ABC Stores' Sales Analysis

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Executive Summary

This report presents a comprehensive analysis of ABC Stores' sales data, exploring aspects such as shipping methods, regional performance, customer segments, and profitability trends. Key findings reveal that First Class shipping is the most profitable, the West region leads in sales and profitability and that Home Office customers offer the highest margins. Recommendations include optimizing logistics, targeting high-margin products, and refining discount strategies to balance sales growth with profitability.

Introduction

In today's competitive business environment, retail companies must continuously analyze their performance to adapt to market demands and maintain profitability. ABC Stores, a retail business seeking to improve its operational efficiency and strategic decision-making, provided its sales and profitability data for an in-depth analysis.

This report aims to uncover key insights that drive business success, including identifying high-performing product categories, understanding regional and customer segment trends, and evaluating the effectiveness of shipping and discount strategies.

The analysis covers various aspects of the business, from geographic performance and customer behavior to profitability trends. The findings will culminate in actionable recommendations designed to help ABC Stores enhance its competitive edge, address underperforming areas, and capitalize on growth opportunities.

Data Analysis and Insights

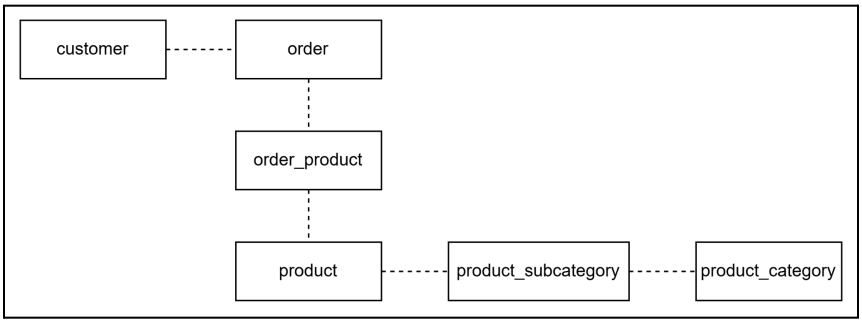
After accessing the data in the Excel spreadsheet, the analysis started by identifying the columns (fields) and the relationships between them. Each row appears to represent a record of a sold product, linking it to the relevant tables: products, product categories, product subcategories, orders, and customers.

Since the analysis will use Excel PivotTables to summarize the data, normalization is not required. However, understanding the data structure and

relationships provides valuable context for generating insights. Figure 1 illustrates a proposed schema for the database.

Figure 1

Proposed Database Entity-Relationship Diagram



Analysis 1 - Optimizing Shipping Modes

To analyze the profitability associated with different shipping modes and their corresponding shipping durations, a new calculated field, “Shipping Duration”, was created. This field computes the difference between the Order Date and the Ship Date, representing the time taken to fulfill an order. A PivotTable was then used to aggregate the data, summarizing the profit average and shipping duration average for each shipping mode. The results are presented in Table 1.

Table 1

Shipping model analysis

Ship model	Count of Row ID	Average of Profit	Average of Shipping Duration
First Class	1538	31.84	2.2

Second Class	1945	29.54	3.2
Same Day	543	29.27	0.0
Standard Class	5968	27.62	5.0
Grand Total	**9994**	**28.73**	**4.0**

First Class shipping is the most profitable mode, with an average profit of 31.84, which might indicate that customers that value faster service are likely to pay a premium.

Standard Class, despite being the most used (5,968 orders), has the lowest average profit (27.62) probably due to its cost-saving appeal – customers that chose this shipping model are ok waiting longer delivery time (5 days in average).

To enhance profitability, the Company should:

- Optimize logistics for Standard Class, as it is the most used shipping model. 59.7% of all orders used this type of shipping method.
- Leverage the profitability of First Class shipping through targeted promotions and premium packaging for high-margin products.
- Since the Same Day shipping model is related to customers with urgent needs, charging premium fees could help improve profitability. Besides this, expanding Same Day capacity might increase availability for high-margin products to maximize its potential.

Analysis 2 - Geographical Performance

In this section, analysis will identify the top-performing and underperforming regions and states separately, based on total sales and average profit. A PivotTable was used to aggregate the data, summarizing total sales and average profit for each state. The results are presented in Tables 2, 3, and 4. For better visualization, Figure 2 highlights total sales data for each state.

