# Superstore Dashboard

## Applied Data Science - Report

**Prepared by:** *Lakshay Kapur [3150046]*
**Date:** *3 November 2024*
**Data Source:** *Superstore Dataset US (Kaggle Data)*

## Summary

The Superstore dashboard provides a comprehensive analysis of sales, profitability, and customer behaviour across regions, product categories, and customer segments. The dashboard aims to uncover trends in revenue growth, highlight high- and low-performing segments, and support data-driven decision-making to optimise performance. Key insights revealed opportunities in specific regions and product categories, as well as patterns in customer spending. The dataset consists of 9994 rows and 22 fields. After analysing the dataset and creating interactive dashboards, following are the insights and conclusions:

# Dashboard 1: **Sales and Profit Analysis**
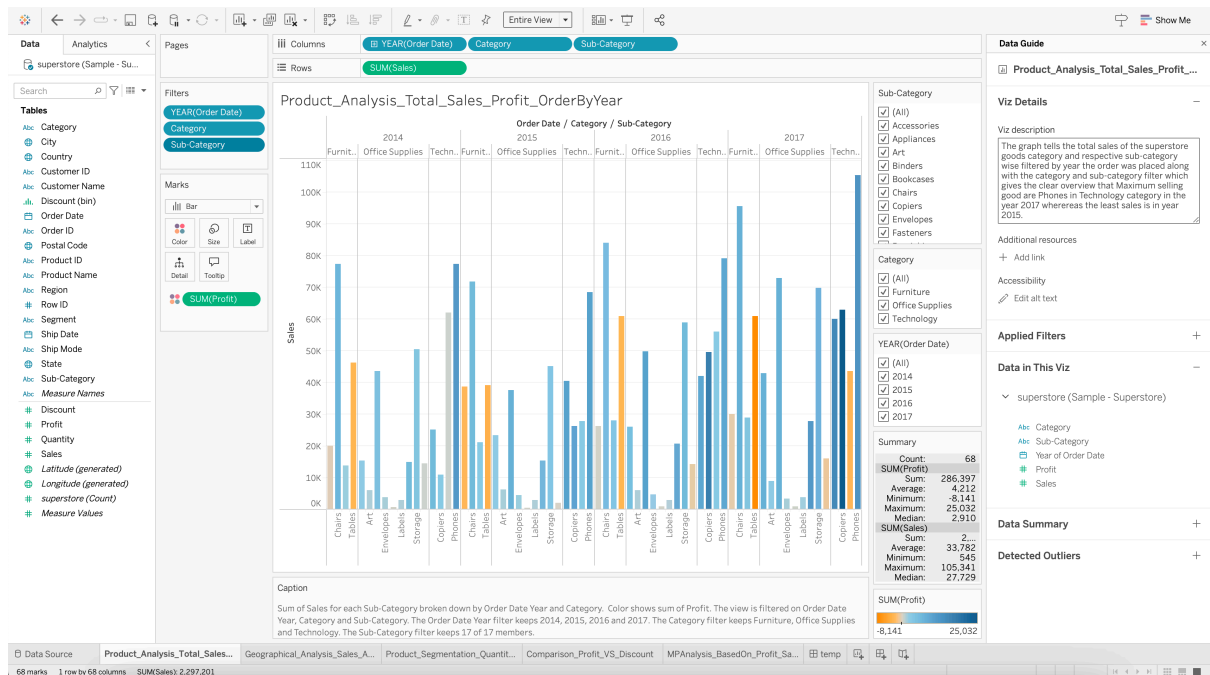


This dashboard provides a breakdown of total sales across the **Superstore**'s primary categories (Technology, Furniture, and Office Supplies), with further detail by sub-category and year, allowing for a clear view of trends and key performance indicators.

