

Supply Chain Tracker

The project involves leveraging a practical dataset in the realm of supply chain analytics to address critical issues related to shipment and inventory management. As the primary data analyst at Stratcap, your responsibilities include tackling challenges within the supply chain, identifying inefficiencies, and developing informative dashboards. Through your analysis, you aim to provide valuable insights to business stakeholders, highlighting potential issues, and recommending strategic improvements to enhance overall operational efficiency.

Objective: Develop an interactive dashboard to succinctly present the findings of the supply chain issue research and propose effective solutions.

Approach: Conduct descriptive, exploratory, and diagnostic analyses.

Methodology Used:

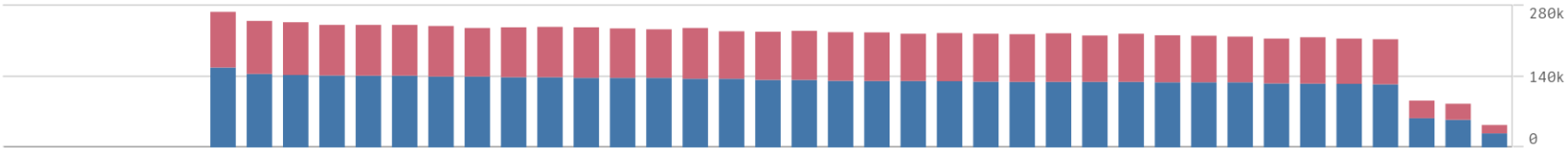
Tools Used: Python (Data preprocessing, data cleaning, inventory segmentation); Qlik (Dashboard creation)

Aim: Gain insights into and monitor customer demand and product sales. Manage the flow of inventory, covering order fulfillment, storage, and distribution. Supervise daily shipping and distribution operations to customers

Result: Comprehensive dashboard displaying overall business performance metrics such as sales, profit, orders, customers, and top-performing products. Dashboard for inventory management, including warehouse inventory, customer orders, and storage costs. Dashboard for shipping management, offering insights into orders, locations, timing, and any shipping delays.

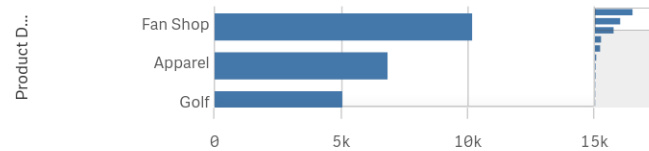
Number of Orders
10,265

Net Sales and Profits

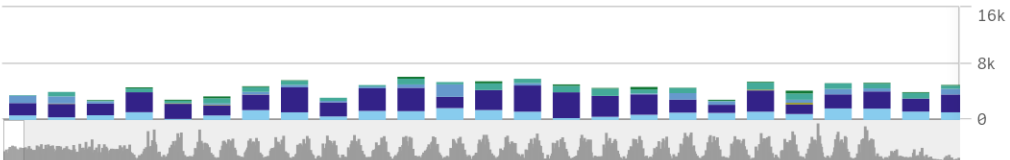


Number of Customers
7,414

Top Product Departments by Number of Orders

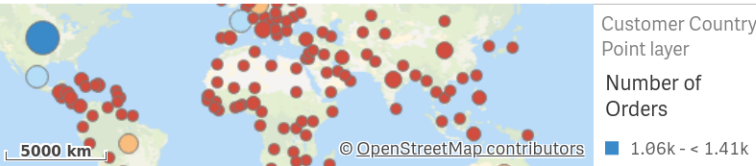


Net Sales By Department

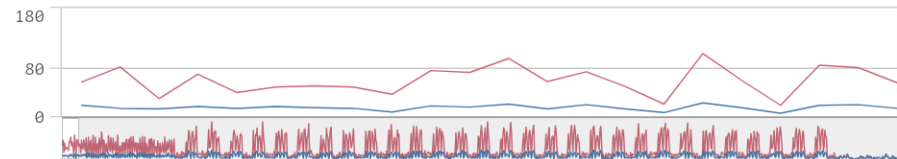


Net Sales
4.6M

Number of Orders By Geography

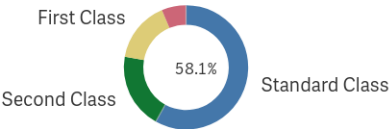


Number of Orders vs order Quantity



Discount
10.14%

Number of Orders by Shipment Mode



Number of Orders by Product Category



* The data set contains negative or zero values that cannot be shown in this chart.

Product Department

Apparel

Book Shop

Discs Shop

Fan Shop

Product Category

Accessories

As Seen on TV!

