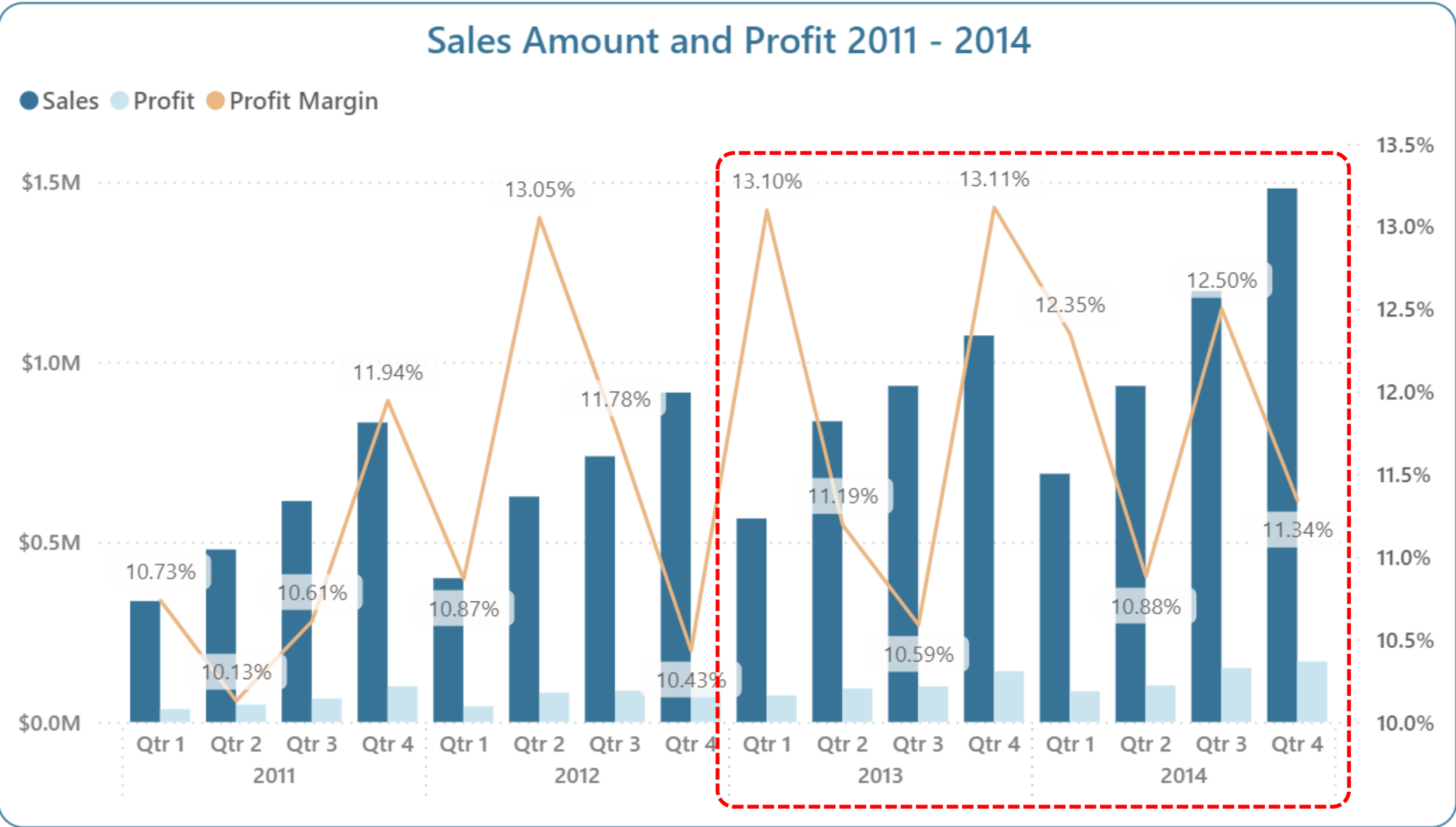


Data Analysis

1. Business Performance Overview (2011 - 2014)



Sales Growth:

- Sales increased steadily over the years, particularly high in Q4 each year.
- Q4/2014 recorded the highest revenue, nearing the \$1.5 million mark.

Profit Fluctuations:

- Profits fluctuated significantly, with the lowest levels typically in Q1 and Q2 each year.
- The later quarters (Q3 and Q4) generally saw higher profits.

Profit Margin:

- Ranged between 10% and 13.5%, peaking in Q4/2012 (13.11%) and dipping to its lowest in Q2/2011 (10.13%).
- Profit margin was inconsistent, affected by rising costs.

Correlation Between Sales and Profit Margin:

- Sales increased, but profit margins did not grow proportionally, indicating the need for better cost control.
- A downward trend in profit margin was observed from 2013 to 2014.

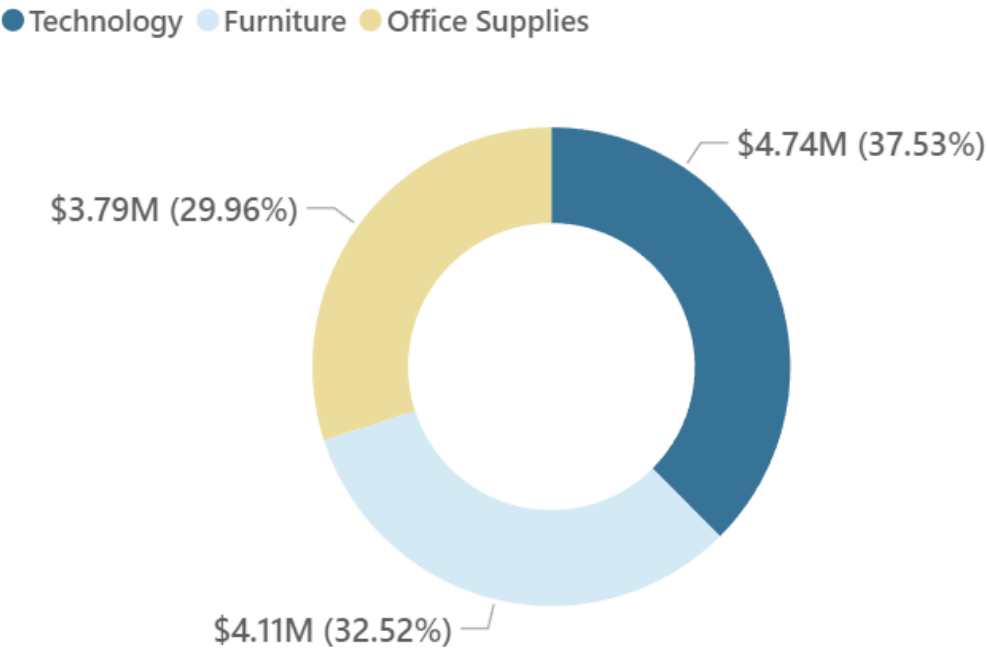
Outstanding Year-End Performance:

- Q4 each year consistently achieved the highest sales and profit, likely driven by holiday seasons or effective sales campaigns.



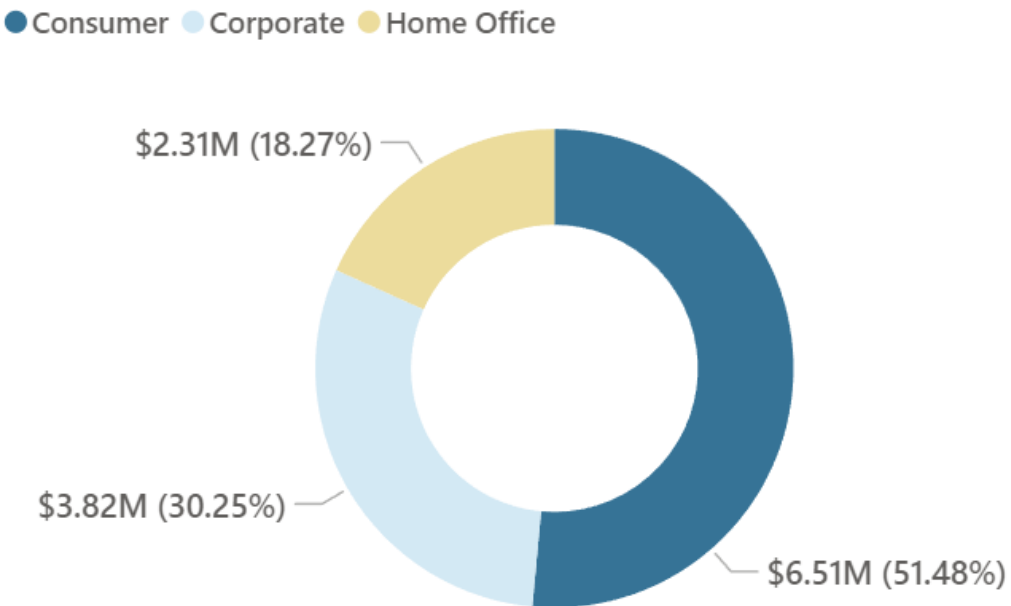
Data Analysis

Sales Amount by Category



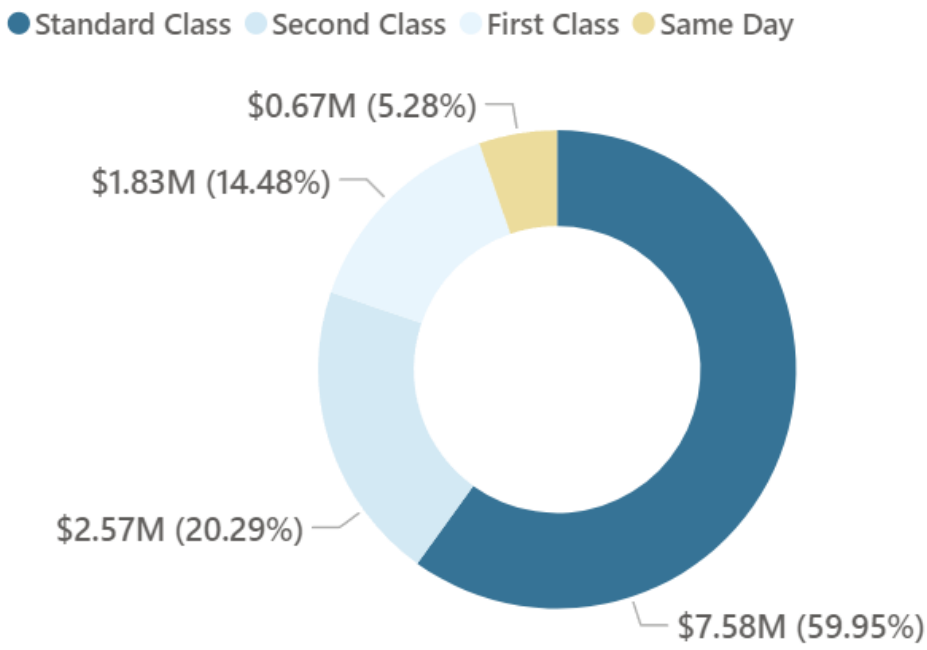
- Sales is relatively evenly distributed across the three product categories.
- Leading the way is **Technology**, accounting for **37.53% of total revenue**, highlighting significant potential and the need for continued focus.
- Although contributing the least, **Office Supplies** still makes **up nearly 30%**, indicating room for growth and the possibility of stronger exploitation in the future.

Sales Amount by Segment



- The **Consumer Segment** is the primary contrinutor, accounting for **over 50% of total sales**, underscoring its critical role in business strategy.
- Although **Home Office** has the **smallest** share, it is considered a promising niche market amidst the growing trend of remote work.
- Therefore, it is crucial to focus on maitaining and developing tailored business strategies for each customer segment to optimize effectiveness.

Sales Amount by ShipMode

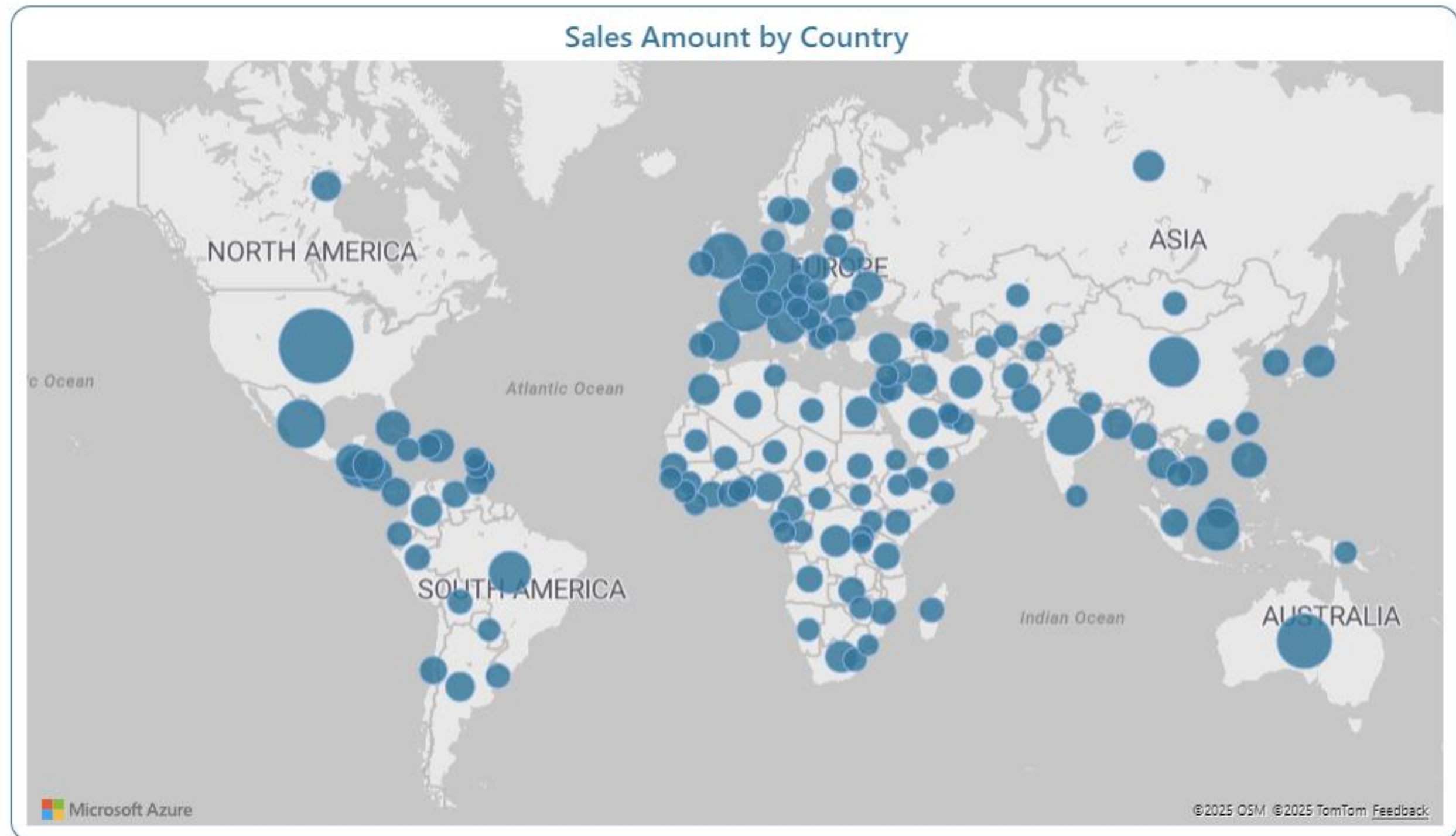


- **Standard Class** is the most preferred shipping method, contributing **nearly 60% of total sales**.
- As shipping speeds increase, customer usage tends to decline, with sales from **Same Day** being the **lowest at only 5.28%**.
- Therefore, it is essential to optimize the operations of Standard Class while enhancing fast shipping services (Same Day, First Class) to better meet diverse customer demands.



Data Analysis

- The company's market is continuously on a global scale.
- **The highest sales** comes from developed countries such as the **United States, Germany, China and Japan**, due to their stable economies and strong consumer demand.
- Asia is emerging as a rapidly growing region with significant sales potential and impressive growth rates.
- Revenue from African countries remains modest for now, but the region holds long-term opportunities if investments are made in infrastructure and improvements in customer outreach strategies.



Data Analysis

Insights

- Overview of business performance during the period 2011–2014: Promising sales growth accompanied by challenges in profitability.
- During the period 2011–2014, the company experienced impressive sales growth, particularly in the fourth quarter of each year, clearly demonstrating its ability to seize market opportunities and the effectiveness of its sales campaigns.
- However, the profitability picture showed significant fluctuations, not growing in tandem with revenue, highlighting an urgent need to optimize costs and improve operational efficiency. Nevertheless, the company has a solid foundation and significant potential for development in many aspects, provided that appropriate strategic adjustments are implemented.



