Data-Driven Innovations in Supply Chain Management with Qlik Insights

The business problem:

This project aims to understand the link between decline of sale ,reduction in profit , changes of trends in market and overall improvement if needed for the company. To understand revolutionize supply chain management through data-driven insights using Qlik. Leveraging advanced analytics, it seeks to optimize logistics, forecasting, and inventory management, enhancing operational efficiency and responsiveness.

Business requirements:

Implement a robust data integration strategy to aggregate and centralize relevant data from diverse supply chain sources. Utilize Qlik's advanced visualization capabilities to create intuitive and dynamic dashboards, providing stakeholders with clear insights .

Literature survey:

Data-driven innovations in supply chain management significantly enhance operational efficiency and facilitate cost reduction through various advanced technologies. These innovations leverage IoT, big data, machine learning, and blockchain to optimize processes and improve decision-making.

IoT and Data Analytics

- IoT devices and data analytics improve real-time visibility, streamline inventory management, and reduce operational delays, leading to enhanced efficiency and performance.
- The integration of edge computing and AI further supports agile supply chains, fostering resilience and sustainability.

Big Data and Predictive Analytics

- Big data analytics enables predictive demand forecasting and inventory optimization, as demonstrated by JD E-commerce, which reduced turnover days and costs through AI-driven insights.
- This technology also enhances transparency and mitigates risks in cross-border logistics, addressing complexities in global supply chains.

Machine Learning Applications

- Machine learning optimizes various supply chain functions, including demand forecasting and route optimization, resulting in reduced operational costs and improved customer service.
- Successful implementations showcase the transformative potential of machine learning in making data-driven decisions.

While these innovations promise substantial benefits, challenges such as data security, integration complexities, and skills shortages remain significant barriers to widespread adoption. Addressing these issues is crucial for organizations aiming to fully leverage data-driven technologies in supply chain management.

Social or Business Impact:

- Created visualizations to showcase the demographic distribution of Supply chain management

  Example : Analysis on customer purchase country by sale
- Explore any correlations both positive and negative to understand the impact on both social and business

  Example : correlation between Late Delivery and reduction in sales
- Evaluate the impact of data-driven innovations in supply chain management on sales, customer onboarding, and operational efficiency.

Data Collection & Extraction from Database:

Data Collection is done from kaggle
https://www.kaggle.com/datasets/shashwatwork/dataco-smart-supply-chain-for-big-data-analysis/data.

Understand the data:

Data contains all the meta information regarding the columns described in the CSV files
Column Description of the Dataset:

- Type: Type Count
- Days for shipping (real): Product shipment days
- Days for shipment (scheduled): product getting prepared for shipment
- Benefit per item: profit earned per product
- Sales per customer: No of products purchased by the customer
- Delivery: Products delivery date.
- Late_delivery_risk: percentage of late delivery risk
- Category Id: product category ID
- Category: product category
- Customer City: Customer purchase city
- Customer Country: Customer purchase country
- Customer Email: Customer purchase Email
- Customer Fname: Customer First name.
- Customer ID: Customer order ID
- Customer Lname: Customer's last name
- Customer Segment: Types of Customer
- Customer State: Customer order state
- Customer Street: Customer address
- Customer Zipcode: Customer area code.
- Market: top 10 country Market
- Order City: Customer purchase city
- Order Country: Customer purchase country
- Order Customer ID: Customer

- order date (DateOrders): Customer order date
- Order Item Product Price: product price
- Order Item Profit Ratio: profit ratio
- Order Item Quantity: No of orders placed
- Sales: total no of sales
- Order Item Total: total price of the order placed
- Order Profit Per: product
- Order Region: order placed region
- Order State: order placed State
- Order Status: order delivery status
- Order Zipcode: customer area code
- Product Card ID: product number
- Product Category Id: a product whose category belongs to
- Product: what product
- Product Image: image of the product
- Product Price: Price of the product.

DATA PREPARATION FOR VISUALIZATION:

STEP 1: Loaded the data on Qlik Platform(Add New -> Create a new app-> Create-> Files and other resourses->Drop a file here or select a file)

STEP 2: Hided the unwanted columns.(Customer Email: Customer purchase Email, Customer Zipcode: Customer area code,Order Zipcode: customer area code ,etc)

STEP 3: Checked for null values and found them but in hided columns.So didn't filled any as not needed.

STEP 4: Checked for duplicate values and found none.

STEP 5: Using split I have splitted shipping date (DateOrders) column into order date and order time columns to make the data easily understandable.

STEP 6: Added calculated fields using the dataset provided.(Cost Price and Profit/Loss).

STEP 7: After cleaning the data , it is uploaded on QLIK platform for Visualization.