Baby

Baseball & Softball

Order Year

2015

2016

2017

Order Month

Jan

Feb

Mar

Apr

Order Quarter

Q1

Q2

Q3

Q4

Order Quantity

54,234

Number Of Orders y Product Department



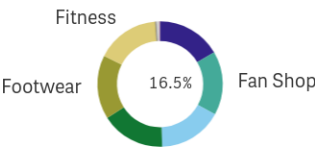
Warehouse Inventory

71,014

Storage Cost

86.43k

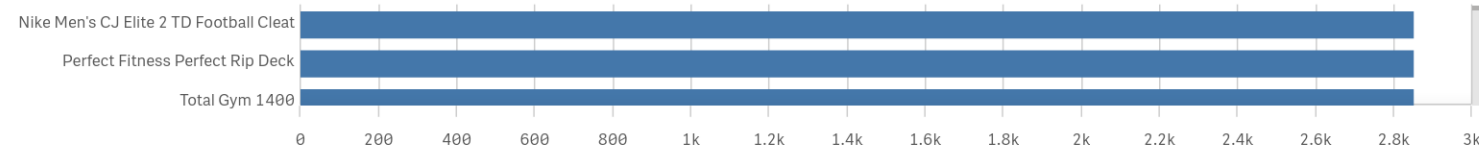
Storage Cost by Product Department



Avg Warehouse Order Fullfilm...

5.33

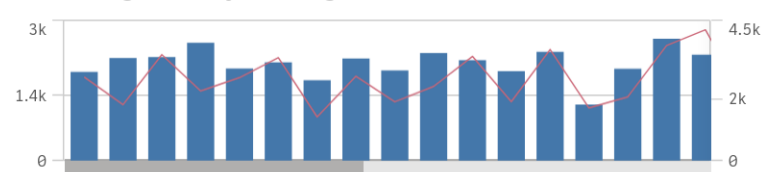
Top Products By Inventory



Inventory Cost per Unit

5.19k

Warehousing Inventory vs Storage Cost



Warehouse By Continent



Product Department

Apparel

Book Shop

Discs Shop

Fan Shop

Product Category

Accessories

As Seen on TV!

Baby

Baseball & Softball

Product Name

adidas Brazuca 2017 Official Match Ball

adidas Kids' F5 Messi FG Soccer Cleat

adidas Men's F10 Messi TRX FG Socc...

adidas Men's Germany Black Crest Aw...

Order Year

2015

2016

2017

Order Month

Jan

Feb

Mar

Apr

Order Quarter

Q1

Q2

Q3

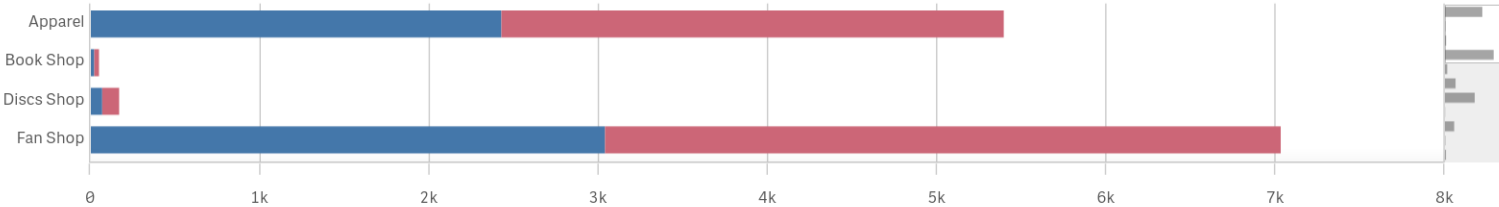
Q4

Earliest Order Date
1/1/2015

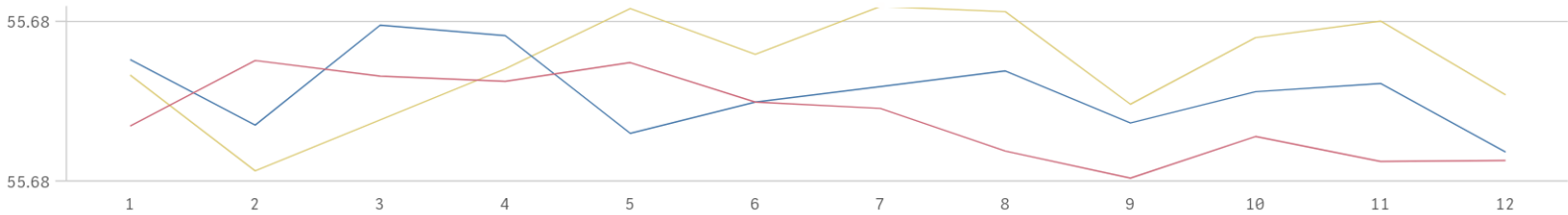
Latest Order Date
12/30/2017

Shippment Schedule
79.28k

Delay Shipment by Product Department



Late Shipment Rate Over Time



Late Shipment by Country *



Product Name
adidas Brazuca 2017 Official Match Ball
adidas Kids' F5 Messi FG Soccer Cleat
adidas Men's F10 Messi TRX FG Soccer Cleat
adidas Men's Germany Black Crest Away Tee
adidas Youth Germany Black/Red Away Match Soc