Data Analysis

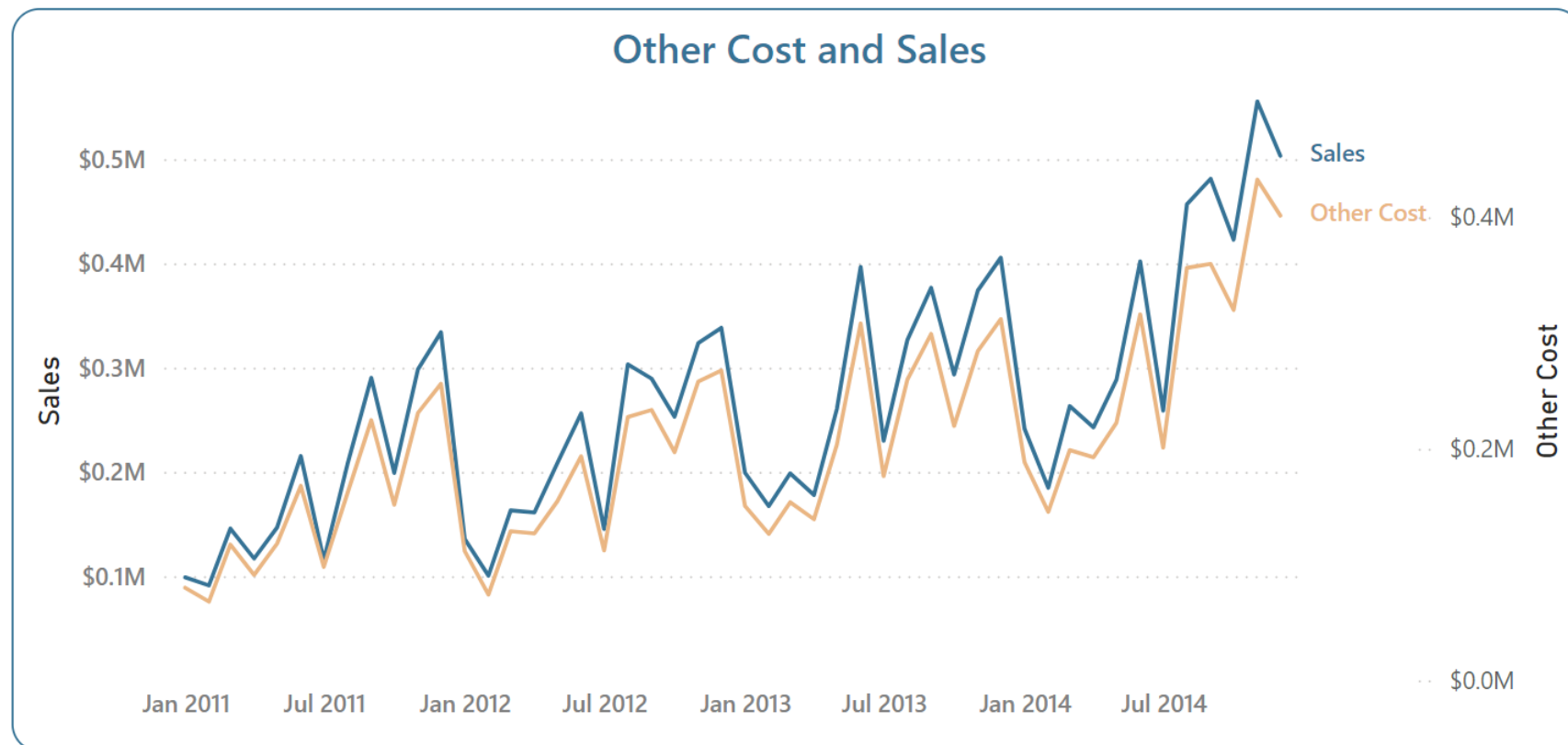
Business Question:

Why did the Profit Margin decrease even as Sales increased?

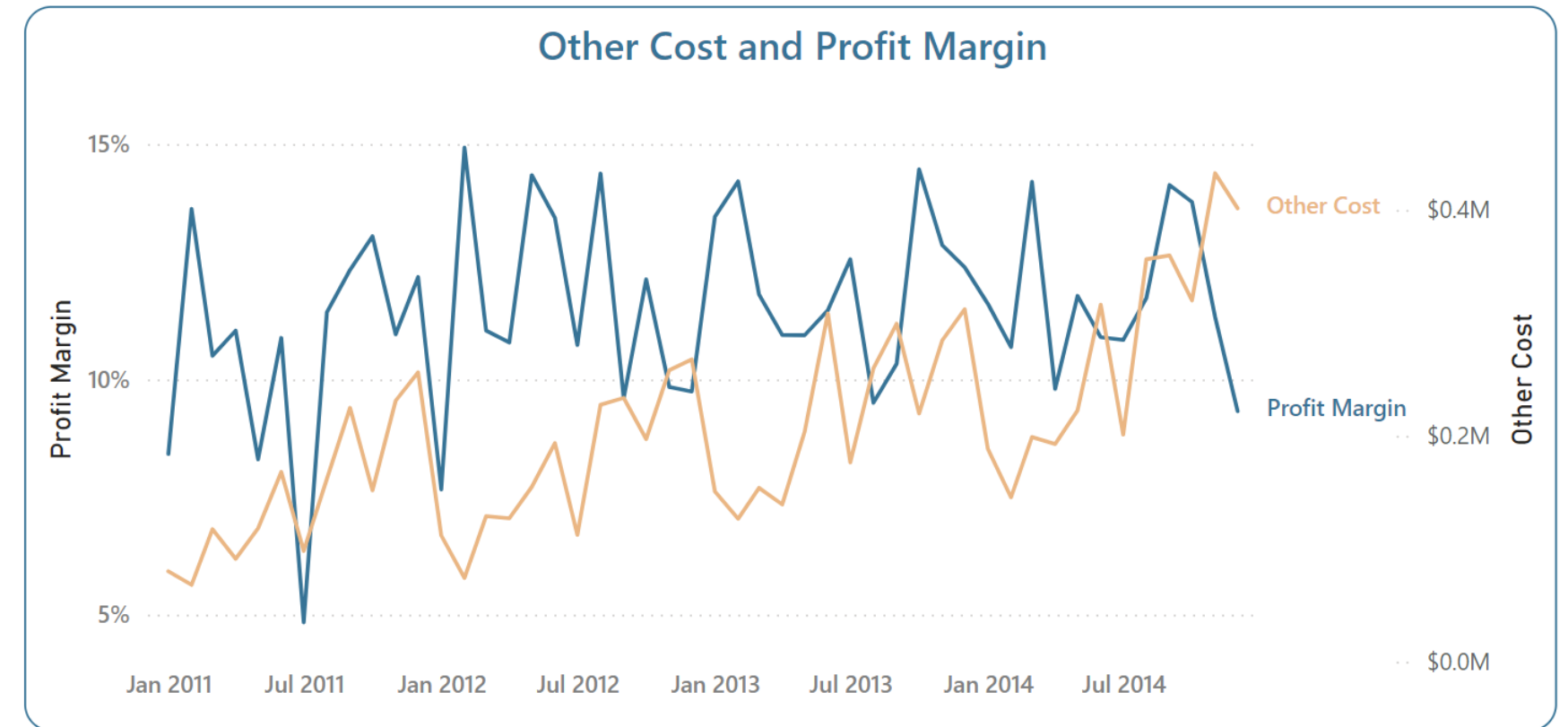


Data Analysis

2. Factors affecting Profit Margin



- Sales and Other Costs both increased over time from 2011 to 2014, reaching their highest point in 2014.
- There is a strong correlation between Other Costs and Sales, as reflected in the synchronization of the two lines. When Sales increase, Other Costs also increase, and vice versa.
- The close alignment of Other Costs with Sales is one of the reasons why Profit remains modest despite strong Sales growth.



- There is a relatively inverse correlation between Other Costs and Profit Margin.
- Other Costs tend to increase over the years, while Profit Margin does not increase steadily but fluctuates significantly.
- When Other Costs increase, it **may impact the profitability** of the business.

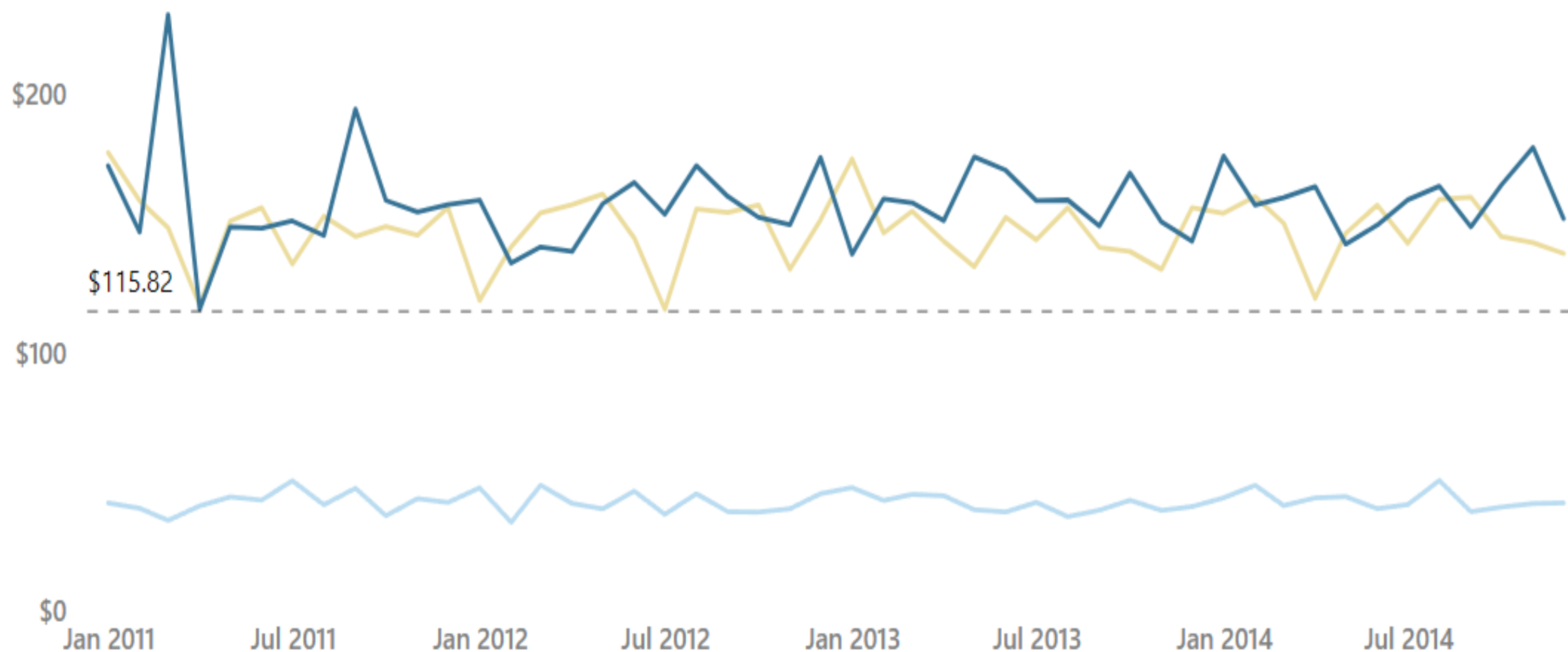


```
OtherCost = Sales[Sales] - Sales[Profit] - Sales[ShippingCost]
```

Data Analysis

Average of UnitPrice by Year-Month and Category

● Furniture ● Office Supplies ● Technology



The Impact of Product Pricing?

Product prices in each segment remained relatively stable over time, with no significant fluctuations, despite rising costs.

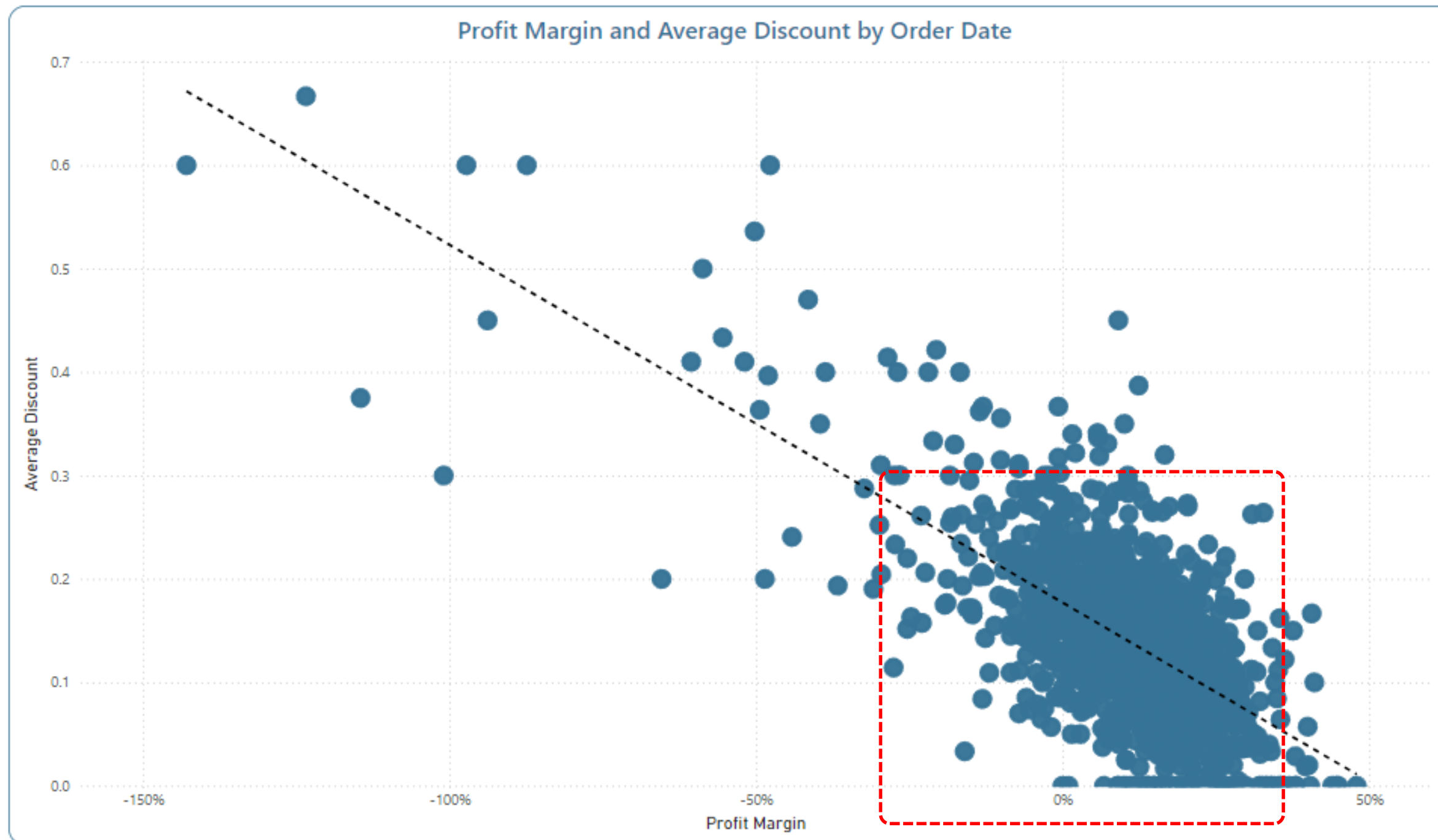
- **High-Price Segment (above average):** Furniture and Technology experienced greater price variability compared to Office Supplies.
- **Low-Price Segment (below average):** Office Supplies showed minimal price fluctuations during the 2011-2014 period.

Positives: The effective pricing strategy helped maintain customer purchasing power.

Negatives: While costs continued to rise, **stable selling prices limited profit growth, leading to significant fluctuations in Profit Margins.**



Data Analysis



The Impact of Discount?

Inverse Relationship: The trendline shows a negative correlation between Average Discount and Profit Margin.

Data Distribution:

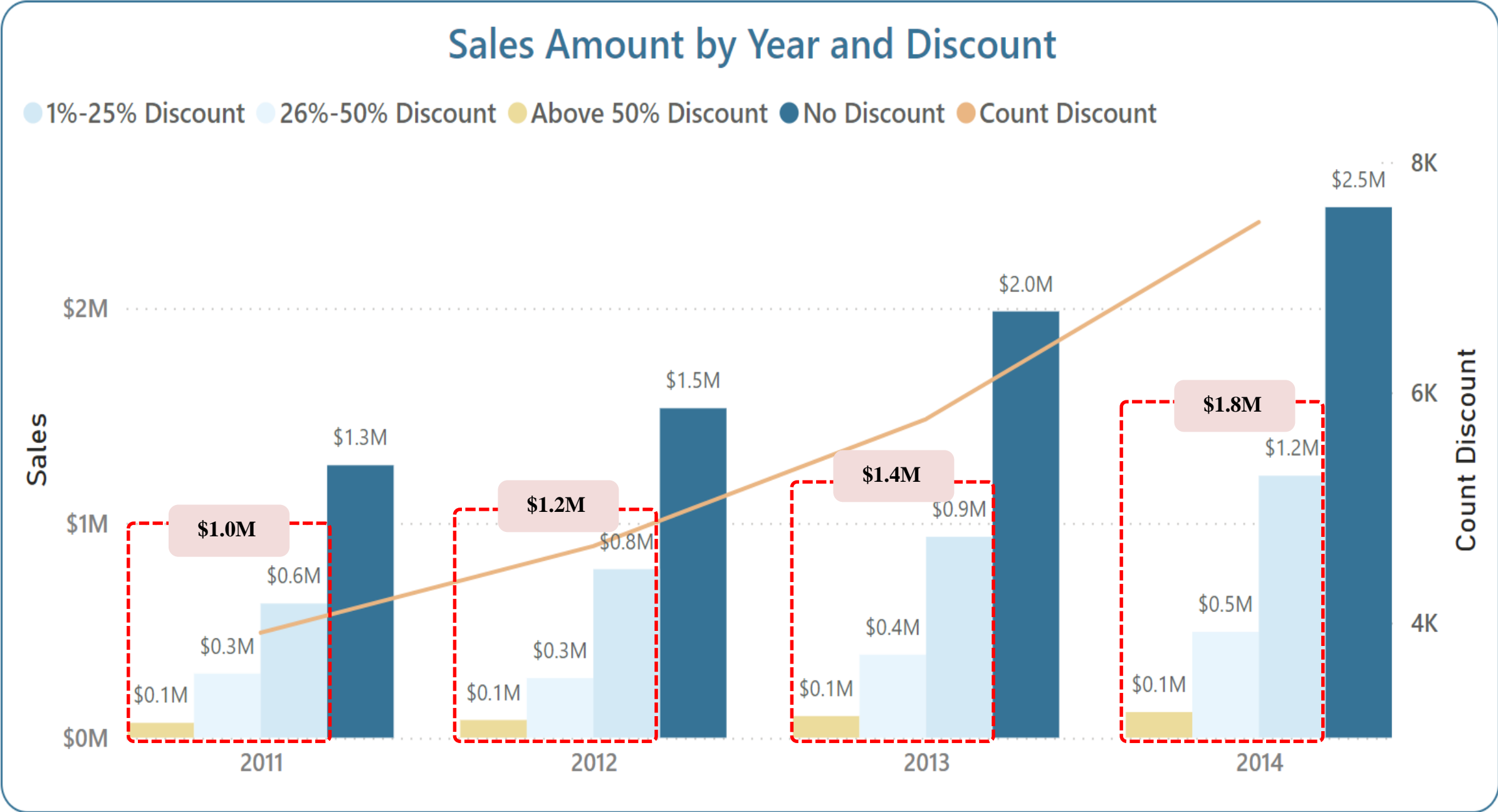
- Most data points are concentrated in the lower-right quadrant, where discounts range from 0% to 30% and profit margins fall between -25% and 25%. This indicates that the majority of orders have moderate discounts, with profit margins fluctuating within a relatively wide range.
- When discounts exceed 30%, the number of data points decreases significantly, and the proportion of negative profit margins increases. This suggests that deep discounts are not only less common but also more likely to lead to losses.



