SUPPLY CHAIN ANALYSIS

Domain: Supply Chain Management
Function: Inventory Optimization

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PROBLEM STATEMENT

The company is facing challenges in optimizing its inventory management, which leads to overstocking or understocking issues. This inefficiency not only impacts the storage costs and capital tied up in inventory but also affects the ability to meet customer demand promptly. The current analysis does not sufficiently focus on critical inventory metrics needed to make informed stocking decisions.

OBJECTIVE

The objective of this project is to enhance the efficiency of the supply chain by optimizing inventory management. This will involve identifying the key products to stock, determining optimal reorder points, and ensuring timely fulfillment of customer orders. By focusing on critical inventory insights, the company aims to reduce storage costs, prevent stockouts, and improve overall customer satisfaction.

TOOLS USED

Analytical & Visual:
- ✓ Microsoft excel

Presentation:
- ✓ Microsoft power point

DATASET OVERVIEW

**Data source:** Internet

Time period: 2015-2018

Data size: Sales_Shipment_Data Table(180,519,46) ,Inventory_stock_Data table(118,11)

Key columns:

Actual Columns: Sales per customer, Customer Segment, Order Status, Class, Shipping Mode, Current Stock, Order Profit Per Order, Orde Item Quantity, Sales Per Customer, Order Item Discount, order-now

Dax/Calculated columns: stock_item_price, product_class, sales_compared_to_prev_year,
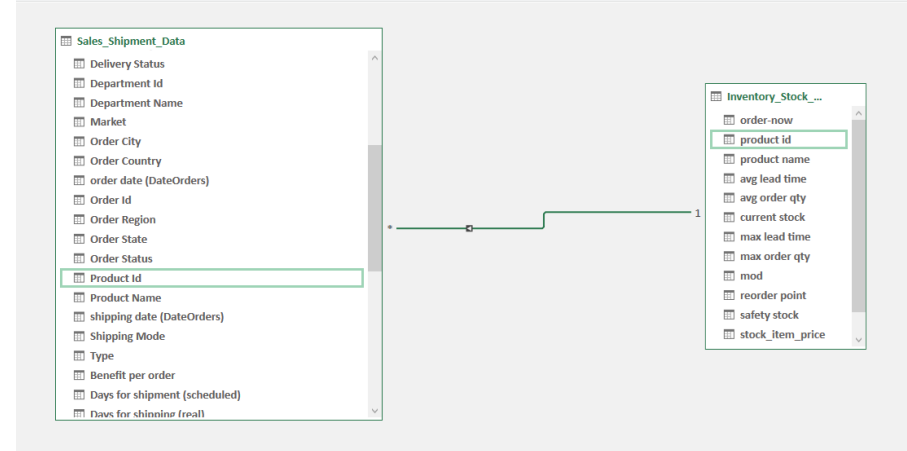
Data Model

ANALYSIS WORKFLOW

1	Load data in excel	Aplied Add column	**5**
2	Changed data types	DAX	**6**
3	Replaced Values	Pivot table analysis	**7**
4	Table Connection	Data Visualization	**8**