Table 2

Total sales and profits per region

Region	Count of Products sold	Sum of Sales	Sum of Profit	Profitability
Central	2323	501,239.89	39,706.36	7.9%
South	1620	391,721.91	47,515.49	12.1%
East	2848	678,781.24	91,522.78	13.5%
West	3203	725,459.82	108,425.45	14.9%
Grand Total	**9994**	**2,297,202.86**	**287,170.08**	**12.5%**

Some insights and recommendations according to geographical analysis:

- The West region presents the best sales volume ($725,459.82) and best average profitability (14.9%). The company might improve its strengths, by investing in marketing campaigns and building distribution centers to reduce shipping fees and delivery time. This may boost sales.
- The South region has the lowest total sales ($391,721.91), followed closely by the Central region ($501,239.89). This suggests these regions

contribute significantly less to overall revenue, besides they have the lowest average profit (12.1% and 7.9% respectively). Underperformance in sales in these regions could indicate inadequate marketing strategies or insufficient targeting of customer needs.

Table 3

Top-3 Performing states on profitability

State	Sum of Sales	Sum of Profit	Profitability
District of Columbia	2,865.02	1,059.59	37.0%
Delaware	27,451.07	9,977.37	36.3%
Minnesota	29,863.15	10,823.19	36.2%

Table 4

Top-3 Performing states on total profit

State	Sum of Sales	Sum of Profit	Profitability
California	457,687.63	76,381.39	16.7%
New York	310,876.27	74,038.55	23.8%
Washington	138,641.27	33,402.65	24.1%

Table 5

Top-3 Underperforming states on profitability

State	Sum of Sales	Sum of Profit	Profitability
Ohio	78,258.14	-16,971.38	-21.7%

Colorado	32,108.12	-6,527.86	-20.3%
Tennessee	30,661.87	-5,341.69	-17.4%

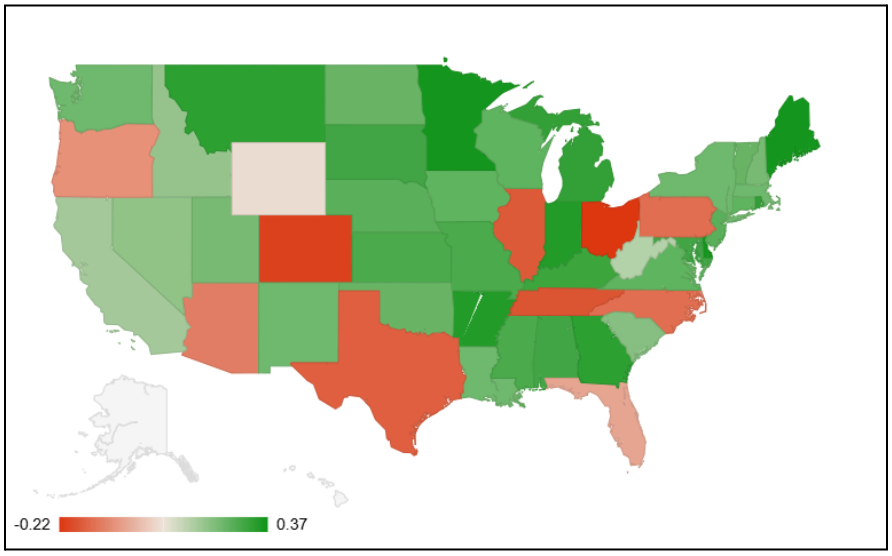
Table 6

Top-3 Underperforming states on total profit

State	Sum of Sales	Sum of Profit	Profitability
Texas	170,188.05	-25,729.36	-15.1%
Ohio	78,258.14	-16,971.38	-21.7%
Pennsylvania	116,511.91	-15,559.96	-13.4%

Figure 2

Profitability per state



Note. The profitability scale ranges from -0.22 (-22%) to 0.37 (37%).

- The District of Columbia, Delaware and Minnesota are the top 3 states in terms of profitability, but it is important to note that their contribution to total sales is relatively small, accounting for only 0.12%, 1.19%, and 1.30% of nationwide sales. This suggests they may represent niche markets with limited scalability but high-margin opportunities.
- The top 3 underperforming states in profitability are Ohio, Colorado, and Tennessee, as outlined in Table 5. Addressing this requires a thorough analysis of cost optimization strategies, pricing adjustments, and an emphasis on promoting high-margin product lines.
- As Figure 2 presents, the profitability per state can not be related to region. All regions have states with positive and negative profitability, and this indicates that profitability is influenced more by state-specific factors, such as local market conditions than regional trends.
- Lastly, Table 7 highlights the Top 5 performing states based on total sales. Combined, these states account for 50% of the total sales, underscoring their critical importance in sales forecasting and strategic planning.