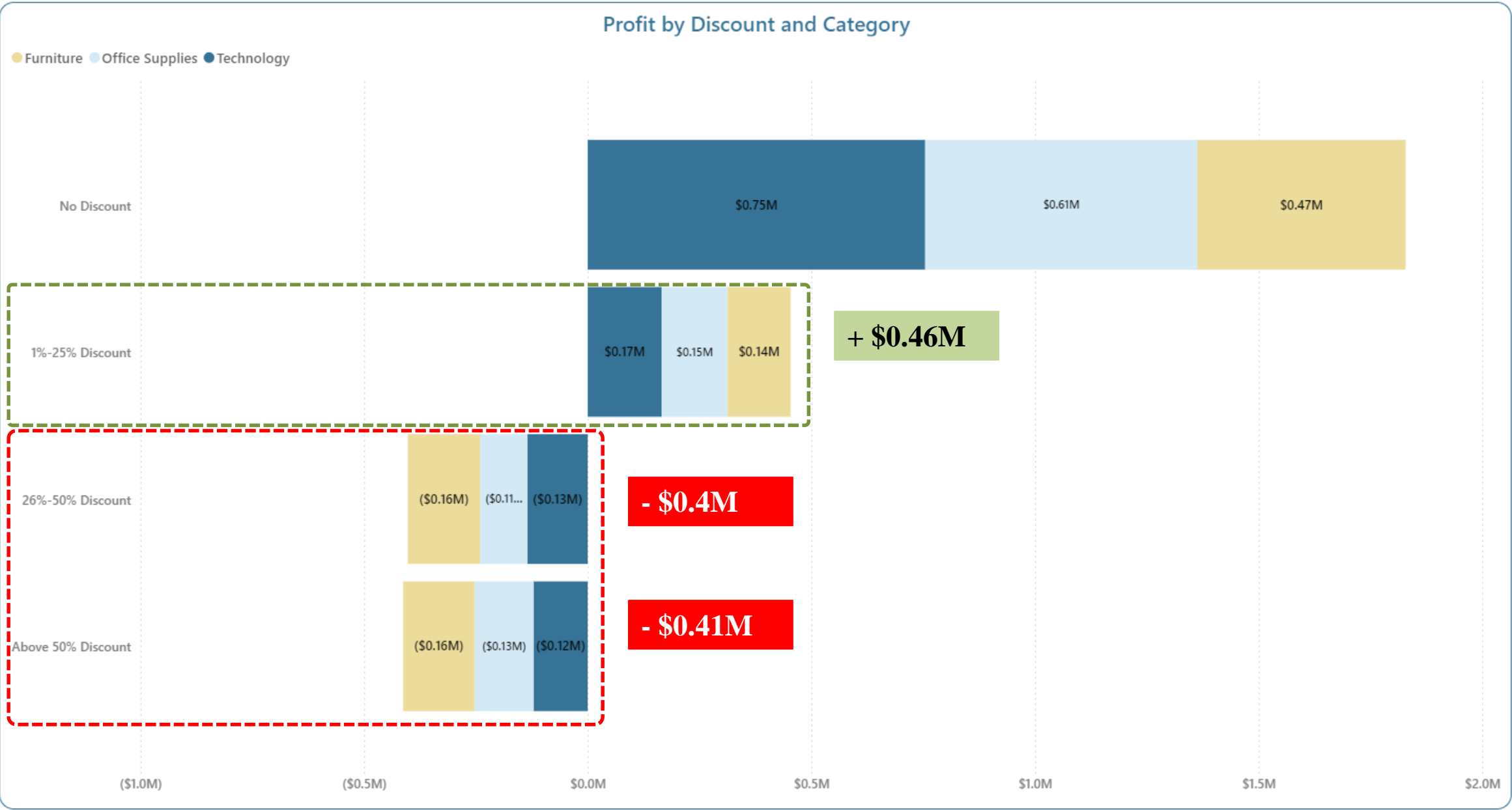
Data Analysis

How does Discount affect?

- Overall, **Total Sales** shows a steady **upward trend** as discount programs are implemented.
- However, the **No Discount** segment remains the primary contributor, **accounting for 50% to 70% of annual sales**.
- The 1%-25% discount range is the most common after No Discount, generating \$1.2 million in sales in 2014, double the \$0.6 million recorded in 2011.
- In contrast, discounts over 26% contribute insignificantly to sales, indicating that deeper discounts are neither widely applied nor particularly effective.
- Notably, **the number of discount programs** has steadily **increased over the years**, highlighting the strategic importance of discount policies in driving sales growth.



Data Analysis



Are Discounts truly effective?

Different discount levels yield varying effectiveness:

- **1%-25%:** Generates positive profits across all three segments, indicating that this is an effective and sustainable discount range.
- **26%-50%:** Results in negative profits, highlighting the inefficiency of applying this discount level.
- **Above 50%:** Causes even greater losses to profits, significantly eroding profit margins.
- **No Discount:** Contributes exceptional profits across all three segments, with **Technology** leading the way at \$0.75 million in profit.

High Discount levels are not only ineffective but can also lead to significant profit losses, **reducing profit margins** substantially.



Data Analysis

Insights

Steady Growth but Fluctuating Profit Margins:

- Sales and profits experienced steady growth from 2011 to 2014, especially with **Q4 consistently achieving the highest levels**, thanks to holiday seasons and promotional programs to stimulate demand.
- However, **profit margins were unstable** due to factors such as costs and discount policies.

Increased Other Costs Significantly Impact Profit Margins:

- Other costs increased in proportion to sales, creating significant pressure on profit margins.
- While **average selling prices remained unchanged**, rising costs have gradually narrowed profit margins over the years.
 - Solution: Implement stringent controls on other costs to optimize profitability.

Suboptimal Discounting Effectiveness :

- **50%-70% of revenue comes from non-discounted orders**, which positively contributes to profit margins.
- Discounts ranging from **1%-25% do not yield significant profits**, while discounts exceeding **26% result in losses**.
 - Solution: Adjust promotional strategies, focusing on **selective discounts** instead of widespread applications.

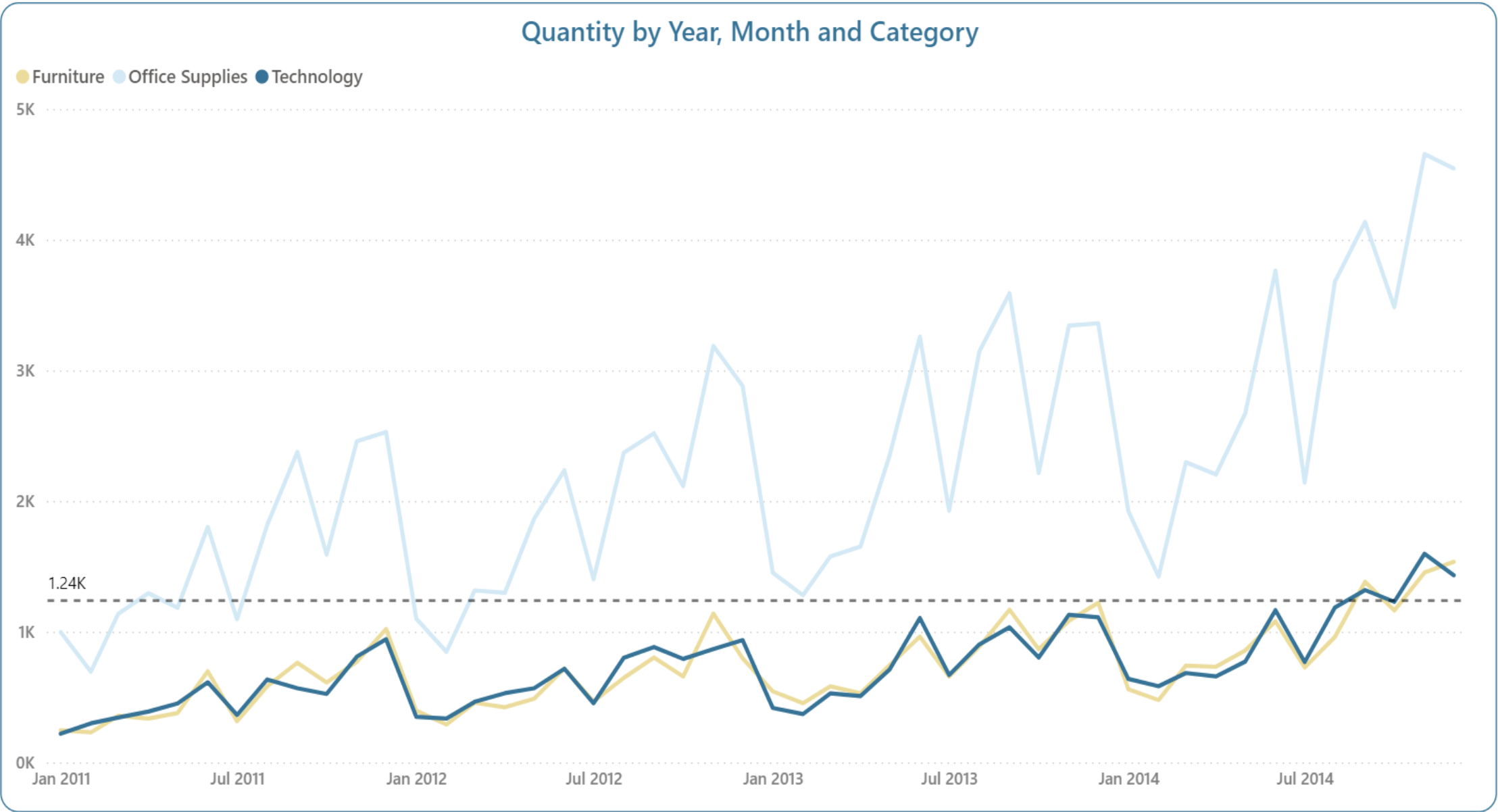
Summary:

- The company has good growth potential but must control costs and optimize its discounting strategy to improve profit margins.
- Develop **flexible promotional programs** and avoid ineffective widespread discounting.
- Control other costs to ensure that profit margins are not continuously eroded over time.



Data Analysis

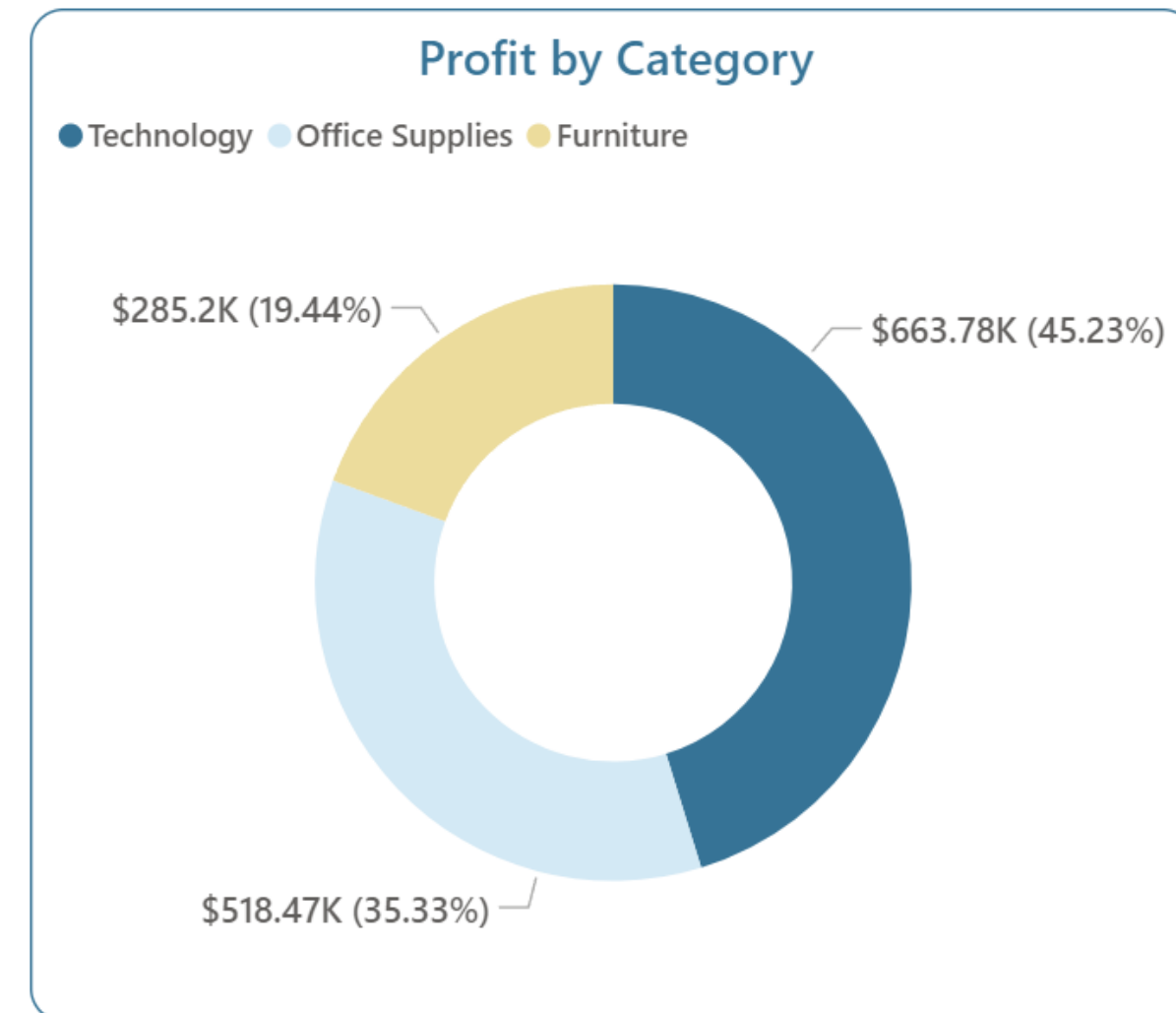
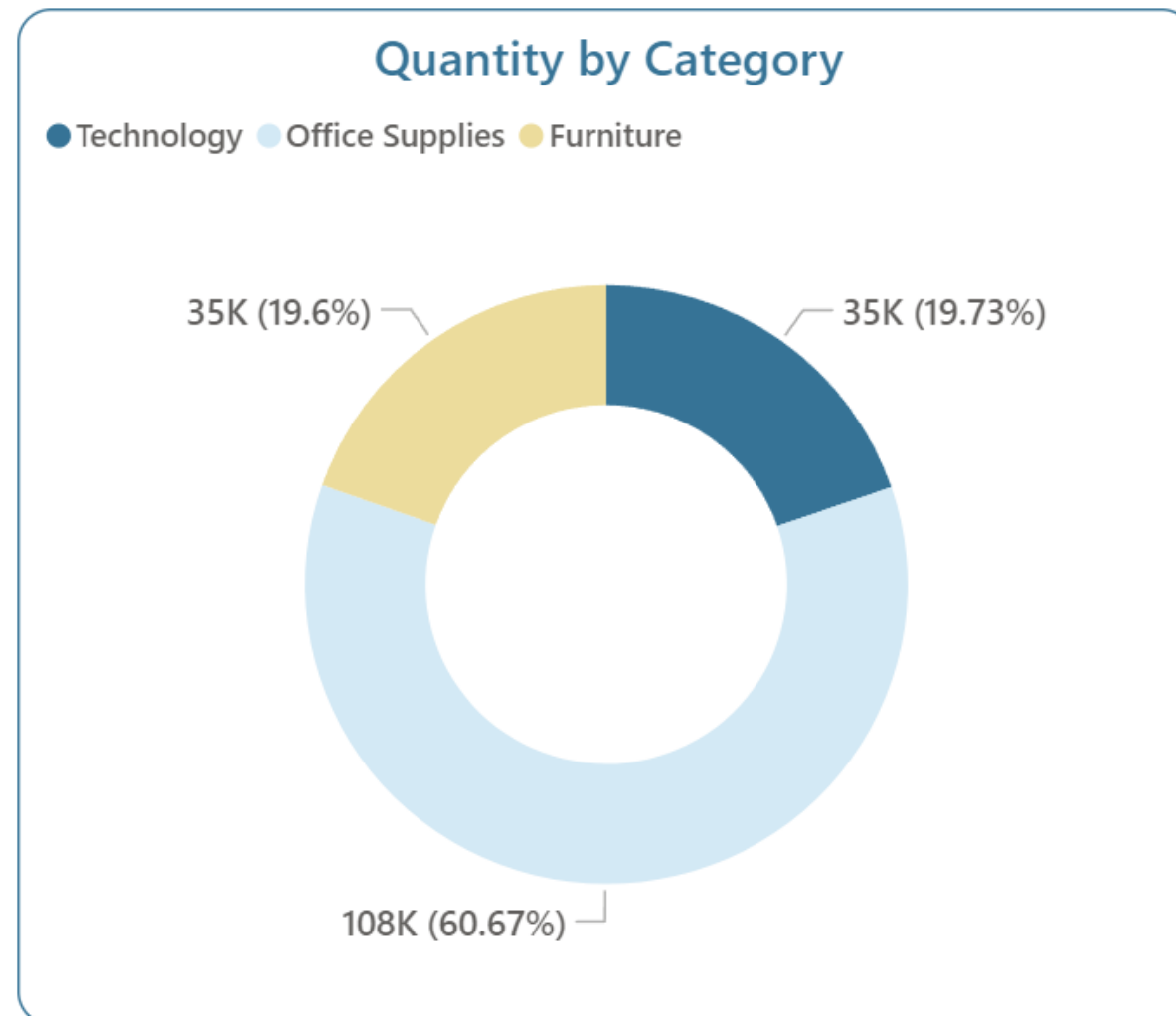
3. Summary Category



