Northwind Traders - Data analysis

SQL Database with 13 tables containing sales, supplier, shipping and customer information.

What is over overall picture that the data provides?

Northwind Traders - Overview

Customers x 91
(89 active)

Orders x 828

Product-Order x 2155
(77 Products)

Discounts:
5%, 10%, 15%, 20%, 25%

Each order:

Discounted Products	Not discounted

Salesperson x 9

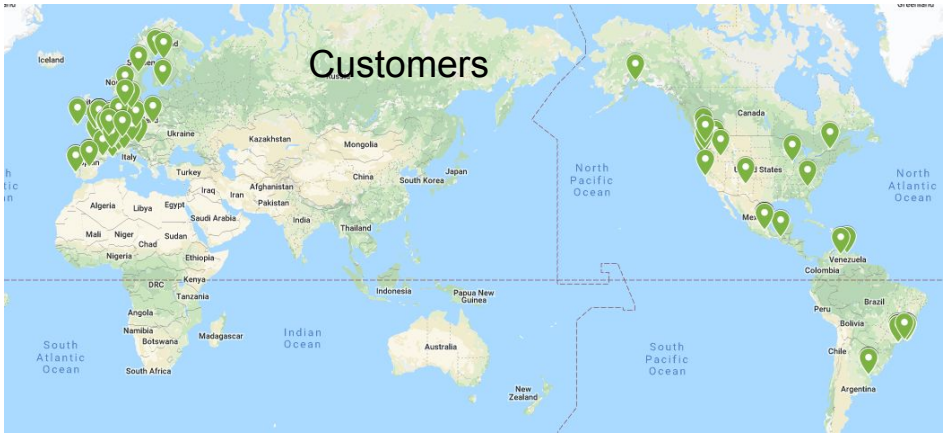
Sales period

4th July 2012

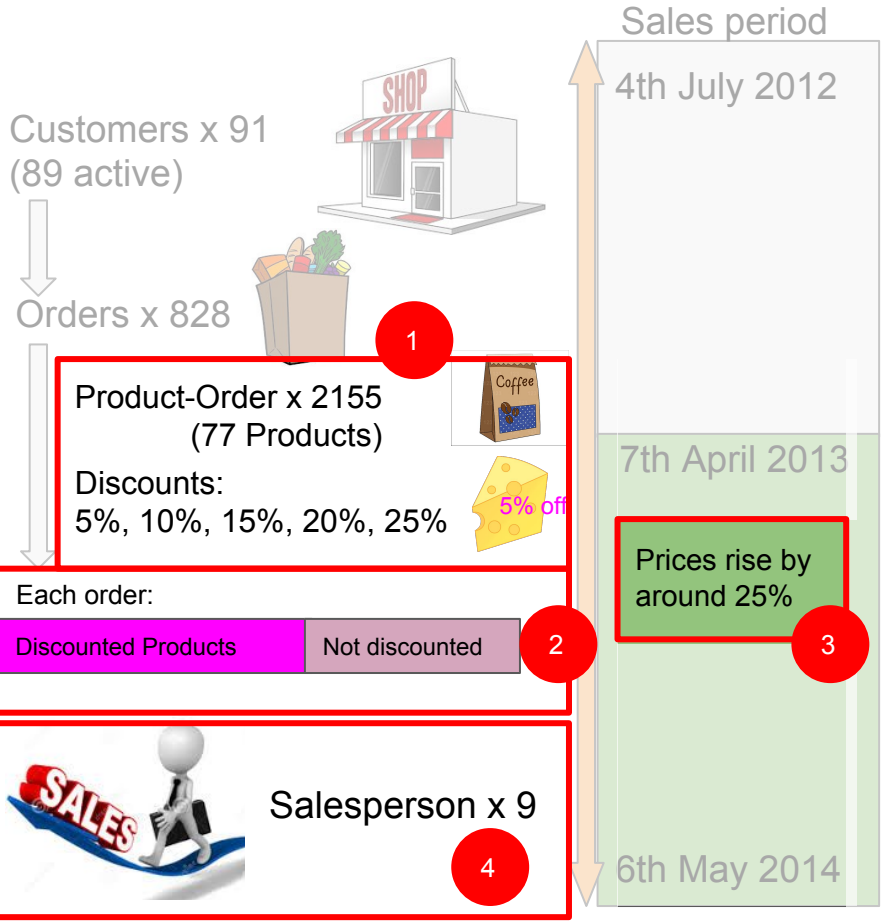
7th April 2013

Prices rise by
around 25%

6th May 2014



Northwind Traders - 4 business questions



Study aims to answer 4 Business questions:

