

Supply Chain Analysis Dashboard

1-Project Summery:

This report analyzes a global retail supply chain dataset to enhance operational efficiency, track key performance metrics, and identify opportunities for cost reduction and revenue growth. The analysis spans across product categories, customer segments, and shipping methods in various regions, focusing on order patterns, delivery performance, and profitability.

2-QUESTIONS:

1. What was the goal of Our data wrangling process?

- Our goal was to deliver a clean and consistent dataset to support accurate analysis and meaningful insights.

2. What challenges did we face during the wrangling process?

- we encountered several issues, such as missing values, duplicate records, inconsistent data types, and the presence of outliers.
- Each challenge required careful strategies to resolve without losing important information.

3. How did we handle missing values?

- we first checked for missing values using `isnull().sum()`.
- we decided to remove rows with missing entries using `dropna()` after evaluating their impact on the overall dataset.
- Finally, we verified that no missing values remained after cleaning.

4. How did we manage duplicated data?

- we detected duplicate rows using `duplicated().sum()` and removed them with `drop_duplicates()`.

- After removal, we double-checked to ensure that the dataset was completely free of duplicates.

5. How did we deal with inconsistent data types?

- we converted the 'Date' column into datetime format to enable time-based analysis.
- we also transformed categorical features like 'Payment Method' into numerical codes using `.astype('category').cat.codes`.

6. How did we analyze the data distribution and detect outliers?

- During the cleaning phase, we analyzed the values using descriptive statistics like `describe()` to identify potential outliers numerically. we also reviewed maximum and minimum values manually, but we chose not to remove or modify any outliers to preserve important data.

7. Did we standardize or adjust the data distribution to ensure accuracy?

- In this cleaning process, we did not perform standardization or distribution adjustment. The main goal was to clean missing values, correct data types, and prepare the raw data for more advanced analysis later.

8. How did we verify data quality after cleaning?

- we re-checked for missing values, duplicates, and outliers.
- we visualized some key columns before and after cleaning to confirm improvements.
- Finally, we ran basic descriptive statistics to ensure that the data distribution looked logical and clean.

9. What additional enhancements did we apply during wrangling?

- We renamed columns to more readable and understandable names.
- Some columns contained unclear or meaningless values, so we replaced them with more meaningful values.
- We removed unnecessary columns like links, images, and other irrelevant fields.
- We adjusted the date columns properly to ensure correct handling for time-based analysis.

- We added new columns that could enhance and support deeper analysis later on.

10. What tools and libraries did we rely on during this process?

- we mainly used Pandas for data manipulation and Seaborn/Matplotlib for data visualization during the wrangling phase.
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3. Purpose and Objectives:

The primary purpose of this analysis is to derive actionable insights into the supply chain operations. The objectives include improving efficiency, minimizing delivery delays, pinpointing high-performing products, optimizing shipping methods, and ultimately maximizing profitability.