1. **Category and Sub-Category Insights**

    o The **Technology** category stands out as the top-performing category, with **Phones** driving the highest sales among all sub-categories. In 2017 alone, **Phones** generated a substantial **$105,341 in sales** and achieved a total profit of **$12,849**, underscoring its significant contribution to the Superstore's revenue and profitability.

    o Within the **Office Supplies** and **Furniture** categories, **Chairs** and **Binders** also exhibit strong performance, albeit at lower profitability margins compared to Technology.

2. **Sales and Profit Correlation**

    o A notable observation is the high profit margin in Technology, especially within Phones, compared to other categories. This alignment between sales volume and profit signifies that Technology products are not only in demand but also contribute significantly to the Superstore's profitability.

    o Conversely, while certain sub-categories in **Furniture** (e.g., Bookcases) show respectable sales, they deliver lower profit margins, suggesting the need for targeted pricing or cost-optimisation strategies in these areas to improve overall profitability.

## Dashboard 2: **Geographical Analysis State-Wise Average Profit by Number of Superstores**
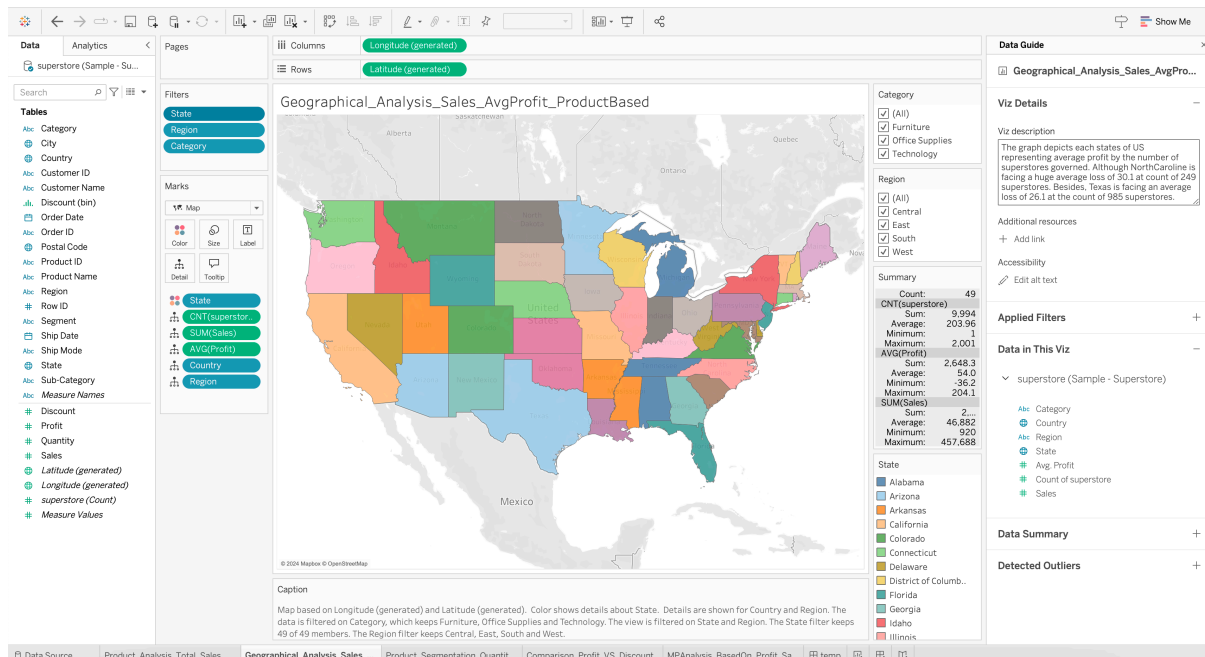


This dashboard provides a state-by-state breakdown of the **average profit** for Superstore locations across the U.S., mapped by the number of stores operating in each state. The visual comparison highlights both profitable and underperforming regions, providing insight into operational efficiency and regional profitability.