Table 7

Top-5 Performing states on Sum of Sales

State	Sum of Sales	% of Sales on total	Sum of Profit	Profitability
California	457,687.63	19.92%	76,381.39	16.7%
New York	310,876.27	13.53%	74,038.55	23.8%
Texas	170,188.05	7.41%	-25,729.36	-15.1%

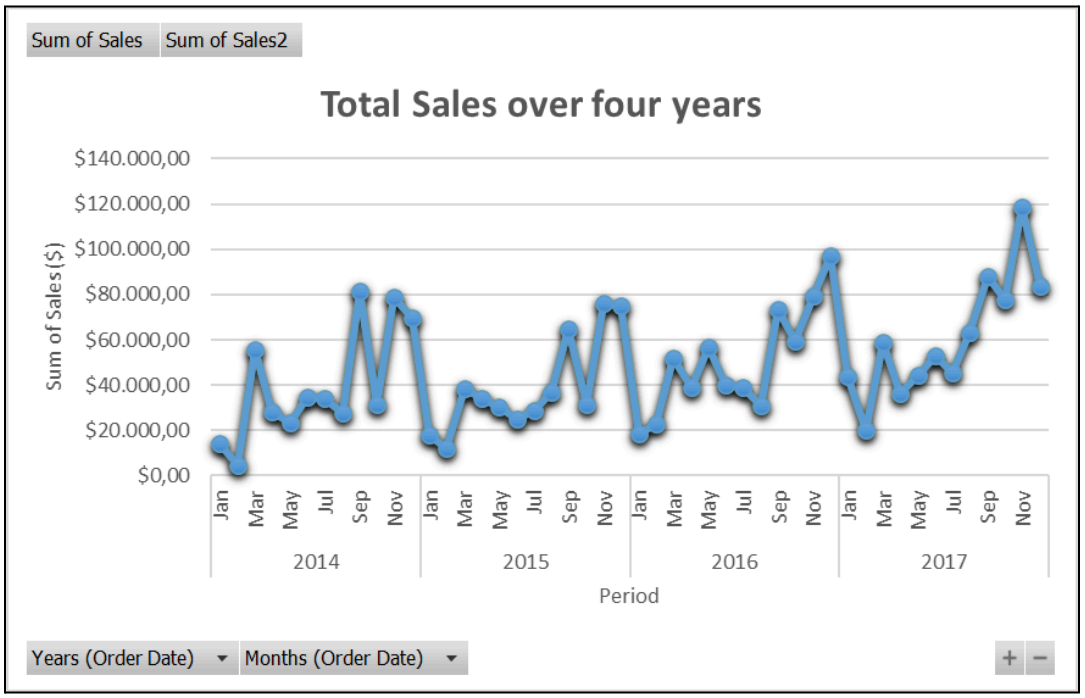
Washington	138,641.27	6.04%	33,402.65	24.1%
Pennsylvania	116,511.91	5.07%	-15,559.96	-13.4%

Analysis 3 - Sales Trends Over Four Years

In this section, analysis will visualize and interpret sales trends over a four-year period (using the order date), with each data point representing a month. Following this, it will identify any significant patterns, spikes, or declines in sales and discuss potential factors that might have contributed to these fluctuations. The results are presented in Figure 3.