4. Detailed Analysis of Dashboard Visuals:

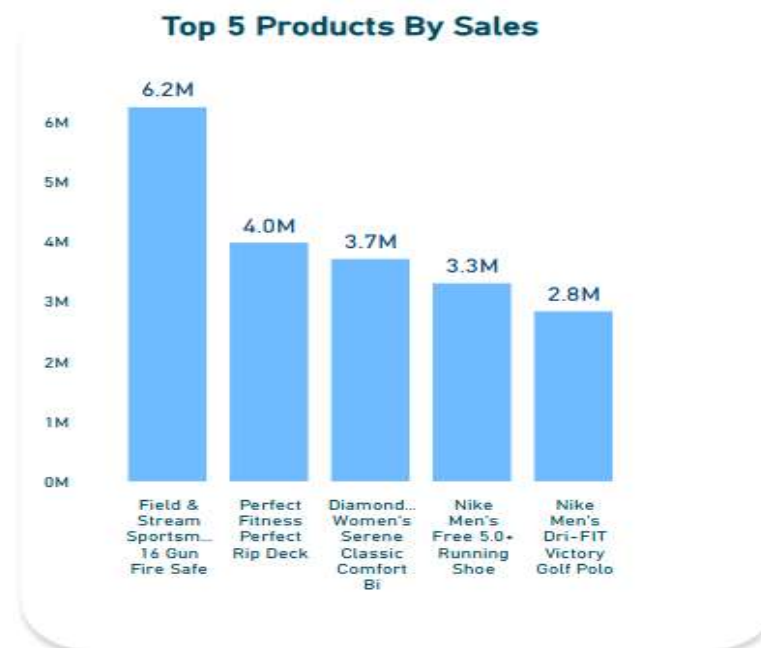
- **Overall Metrics:**

- Total Sales: The total sales reached 33.05 million.
- Total Orders: The total number of orders was 181,000.
- Total Profit: The total profit amounted to 3.97 million.

- **Product Analysis (Page 2):**

- **Top 5 Products by Sales:**
 - The top-selling product is "Field & Stream Sportsman 16 Gun Fire Safe" with sales of 6.2 million.
 - "Perfect Fitness Perfect Rip Deck" ranks second with 4.0 million in sales.

- "Diamond Women's Serene Classic Comfort Bi" has sales of 3.7 million.
- "Nike Men's Free 5.0+ Running Shoe" generated 3.3 million in sales.
- "Nike Men's Dri-FIT Victory Golf Polo" shows sales of 2.8 million.



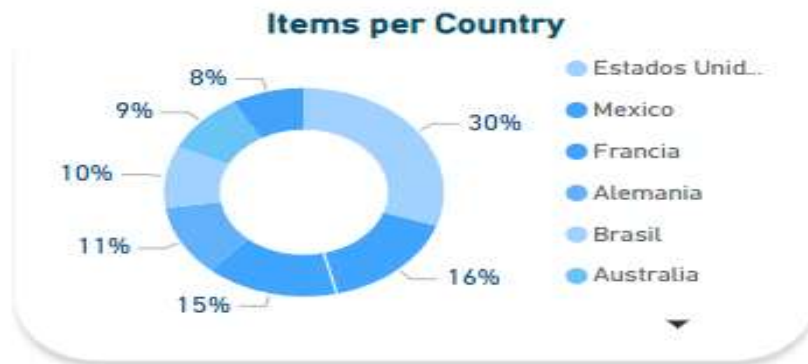
○ Sales by Year and Month:

Sales fluctuate over the years, with peaks and troughs visible in the provided graph. For example, sales reached 1.05M in July 2017 and January 2018.



- **Items per Country:**

The highest percentage of items is sold in the United States (30%), followed by Australia (16%), Brazil (15%), France (10%), Mexico (9%), and Alemania (8%).

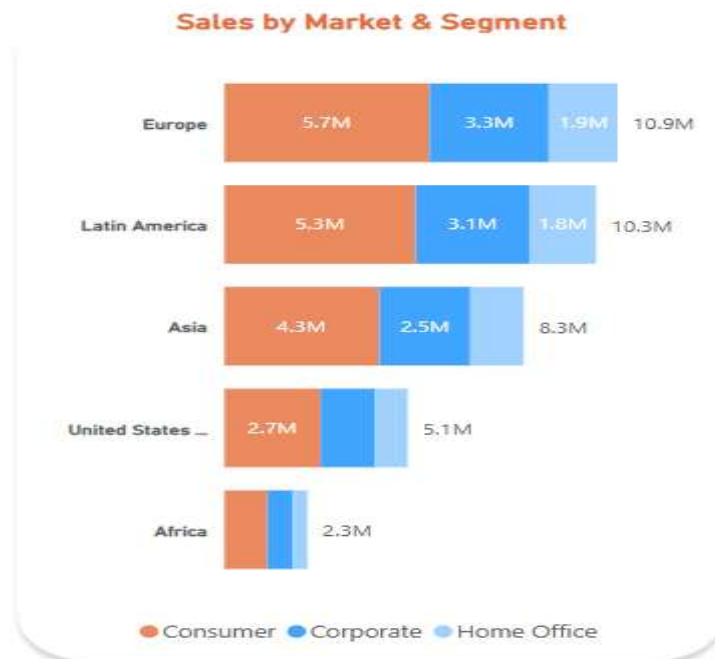


- **Customer Analysis (Page 3):**

- Total Customers: The total number of customers is 180,520.