PARIMARY INSIGHTS

Inventory Value

$1.59M

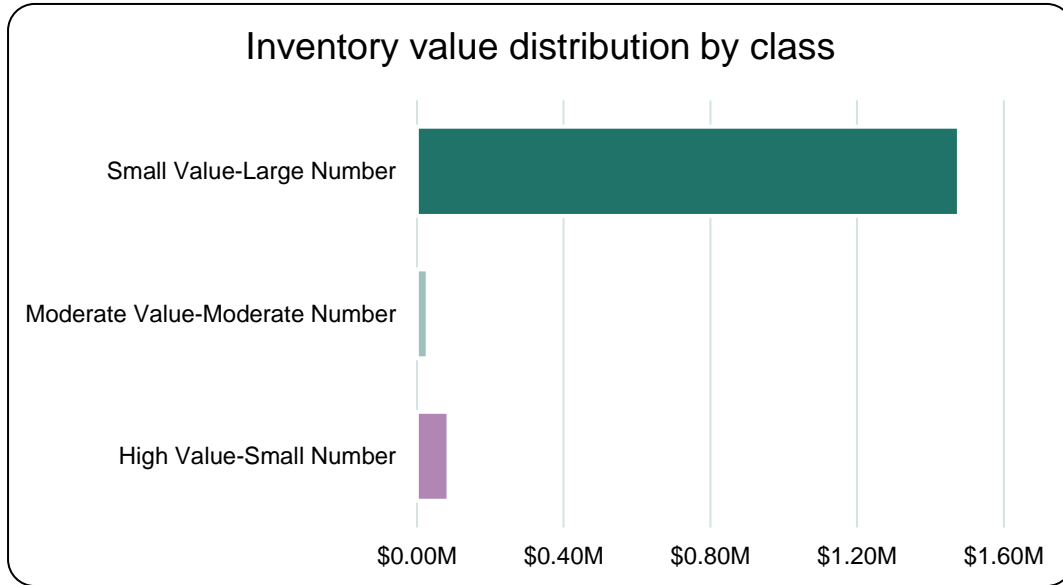Total Sales

$33.05M

Inventory Unit

118

Reorder Unit

54

Total Units in Inventory

18.97k

Highest-stocked product class

Small Value-Large Number

SECONDARY INSIGHTS

Inventory value distribution by class

The majority of the inventory value is concentrated in the **small value, large number** class.

Recommendation:
Evaluate the demand and turnover rate of the small value, large number items to ensure they justify their inventory levels. Optimize stocking strategies by considering the profitability and storage costs of these items. For high–value and moderate–value items, ensure adequate stock to meet demand without overstocking. Implement inventory management practices, such as ABC analysis, to balance inventory levels and improve overall efficiency.

SECONDARY INSIGHTS

Sales by Customer segment

Home Office, $5.86M

Consumer, $17.16M

Corporate, $10.03M
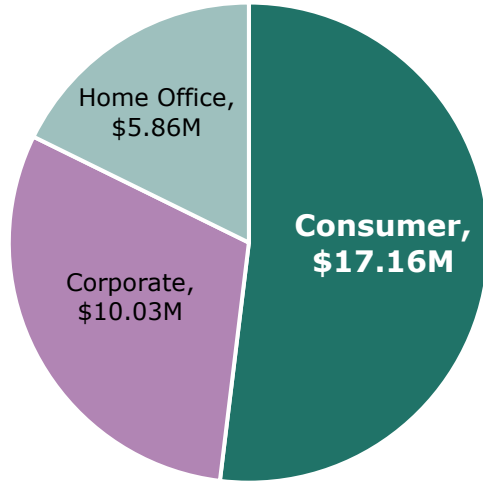
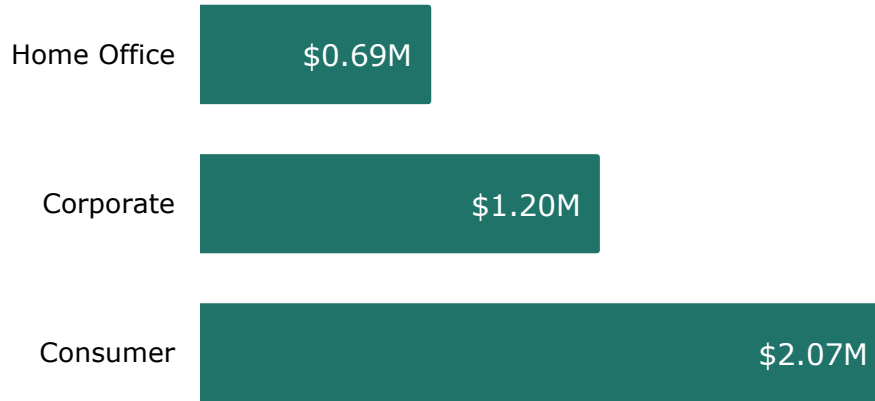**More than half** of the sales coming from **consumer segment.**

Recommendation:
Focus on maintaining and enhancing the consumer segment through targeted marketing and personalized customer experiences to sustain and grow this significant revenue source. Simultaneously, develop strategies to boost sales in the corporate and home office segments, such as tailored solutions, bulk pricing, and loyalty programs, to diversify revenue streams and reduce dependency on the consumer segment.