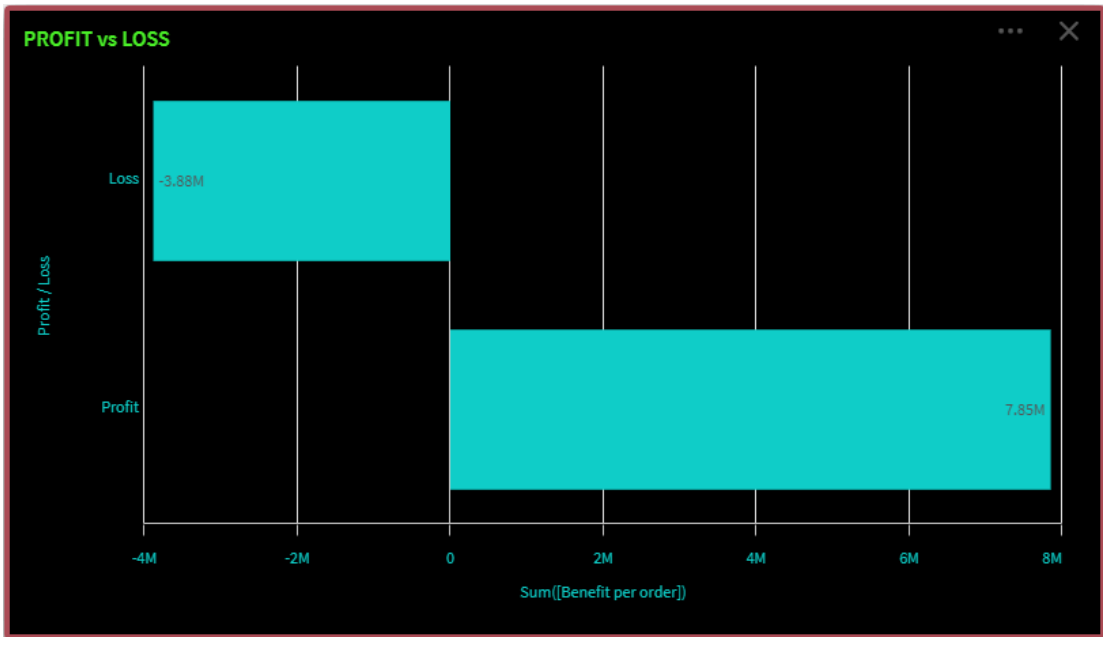
Data Visualisations:

Number of Unique Visualizations:

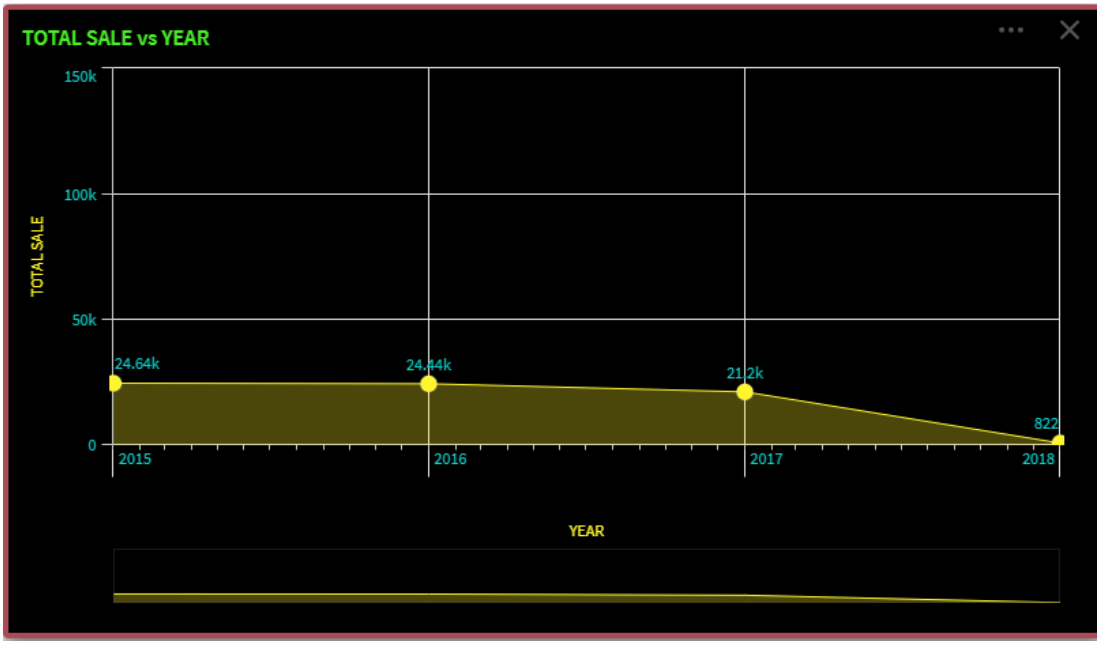
- bar charts
- line charts
- pie charts
- KPI's
- Pivot charts

Visualizations:

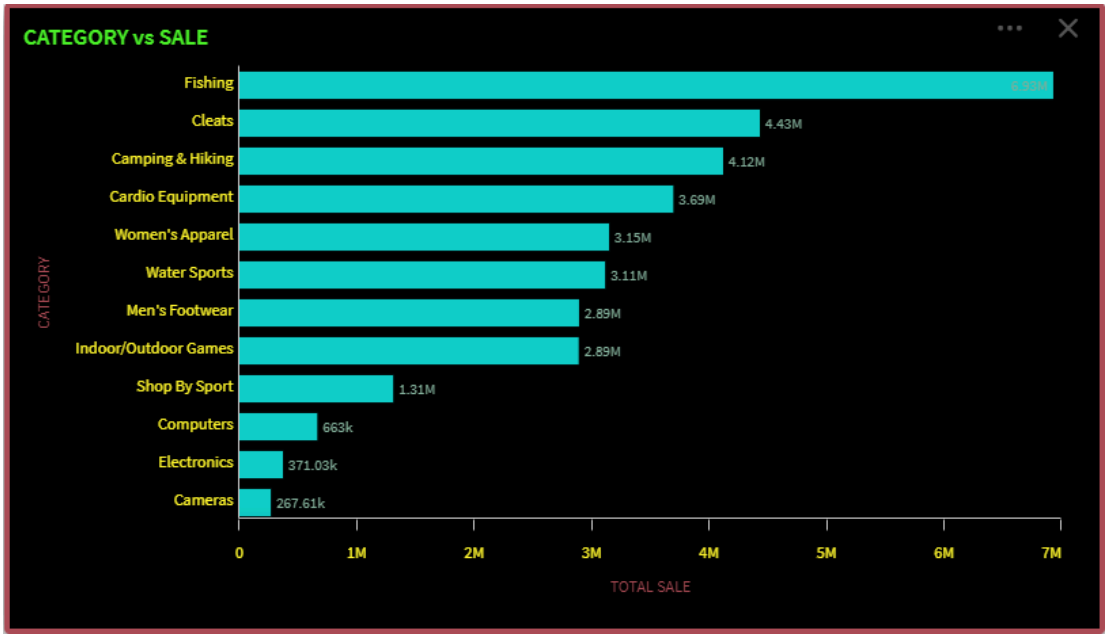
OVERALL TOTAL PROFIT vs LOSS FACED BY THE COMPANY