- From 2011 to 2014, the total quantity of products sold exhibited a steady growth trend, aligning with the increase in revenue.
- Although **Technology** initially led in revenue generation, **Office Supplies** truly stood out by surpassing the average sales volume in June 2011 and maintaining consistent growth until the end of 2014, solidifying its role as the primary category.
- Meanwhile, both **Furniture** and **Technology** showed more gradual growth. Most of their sales remained below the average level until September 2014, when they began to experience a notable breakthrough.



Data Analysis

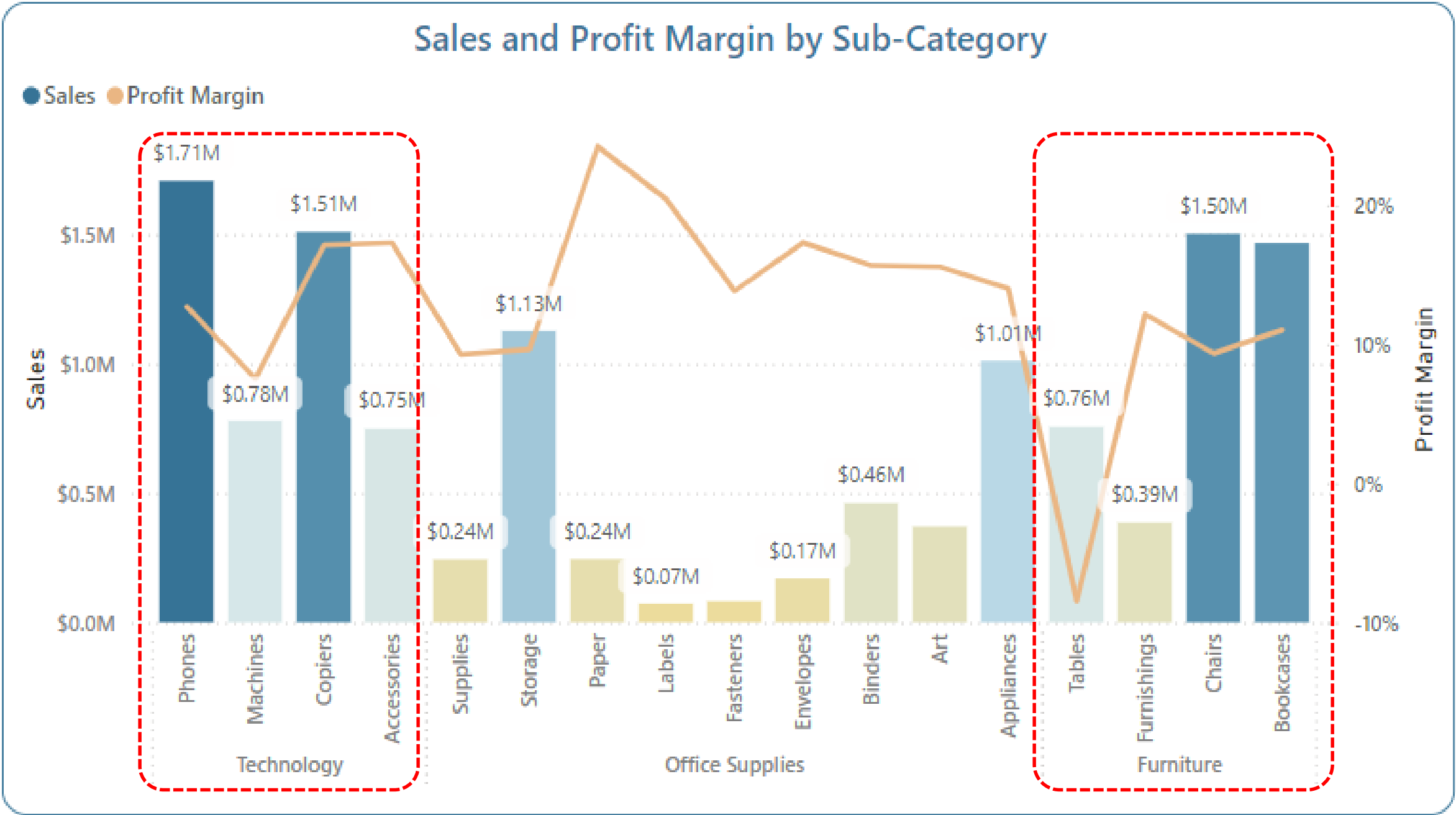


- Office Supplies account for 60.67% of total sales (108K units), but due to low pricing, they contribute only 35.33% of total profit.
- Technology is the highest-value category, making up just 19.73% of sales volume but contributing 45.23% of total profit (\$663.78K), highlighting strong growth potential.
- Furniture has high selling prices but low sales volume (19.6% of total sales) and the lowest profit contribution (19.44% of total profit).



Data Analysis

- Phones & Copiers (Technology) and Chairs and Bookcases (Furniture) are the top four best-selling categories.
- Technology maintains a stable profit margin, with Copiers achieving the highest margin.
- Furniture shows clear differentiation, as Chairs and Bookcases sustain stable profitability, while Furnishings have a negative profit margin.
- Office Supplies have lower sales volume but the highest profit margin, indicating strong potential for efficient exploitation.



Data Analysis

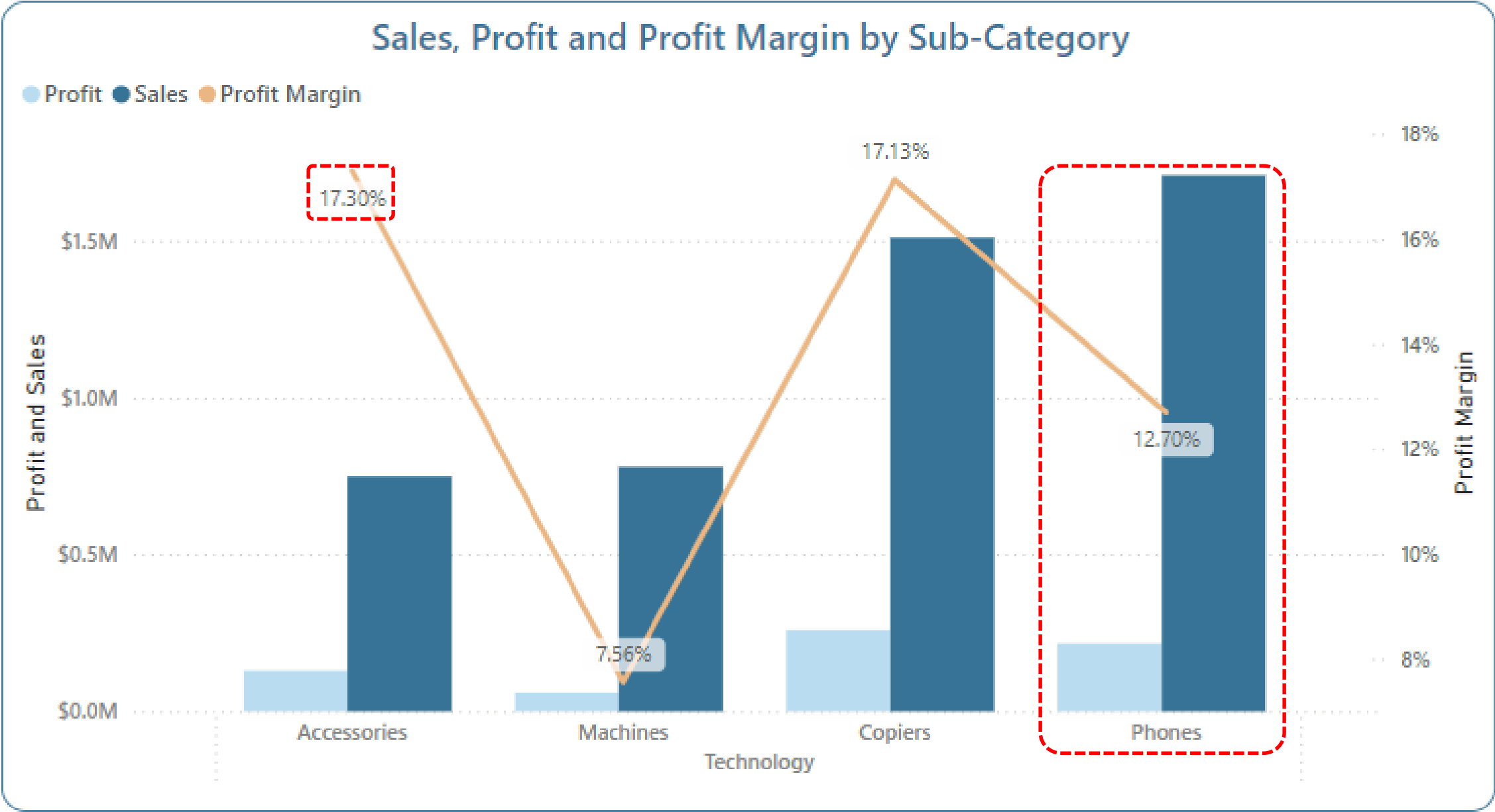
Business Question:

What factors are affecting the profitability of each Category?



Data Analysis

Technology

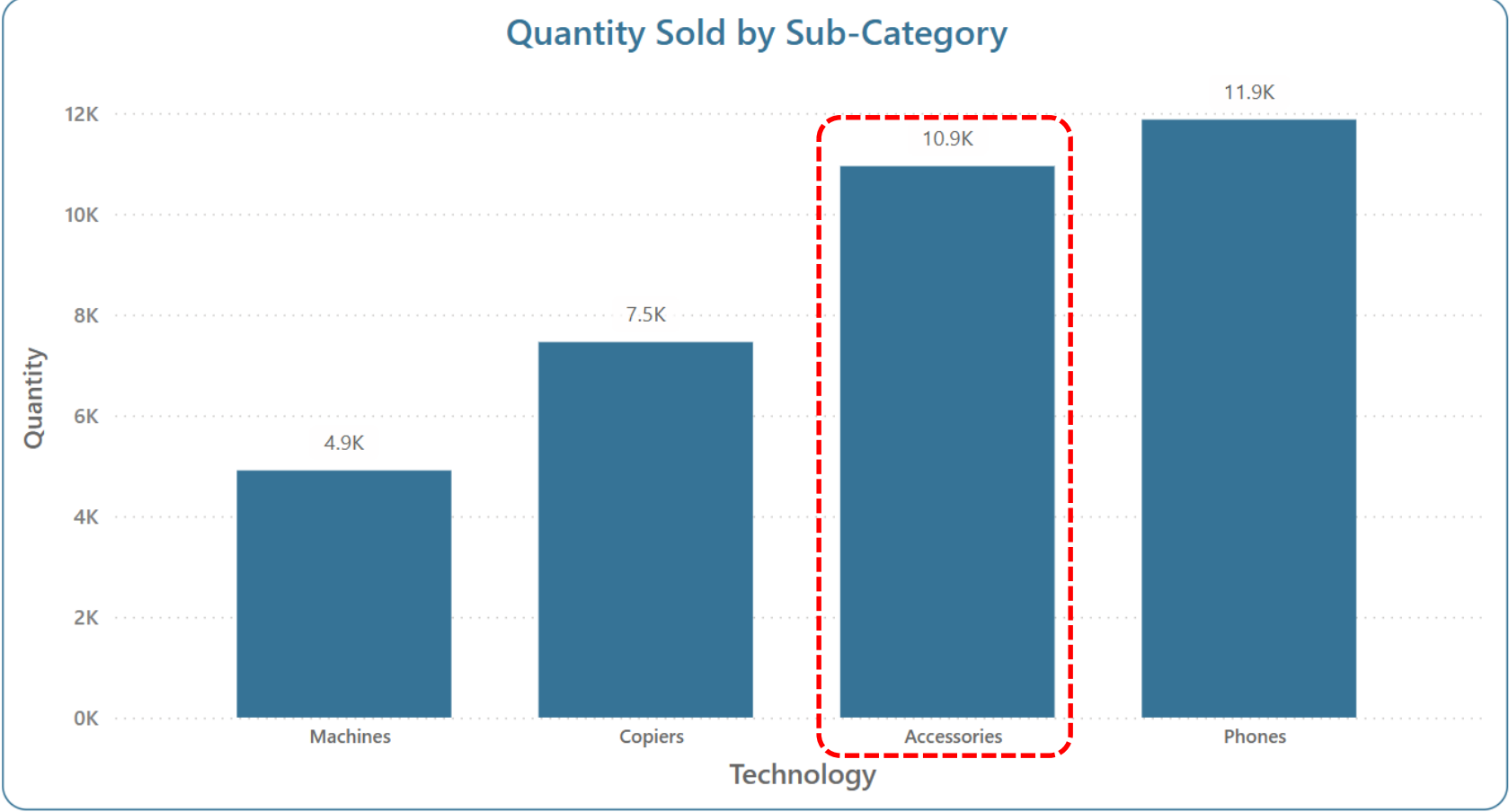
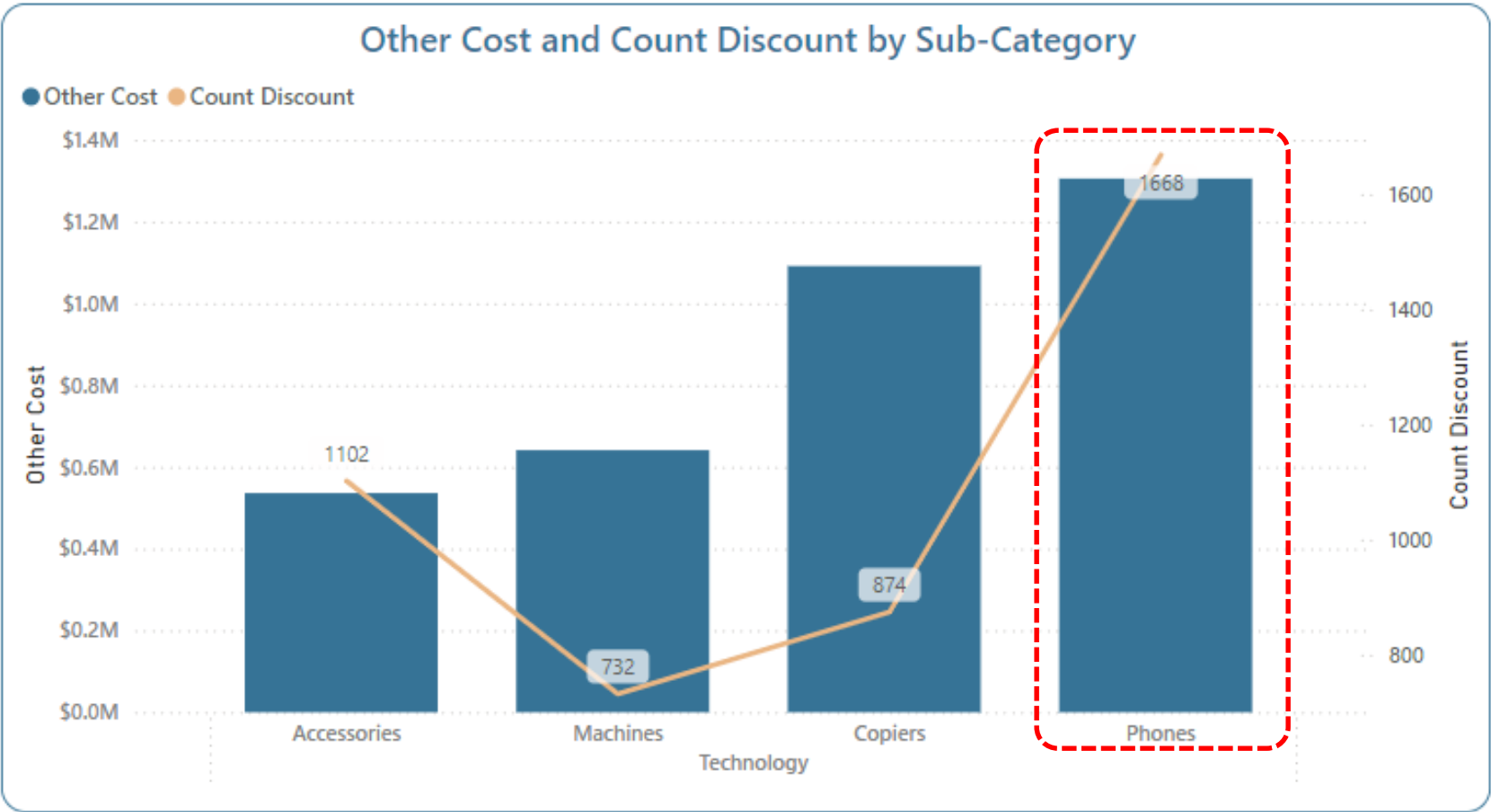


- Phones have the highest sales in the Technology category, making a significant contribution to total revenue. However, the profit margin is only 12.70%, an average level, indicating potential for improving business efficiency.
- Copiers have a high profit margin (17.13%) despite lower sales than Phones, demonstrating strong profitability.
- Accessories have the lowest sales but achieve the highest profit margin (17.30%), showing high profitability despite not being a core product.
- Overall trend: The Technology category is performing well, with three out of four products exceeding a 10% profit margin.