1. **State Profitability Analysis**

   o **North Carolina** shows the most significant financial challenge, with an **average loss of $30.1** across **249 Superstore locations**. This high average loss signals issues at both the operational and market levels, suggesting potential over saturation or demand gaps.

   o **Texas** similarly faces considerable profitability issues, with an **average loss of $26.1** over a **larger count of 985 stores**. The scale of operations in Texas compared to other states amplifies the impact of this loss, indicating the need for a strategic reassessment of store locations, marketing, or product offerings.

2. **Store Count and Profit Correlation**

   o There is an inverse correlation in some states between store count and profitability; regions with a higher number of Superstores, like Texas and North Carolina, report lower average profit margins. This pattern suggests that store density alone does not equate to profitability and that over saturation may be eroding profit margins in certain high-density areas.

   o States with fewer but highly profitable stores might offer insights into optimal store placement and market penetration strategies, indicating that a selective approach to expansion could enhance overall profitability.

# Dashboard 3: **Product Segmentation by Quantity and Profit**



This dashboard features a box-plot that compares the quantity of orders and total profit segmented by **product category**, **sub-category**, **customer segment**, and **order year**. This visualisation offers insights into order volume and profitability trends across time, helping to identify top-performing products and segments.

1.  **Order Quantity Trends by Year and Segment**

    o   **2015 and 2016** saw the **highest quantity of orders** placed by the **Consumer segment**, indicating strong demand from individual consumers in these years.
    o   **Office Supplies** in particular saw a surge in demand among **Consumers** in **2017**, suggesting either successful promotional efforts or increased consumer needs for these products. This trend makes Office Supplies a key category for continued engagement with the Consumer segment.

2.  **Profitability by Product and Segment**

    o   **Technology** products, especially **Copiers**, have yielded the **highest profit** within the **Home Office segment**. This high profitability suggests that Home Office customers are willing to invest in premium technology products, making this segment a profitable target for upselling and high-margin products.

3.  **Category-Specific Insights**

    o   **Furniture** and **Office Supplies** categories exhibit stable but lower profit margins, especially compared to the Technology category. Despite high order volumes, these categories tend to have less profitability on a per-unit basis, potentially due to pricing, discount structures, or shipping costs associated with larger items like **Chairs** and **Bookcases**.

# Dashboard 4: **Profit and Discount Comparison**



This dashboard visualises the relationship between **discounts and profit** across different **regions** (Central, East, South, and West) and **product categories** (Furniture, Office Supplies, and Technology). The graph uses discount bins to show how varying discount levels impact profitability within each region and product category, providing insights into where discounting may be detrimental to profitability.

1.  **Impact of Discounts on Profitability**

    o   The dashboard reveals a clear **inverse relationship between discount levels and profit** across all regions. As discounts increase, profits tend to decrease, indicating that discounting is generally eroding profit margins.

    o   This trend is especially pronounced in the **Furniture** and **Office Supplies** categories, which show consistent losses in profit as discounts increase. This pattern suggests that the current discounting strategy may not be sustainable for these categories.

2.  **Discount Bins and Profit Trends**

    o   The breakdown by discount bins provides insight into specific discount thresholds that lead to losses. For instance, discounts above 20% consistently result in negative profits across most categories and regions, indicating that a more conservative discounting approach could benefit Superstore's overall profitability.

    o   This analysis suggests that **discounts beyond certain levels** do not generate enough additional sales volume to justify the profit reductions they cause. By identifying optimal discount thresholds, Superstore can maximise revenue without undermining profitability.

3. **Product-Specific Recommendations**

- o For **Furniture**: Due to consistent losses across regions, it may be beneficial to implement a no-discount policy or focus on alternative sales strategies, such as bundling, to attract customers without resorting to high discounts.

- o For **Office Supplies in Central Region**: Discount reductions are recommended to curb ongoing losses, as the Central region shows the highest sensitivity to discounting in this category.