TOTAL SALE as per YEAR

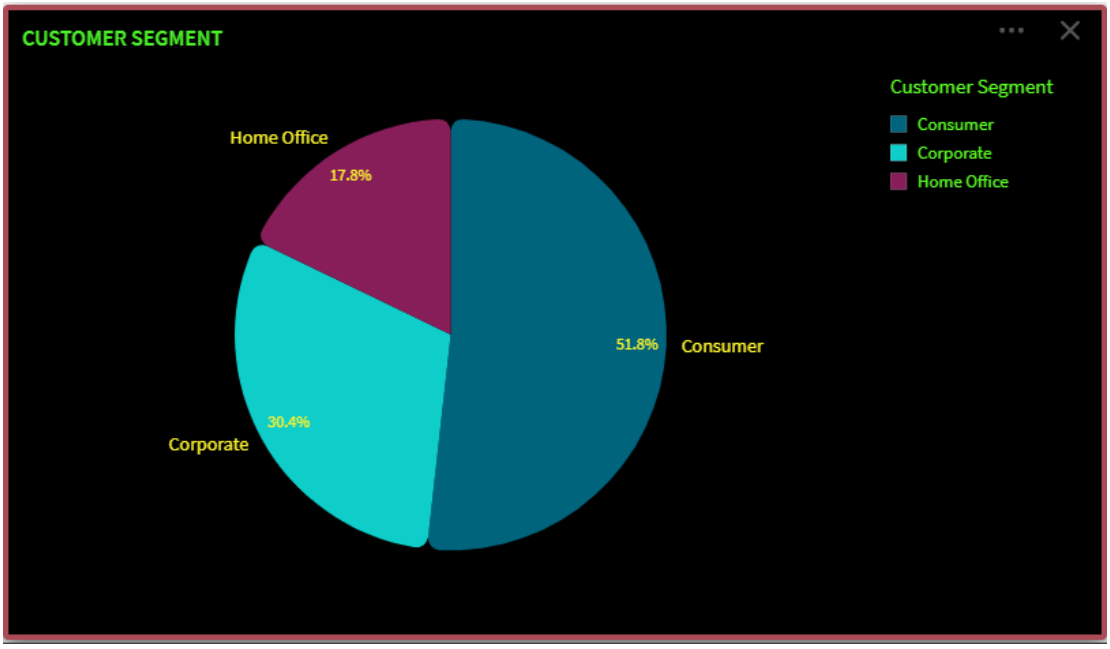


Analysis on CATEGORY by SALE

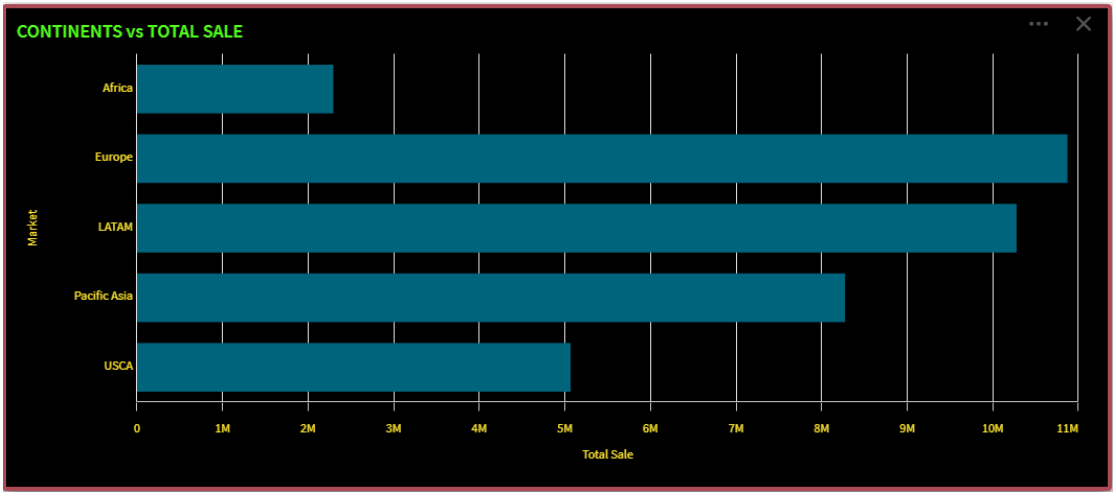


Analysis on CUSTOMER PURCHASE COUNTRY by SALE

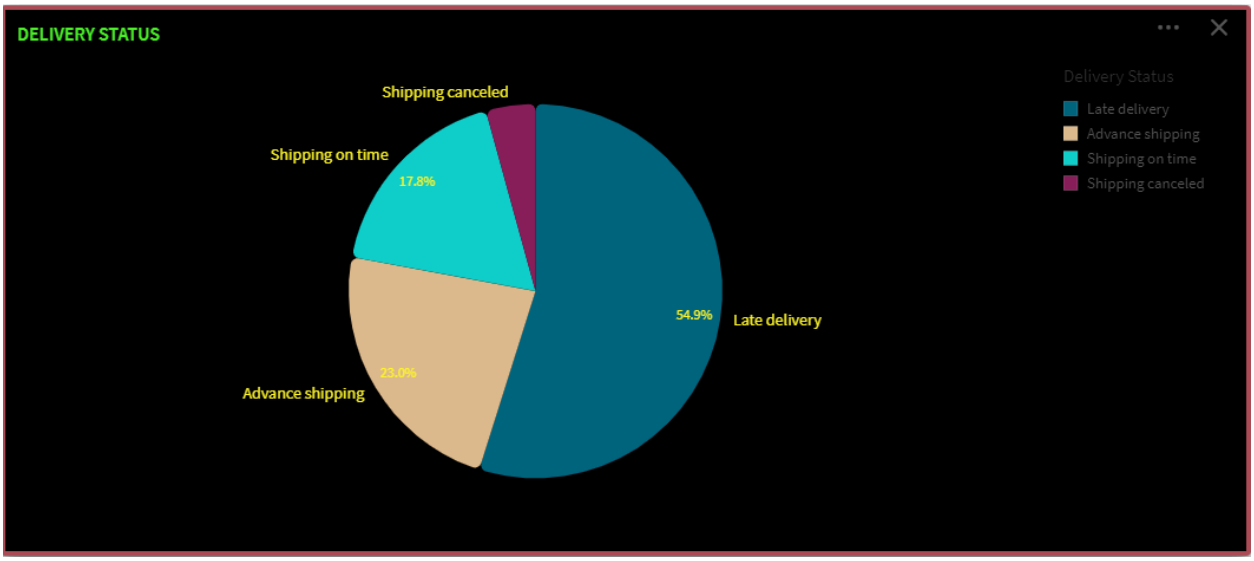