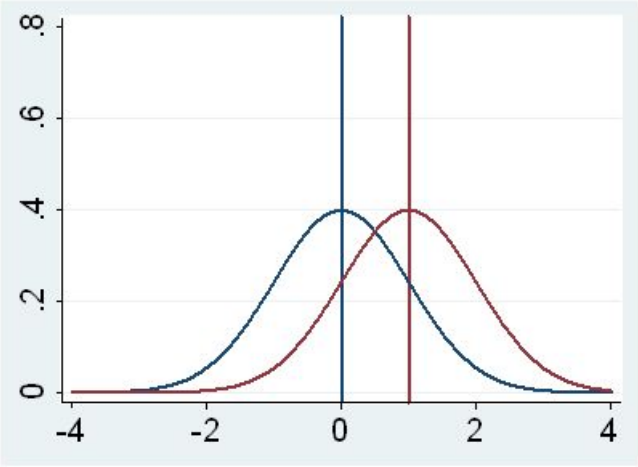
1. Do discounts have a statistically significant effect on the number of products customers order? If so, at what level(s) of discount?
2. What proportion of a customer's order is likely to be made up of discounted products, when a discount is available?
3. Should Northwind aim to avoid raising prices?
4. Do any of the existing sales team members require additional training to improve their sales?

Methodology

2 types of statistical test used: t-test and tukeys comparison of means.

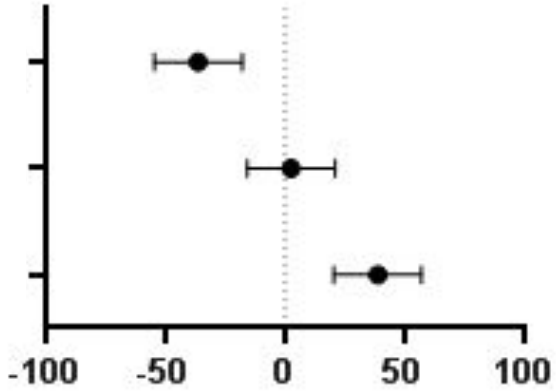
T-test

How similar is the data of two samples relating to the same information?



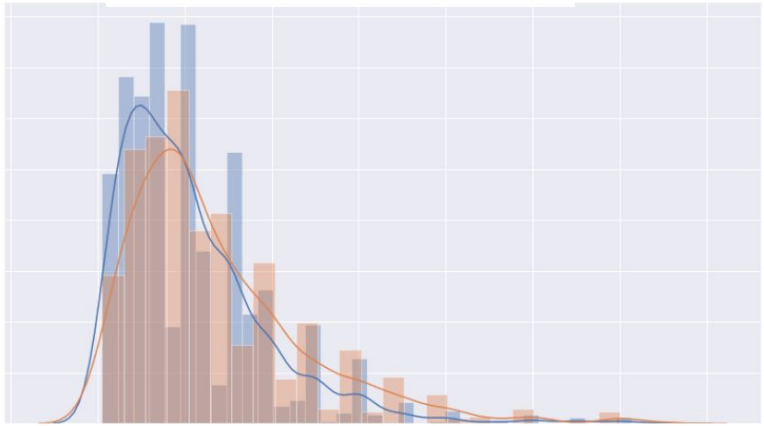
Tukeys
comparison of means

For multiple samples, how close are they to each-other?



1 Do discounts have a statistically significant effect on the number of products customers order? If so, at what level(s) of discount?