- o For **Technology**: While discounting should be controlled, moderate discounts in Technology may still be feasible, especially in regions where demand is strong. This could help maintain competitive positioning without severely impacting profitability.

## Dashboard 5: **Trend Analysis of Marked Price Based on Profit, Sales, and Discount Across Customer Segments**
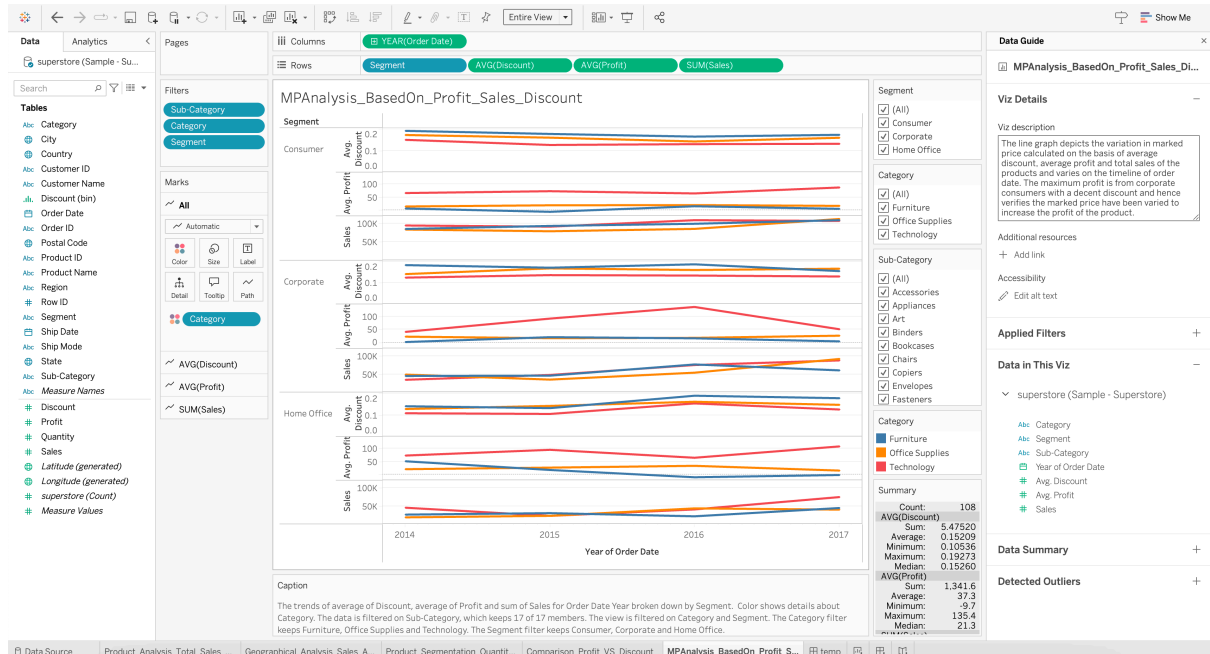


This dashboard visualises the trends in **average discount**, **average profit**, and **total sales** across different **customer segments** (Consumer, Corporate, and Home Office) over the years from **2014 to 2017**. By examining the variations in these metrics over time, we gain insights into how marked prices are adjusted to influence profitability and drive sales within each segment.

1.  **Trends in Profit and Discounts by Segment**

    ○  **Corporate Segment**: The Corporate segment consistently shows **higher profit levels** compared to Consumer and Home Office segments, particularly in 2016. The profits in this segment appear to benefit from a balance of **moderate discounts**, indicating that Corporate customers respond positively to selective discounting, which in turn maximises profit. This suggests that optimising discount strategies for Corporate clients can be a key driver of profitability.

    ○  **Consumer Segment**: The Consumer segment has **stable but lower profits** compared to Corporate, with profits showing a slight increase toward 2017. Discounts remain consistent, suggesting that the Consumer segment is less sensitive to marked price variations and may require additional promotions or marketing to drive higher profits.