Figure 3

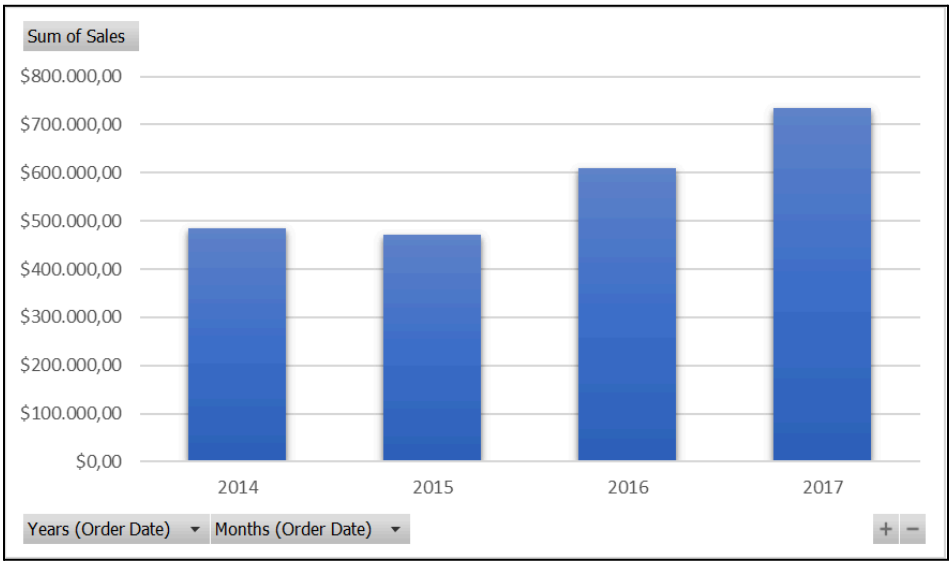
Total sales over years, month-by-month, 2014 to 2017



- Sales show a noticeable spike in November and December each year, likely driven by holiday shopping and end-of-year promotions. On average, 30% of the year's total sales were ordered in November and December. The Company might create other special dates marketing campaigns to promote more sales in other periods.
- As sales dip during January and February (indicating a post-holiday lower consumer spending), the Company might promote other types of products that can address customers needs, like winter-related products.
- September is a month that shows unusually high sales, possibly due to specific promotional campaigns or product launches. Notably, it was the top-selling month in 2014.
- The data shows a trend and seasonal pattern over these four years, so it is possible to forecast demand and plan ahead, ensuring inventory levels meet peak-season needs and aligning staffing and marketing efforts with reduced demand to optimize costs.
- Consider adding regional warehouses and negotiating with delivery partners near high-sales regions (e.g., the West or East) to reduce delivery time and shipping costs.

Figure 4

Total sales over years, 2014 to 2017



- From 2014 to 2017, there is a general upward trend in sales, suggesting overall business growth and increasing market penetration.
- A key factor of success is focusing on Customer Retention. Introduce loyalty programs to reward repeat customers and increase lifetime value.
- As the company continues to grow, scaling operations becomes essential. Establishing new distribution centers in regions with the highest growth potential and investing in automation for inventory management and order processing can enhance market reach by reducing delivery times.

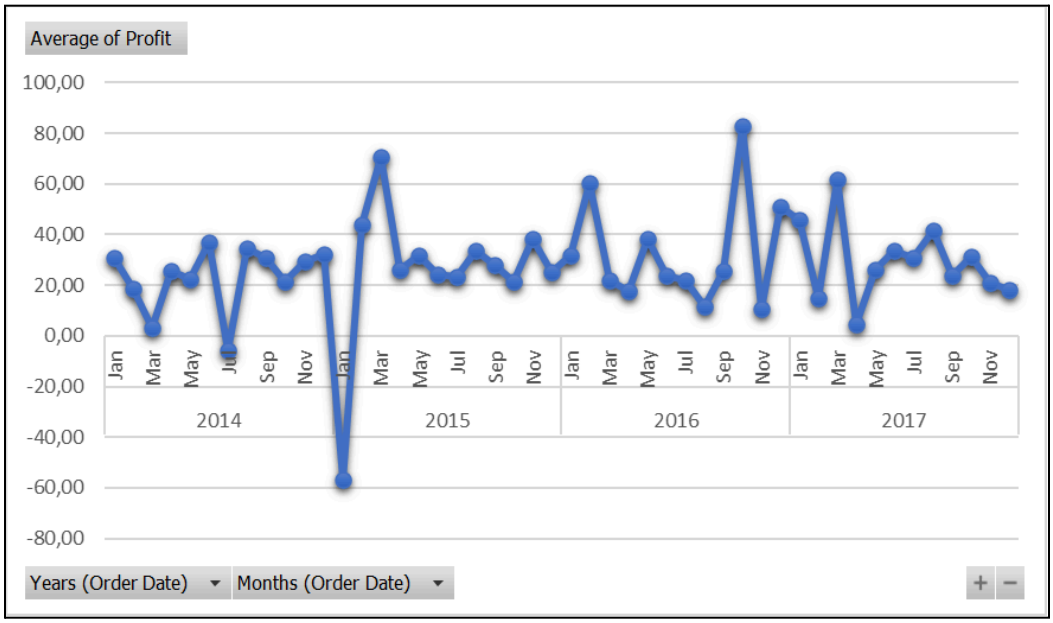
Analysis 4 - Average Profit Trends Over Four Years

In this section, analysis will create a chart illustrating average profit trends across four years, with each data point representing the average of a month. Later, it

will look for any noteworthy fluctuations and their potential causes. The results are presented in Figure 5.