SECONDARY INSIGHTS

Profit by customer segment

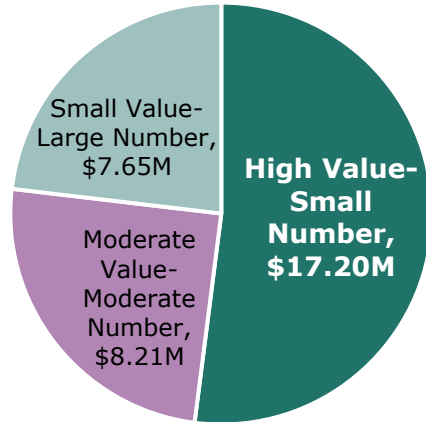| Segment	Profit
Home Office	$0.69M
Corporate	$1.20M
Consumer	$2.07M

More than half of the profit coming from **consumer segment.**

Recommendation:
Focus on enhancing the profitability of the consumer segment through strategic pricing, upselling, and loyalty programs to sustain this key revenue source. Additionally, implement initiatives to increase profitability in the corporate and home office segments, such as offering tailored services, optimizing product mix, and exploring cost–saving opportunities to balance profit distribution and reduce reliance on the consumer segment.

SECONDARY INSIGHTS

Sales by class

- Small Value-Large Number, $7.65M
- Moderate Value-Moderate Number, $8.21M
- High Value-Small Number, $17.20M

More than half of the sales coming from **High value–Small number segment.**

Recommendation:
Focus on maintaining and enhancing the high value small number segment through targeted marketing and personalized customer experiences to sustain and grow this significant revenue source. Simultaneously, develop strategies to boost sales in other segments, such as tailored solutions, bulk pricing, and loyalty programs, to diversify revenue streams and reduce dependency on the high value small number segment.
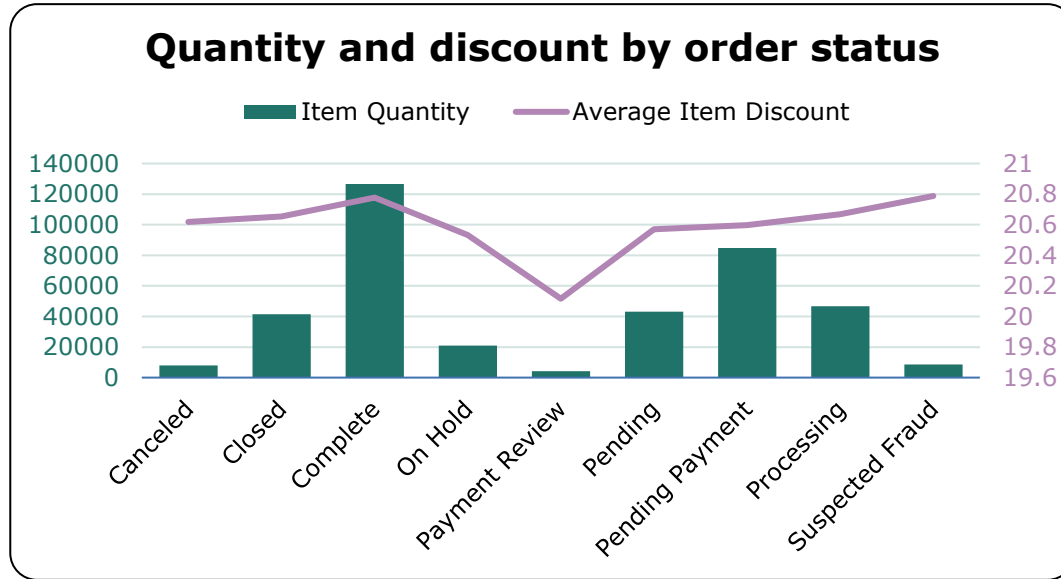
SECONDARY INSIGHTS