Data Analysis

Technology



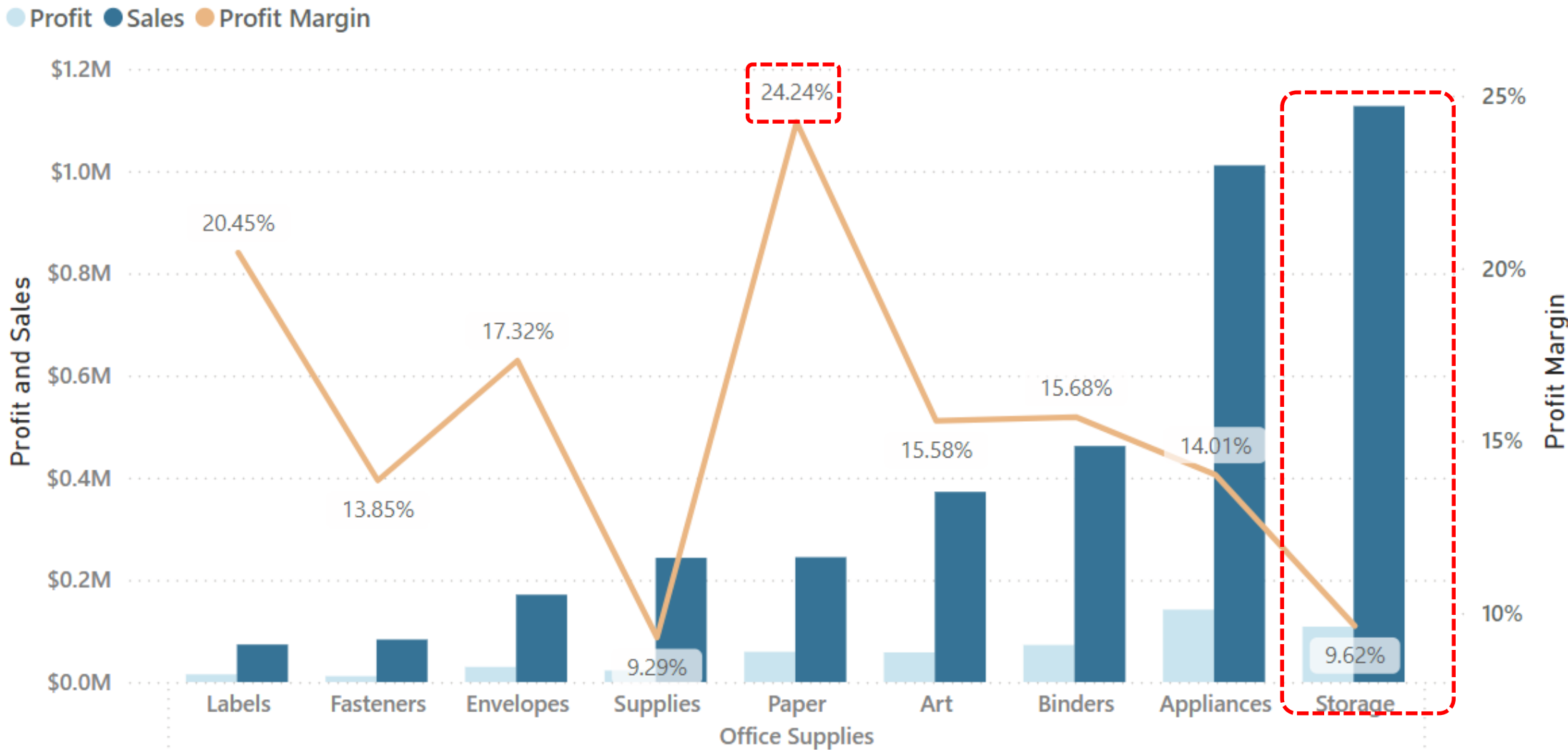
- **Phones:** Low profit margin due to **high discount** and large **Other Cost**.
- **Accessories:** Achieved the highest profit margin, with **medium discount**, **low Other Cost** and **high revenue** (10.9K products sold).
- **Machines:** Has the **lowest quantity sold** (4.9K products sold), despite **low discount** and **Other Cost** not being high.
- **Other Cost, Discount and Quantity Sold** are 3 important factors that strongly influence the **profit margin** of the Sub-Categories within the Technology group.



Data Analysis

Office Supplies

Sales, Profit and Profit Margin by Sub-Category

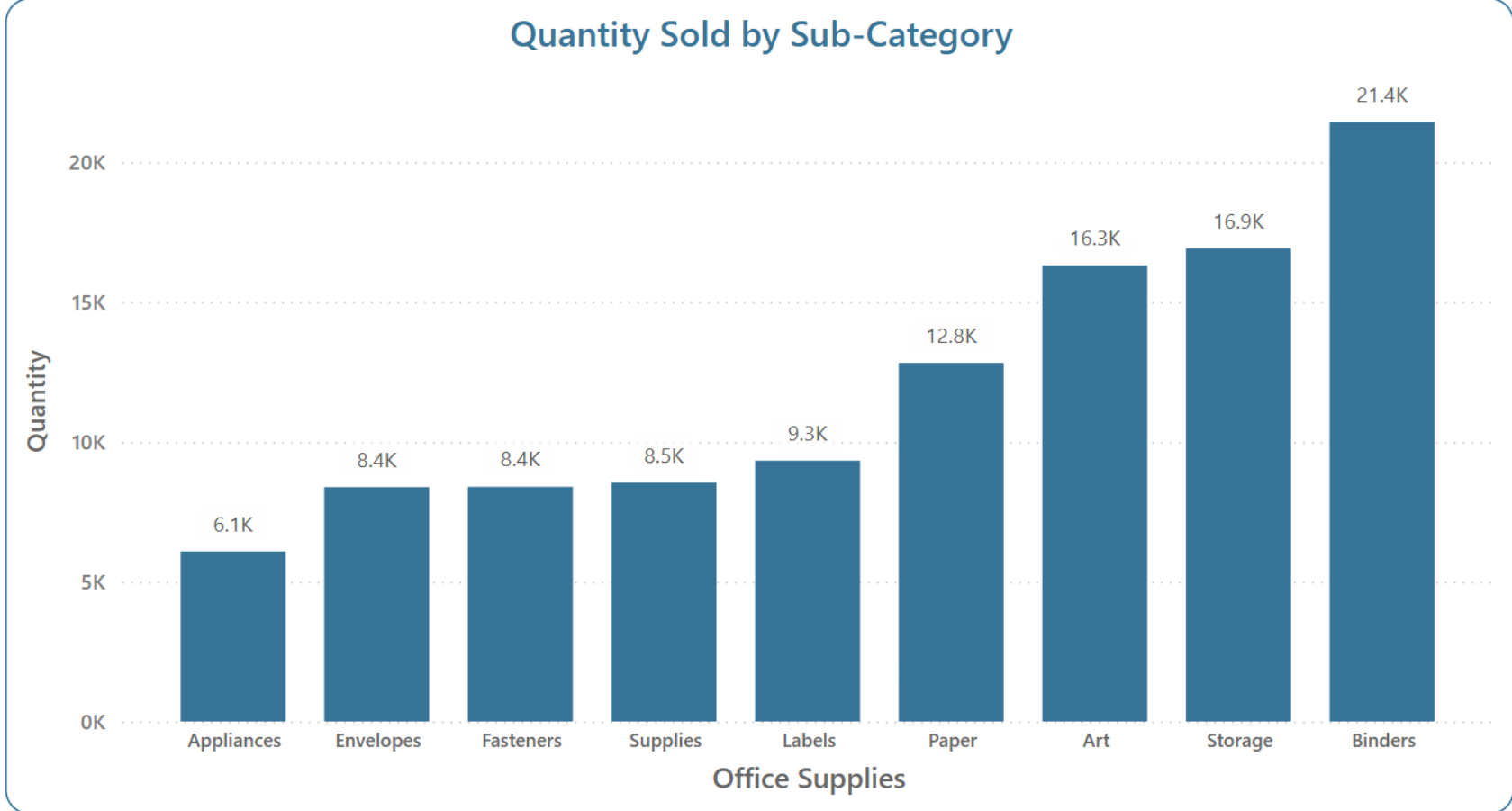
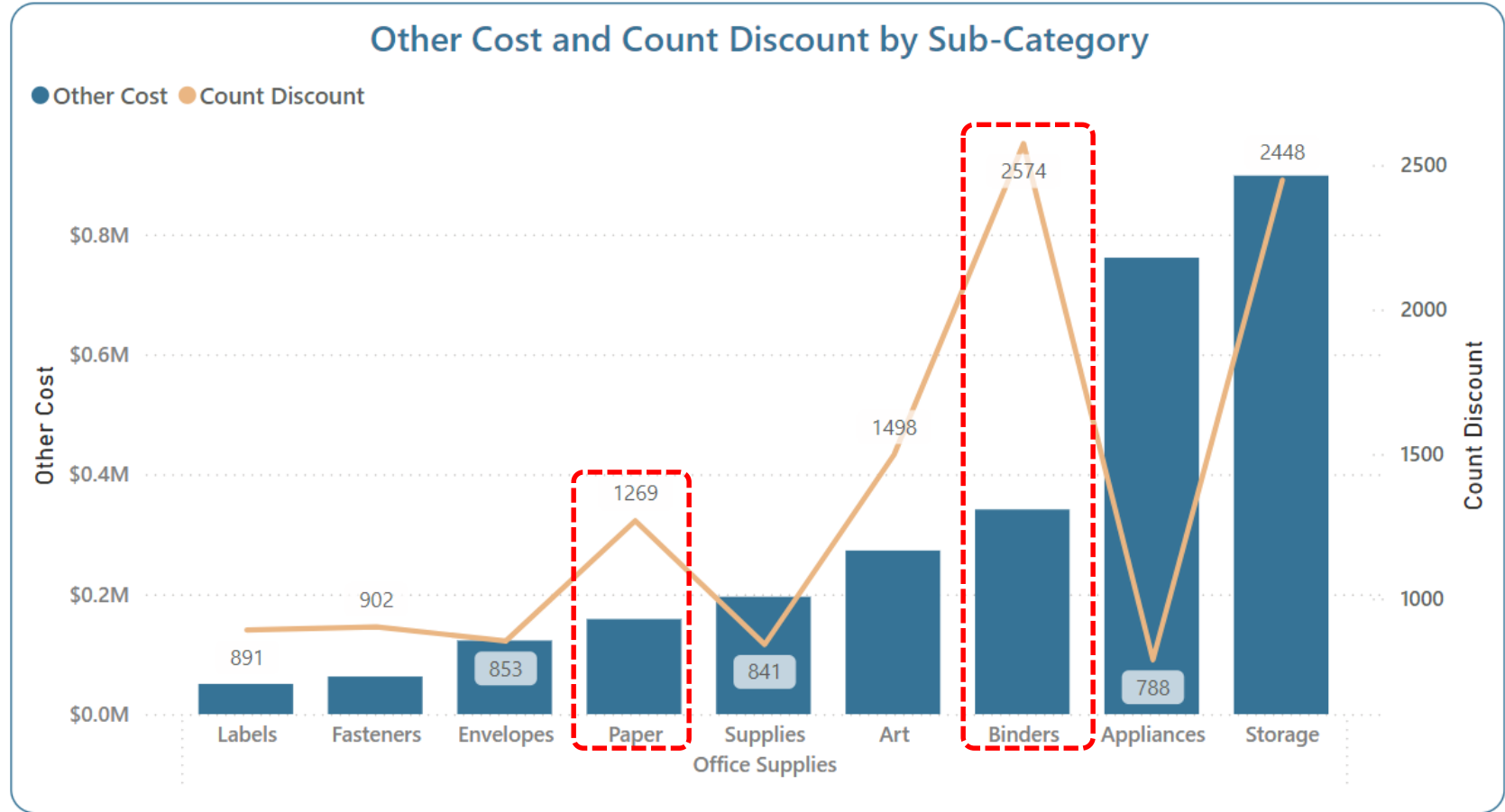


- **Storage** leads in sales and almost takes the top position in profit, but the **profit margin belongs to the lowest group (9.62%)**, indicating many issues need to be improved.
- **Paper** sales is more than 5 times lower than Storage, but the **profit margin is the highest (24.24%)**, showing high efficiency.
- General Trend: Product groups with **high sales usually have lower profit margins and vice versa.**



Data Analysis

Office Supplies

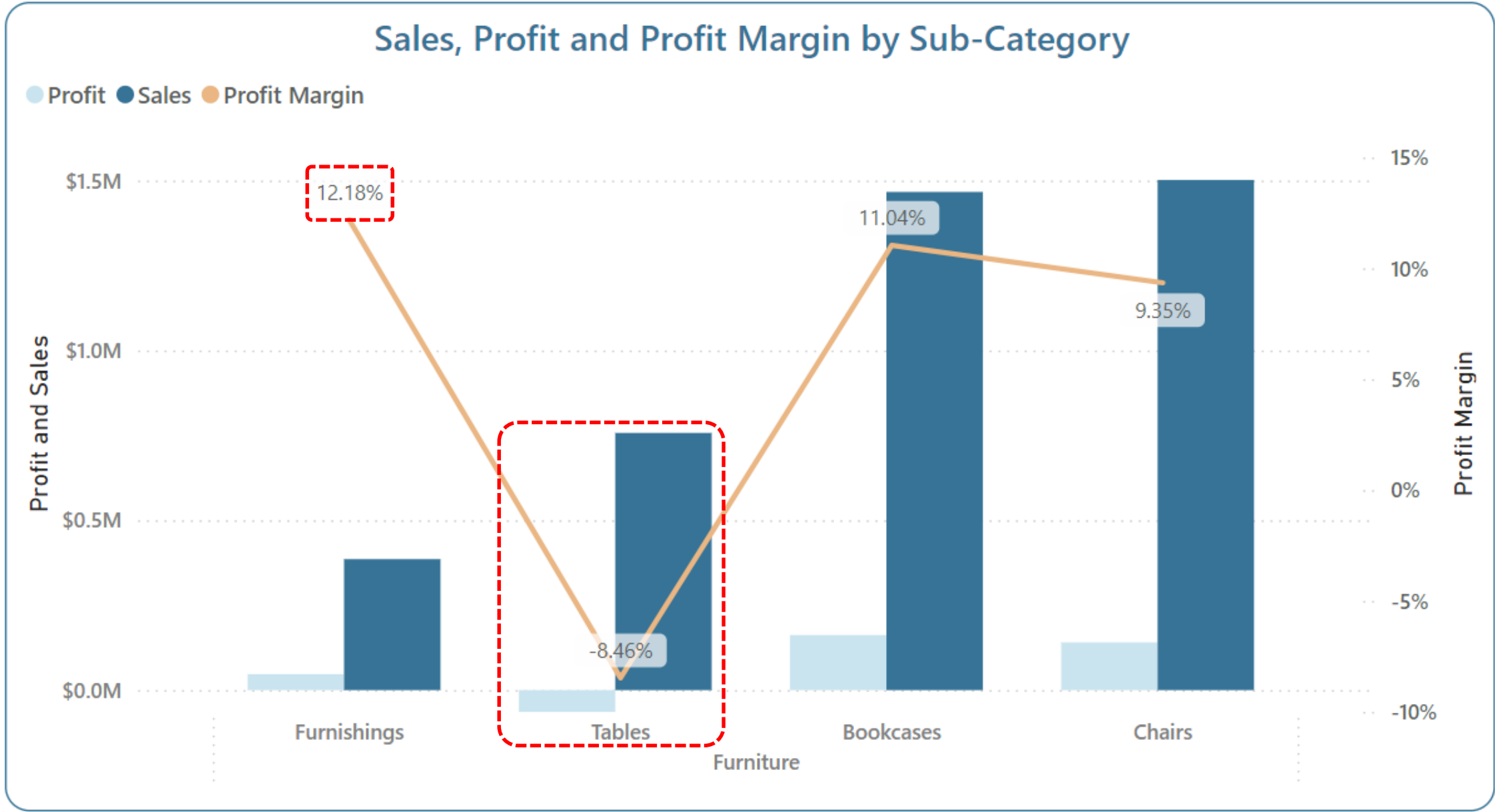


- **Storage:** Poor profit margin due to high Other Cost and large Discount amount, reducing business efficiency.
- **Paper:** Although Other Cost is low (under 0.2 million USD), it still achieves high sales (top 4 with 12.8K products sold), showing good profitability.
- **Binders:** Has low Other Cost, but highest Discount and leading product sold (21.4K products sold), proving efficiency when applying discounts.
- Applying Discount to the right target audience, controlling Other Cost reasonably will promote purchasing power and positive profit margin results.



