



Northwind's Sales

Statistical Analysis

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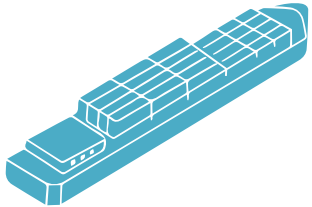
Introduction



Background

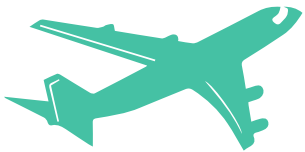
Northwind has been experiencing global growth during the past couple of years. Given its global operations, it has been exposed to both, global and local competitors, all competing for market share while struggling to remain profitable. Northwind has to find sales strategies that either increase its revenue or decreases costs, to increase its profitability.

Sales Strategies



Discounts

Discounts are an essential part of business, however it is imperative to find out their efficiency at driving sales up.



Product Categories

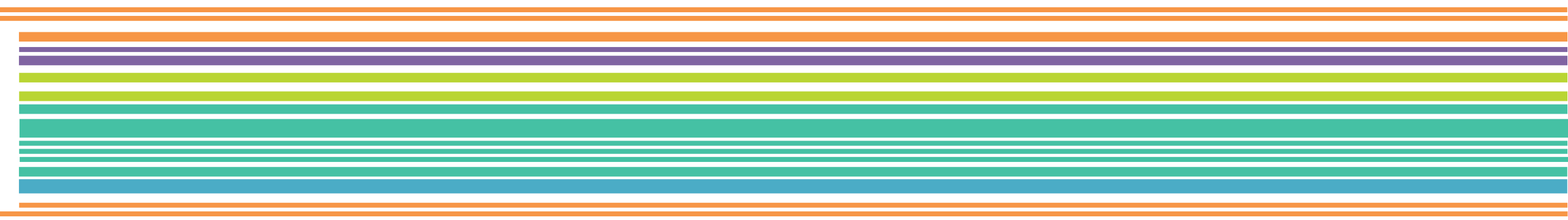
Identify investment opportunities in specific product categories.

Employee Productivity

It is best business practice to encourage above average performance and review poor performing employees.

Shipping Costs

Ultimately, shipping costs end up being perceived from customers as part of the price paid for a product. Hence, this should be as low as possible.



Hypothesis Testing

- Statistical tool to test conventional wisdom.
- Includes two mutually exclusive hypothesis. The null and alternate hypothesis.
- Significance level is the probability of rejecting the null when it is true.

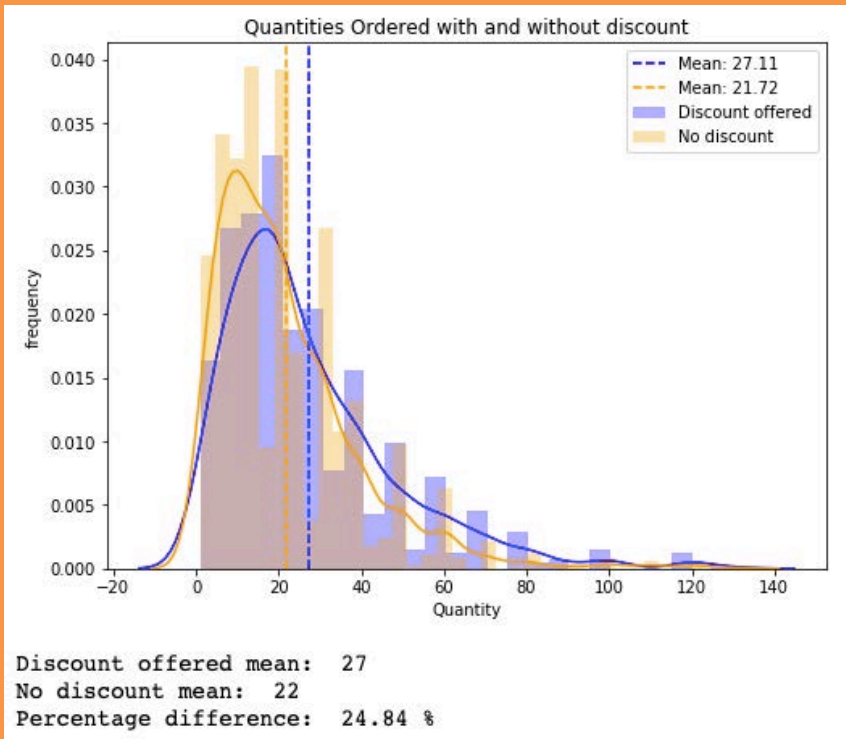
Welch's T-test, ANOVA and Effect Size

- Welch's t: Find difference in means amongst two samples.
- ANOVA: Find differences in means amongst more than two categorical values.
- Effect size: How big is the difference.