Figure 5

Average Profit over years, month by month, 2014 to 2017



- Despite occasional spikes, the average profit demonstrates a stationary pattern, with data fluctuating consistently around a constant mean of 28.73% over the years.
- The two highest spikes in average profit happened in October 2016 (82.87%) and March 2015 (70.52%), which could indicate promotional events or operational efficiency improvements.
- January 2015 was the worst month in historical data, as the average profit sharply dropped to -56.57%. This likely happened due to post-holiday discounts or clearance sales with lower margins. But the

company quickly rebounded, as the two following months had above-average results (43.97% in February and 70.52% in March).

Analysis 5 - Customer Segments Analysis

In this section, analysis will assess variations in total sales, profit, and profit margin among different customer segments and identify the most profitable segment to provide strategic insights.

The results are presented in Table 8.

Table 8

Analysis on Customer Segment

Customer Segment	Sum of Sales	Sum of Profit	Average of Profitability
Consumer	1,161,401.34	134,885.27	11.6%
Corporate	706,148.37	91,986.13	13.0%
Home Office	429,653.15	60,298.68	14.0%
Grand Total	**2,297,202.86**	**287,170.08**	**12.5%**

- Analysed data shows that Home Office customers are the most profitable, with 14.0% profitability. Focus on increasing product variety and tailoring solutions that align with the needs of small-scale offices or remote workers.

- While the Home Office segment has the best margins, its total sales are lower ($429,653.15). Invest in strategies to grow its volume without sacrificing profitability.
- The company should analyze the best-selling products within the Consumer segment to identify why it has the lowest profit margin (11.6%). Since this segment accounts for the highest total sales, even small enhancements in pricing or cost management could cause significant profitability gains.

Analysis 6 - Categorizing Profitable Categories and Sub-Categories

In this section, analysis will define the top-performing and underperforming categories and sub-categories separately based on both sales and profit.

