DASHBOARD AND STATISTICS DOCUMENTATION

Superstore: Sales, Customers, Products and Profit

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Power BI Desktop · DAX · ANOVA · Regression

4	793	17	4
linked report pages	customers, 2014 to 2017	product sub-categories compared	statistical tests added to the report

> A practice dashboard built on a training dataset. It is not client data. Figures are quoted as they appear on the report. The three statistical tests were run on the same dataset.

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01 THE STORY BEHIND THE REPORT

> *Imagine a store manager who sells furniture, office supplies and technology to businesses and households across the United States. Sales are growing, but the question that matters is where the profit is, and where it is leaking.*
>
> *This project answers it with four linked dashboard pages and four statistical tests.*

The aim was to judge a US retail business on sales, customers, products and profit, and to find which choices improve profit and which damage it.

02 WORDS USED IN THIS DOCUMENT

Word	What it means
KPI	Key performance indicator: one number that says how the business is doing, such as total sales or churn rate.
DAX	The formula language inside Power BI. A measure written in DAX recalculates itself whenever a filter changes.
Profit margin	Profit divided by revenue, shown as a percentage. A 44% margin means 44 of every 100 units of sales is left after costs.
Year on year	This year compared with the same period last year.
Segment	Type of customer: Consumer, Corporate or Home Office.
ANOVA	A test of whether the averages of three or more groups differ by more than chance.

Word	What it means
Regression	A way of measuring how much one thing moves when another changes. Here, how profit moves as discount rises.
Post-hoc test	A follow-up test that says which groups differ, after ANOVA says that some do.

03 WHAT THIS REPORT IS

Item	Detail
Author	Temidayo Sunday Alade
Tool	Power BI Desktop, with the statistics run on the same data
Period	Orders from 2014 to 2017
Pages	Sales Overview, Customer Insights, Product Performance, Profitability Analysis
Filters	Ship mode, year and state on every page, with a reset button

04 THE QUESTIONS THE REPORT ANSWERS

Question	Where it is answered
How much did we sell and earn?	Sales Overview: revenue, quantity, profit, margin
Who are our customers and how loyal are they?	Customer Insights: 793 customers, repeat and one-off
Which products and sub-categories pay?	Product Performance: margin by sub-category
Where does discounting cost us?	Profitability Analysis: margin against discount
Does profit differ by segment?	Statistical test: consumer against corporate
Does profit differ by region?	One-way ANOVA
Does revenue differ by product category?	One-way ANOVA with a Tukey follow-up
Does discount predict profit?	Simple linear regression

05 HOW IT WAS BUILT



1. Load the order lines with customer, segment, region, state, ship mode, category, sub-category, product, quantity, discount, sales and profit.
2. Set up a date table and write measures for revenue, quantity, profit, profit margin, previous-year revenue and profit, and year-on-year change.
3. Build the four pages with a common menu, three filters and a reset button, so that every page can be explored the same way.
4. Add a decomposition tree on the product pages, so a reader can drill from category to sub-category to product.
5. Run the statistical tests and write each result in words: what was done, what was found and what it means.

06 HOW THE NUMBERS ARE WORKED OUT

CALCULATIONS AND THE FITTED LINE

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profit margin   =  profit ÷ revenue
revenue per customer  =  revenue ÷ number of customers
profit  =  67.56 − 249.05 × discount          (the fitted line)
```

Discount given	Profit the line predicts per order line	Working
0%	$67.56	The starting level
20%	$17.75	67.56 − 249.05 × 0.20
30%	−$7.16	67.56 − 249.05 × 0.30

An everyday example. Setting the line to zero shows where discounting stops paying: 67.56 ÷ 249.05 = 0.27. On average an order line stops earning once the discount passes about 27 per cent. This is an average over all products, and some products turn unprofitable much earlier.

The statistical tests

Question	Test	Result
Profit, consumer against corporate	Independent test after a normality check	No significant difference
Profit across four regions	One-way ANOVA	F = 1.36, p = .253: no significant difference
Revenue across three categories	One-way ANOVA, Tukey follow-up	F = 167.23, p < .001; all three pairs differ
Profit against discount	Simple linear regression	R^2 = 0.05, F = 505.73, p < .001; each 10 points of discount lowers profit by about $24.90

07 PAGE BY PAGE

Page	What it shows	Notable reading
Sales Overview	$11.49M revenue, 37.87K units, $1.43M profit, 12.45% margin; revenue by segment, month, category and state	Consumer is 50.7% of revenue. Revenue peaks in November and December at $1.75M a month and is lowest in February.
Customer Insights	793 customers, 781 repeat and 12 one-off; revenue and profit by segment and region; customers by year	Active customers rose from 573 in 2015 to 693 in 2017. Consumer profit is $669K, Corporate $469K, Home Office $292K.
Product Performance	Decomposition tree; margin by sub-category and by category and segment	Labels (44%), Paper (43%) and Envelopes (42%) lead. Supplies, Bookcases and Tables lose money, with Tables at −8%.
Profitability Analysis	Profit by segment and region; this year against last; margin against discount	Average profit per order is highest in the West ($166) and lowest in the Central region ($95). Margin falls as discount rises.

08 WHAT IT FOUND

Profit does not follow revenue. Technology earns the most revenue, but it is office supplies such as Labels, Paper and Envelopes that carry the highest margins, above 40 per cent. Tables, Bookcases and Supplies sell but lose money.

Discounts are the clearest lever. The scatter on the profitability page slopes downward, and the regression agrees: a higher discount is linked with a lower profit. The report does not yet show discount by state or sub-category, so whether discounting explains the loss-making states and lines is the next thing to test.

Location matters less than it looks. Average profit per order varies by region on the page, but the test found no significant difference in profit across the four regions, so the gap may be chance.

Customers return. 781 of 793 customers bought more than once, so loyalty is high and growth depends on keeping them.

09 WHAT I RECOMMENDED

- Cap discounts, starting with furniture and the loss-making sub-categories, and review the loss-making states one by one.
- Push the high-margin office supply lines in bundles with technology orders.
- Prepare stock and staff for the September to December peak.
- Keep loyalty programmes for repeat Consumer and Corporate customers, who bring most of the profit.

10 NOTES ON THE FIGURES AND LIMITATIONS

Every figure in this document is taken from the report page it describes. These notes say how to read the figures that need care, and what the data cannot show.

- **Totals and margin.** The headline profit card ($1.43M) and the product table at the foot of the profitability page ($286,397.02) are built from different measures and do not match. The margin, 12.45%, is the same in both, so the findings here rest on margins, shares and comparisons rather than on the headline totals.
- **State table.** The table lists the leading states, so its total ($9.93M) is below the headline revenue.
- **Small effect.** Discount explains only about 5 per cent of the variation in profit ($R^2 = 0.05$). The effect is real, but it is one of several.

11 OUTPUTS

A 4-page Power BI report (PDF export) and a 5-page version with a project brief.

A written statistical analysis with the hypotheses, tables and a plain-English reading for each test.

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