Discounts Effectiveness



Do discounts have a statistically significant effect on the number of products customers order?



Findings

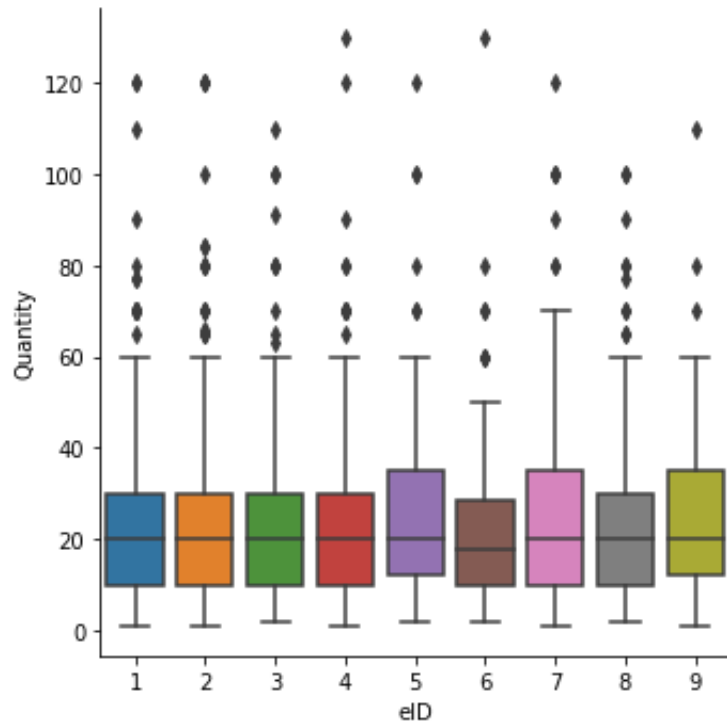
- Discounts increased the average quantity ordered.
- Effect size was larger at 5% and 15% discounts.

Recommendations

- Keep offering discounts to customers.
- Incentivize employees that do not use discounts to avoid excessive and unnecessary discounting.
- In marketing materials, limit discounts to 5% and 15%.

Employee Productivity

Are certain employees more productive than others?



Findings

- There was no statistically difference in the mean sales level amongst employees.

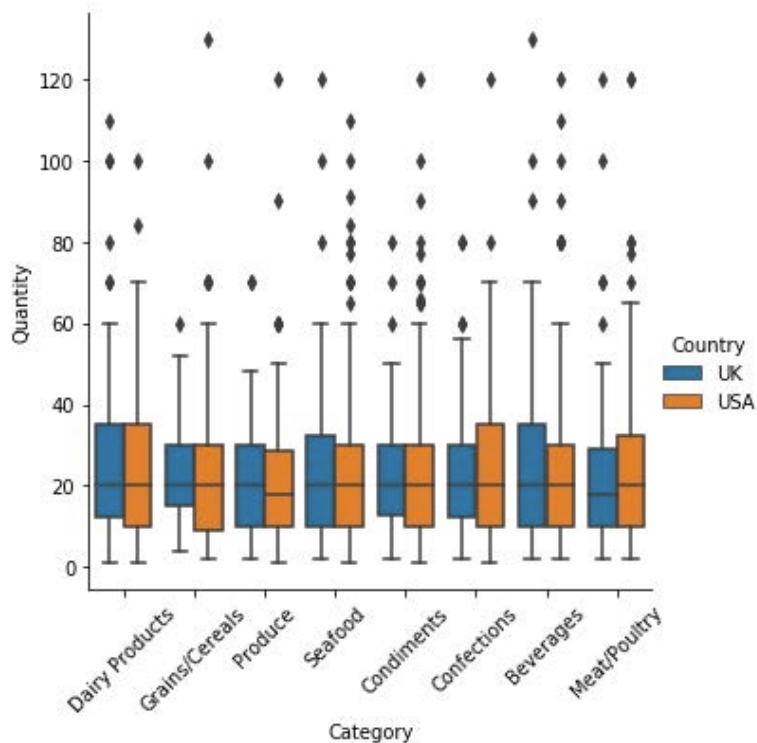
Recommendations

- More senior employees should be held to a higher standard, and be expected deliver above average results.
- Review incentives in place that favor career advancement according to performance level.
- Prioritize collaboration amongst peers.