Customer and sales by order status

■ Sales — Number of Customer
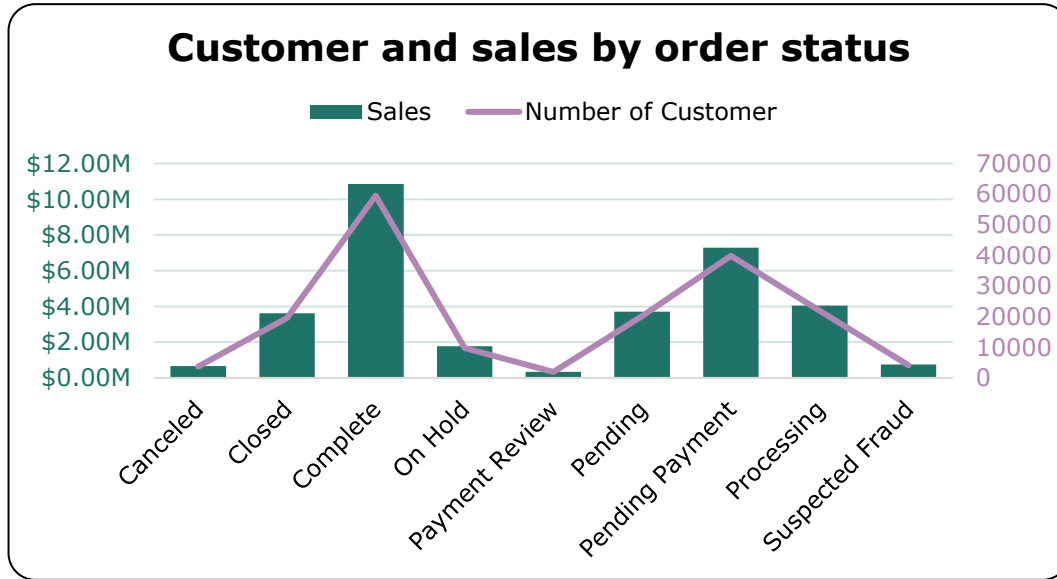
Sales and number of customers is highest for **completed orders.**

Recommendation: Prioritize strategies that streamline and expedite order completion processes to maximize sales and customer satisfaction. Address issues causing delays or cancellations by enhancing order management systems and improving communication with customers. Implement measures to reduce pending and on–hold orders by identifying and mitigating common bottlenecks. Additionally, reinforce fraud detection and prevention mechanisms to minimize suspected fraud cases, ensuring a secure shopping environment for customers.
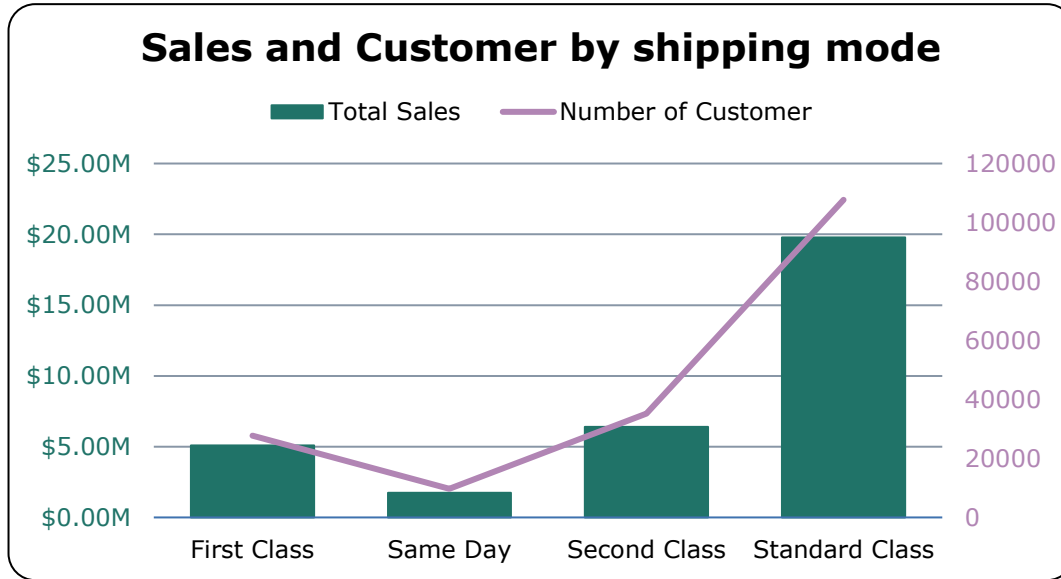
SECONDARY INSIGHTS

