Full Insight Summary:

Project Goal: “Identify what drives profit and how we can optimise sales performance.”

1.0 Executive Summary

Overall, the business is profitable, but profit is highly sensitive to discounting and varies significantly across product categories and customer segments. Sales show gradual long-term growth, with profit growth very similar. A regression model indicates that sales volume is the main driver of profit, while order quantity and discount both impact negatively – the latter significantly. Despite this, forecasts show profit will continue to grow at a steady rate with no intervention. However, it is recommended to re-evaluate current discounts, or pricing, as nearly 20% of current products produce a loss.

2.0 Bullet Point Summary

Profitability:

- Annual profit margin averages at 12.4%.
- “Technology” category is the most profitable.
- Sub-category “Tables” produced the greatest loss
- Discounts above 20% correlate with increasingly negative profit margins.
- Region “West” performs best, while “Central” underperforms.
- Top 10 customers contribute nearly 18% of all profit.
- 300 of the 1845 products sold make a loss or breakeven.
- Subcategory “Binders” has the lowest margin at -20%.
- Recommendations:
    - Consider price changes, discount reduction or removal of lowest performing sub-categories (Tables and Binders).
    - Reducing deep discounting across all products would generate greater profit growth

Customer analytics:

- Most valuable customers:
    - Tamara Chand
    - Raymond Buch
    - Sanjit Chand
    - Hunter Lopez
    - Adrian Barton
    - Tom Ashbrook
    - Christopher Martinez
    - Keith Dawkins
    - Andy Reiter
    - Daniel Raglin
- Consumer segment is the most profitable, but Home Office has the greatest margin.
- Most orders came from the Consumer segment, least is from Home Office.
- High value customers make 2 more orders on average than low value.
- Top 10 customers make a profit of $50,000 (18% of profit), in contrast to the bottom 10 who produce a loss of $30,000.

Regional performance:

- The region ordering the most is “West”, while the “South” orders the least.
- The state producing the highest profit margin is the District of Columbia
- The cities with the largest profit margins are Atlantic City and Grand Island

Operations:

- A shipping delay has little effect on profit; no strong correlation was observed.

3.0 Detailed Summary

1. Data Quality & Structure

- Dataset included a total of **9,995 items purchased** across **5009** customer orders.
- Data required significant cleaning:
  - Dates stored as text
  - Numeric fields inconsistently formatted
  - All columns imported as “General”
- No blank values or unrealistic/outlier values were found
- After cleaning, the dataset was structured properly into **IDs, categorical fields, text fields, dates, and numeric measures**, enabling reliable analysis.

2. Sales & Profit Performance

- **Total Sales and Profit** have increased gradually over the dataset timeframe, growing by **51%** and **89%** respectively over the 4-year period.
- Monthly sales show a **moderate upward trend**, supported by a linear trendline.
- Profit shows **more volatility** than sales, suggesting margin pressure and heavy reliance on discounts. The latter creating a significant loss above a 10% discount.

3. Drivers of Profit (Regression Model)

The regression model used **Sales, Quantity, and Discount** and showed:

- **Sales** had a positive effect on **Profit -** positive coefficient of 0.18
- **Quantity** ordered and **Discount** both have a negative effect on **Profit** – negative coefficients of -2.96 and -233.46 respectively. The latter having a much greater impact.

Interpretation:

Even small increases in discount percentage reduce profitability sharply. Discounts are the primary drag on margin performance. Also possible to link the decrease associated with quantity to bulk buying discounts.

4. Forecasting Future Profit (Next 36 Months)

The regression model generated closely predicted the profits produced over the 4-year period. Given this, the model was used to forecast for the following 3 years.

- Trends for Sales, Quantity, and Discount were calculated for the period of the dataset
- These linearly predicted values were then applied to the regression formula for future months

Key forecast insights:

- **Sales** expected to continue slow, steady growth.

- **Profit** forecast differs from a simple linear trendline, showing a sharp increase in the first year proceeding the dataset followed by a similar upward trend to a linear interpretation.
- Expected profit margin is likely to remain under pressure at current discounting levels.

Strategic takeaway: Adjusting discount strategy could significantly impact future profitability.

5. Category & Region Observations

- **Sales** for all three categories (Furniture, Office Supplies and Technology) were very similar over the duration of the data set.
- **Profit** however saw significant loss in profit margin for Furniture compared to the other two:
    - 3.8% margin compared to 13-16% for Office Supplies and Technology.

- All categories generate strong revenue but Furniture has low profit due to heavy discounting.
- High-performing categories (e.g., Office Supplies) show healthier margins.
- Regional differences suggest that some areas respond better to promotions than others.
    - The Western and Eastern regions of the US generate the most profit, in both cases over 2-fold greater than the other two regions.
    - Profit margin is more consistent across all regions, Central US is an outlier here performing notable worse.