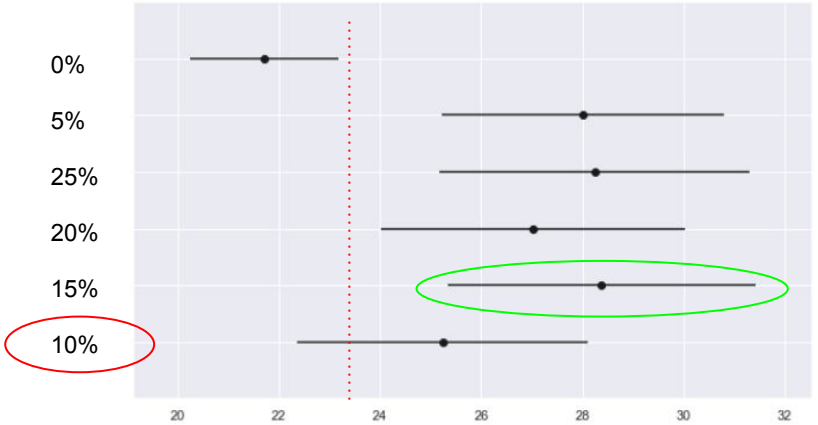
T-TEST



Order quantity Distributions:
Blue - No Discounts, Red - Discounts

We have enough data to claim with 95% confidence that discounts increased the average product-order quantity from 21.72 to 27.35 products per order.

TUKEYS TEST



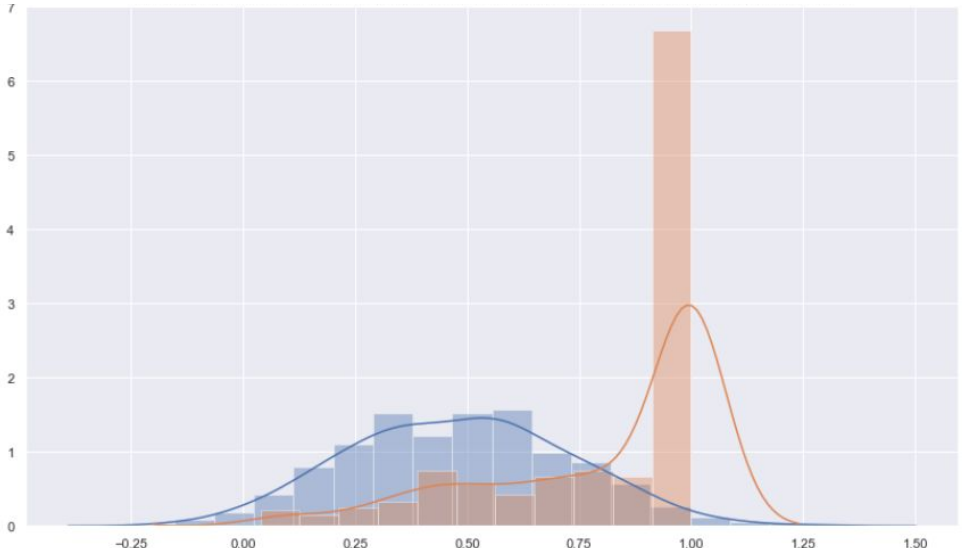
Assuming the data we have is representative, we can state with 95% confidence that all discount levels result in an increase in order quantities. (15% appears to be optimum).

The exception of 10% might be due to lack of data.

2

What proportion of a customer's order is likely to be made up of discounted products, when a discount is available?