Quantity and discount by order status

Item Quantity • Average Item Discount

Quantity and discount is highest for **completed orders.**

Recommendation: Focus on streamlining the order fulfillment process to reduce orders in statuses such as "Pending," "Pending Payment," and "On Hold." Identify and address any bottlenecks or issues that may be hindering the completion of these orders. Additionally, review the discount strategy for orders in other statuses to evaluate if targeted discounts can help convert more orders to the "Complete" status, thereby maximizing revenue and customer satisfaction.
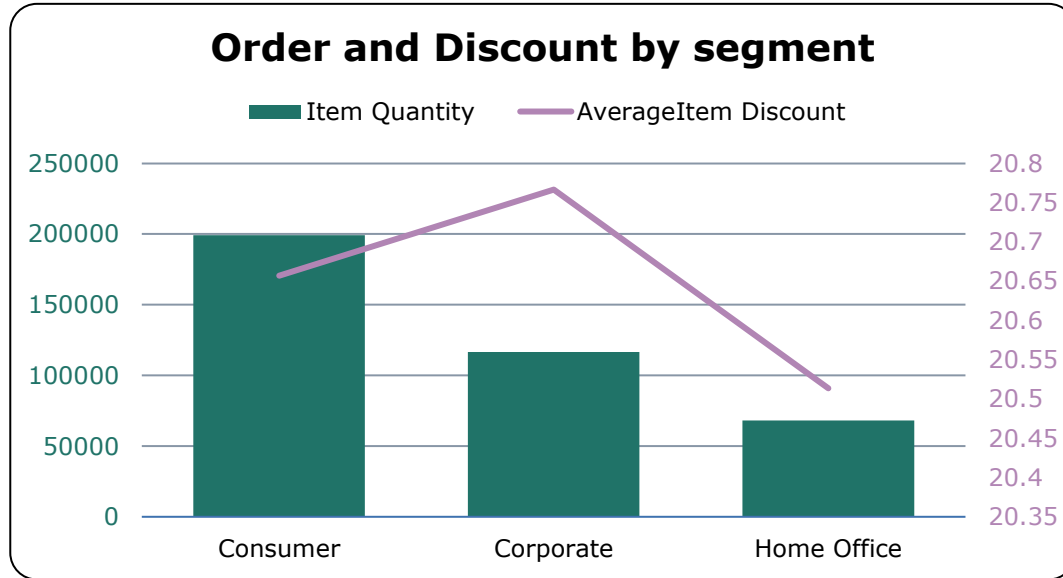
SECONDARY INSIGHTS

Sales and Customer by shipping mode

Legend: Total Sales, Number of Customer

Left axis (Total Sales): $0.00M, $5.00M, $10.00M, $15.00M, $20.00M, $25.00M
Right axis (Number of Customer): 0, 20000, 40000, 60000, 80000, 100000, 120000

Categories: First Class, Same Day, Second Class, Standard Class

Standard Class

has highest sales and customers.

Recommendation:
Prioritize strategies that streamline and expedite order completion processes to maximize sales and customer satisfaction. Address issues causing delays or cancellations by enhancing order management systems and improving communication with customers. Implement measures to reduce pending and on-hold orders by identifying and mitigating common bottlenecks. Additionally, reinforce fraud detection and prevention mechanisms to minimize suspected fraud cases, ensuring a secure shopping environment for customers.

SECONDARY INSIGHTS

Order and Discount by segment

Legend: Item Quantity — AverageItem Discount

Left axis: 0, 50000, 100000, 150000, 200000, 250000

Right axis: 20.35, 20.4, 20.45, 20.5, 20.55, 20.6, 20.65, 20.7, 20.75, 20.8

Categories: Consumer, Corporate, Home Office

Recommendation: Evaluate the effectiveness of discount strategies across segments and consider aligning discounts with order volumes to optimize profitability. Additionally, explore opportunities to increase order volumes in the high–discount corporate segment through targeted marketing and tailored offerings.

While the consumer segment accounts for the highest order volume, **the corporate segment** enjoys a higher average discount.

SECONDARY INSIGHTS

YoY change in Profit

Year	Value
2018	$0.03M
2017	$1.30M
2016	$1.31M
2015	$1.32M

Recommendation: Conduct a detailed analysis to identify factors driving the profit decline, such as rising costs, pricing strategy, or operational inefficiencies. Implement cost–control measures, optimize pricing strategies, and improve operational efficiencies. Additionally, explore new revenue streams and enhance product offerings to drive profitability.

Profit have been consistently declining year over year.