Data Analysis

Furniture

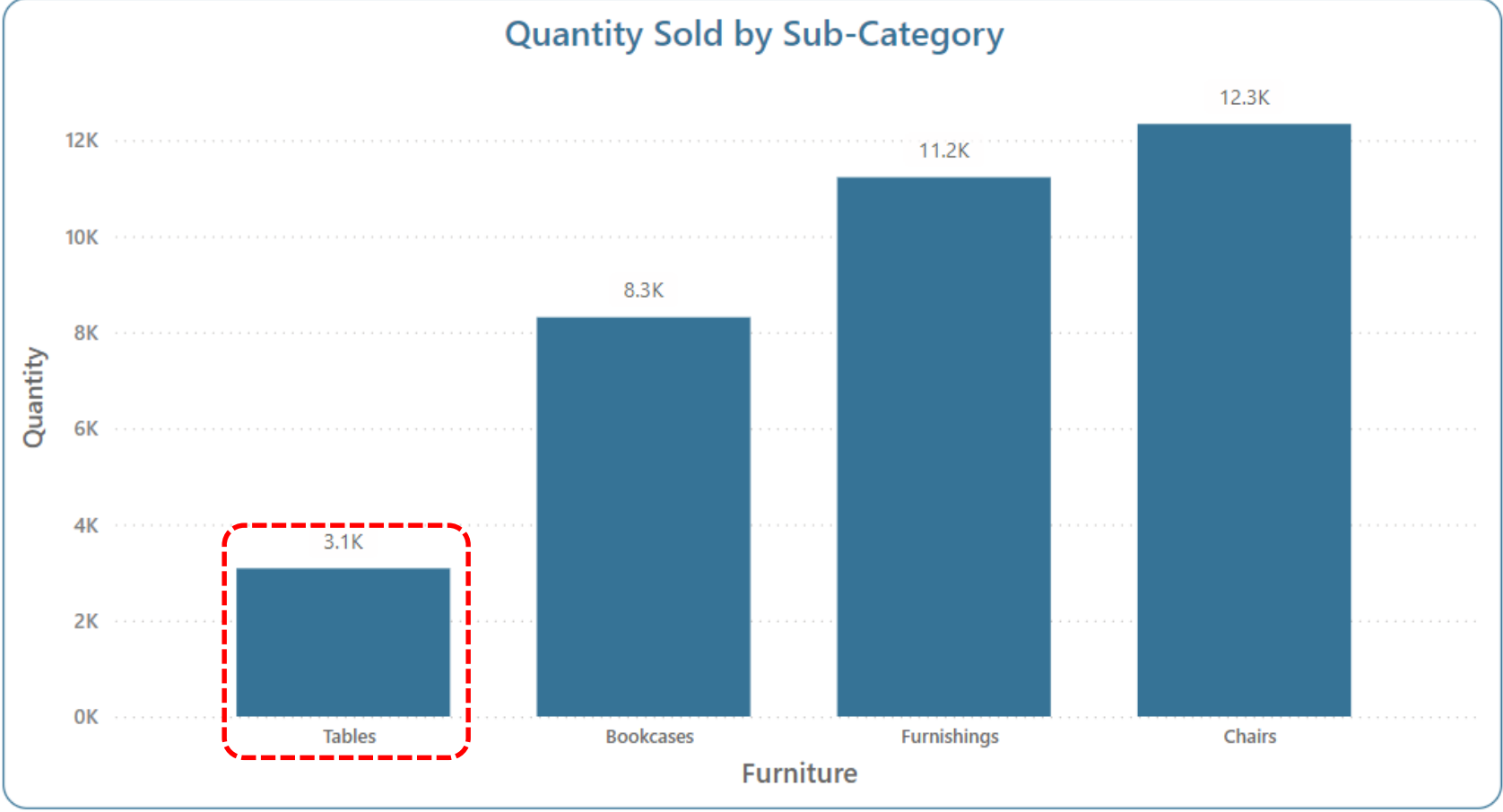
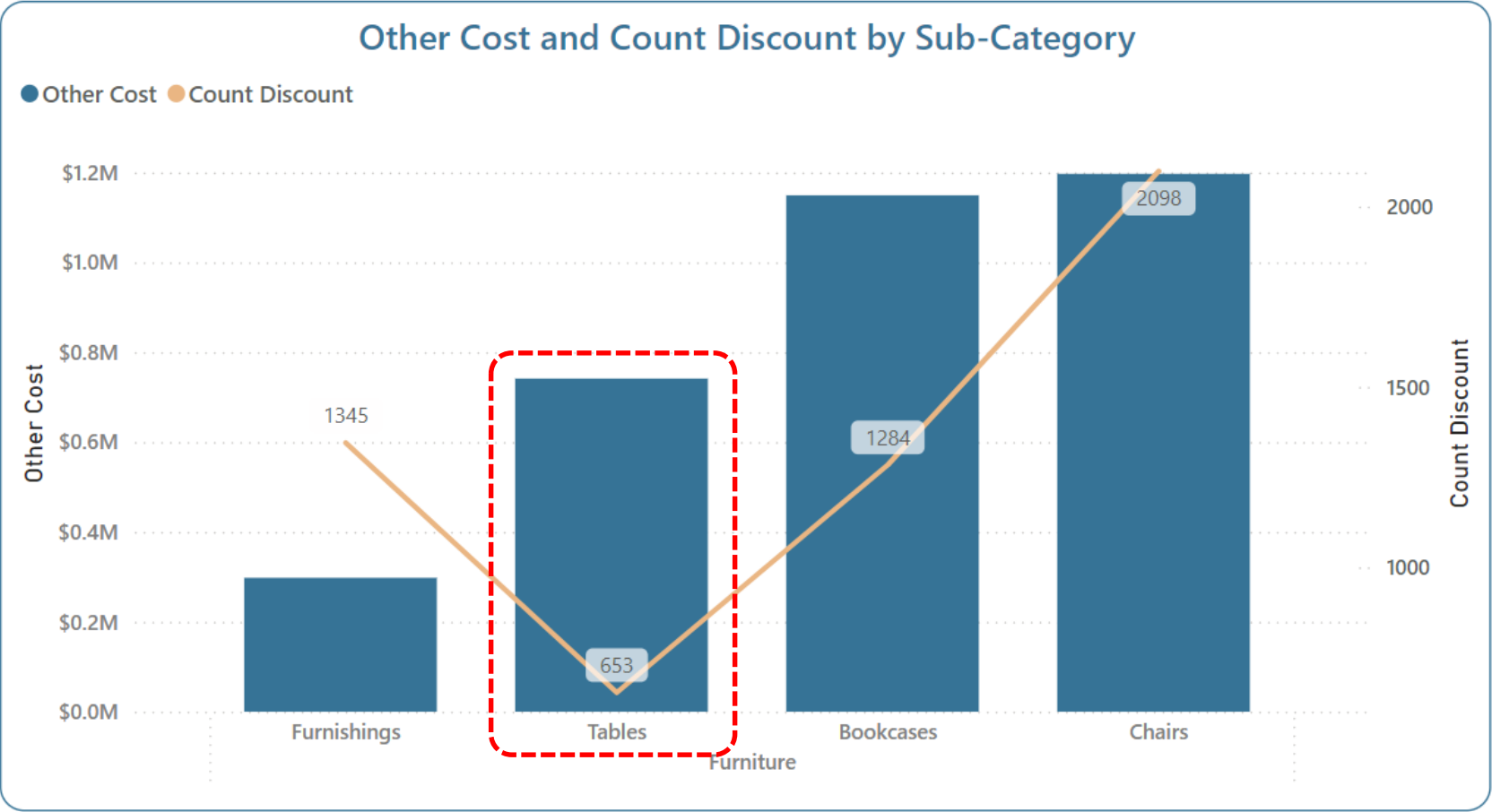


- Chairs and Bookcases have high sales and stable profit margins (9.35% and 11.04%), playing an important role in the Furniture category.
- Furnishings have the highest profit margin (12.18%) but low revenue.
- However, the company needs to review the business strategy for **Tables**, because this category is currently losing money.



Data Analysis

Furniture



- **Furnishings** have the **lowest Other Cost** and **effective discount application**, helping to **rank second in quantity sold (3.1K products sold)** and **lead in profit margin** within the Furniture group.
- **Bookcases & Chairs**, although having **high costs** and **large discount levels**, still achieve **high sales (8.3K & 12.3K products sold)**, affirming their role as **core categories**.
- **Tables** are facing serious problems:
 - Costs are not too high, discounts are low, but revenue is the lowest in the group (3.1K products sold).
 - Is the only category incurring losses in profit margin and having negative growth.



Data Analysis

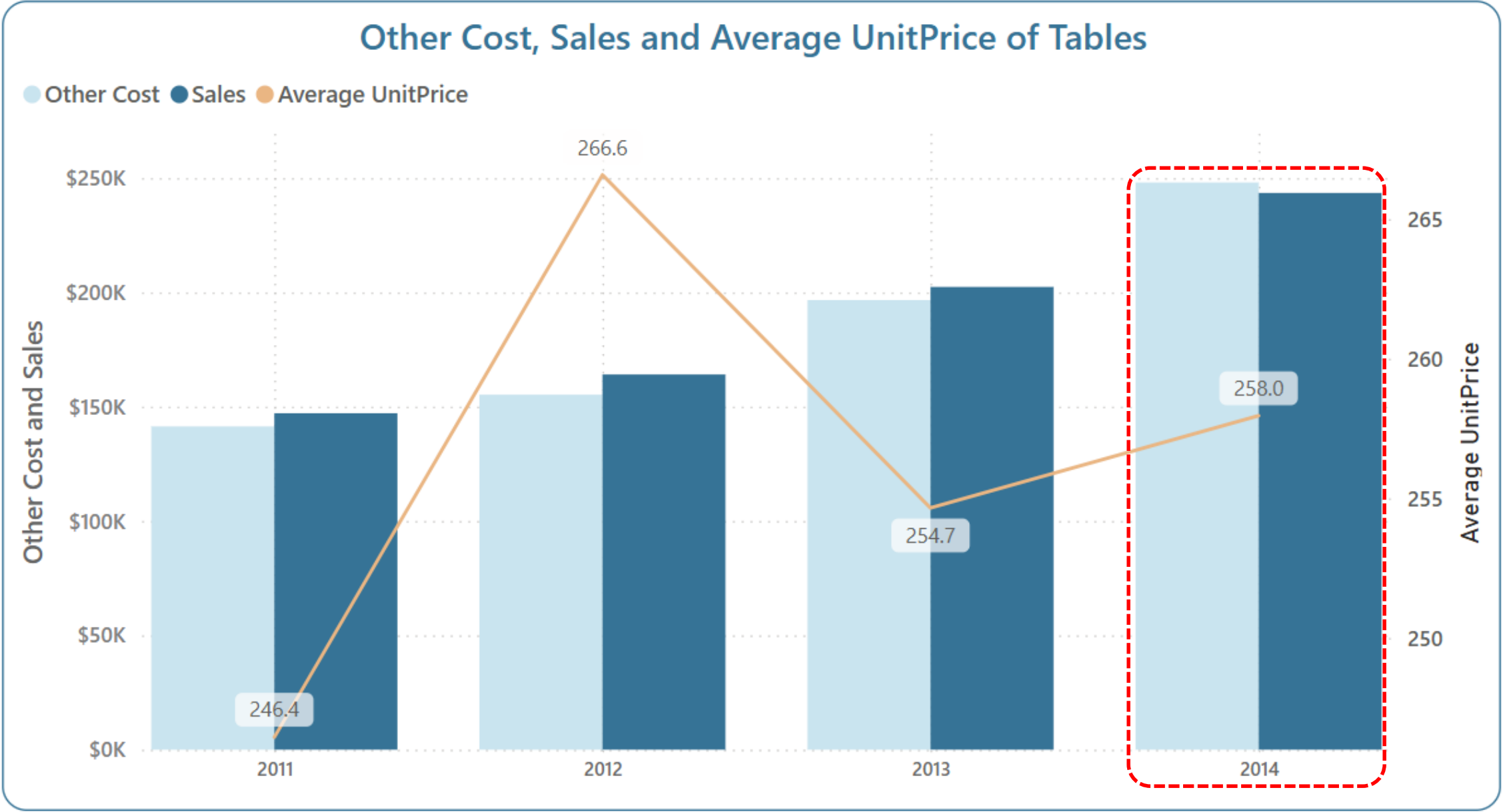
Business Question:

Why are Tables not profitable?



Data Analysis

- Sales of Tables have grown steadily over the years, indicating that the product still has certain demand in the market.
- Other Costs increased over time, peaking in 2014, even exceeding sales, putting pressure on profits.
- The average selling price fluctuated sharply, peaking in 2012 (266.6 USD), but decreased in 2013 (254.7 USD) before slightly recovering in 2014 (258.0 USD).
- Negative impact on profit and profit margin, due to rising costs while selling prices are unstable, making Tables an ineffective category.