Analysis on CUSTOMER SEGMENT



Analysis on CONTINENTS by SALE



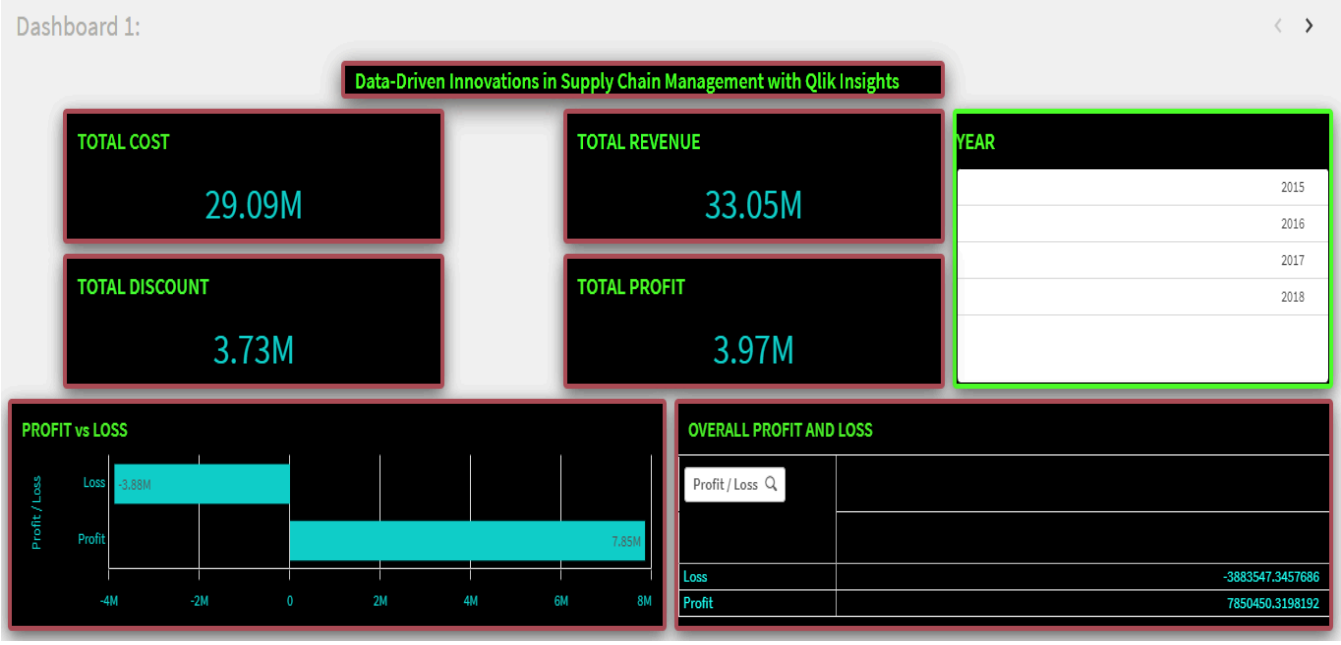
Analysis on DELIVERY STATUS



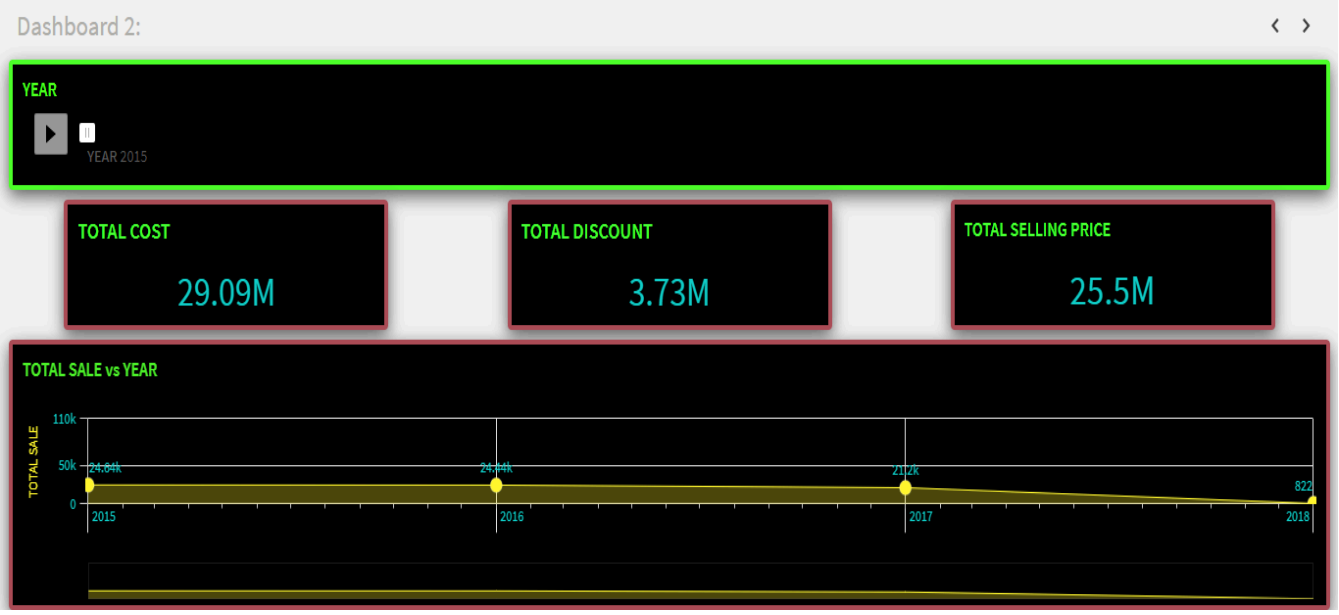
DASHBOARDS:

Responsive and Design Of Dashboard

Dashboard 1:



Dashboard 2:

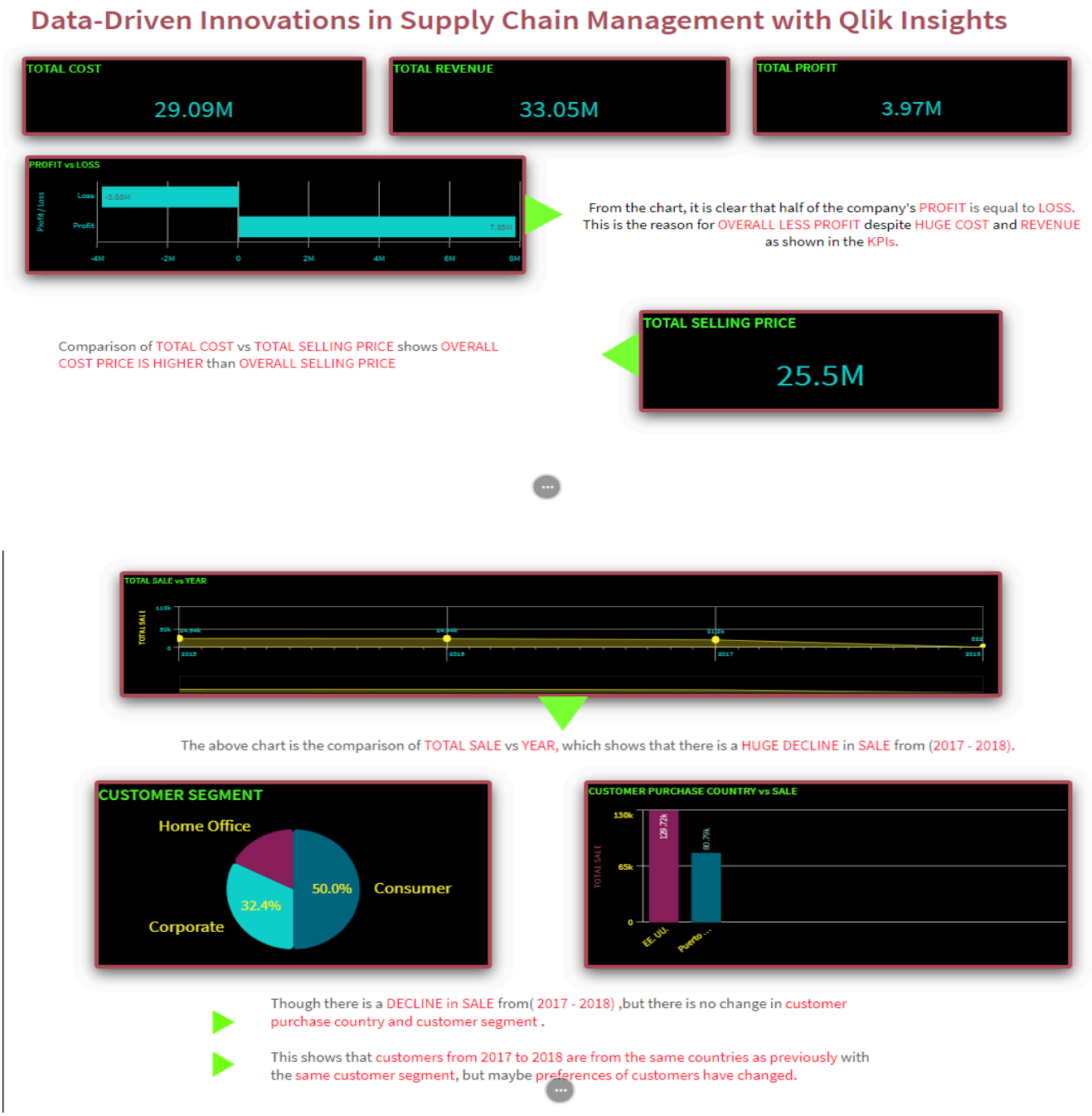


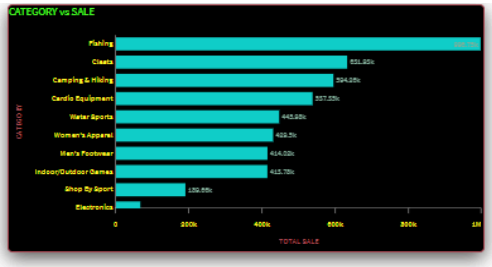
Dashboard 3:

Dashboard 4:

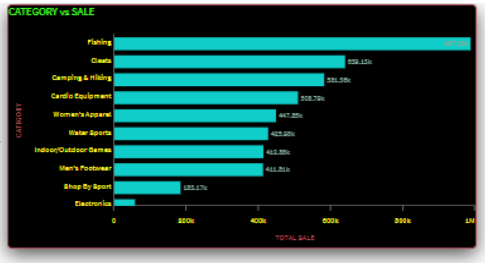
STORY :

Design of story :



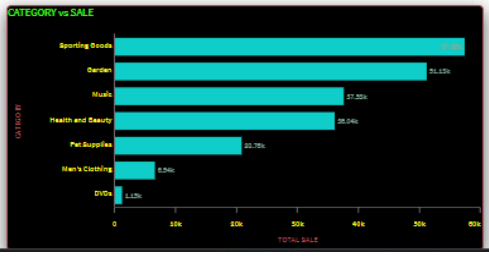


2015 -2016

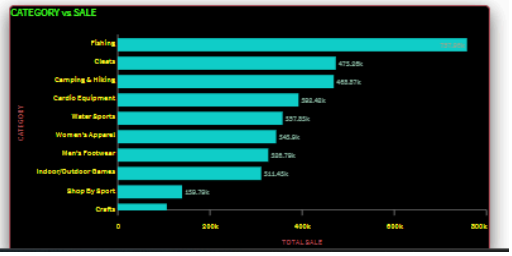


2016-2017

All the charts portray customer preference over time(every year).
IN (2015 -2016 -2017)there is NO DRASTIC CHANGE of preference. However, from 2017 to 2018, there was a DRASTIC CHANGE IN THE customer's choice, which could be one of the reasons for the drop in sales.