SECONDARY INSIGHTS

YoY change in sales

$11.09M — 2015
$11.06M — 2016
$10.61M — 2017
$0.30M — 2018
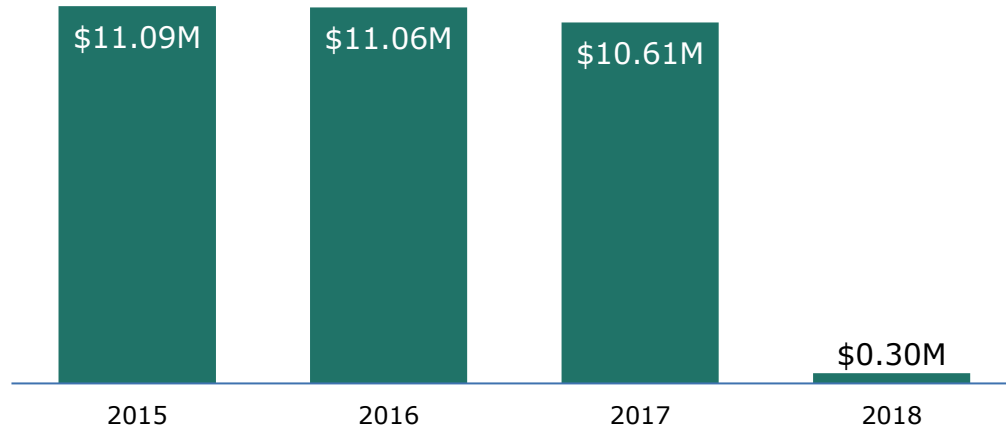
Sales have been consistently declining year over year.

Recommendation: To address the declining sales, conduct a thorough root cause analysis to understand underlying issues, such as changes in market trends, customer preferences, and competitive pressures. Revise sales and marketing strategies to target potential growth areas, enhance customer engagement through improved experiences and loyalty programs, and explore diversification of product offerings and entry into new markets to stimulate sales growth and mitigate future declines.

SECONDARY INSIGHTS

Delivery Status trend by year
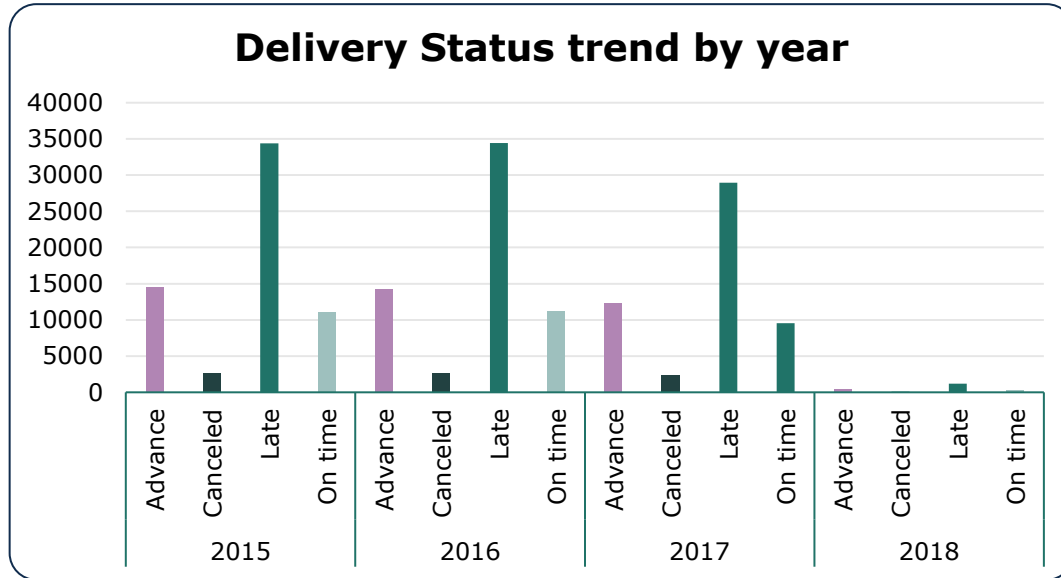
Half of our deliveries are consistently late each year.

Recommendation: Conduct a detailed analysis to identify the root causes of late deliveries, such as logistical inefficiencies, supply chain disruptions, or inadequate planning. Implement process improvements and technology solutions to enhance delivery scheduling and tracking. Collaborate with logistics partners to ensure timely delivery, and consider revising policies to incentivize on–time performance. Prioritize customer communication to manage expectations and improve satisfaction.