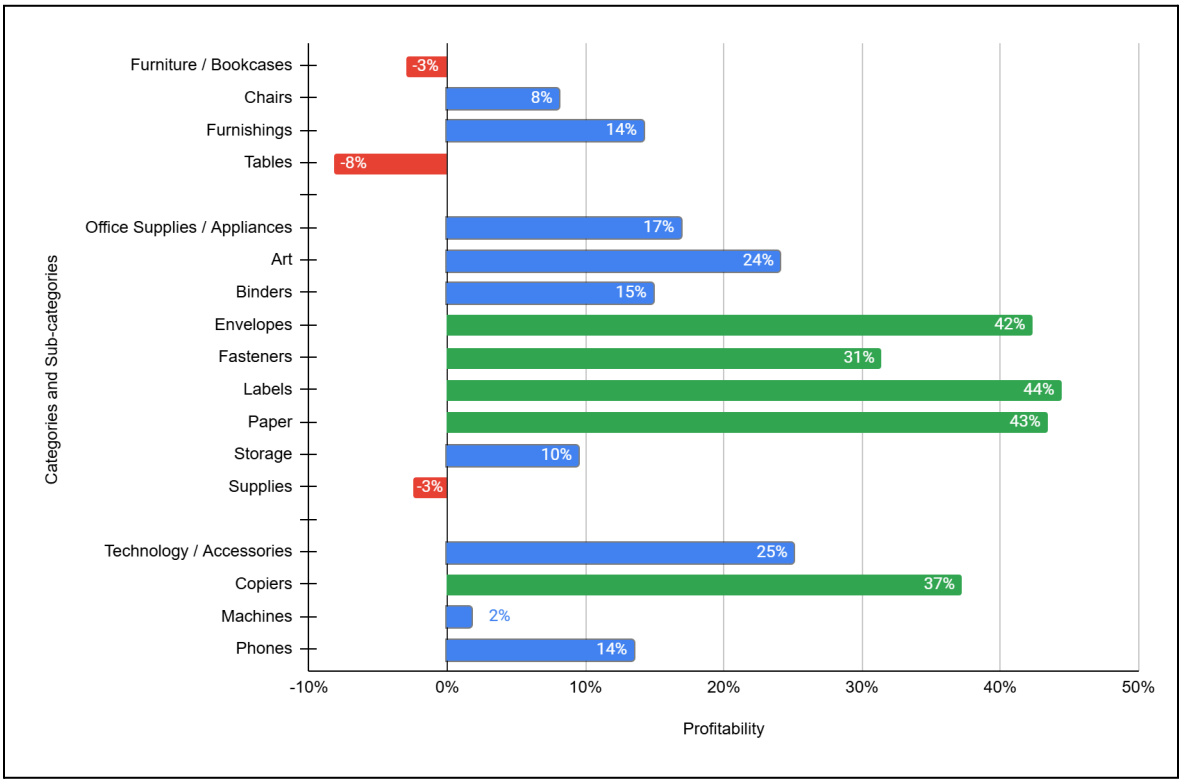
Table 9

Analysis on Product Category

Category	Sum of Sales	Sum of Profit	Profitability
Furniture	741,999.80	19,217.33	2.6%
Office Supplies	719,047.03	122,490.80	17.0%
Technology	836,156.03	145,461.95	17.4%
Grand Total	**2,297,202.86**	**287,170.08**	**12.5%**

Figure 6

Analysis on Profitability per Product Categories and Sub-categories



- Technology and Office Supplies demonstrate similar profitability levels, both around 17%.
- In the Office Supplies category, Labels (44%), Paper (43%), and Envelopes (42%) are the most profitable sub-categories, significantly outperforming others.
- In contrast, Furniture has a significantly lower profitability of just 2.6%, indicating potential inefficiencies or challenges specific to this category. Furniture-related sub-categories such as Tables (-8%) and Bookcases (-3%) presents negative profitability, reflecting the broader challenges faced by the Furniture category.

- For easier analysis, the sub-categories have been divided into three groups, each highlighted in Figure 6 with distinct colors to represent their profitability levels:
    - Highly Profitable (Profitability >= 30%): green.
    - Moderately Profitable (Profitability between 0% and 30%): blue.
    - Unprofitable: red.

Analysis 7 - Location-based Analysis

In this section, Plot two charts that present lists of the top 8 cities based on total sales and profit. Additionally, identify cities with negative profit and propose potential strategies for improvement.

Table 10

Top 8 cities based on total sales

City	Sum of Sales	Sum of Profit	Profitability
New York City, New York	256,368.16	62,036.98	24.2%
Los Angeles, California	175,851.34	30,440.76	17.3%
Seattle. Washington	119,540.74	29,156.10	24.4%
San Francisco. California	112,669.09	17,507.39	15.5%
Philadelphia. Pennsylvania	109,077.01	-13,837.77	-12.7%
Houston. Texas	64,504.76	-10,153.55	-15.7%
Chicago. Illinois	48,539.54	-6,654.57	-13.7%
San Diego. California	47,521.03	6,377.20	13.4%

Table 11

Top 8 cities based on total profit

City	Sum of Sales	Sum of Profit	Profitability
New York City. New York	256,368.16	62,036.98	24.2%
Los Angeles. California	175,851.34	30,440.76	17.3%
Seattle. Washington	119,540.74	29,156.10	24.4%
San Francisco. California	112,669.09	17,507.39	15.5%
Detroit. Michigan	42,446.94	13,181.79	31.1%
Lafayette. Indiana	19,630.45	8,976.10	45.7%
Newark. Delaware	20,448.05	8,086.17	39.5%
Atlanta. Georgia	17,197.84	6,993.66	40.7%

Table 12

Top 8 cities based on negative profit

City	Sum of Sales	Sum of Profit	Profitability
Philadelphia. Pennsylvania	109,077.01	-13,837.77	-12.7%
Houston. Texas	64,504.76	-10,153.55	-15.7%
San Antonio. Texas	21,843.53	-7,299.05	-33.4%
Lancaster. Ohio	8,202.63	-7,149.62	-87.2%
Chicago. Illinois	48,539.54	-6,654.57	-13.7%
Burlington. North Carolina	12,681.28	-5,894.53	-46.5%
Louisville. Colorado	5,070.42	-3,406.21	-67.2%
Dallas. Texas	20,131.93	-2,846.53	-14.1%