    ○  **Home Office Segment**: The Home Office segment exhibits the most **volatile profit trends**, with noticeable fluctuations year over year. Profit levels in this segment are generally lower, suggesting that discount strategies are less effective, or possibly overused, for Home Office clients. Adjustments to

discount levels in this segment may be needed to achieve more consistent profit growth.

2. **Discount, Sales, and Profit Correlation Over Time**

   ○ Across all segments, there is a noticeable **inverse relationship between discount and profit**, indicating that while discounts may boost sales volumes, they also erode profit margins. This highlights the importance of strategically balancing discounts to maintain healthy profit margins without compromising sales growth.

   ○ **Sales Trends**: Sales remain strong across the years, particularly in the Consumer and Corporate segments, demonstrating a steady demand. However, sales alone do not always correlate with profit, especially in cases where high discounts are applied. This underscores the need to align discount strategies with profit goals rather than relying solely on sales volume.

3. **Formula Relationship between Marked Price, Discount, and Profit**

   ○ **Formula**: The relationship between **Marked Price**, **Discount**, and **Profit** can be expressed as:

   Selling Price = Marked Price × ( 1−Discount )

   Profit = Selling Price − Cost Price

   ○ **Explanation**:
      ■ **Marked Price** represents the original price of the product before any discount is applied.
      ■ **Discount** is the percentage reduction on the Marked Price, which affects the final **Selling Price**.
      ■ **Profit** is calculated as the difference between the Selling Price and the Cost Price. Thus, higher discounts lower the Selling Price, which, if not offset by cost reductions, will lead to a decrease in profit.

4. **Segment-Specific Recommendations**

   ○ **Corporate**: Maintain moderate discount levels to capitalise on high profitability in this segment. Avoid high discounts that could reduce profit margins.

   ○ **Consumer**: Introduce targeted promotions or limited-time discounts to stimulate profit growth without heavy reliance on high discount rates.

   ○ **Home Office**: Reassess discounting strategies to reduce volatility in profit. Consider reducing discounts or exploring alternative incentives for this segment to improve profit stability.

# Key Takeaways

1. **Focus on High-Growth Categories**: Technology, especially sub-categories like Phones, shows strong profitability and growth potential. By prioritising high-performing categories and refining those with high sales but lower profit (e.g., Furniture and Office Supplies), Superstore can drive sustained revenue growth.

2. **Regional Profitability Optimisation**: High-loss states like North Carolina and Texas require targeted strategies, such as consolidating stores or enhancing marketing. Profitable models in states with balanced store density can be replicated to improve average profits nationwide, promoting a more sustainable expansion strategy.

3. **Segment-Specific Discount Strategies**: Customer segments respond differently to discounting, with Corporate showing strong profit at moderate discounts. Tailoring discount levels by segment, rather than a uniform approach, will maximise profit margins without sacrificing sales volumes.

4. **Regionally Tailored Discounts**: Discounts impact profitability differently across regions, with Central and Western regions facing losses in categories like Office Supplies and Furniture. Superstore should establish optimal discount thresholds and adjust regionally to maintain competitiveness while improving profitability.

5. **Strategic Pricing Adjustments**: Superstore's analysis of trends in marked prices based on discounts and profit margins suggests a need for data-driven pricing. By aligning marked prices with segment demands and profit goals,  Superstore can balance short-term sales growth with long-term profitability.

## Conclusion

Through this comprehensive analysis, Superstore gains valuable insights into category performance, regional dynamics, customer segment preferences, and effective pricing strategies. By implementing targeted, data-driven actions focusing on high-growth areas, optimising store placement, tailoring discounts, and adjusting marked prices. Superstore is well-positioned to enhance both revenue and profitability. This strategic approach not only fosters sustainable growth but also strengthens Superstore's competitive edge in a diverse market landscape.