SECONDARY INSIGHTS

YoY change in Avg Discount

Year	Value
2015	19.97
2016	19.95
2017	22.51
2018	15.87
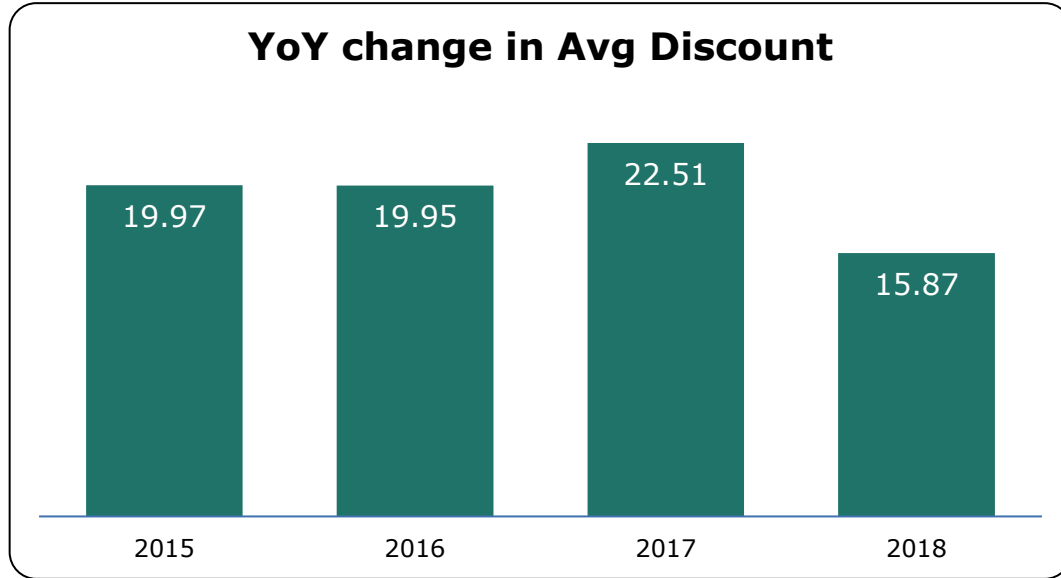
Discount have been consistently declining year over year except for a spike in 2017.

Recommendation:
Analyze the impact of discount strategies on sales and profit margins. Identify reasons for the 2017 spike and leverage effective discount practices from that year. Develop a balanced discount strategy that drives sales without significantly impacting profit margins, considering customer preferences and competitive positioning.

KEY FINDINGS

This analysis provides a comprehensive overview of the company's inventory management, sales performance, and profitability across various dimensions. The key primary insights reveal an inventory value of $1.59M, total sales of $33.05M, and 18.97K units in stock. The "small value, large number" product class accounts for the highest stocked items.

Key findings include:
1. The "small value, large number" class accounts for the majority of inventory value.
2. The consumer segment generates over half of total sales and profit.
3. The "high value, small number" class contributes to more than half of the sales.
4. Completed orders have the highest sales, customers, quantities, and discounts.
5. The standard shipping class dominates in sales and customer volume.
6. The corporate segment enjoys higher average discounts compared to other segments.
7. Both profit and sales have been declining year-over-year, except for a spike in average discounts in 2017.
8. Late deliveries consistently account for half of all shipments across years.

RECOMMENDATIONS

The analysis highlights several key strengths and improvement opportunities for the company's inventory management, sales, and profitability strategies. While the company has achieved commendable sales figures and a diverse product portfolio, declining profits, suboptimal inventory levels, and inefficiencies in logistics and discounting practices require attention. To capitalize on strengths and address areas for improvement, the company should:

1. Optimize inventory levels for the "small value, large number" class based on demand, turnover rates, storage costs, and profitability considerations.
2. Enhance marketing and customer experience strategies for the consumer segment, which drives over half of sales and profits, while exploring growth opportunities in the corporate and home office segments.
3. Reevaluate the discounting strategy across segments to align discounts with order volumes, profitability goals, and customer preferences, addressing the high discounts in the corporate segment.

RECOMMENDATIONS

4. Investigate and address the root causes of declining profits and sales year–over–year through cost control measures, pricing optimization, operational efficiencies, and diversification of product offerings.

5. Streamline order fulfillment processes, address bottlenecks causing pending and on–hold orders, improve communication with customers, and reinforce fraud detection mechanisms.

6. Prioritize on–time deliveries by identifying root causes of consistent delays, implementing process improvements, and collaborating with logistics partners to enhance the standard shipping class performance.

7. Develop a balanced discount strategy that drives sales while maintaining profit margins, considering customer preferences and competitive positioning, leveraging insights from the 2017 spike in average discounts.

8. Focus on maintaining and enhancing the performance of the "high value, small number" class, which contributes significantly to sales, while exploring opportunities in other product classes.

Thanks!

–Amanat Mahmud