Key observations and recommendations:

- Cities like Philadelphia and Houston are both in Table 10 and Table 11 as they generate substantial sales but fail to convert these into profits,
- Cities like Lancaster, Ohio (-87.2%) and Louisville, Colorado (-67.2%) have extremely poor profitability.
- As seen in Figure 2 - Profitability per state, Texas has multiple cities (Houston, San Antonio, Dallas) on this list, indicating potential regional challenges. Evaluate the possibility of building a distribution center.
- Analyze operational and logistical costs in the cities enumerated in Table 12 to identify inefficiencies. Also prioritize promoting high-margin products in these cities.

Analysis 8 - Loyalty and Total Sales Impact

This section identifies and analyzes the top three most loyal customers based on two key metrics: purchase frequency and total order value. Each metric is evaluated separately to gain insights into customer behavior and significance. Additionally, the contribution of these loyal customers to the company's overall sales is calculated as a percentage, demonstrating the impact of customer loyalty on business performance.

Table 13

Top 3 most loyal customers based on frequency of purchases

Customer	Qty of purchases	Sum of Sales	% Sales on Total
Emily Phan	17	5,478.06	0.24%
Zuschuss Carroll	13	8,025.71	0.35%
Patrick Gardner	13	3,086.91	0.13%

Table 14

Top 3 most loyal customers based on total order value

Customer	Qty of purchases	Sum of Sales	% Sales on Total
Sean Miller	5	25,043.05	1.09%
Tamara Chand	5	19,052.22	0.83%
Raymond Buch	6	15,117.34	0.66%

- Emily Phan, from Houston, Texas, is the most loyal customer based on frequency of purchases (17 times) but contributes a modest 0.24% of total sales, indicating high frequency but lower order value per purchase ($322.23).
- Sean Miller, despite only 5 purchases, generates the highest total sales of $25,043.05, accounting for 1.09% of overall sales, reflecting fewer but higher-value transactions – an average order of $5,008,60.
- Of the 5,009 total orders placed, the data reveals that 793 unique customers have made at least one purchase. This is noteworthy because it indicates the company is not overly reliant on a small number of

powerful clients, instead spreading its dependency across a broader customer base.

Analysis 9 - Discount and Sales Correlation

This section focuses on identifying the top 10 states with the highest average discount and analyzing their total sales to uncover patterns or relationships between average discounts and sales performance. A visual representation, including a trendline, is provided to illustrate the correlation, followed by an analysis of key findings to understand how discounting strategies influence overall sales in these states.

