variability in shipping for our customers. In general, our shipping times are not phenomenal compared to national standards.

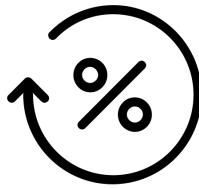
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Business Value

Increase Profits



Increase Volume



Frequent Discounts

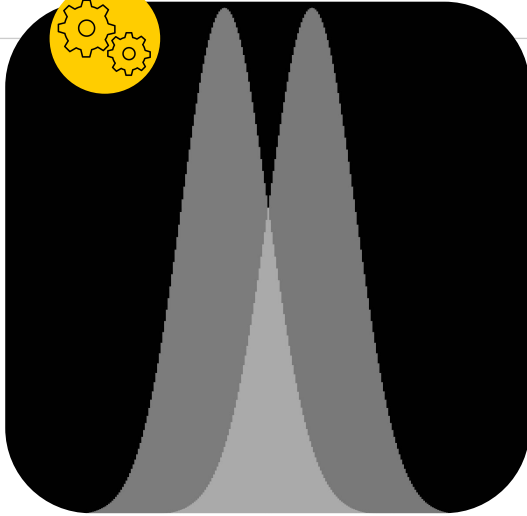


Subscription Service

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The major value-add is an **increase in profits** in the short and long term. The increase in profits comes from three value adds:

1. Optimizing for volume of sales will allow us to make our process more lean. Using this as a clear metric for growth makes it easy for anyone to know if there is improvement or not.
2. We can begin advertising the fact that we have frequent and recurring discounts! This gives us yet another edge to our competition. More on this in a bit.
3. We can pursue a new revenue stream in the form of a subscription service for fast shipping. This is a regular revenue stream, which raises our bottom line in a predictable way. This is also a differentiating feature, so it might entice new customers as well. More on this in a bit.



Methodology

Data Harvesting

Frequentist Statistical Tests

Bayesian Statistical Tests

The methodology used to develop these recommendations is fairly straightforward to explain: we harvest data and group it based on the question that we have. We then compare the groups to see how similar or dissimilar they are. Roughly speaking, the less overlap the more difference!

- We harvested data from our local SQL database. We're glad we've kept all this data!
- Some data was analyzed using frequentist methods, which used to be most common
- Some data was analyzed using Bayesian methods, which is sometimes more powerful than the frequentist methods.



3.1

Recommendations

Optimize Discounts

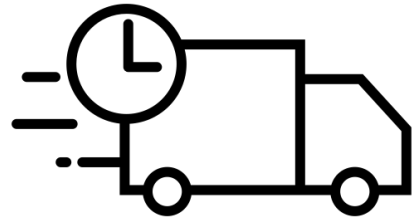
- One order : One discount
- 39% increased volume
- \$205 increased profit
- % Discount has no impact

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Recommendation 1 is to move towards a one order: one discount paradigm. Moving forward, the majority of our orders should have one discounted item. Currently less than half of our orders have at least one item with a discount, and some of our carts are completely discounted.

The reasons for this shift in paradigm is because **orders with discounts garner us more profit and greatly increase our volume**. Orders with at least one discounted item have on average 39% more products than orders without discounted items. Each of those orders yields \$205 more in profit.

Surprisingly, the actual value of the discount (5%-25%) does not impact the results.



3.2

Recommendations

Fast Shipping Service

- Amazon Prime Model
- 8% Increased Orders
- Secondary Revenue Stream
- Federal Shipping Partnership

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Recommendation 2 is to **pilot** a fast shipping service similar to the Amazon Prime Model. We want to move cautiously into this space since it increases our costs in the short term but has a high likelihood of increasing the total number of orders per customer.

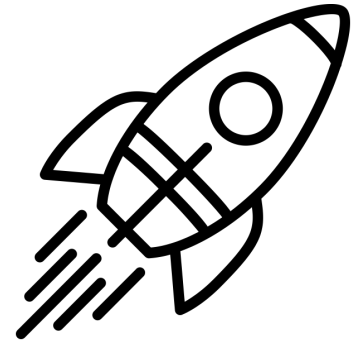
This recommendation is based on the finding that customers with fast shipping (4 days or less) have placed 8% more orders on average than customers with slow shipping. This is about 4 more orders per year per customer, which averages out to about \$1200 more profit per customer. A fast shipping service would also afford us a secondary revenue stream (paid service) with regular income to offset the costs of the program. We recommend partnering with Federal Shipping since they are our fastest carrier service.

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Future Work

2 Projects

- **Optimize Discounts**
 - Identify Products
 - Maximize Profits
- **Fast Shipping Service**
 - Pilot Program Recs
 - Identify candidates



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There is future work to be done in order to reap the biggest benefit from the two previous recommendations.

Optimize Discounts

In order to optimize the returns on discounts, the data science department has to identify the products that are most likely to be in a customer's order. This increases the likelihood of meeting the one order: one discount paradigm, and allows us to maximize profits

Fast Shipping Service

In order to implement the fast shipping service, it is imperative that we provide data-based recommendations on the scope of the pilot program. We will determine the number of participants and the duration of the pilot program necessary to make a definitive recommendation on a full-scale deployment. We will also identify the candidates that are best suited for the program to minimize any potential losses.



Thanks!

Questions ?

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Please feel free to browse the [full analysis at this link.](#)