T-Test



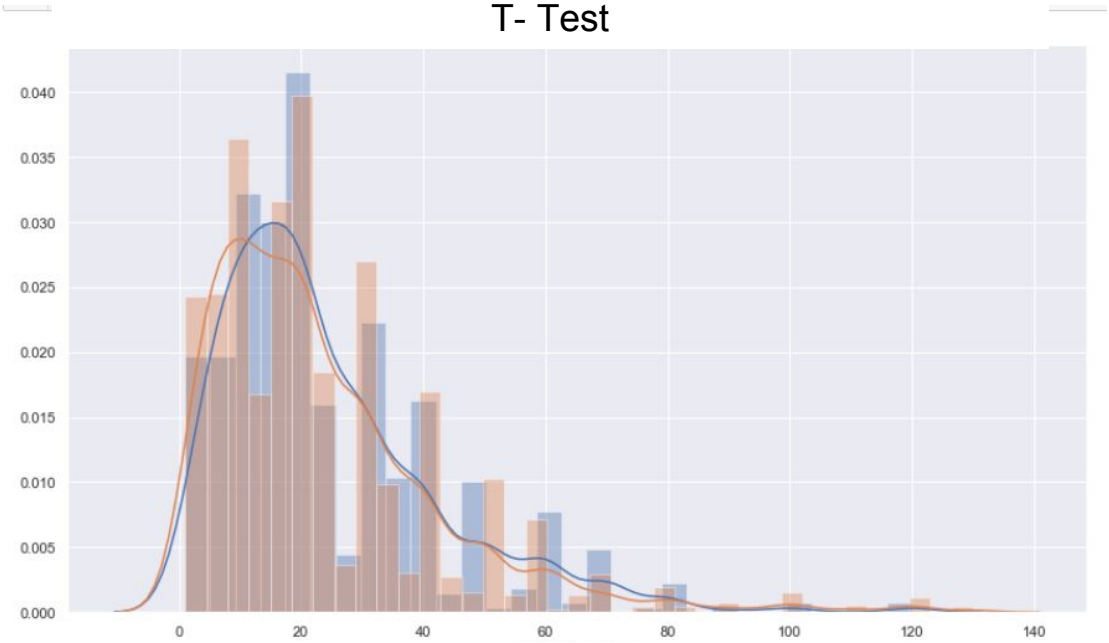
Blue - Distribution if average proportion is 50% (hypothetical)
Red - Distribution of actual proportions

We have enough data to determine with at least 95% confidence that when a discount is available, discounted products are likely to make up between 80 and 85% of a customer's order.

(380 out of the total 800+ orders included discounted products.)

3

Should Northwind aim to avoid raising prices?



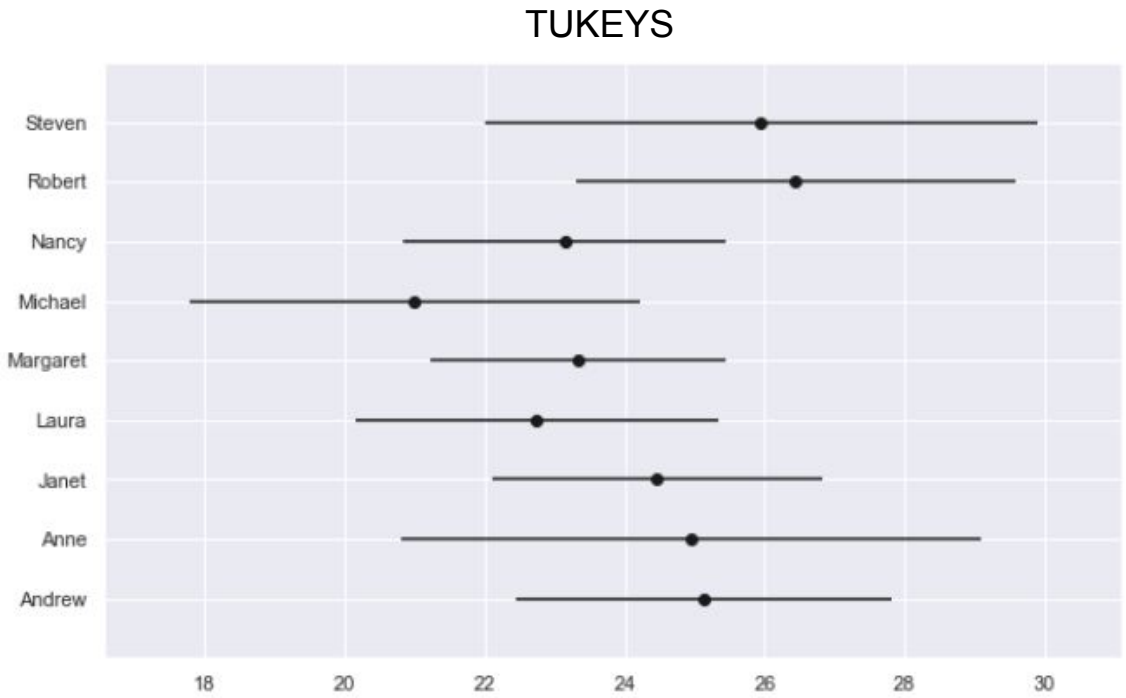
Order quantity Distributions:
Red - Before price rise, Blue - After price rise

The average quantity of an individual product-order went **down** from 24.53 to 23.61 **after** the price rise.