Product Categories

Do certain product categories have higher demand?



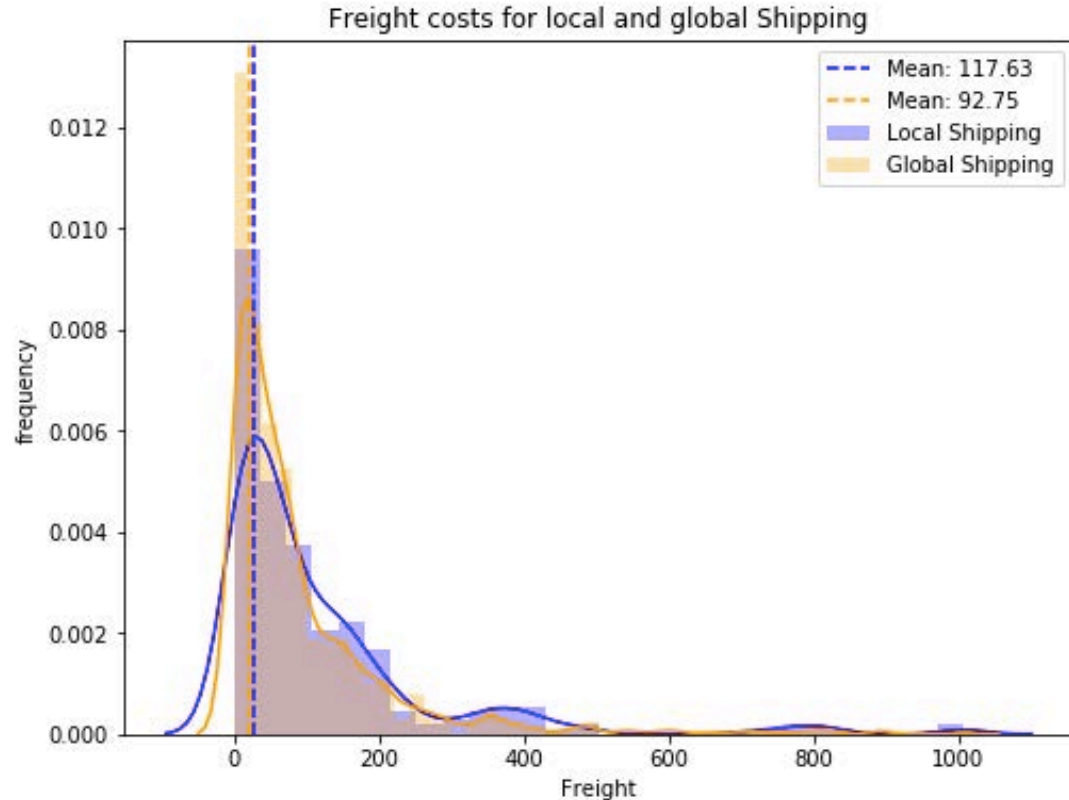
Findings

- There are no differences in average quantities ordered amongst categories.

Recommendations

- Keep expanding current product portfolio in all categories. Categorical differences may appear as the market reaches saturation.

Shipping Costs



Local Shipping mean: 118
Global Shipping mean: 93
Percentage difference: 26.83 %

Findings

- International freight is less expensive than local shipping.

Recommendations

- Include local shippers, to source them directly rather than relying on the current international shippers since they may be outsourcing and increasing costs by acting as intermediaries.

Future Work

- Conduct tests with actual dollar figures instead of just product quantities.

- Test current shippers delivery times.

- Test individual products' price elasticities of demand per region.

- Test for differences in profitability amongst territories.





Thank You

Any Questions?