Product Category
Accessories
As Seen on TV!
Baby
Baseball & Softball
Basketball

Product Department
Apparel
Book Shop
Discs Shop
Fan Shop
Fitness

Shippment Date
2015-01-03
2015-01-04
2015-01-05
2015-01-06
2015-01-07

There are 113 product names in customers' orders, but the warehouse inventory lists 118 product names. This discrepancy is attributed to five products that show no demand. However, it's noteworthy that the inventory levels of these five products exhibit fluctuations over time. Consequently, the company has the option to release these items from the warehouse. Ruling out the possibility of the company donating or recycling these items, as it's not within their scope. The working hypothesis is that there might be a systematic error in recording orders for these items.

As a result, exclude them. Importantly, this exclusion will not impact the analysis, as these particular product names only affect analysis related to the warehouse inventory, unit cost per unit, and storage cost. The decision to drop them is motivated by the belief that they are not contributing meaningfully to the supply chain and could potentially be a recording error in the orders.

Findings

The company consistently experiences instances of excessive inventory or overstocking, even during periods of significant declines in demand. While maintaining some level of overstock for contingency is necessary, there are occasions when the company's inventory exceeds actual demand by up to 30%. The company must enhance its inventory management strategies to address and mitigate this situation effectively.

Moreover, the issue of late shipments is not directly correlated with order fulfillment times but rather stems from challenges within the company's delivery system, particularly in the shipment process from the warehouse to the customer. Through analysis, it was observed that the late shipment rate across different markets tends to be similar, indicating that this challenge is pervasive and not limited to specific geographic regions. To rectify this situation, the company will need to focus on improving its overall delivery system.

Suggestions:

The historical data indicates that both segments are highly sought after by customers and represent the primary source of revenue for the company. A key priority is to reintroduce these segments, making their revival one of the top goals. To achieve this, the company can explore opportunities to engage new suppliers and strategically redesign the supply chain to prevent a recurrence of incidents like the one in Q4/2017. This involves conducting a thorough investigation to pinpoint the areas where disruptions in the supply chain are occurring and actively seeking out viable alternative suppliers.

For instance, products such as clothing, footwear, and apparel are commonly imported from Southeast Asia, West Asia, and Central America. On the other hand, Electronics and Technology products are manufactured both in North America and East Asia. The challenge lies in identifying the specific points of disruption in the supply chain, as it is currently unclear whether the issue occurred in the Southeast Asian, West Asian, Central American, North American, or East Asian segments. Further investigation and a careful selection of alternative suppliers are essential components of the strategy to ensure a resilient and reliable supply chain for these high-demand segments.

Demand forecasting plays a crucial role in effective inventory management. By analyzing historical sales data, monitoring market trends, and utilizing predictive analytics, the company can proactively anticipate future demand. This foresight enables the maintenance of an optimal inventory level, aligning with the expected market requirements. Implementing reorder points for each product is also imperative. These points act as signals for reordering, taking into account factors such as lead time, sales velocity, and desired safety stock levels. This ensures that the company replenishes its stock promptly without the risk of overstocking.

Furthermore, establishing and maintaining safety stock is essential. Acting as a buffer inventory, safety stock serves as a protective measure against unexpected fluctuations in demand or delays in supply. This strategy helps mitigate the likelihood of stockouts, minimizing potential revenue loss, while also reducing the risk of excessive stock accumulation.

Considering the cyclical nature of customer behavior in different markets, the company can leverage this information for more precise inventory planning. For instance, in Q4/2017, there was a shift from European customers to those in the Asia Pacific market. By understanding this cycle, the company can anticipate that customers from the Asia Pacific region will likely dominate in Q1/2018, followed by North America in subsequent quarters. Utilizing this information, the company can calculate the appropriate inventory levels and consider predicting the product life cycle for each region, thus optimizing its inventory management strategy.

To effectively address the challenge of high late shipment rates, the company should consider implementing a comprehensive strategy.

Firstly, optimizing the delivery system by redesigning transportation routes, such as adopting a cross-docking strategy, can significantly improve shipment efficiency. This involves minimizing the time products spend in the warehouse, facilitating quicker movement from suppliers to customers.

Collaborating with local logistics companies presents another valuable opportunity, particularly in markets distant from the USA and Puerto Rico. Leveraging their existing resources and expertise can enhance the last-mile delivery process and contribute to timely and reliable shipments.

Moreover, to strengthen the overall delivery system and expand global reach, establishing a warehouse in a strategic logistics hub like Singapore in Asia would be advantageous. This strategic move not only improves the efficiency of the delivery process but also streamlines operations across various international markets, reducing shipment delays and enhancing customer satisfaction.