With the current amount of data available, this is cannot be regarded not significant.

4

Do any of the existing sales team members require additional training to improve their sales?



There is not a statistically significant difference between the sales performance of the team members, if we look at order-quantities by product. However, the dataset is relatively small so once more data is available it will be worth revisiting the question.

Also, the question could be answered in more detail if additional types of data were available - such as number of hours worked.

Next slide: Recommendations...

Northwind Traders - Recommendations

Sales period

4th July 2012

7th April 2013

6th May 2014

Customers x 91
(89 acti

Product-C
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The discount levels do not need go as high as 25%. (15% appears to be the optimum).

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Each order:

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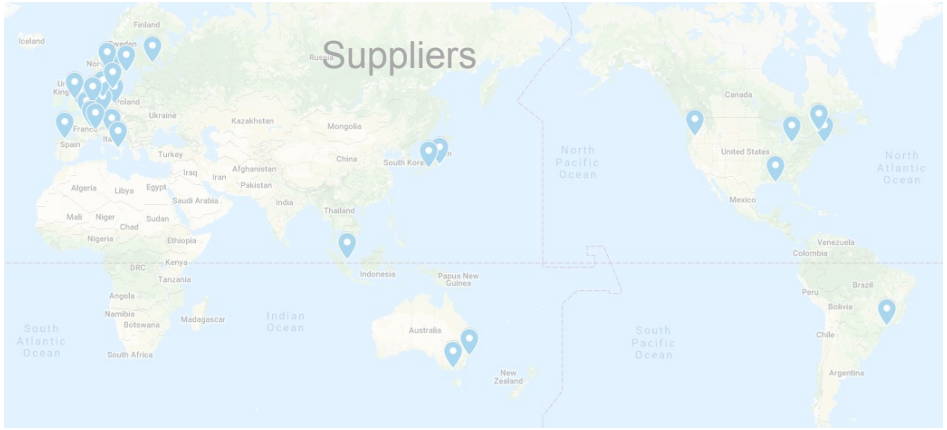
Salesperson x 9



A very high proportion
of a customer's order is likely to be made up of discounted products.

It would be a good idea to do further analysis on the impact of discounts on business revenue, so the availability of discounts can be moderated.

Northwind Traders - Recommendations

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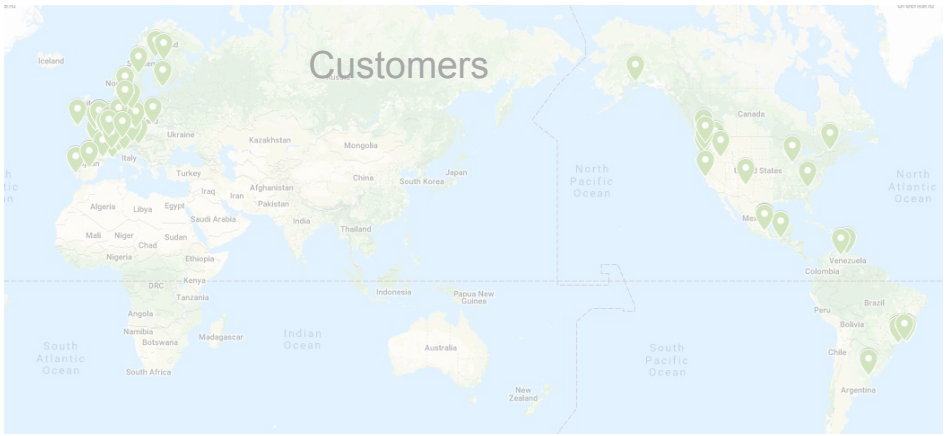
As long as discounts remain available,
it appears a price rise of around 25% does not have an adverse impact on sales. However it would not be wise to raise prices again without more data.
It would make sense to evaluate raising the price of a just a few products for comparison.