Data Analysis

4. Cross Sell

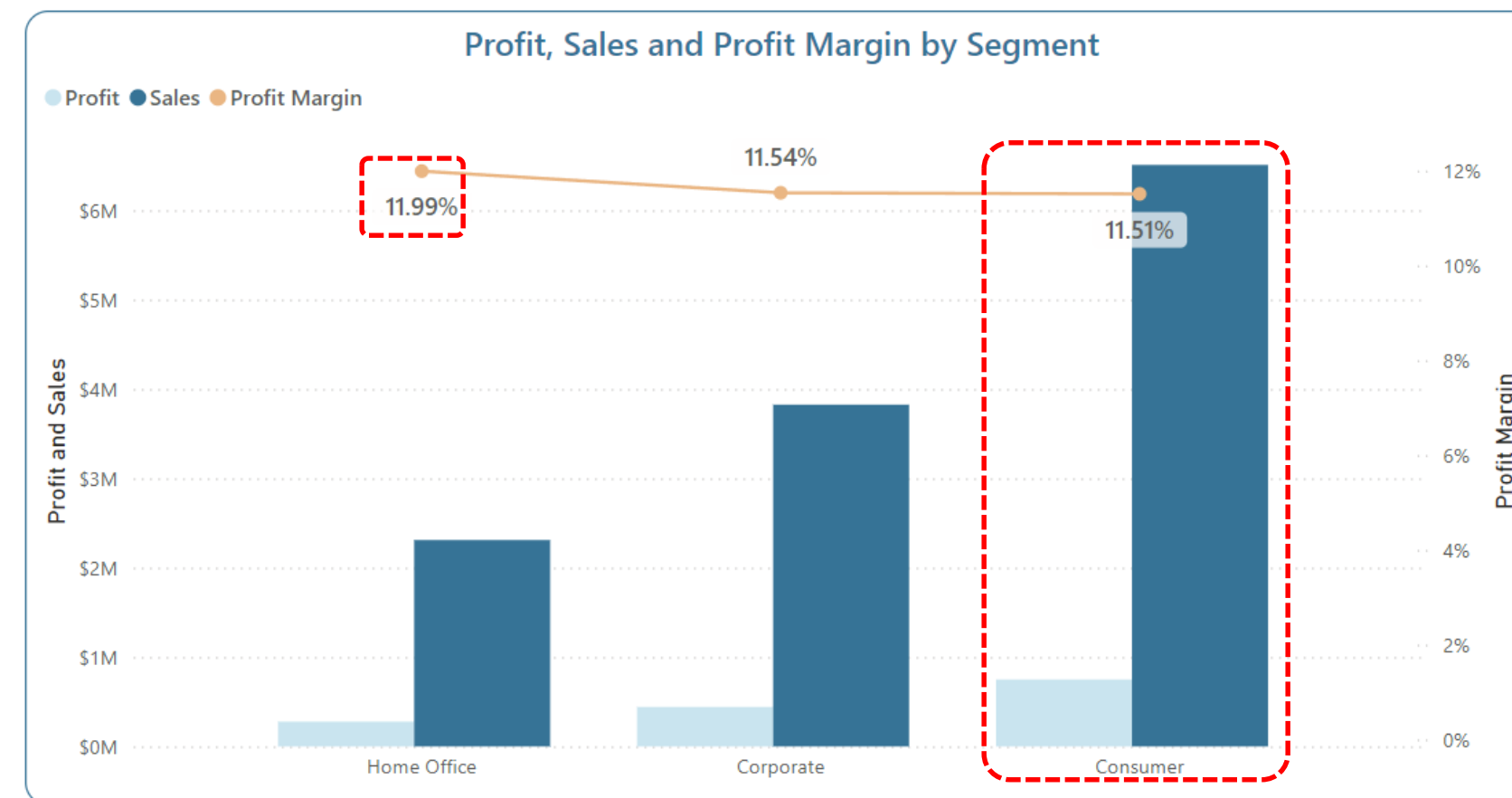
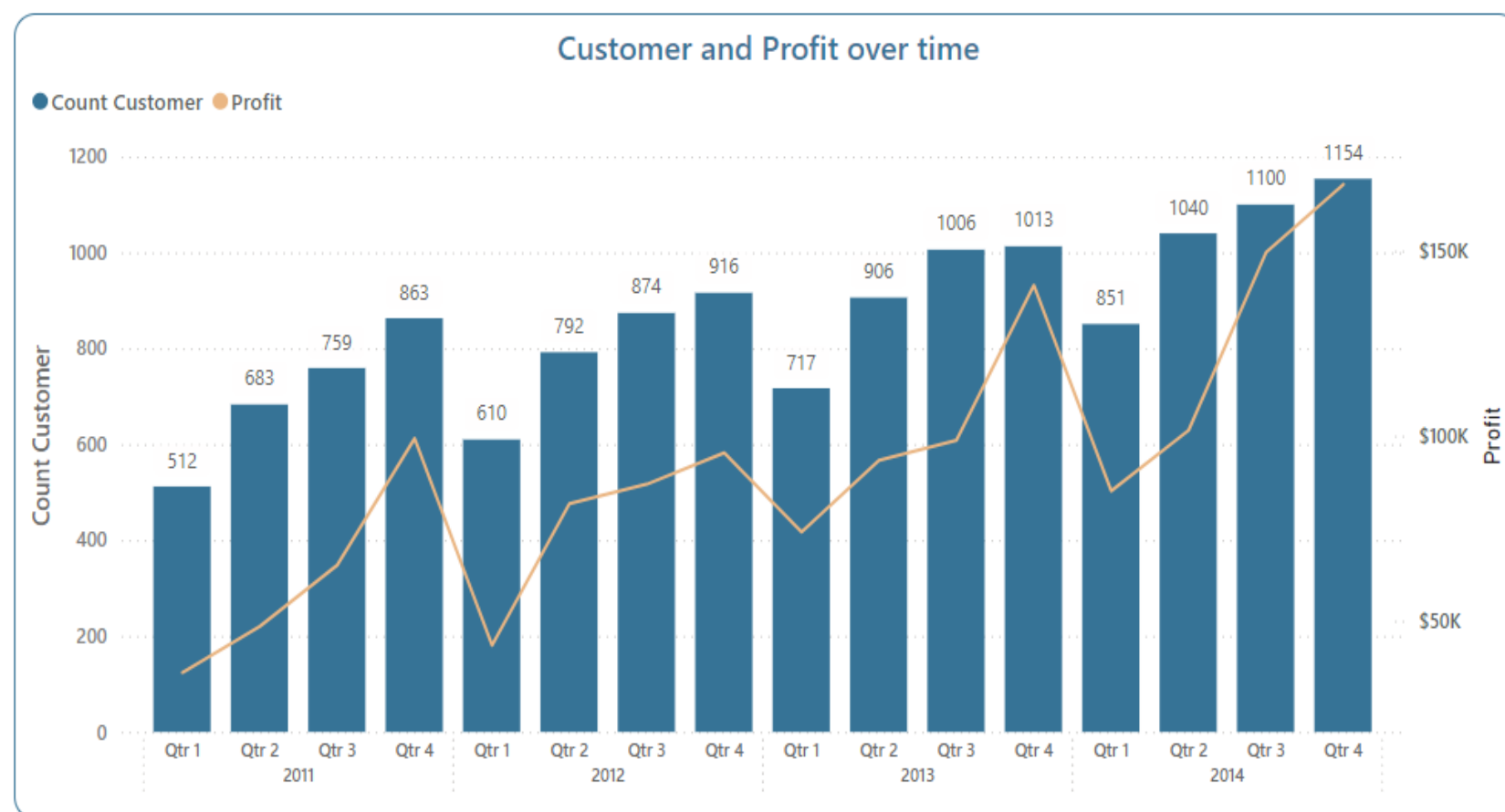
Product Name (Premise)	Order (Premise)	Product Name Consequence	Order (Consequence)	Support	Confidence	Lift
4009 Highlighters	1	Iceberg Mobile Mega Data/Printer Cart	8	0.00%	100.00%	3,219.00
4009 Highlighters	1	Logitech Wireless Marathon Mouse M705	8	0.00%	100.00%	3,219.00
Acco Glide Clips	1	Hand-Finished Solid Wood Document Frame	3	0.00%	100.00%	8,584.00
Ativa V4110MDD Micro-Cut Shredder	2	Staples	222	0.01%	100.00%	116.00
Avaya IP Phone 1140E VoIP phone	1	Global Wood Trimmed Manager's Task Chair, Khaki	14	0.00%	100.00%	1,839.43
Avaya IP Phone 1140E VoIP phone	1	Gould Plastics 18-Pocket Panel Bin, 34w x 5-1/4d x 20-1/2h	10	0.00%	100.00%	2,575.20
Barricks Coffee Table, with Bottom Storage	1	Binney & Smith Canvas, Easy-Erase	29	0.00%	100.00%	888.00
Barricks Coffee Table, with Bottom Storage	1	Brother Personal Copier, Color	18	0.00%	100.00%	1,430.67
Barricks Coffee Table, with Bottom Storage	1	Novimex Round Labels, Alphabetical	19	0.00%	100.00%	1,355.37
Barricks Non-Folding Utility Table with Steel Legs, Laminate Tops	1	Nortel Business Series Terminal T7208 Digital phone	3	0.00%	100.00%	8,584.00
Barricks Non-Folding Utility Table with Steel Legs, Laminate Tops	1	XtraLife ClearVue Slant-D Ring Binders by Cardinal	5	0.00%	100.00%	5,150.40
Barricks Round Table, Rectangular	1	Acme Ruler, High Speed	18	0.00%	100.00%	1,430.67
Barricks Round Table, Rectangular	1	Ibico Binding Machine, Recycled	43	0.00%	100.00%	598.88
Belkin 7 Outlet SurgeMaster Surge Protector with Phone Protection	1	Jabra BIZ 2300 Duo QD Duo Corded Headset	4	0.00%	100.00%	6,438.00
Total	25752		25752			

- A very low Support indicates that the data contains a wide variety of products and orders, leading to a decreased frequency of specific product pairs.
- Meanwhile, a very high Confidence suggests that when one product (Premise) appears, the likelihood of the other product (Consequence) appearing is very high.
- On the other hand, a highly fluctuating Lift coefficient indicates that product pairs have a very strong relationship, with a much higher likelihood of being purchased together compared to random chance.



Data Analysis

5. Summary Customer



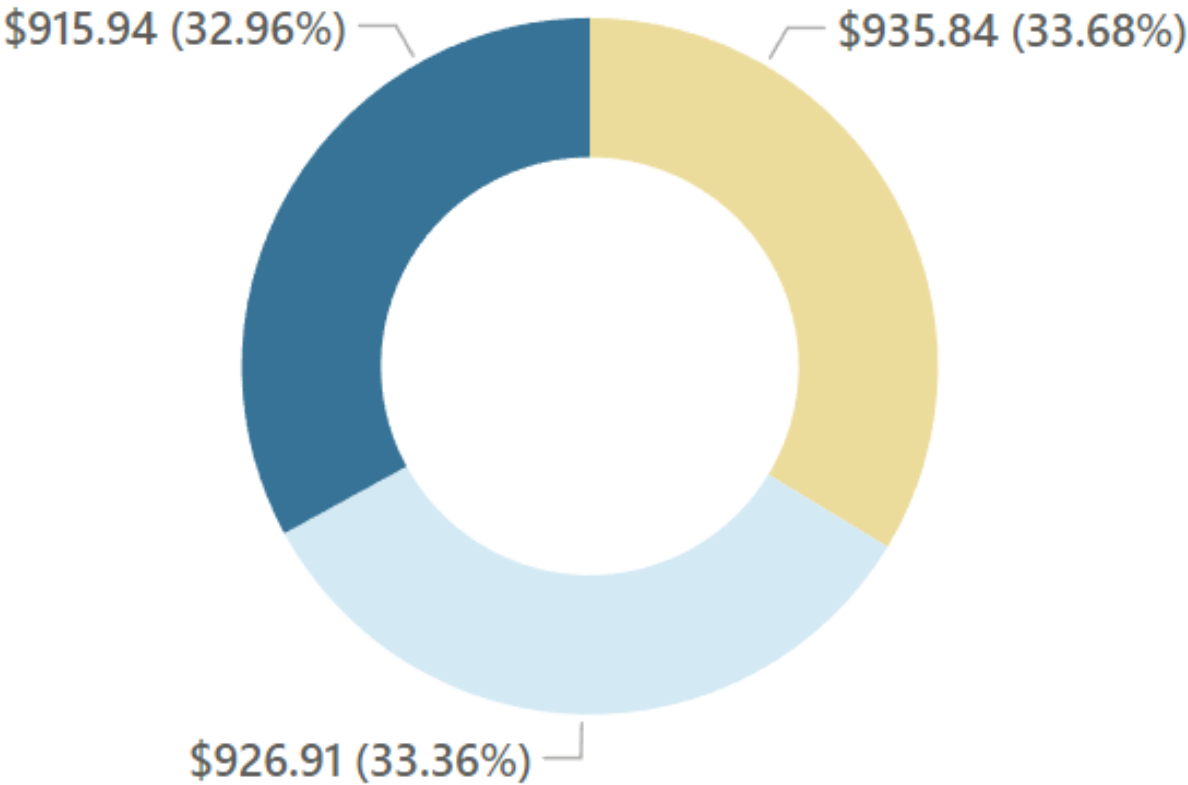
- As of the end of 2014, the business had a total of 1,590 customers.
- The number of customers and profit both gradually increased over time, showing stable expansion.
- The Consumer group contributes the most in terms of both sales and profit.
- Although having a low number of customers, Home Office has the highest profit margin, showing better profitability compared to other groups.



Data Analysis

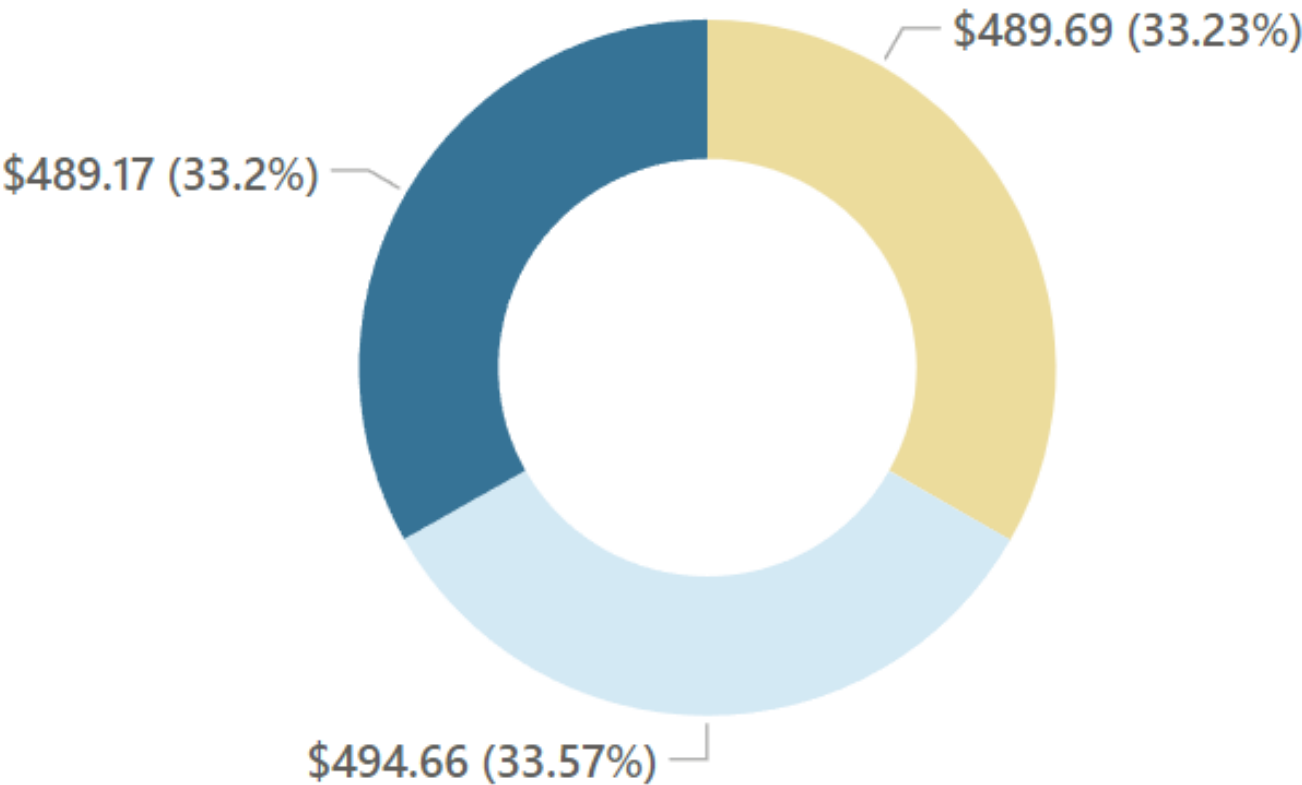
Average Profit by Segment

● Home Office ● Corporate ● Consumer



Average Order Value by Segment

● Home Office ● Corporate ● Consumer



It can be seen that all three customer groups (Home Office, Corporate, Consumer) have a relatively even distribution in terms of both average profit and average order value (fluctuating around 33% for each group)