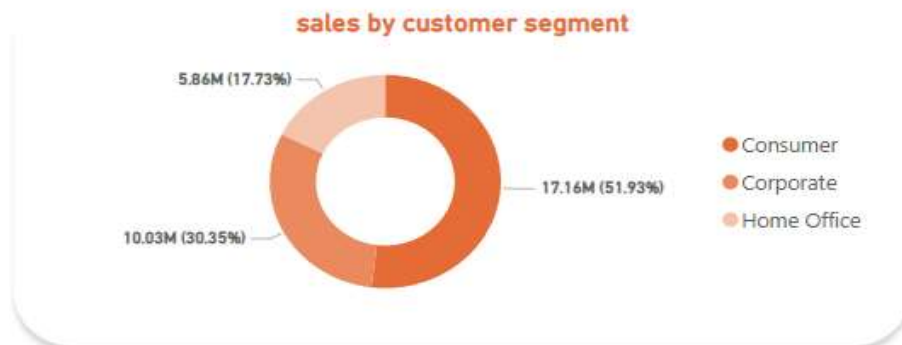
- **Sales by Market & Segment:**

- Europe leads in total sales (10.9M), segmented into Consumer (5.7M), Corporate (3.3M), and Home Office (1.9M).
- LATAM also shows 10.3M in sales, with 5.3M from Consumer, 3.1M from Corporate, and 1.8M from Home Office.
- Pacific Asia's sales are 8.3M, divided into Consumer (4.3M), Corporate (2.5M), and Home Office (1.5M).
- USCA has 5.1M in sales, with segments contributing 2.7M (Consumer), 1.5M (Corporate), and 0.9M (Home Office).
- Africa reports 2.3M, exclusively from the Consumer segment.



○ Sales by Customer Segment:

- Consumer segment accounts for the largest share of sales at 17.16M (51.93%).
- Corporate segment contributes 10.03M (30.35%).
- Home Office segment generates 5.86M (17.73%).



- Profit per Customer Segment:

- The Consumer segment yields the highest profit at 2.07M.
- The Corporate segment's profit is 1.20M.
- The Home Office segment has the lowest profit at 0.69M.



- Shipping Analysis (Page 4):

- Orders and Shipping Status:

- 32,000 orders were on time.
- 99,000 orders were late.
- 7,754 orders were canceled.

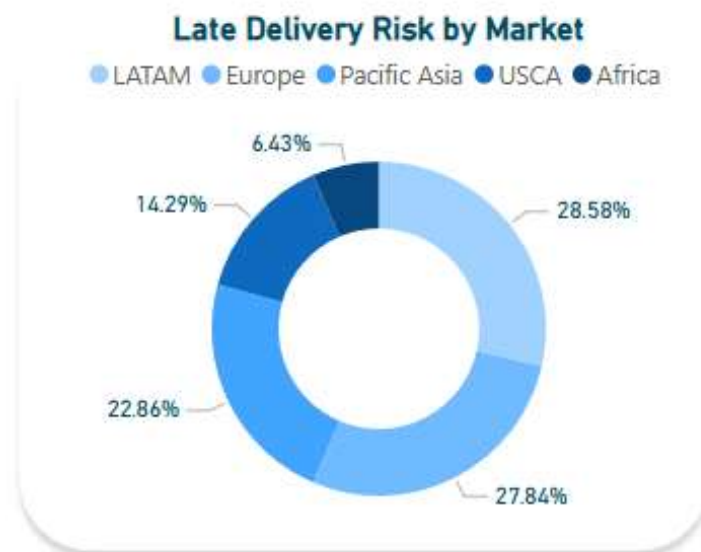
- Earnings per Delivery Method:

- Standard Class shipping generated 2.4M.
- Both First Class and Second Class shipping generated 0.8M each.