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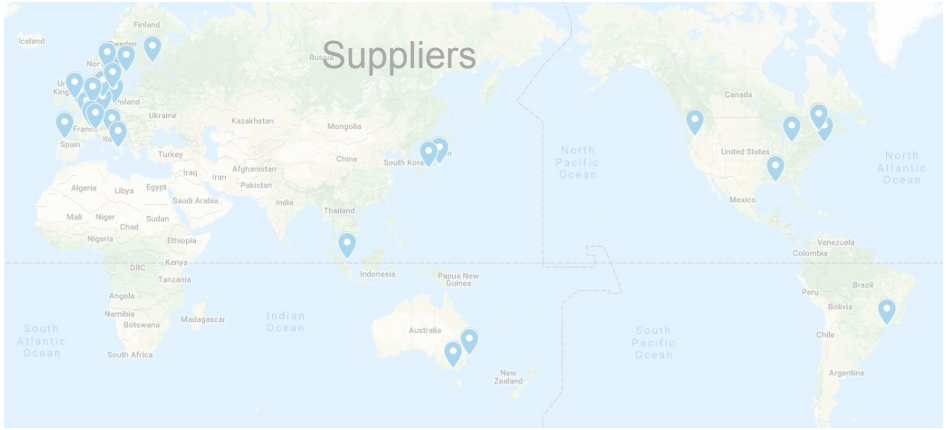

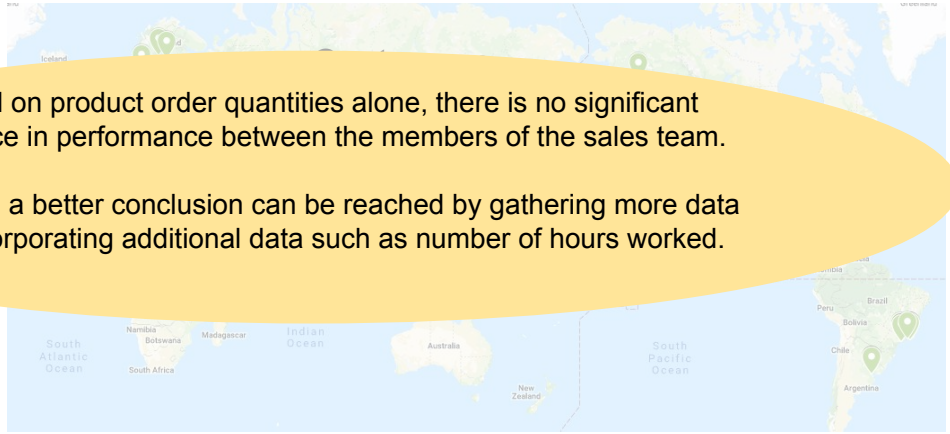

Based on product order quantities alone, there is no significant difference in performance between the members of the sales team.

However, a better conclusion can be reached by gathering more data and incorporating additional data such as number of hours worked.

Recommendations

	Question	Recommendation
1	Do discounts have a statistically significant effect on the number of products customers order? If so, at what level(s) of discount?	Yes, but the discount levels do not need go as high as 25%. (15% appears to be the optimum).
2	What proportion of a customer's order is likely to be made up of discounted products, when a discount is available?	A very high proportion of a customer's order is likely to be made up of discounted products. It would be a good idea to do further analysis on the impact of discounts on business revenue, so the availability of discounts can be moderated.
3	Should Northwind aim to avoid raising prices?	As long as discounts remain available, it appears a price rise of around 25% does not have an adverse impact on sales. However it would not be wise to raise prices again without more data. It would make sense to evaluate raising the price of a just a few products.
4	Do any of the existing sales team members require additional training to improve their sales?	Based on product order quantities alone, there is no significant difference in performance between the members of the sales team. However, a better conclusion can be reached by gathering more data and incorporating additional data such as number of hours worked.