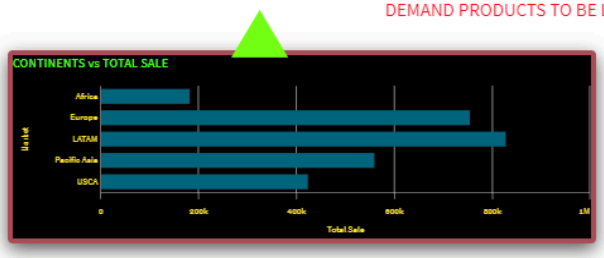
2017 -2018

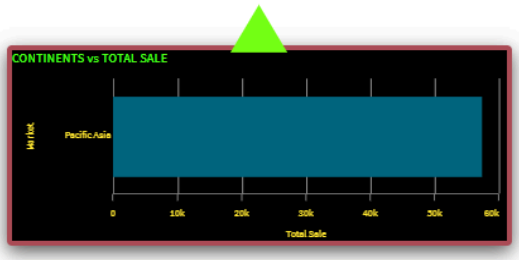


From (2015 to 2017) there were HIGH SALES OF the TOP DEMANDED CATEGORY "FISHING"PRODUCT but with 54.6% OF LATE DELIVERY

From (2017 TO 2018) there was a DROP IN SALES of the TOP DEMANDED CATEGORY "SPORTING GOODS" products with 58.3% OF LATE DELIVERY

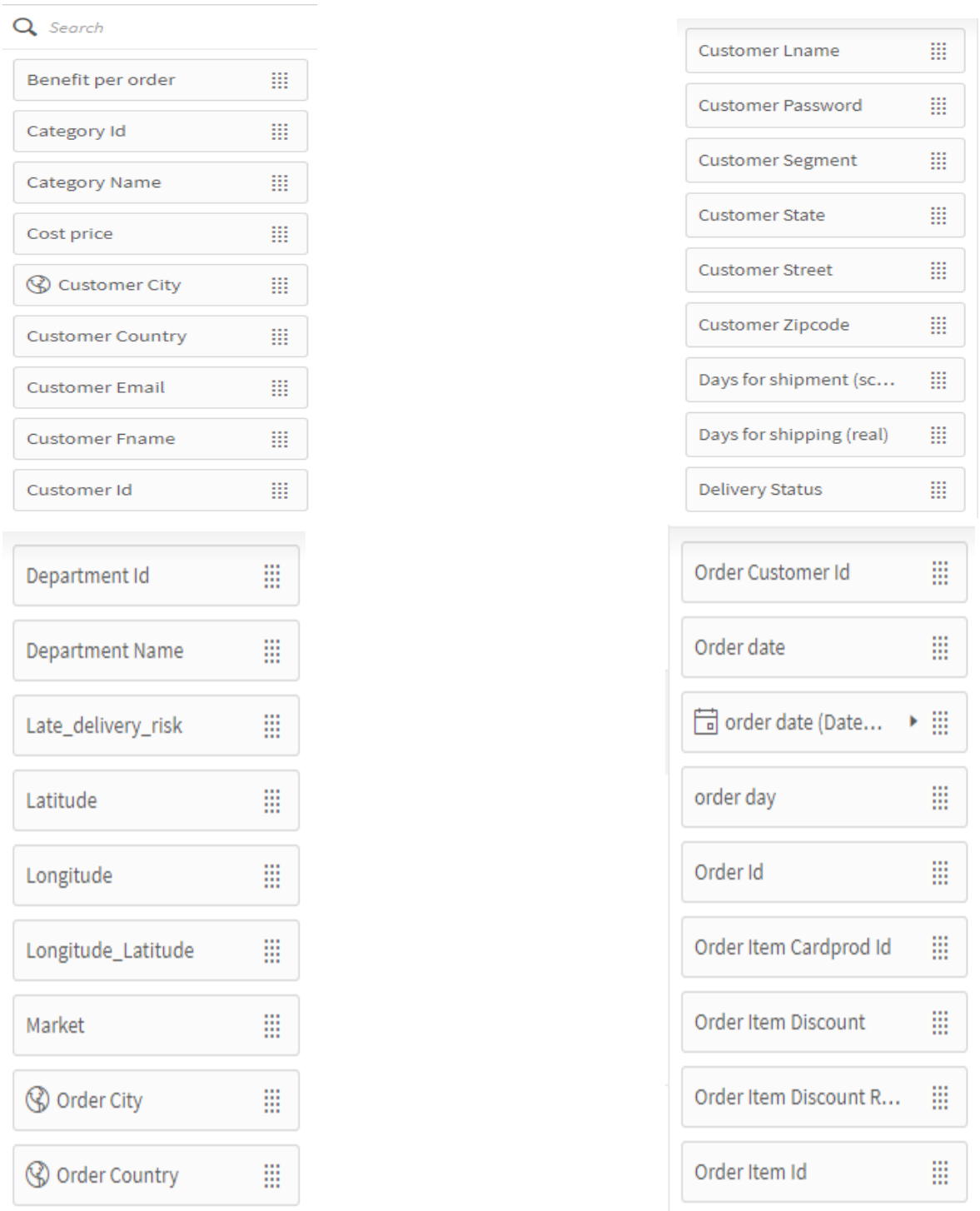
THIS INDICATES THAT DESPITE HAVING HIGH OR LOW SALES COMPANY HAD BAD LOGISTICS WHICH RESULTED IN MORE THAN HALF OF IN-DEMAND PRODUCTS TO BE LATE DELIVERED.