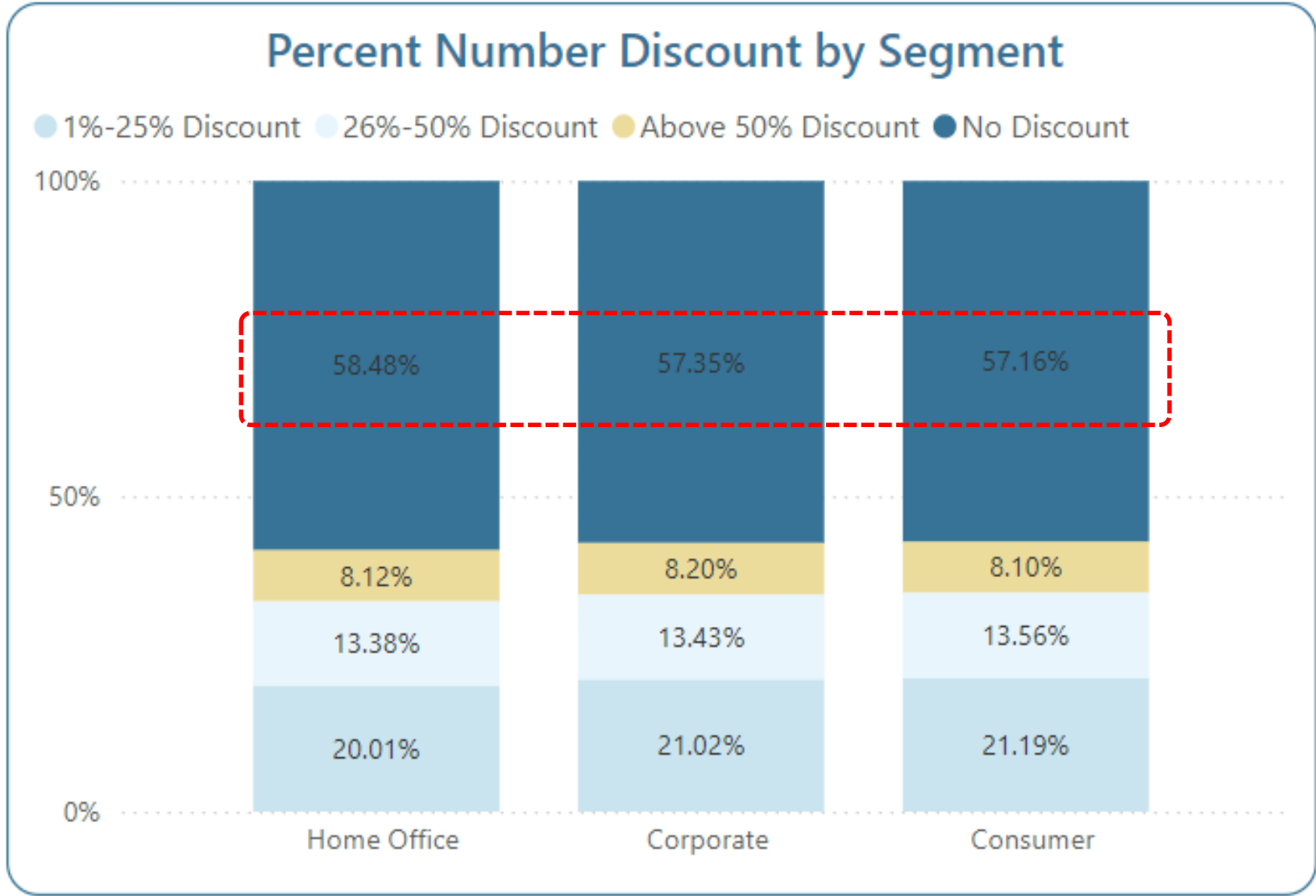
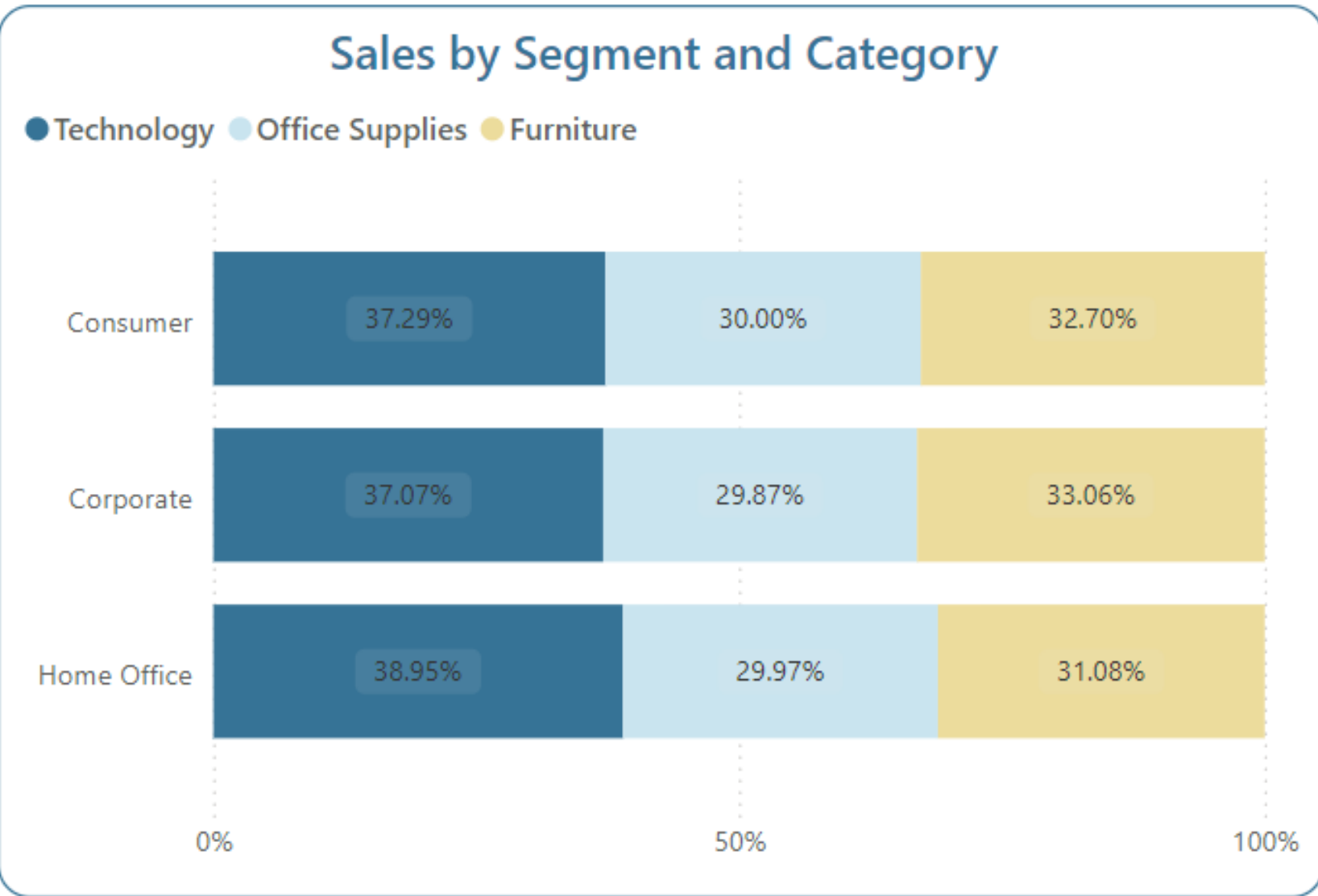
Data Analysis

Business Question:

Why is Home Office's Profit Margin higher than the other two segments?



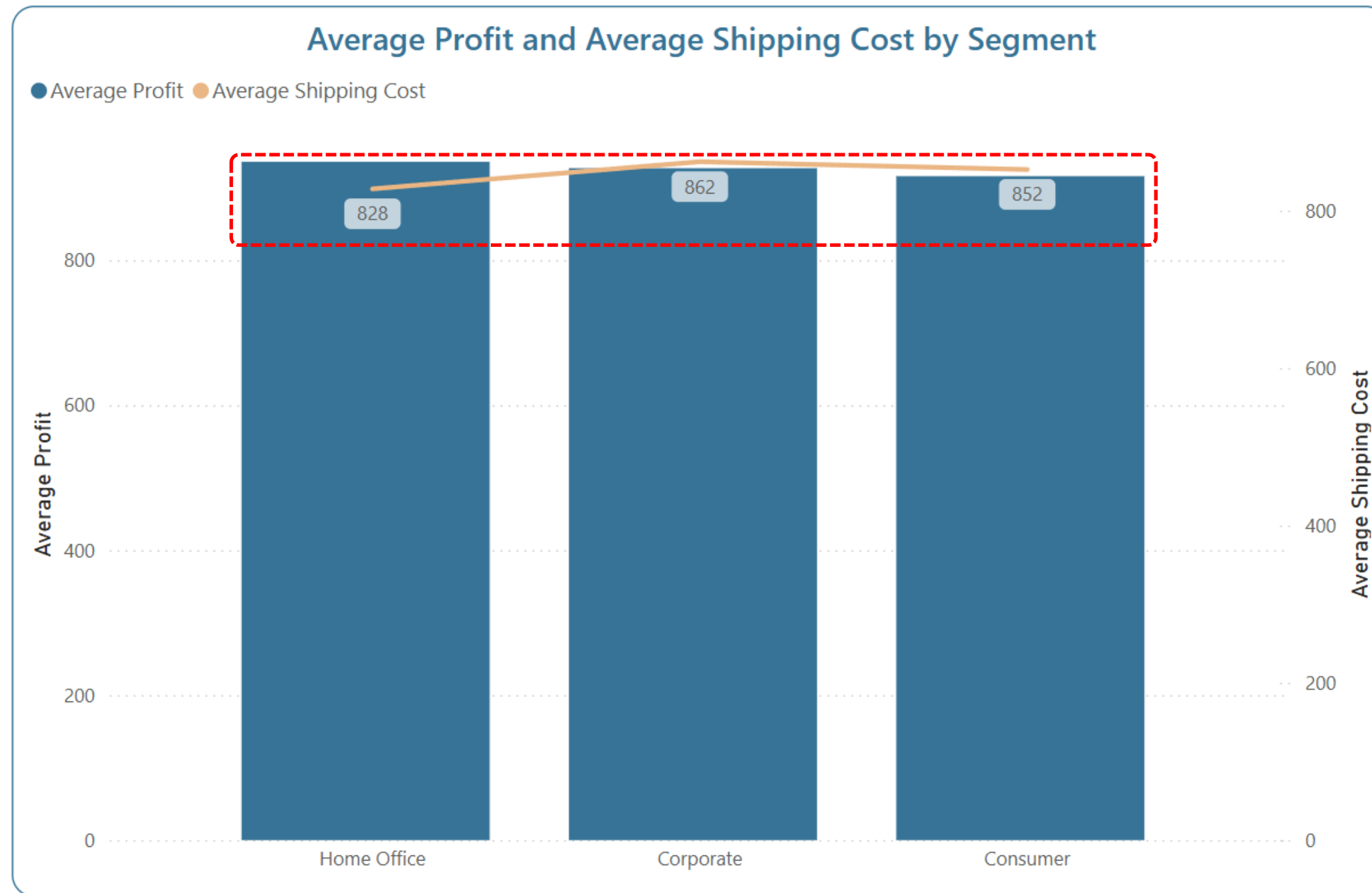
Data Analysis



- Similarity between segments: All three segments (Home Office, Corporate, Consumer) have similar purchasing behavior, with revenue ratios from categories like Technology (~37-38%), Office Supplies (~30%), Furniture (~30-32%) remaining almost unchanged.
- The percentage of non-discounted orders (No Discount) for Home Office is the highest (20.01%), which helps retain more profit.
- The discount level among segments does not have a significant difference, but the fact that there is less discount has helped Home Office optimize profits.



Data Analysis



Shipping costs affecting profit:

- Home Office has lower shipping costs compared to the other two segments, although the percentage is insignificant.
- This helps to maintain a better profit margin.



Data Analysis

Insight

Customer segments have similar purchasing behavior, leading to no significant difference in profit margins. Some factors that could influence this include:

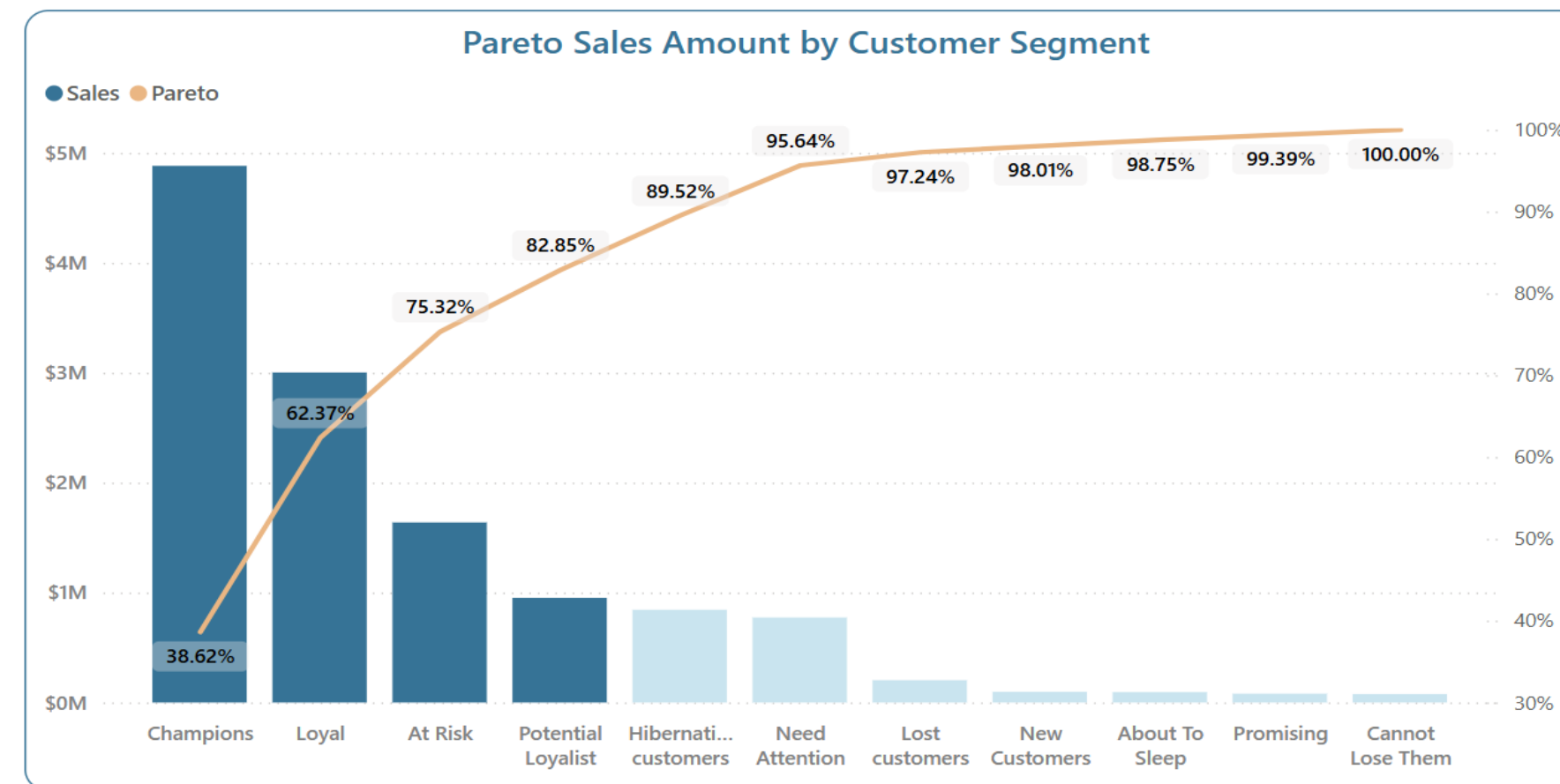
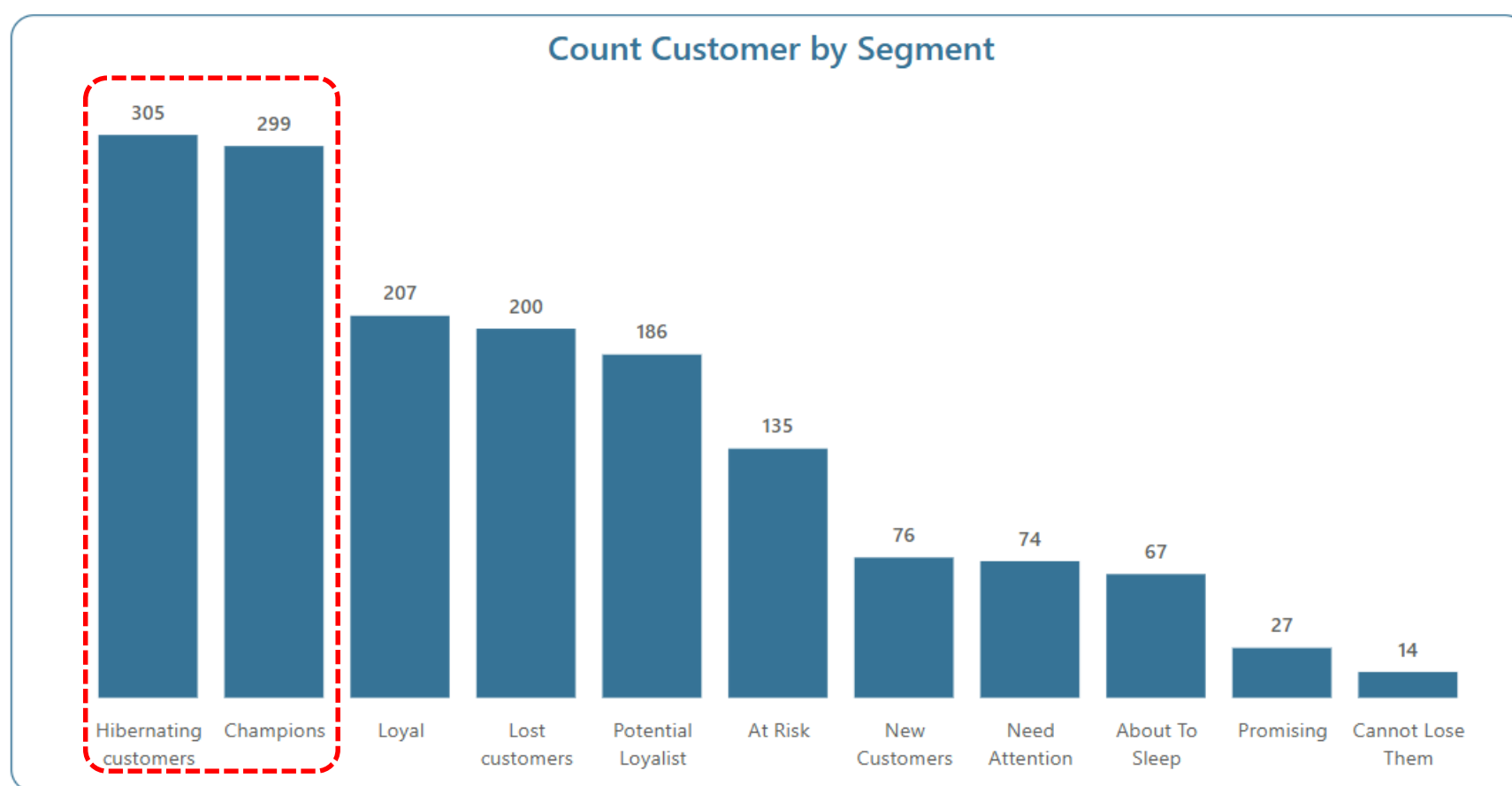
- The Home Office segment receives fewer promotional programs compared to Consumer and Corporate.
- Average shipping costs for Home Office are lower than the other two segments, contributing to profit retention. The similarity in purchasing behavior among segments creates challenges in personalizing business strategies, making it difficult to implement customer care programs, promotions, or growth drivers.

Recommendation: Implement Customer Segmentation based on the purchasing behavior of customer groups in more detail. This will help optimize targeted business strategies, improve decision-making efficiency, and promote sustainable growth towards each customer segment instead of customer groups as it is currently.



Data Analysis

7.6. Customer Segmentation and Analysis



Number of customers by segment:

- After implementing Customer Segmentation, the company categorized 1590 customers into 11 different groups.
- **Hibernating** (305 customers) and **Champions** (299 customers) are the **most populated** groups, indicating the company has a large proportion of effective customers.
- **Lost Customers** (200 customers) are a **matter of concern**, and there needs to be an outreach strategy to recover this group.

Sales by customer segment (Pareto Chart):

- **80% of revenue comes from 4 main groups:** Champions, Loyal, At Risk, and Potential Loyalist.
- **Champions** contribute the most (38.62%), followed by **Loyal** (62.37%), showing that these **are two important customer groups that need focused care**.
- The At Risk and Potential Loyalist groups still have high sales contribution potential, so there should be customer retention and purchase encouragement programs.