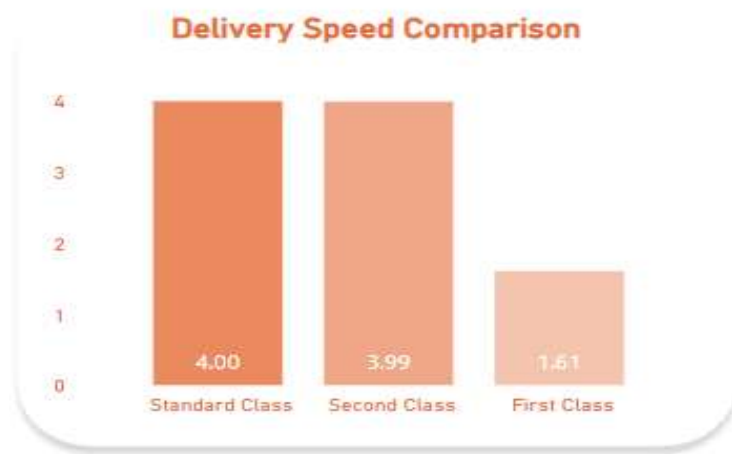
- Late Delivery Risk by Market:

The graph shows a comparison of late delivery risk across different markets (LATAM, Europe, Pacific Asia, USCA, Africa).



- Delivery Speed Comparison:

A bar graph compares delivery speed across Standard Class, Second Class, and First Class.



- Distribution Map of Shipping:

A world map visually represents the shipping distribution.



5. Key Insights and Observations:

- **Sales Concentration:** A significant portion of sales comes from the Consumer segment, indicating its importance.
- **Product Performance:** "Field & Stream Sportsman 16 Gun Fire Safe" significantly outperforms other products.

- **Regional Differences:** Sales and segment distributions vary substantially across regions. Europe and LATAM have the highest sales.
 - **Shipping Efficiency:** There's a high number of late orders compared to on-time orders, suggesting potential issues in the shipping process.
 - **Delivery Method Impact:** Standard Class is used more and generates more earnings, but delivery speed comparisons and late delivery risks need further analysis.
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6. Recommendations:

Based on the analysis, here are some recommendations to improve overall performance:

- **Enhance Shipping Efficiency:**

Investigate the causes of late deliveries and implement strategies to improve on-time delivery rates. This could involve optimizing logistics, partnering with more reliable carriers, or improving tracking and communication with customers.

- **Customer Segment Strategies:**

- **Consumer Segment:** Given the high sales and profit contribution, focus on customer retention and loyalty programs to maintain and grow this segment.
- **Corporate Segment:** Explore opportunities to increase sales and profitability within the Corporate segment through tailored marketing and sales strategies.
- **Home Office Segment:** Analyze the reasons for lower profitability in the Home Office segment and consider strategies to improve it, such as offering bundled deals or targeted promotions.

- **Product Optimization:**

- **Top Performers:** Analyze the factors contributing to the success of top-selling products like "Field & Stream Sportsman 16 Gun Fire Safe" and replicate those strategies for other products.
- **Underperformers:** Identify underperforming products and evaluate whether to improve their marketing, redesign them, or discontinue them.

- **Regional Strategies:**

- **High-Performing Regions (Europe, LATAM):** Continue investing in these regions to sustain growth.
- **Lower-Performing Regions (Africa, USCA):** Develop targeted strategies to increase sales and market penetration. Understand the specific challenges and opportunities in each market.

- **Inventory Management:**

Analyze sales trends and product performance to optimize inventory levels and reduce storage costs. Ensure that popular products are adequately stocked to meet demand.

- **Data Monitoring and Review:**

Regularly monitor the key performance indicators (KPIs) presented in the dashboard to track progress and identify new opportunities or challenges. Conduct periodic reviews of the supply chain strategy to ensure it remains aligned with business goals.