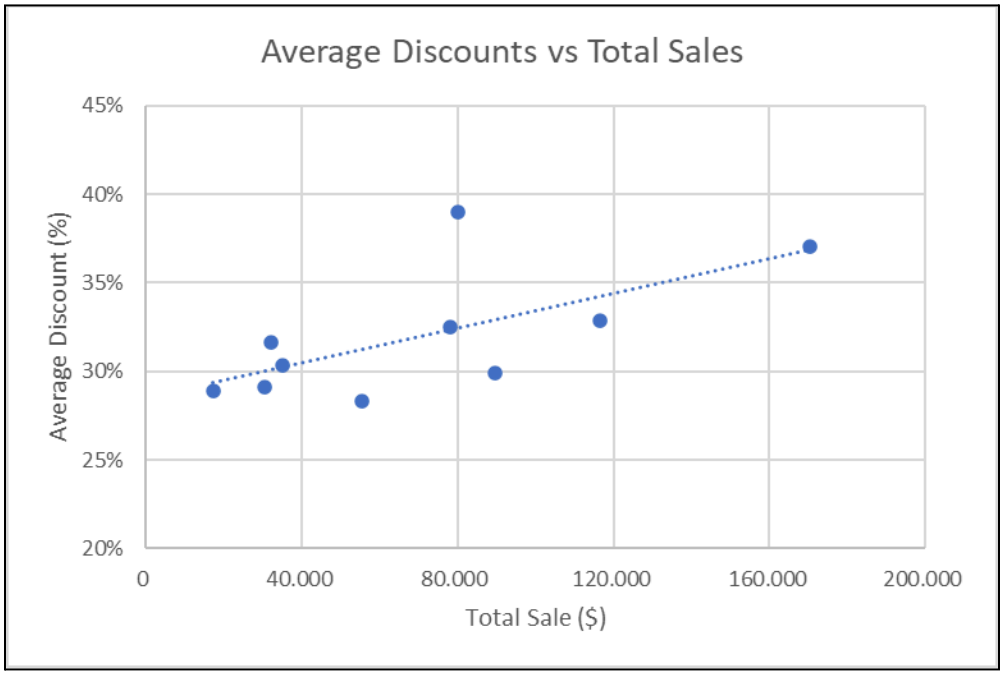
Table 15

Top 10 states with the highest average discount

State	Sum of Sales	Average of Discount
Illinois	80,166.10	39.00%
Texas	170,188.05	37.02%
Pennsylvania	116,511.91	32.86%
Ohio	78,258.14	32.49%
Colorado	32,108.12	31.65%
Arizona	35,284.00	30.31%
Florida	89,473.71	29.93%
Tennessee	30,661.87	29.13%
Oregon	17,431.15	28.87%
North Carolina	55,603.16	28.35%

Figure 6

Analysis on Average Discounts vs Total Sales



- Illinois offers the highest average discount at 39%, with total sales of $80,166.10. Texas follows with a 37.02% discount, generating the highest sales among the top 10 states ($170,188.05).
- The trendline in the scatter plot (Figure 6) indicates a general positive correlation, suggesting that higher average discounts tend to correspond with higher total sales.
- Illinois, however, stands out as an outlier, with an average discount of 39.00%, significantly deviating from the trendline, suggesting that its discounting strategy is unusually aggressive compared to other states and may not align with typical sales-to-discount patterns.

- While discounts can boost sales, the high discount levels in many states may erode profitability, emphasizing the need for strategic discounting to balance sales growth and profit margins.

Analysis 10 - Regression Model for Profit Prediction

This section builds a linear regression model to predict profit using sales, quantity, discount, and category as predictors. The model's significance and limitations will be analyzed to understand its predictive power and practical applicability.

After preparing the data and running Regression Model Calculation on Excel, the output for the Regression Statistics considering the 4 variables discovered an Adjusted R Square of 0.276098395.

Even reviewing each variable coefficient and considering that an estimated coefficient is statistically significant if p-value < 0.05, it can be seen that all coefficients are adequate and that no one should be removed.

Finally, as Adjusted R-Square symbolizes the Coefficient of Determination, which indicates how well the data model fits the Regression Analysis, and only data with Adjusted R-Square value of more than 95% is generally regarded as a good fit for a regression model, the conclusion is that the model is not able to accurately predict profit.

Conclusion

These are the key findings:

- Shipping Modes: First Class shipping is the most profitable, while Standard Class, despite its popularity, has the lowest average profit.
- Geographical Performance: The West region leads in sales and profitability, while the Central and South regions underperform.
- Sales Trends: Sales peak in November and December, indicating strong seasonal demand.
- Profit Trends: Profit remains consistent over time, with occasional spikes.
- Customer Segments: Home Office customers have the highest margins but lower total sales.
- Product Categories: Furniture is the least profitable category, while Technology and Office Supplies show strong margins.
- Customer Loyalty: Loyal customers significantly impact total sales, emphasizing the value of retention programs.

Recommendations

The recommendations cited throughout the report include:

- Optimize Standard Class Logistics: Improve delivery efficiency and reduce shipping costs for Standard Class, the most-used shipping method, to boost profitability.

- Expand Marketing in Underperforming Regions: Increase targeted campaigns and tailor offerings in the Central and South regions to address low sales and profitability.
- Launch Year-Round Promotions: Develop promotions outside the November-December peak, such as seasonal campaigns, to smooth sales and reduce reliance on holiday demand.
- Focus on High-Margin Categories: Prioritize Technology and Office Supplies in marketing and inventory management while addressing inefficiencies in the Furniture category.
- Strategically Adjust Discounts: Implement dynamic discount strategies to strike a balance between driving sales and maintaining profitability, especially in states with aggressive discounting.
- Enhance Customer Retention Programs: Invest in loyalty programs to boost repeat purchases from high-frequency customers while encouraging higher-value transactions from less frequent but high-spending buyers.