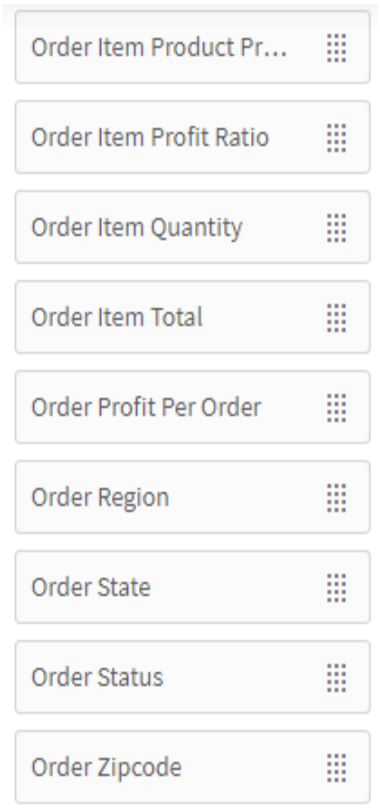


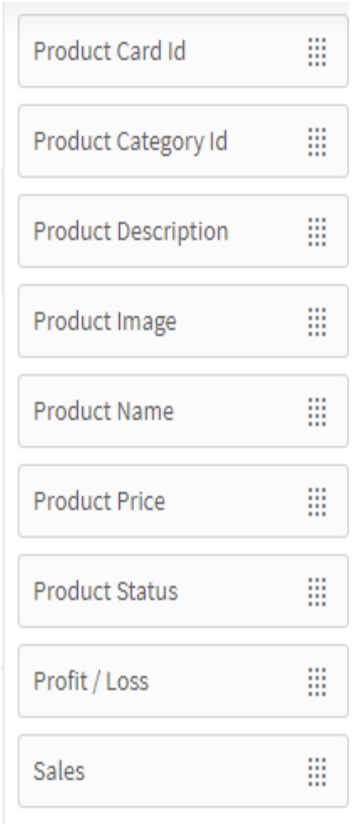


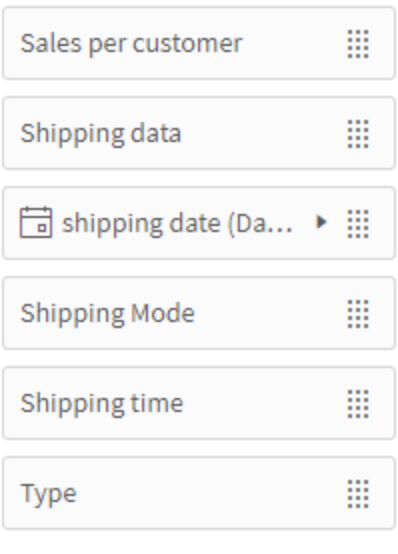
PERFORMANCE TESTING -

Amount of Data Loaded



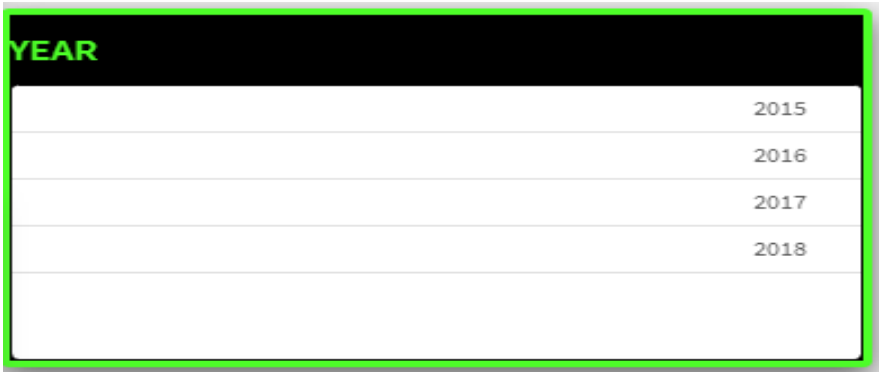

Order Item Product Pr...
Order Item Profit Ratio
Order Item Quantity
Order Item Total
Order Profit Per Order
Order Region
Order State
Order Status
Order Zipcode


Product Card Id
Product Category Id
Product Description
Product Image
Product Name
Product Price
Product Status
Profit / Loss
Sales


Sales per customer
Shipping data
shipping date (Da...
Shipping Mode
Shipping time
Type

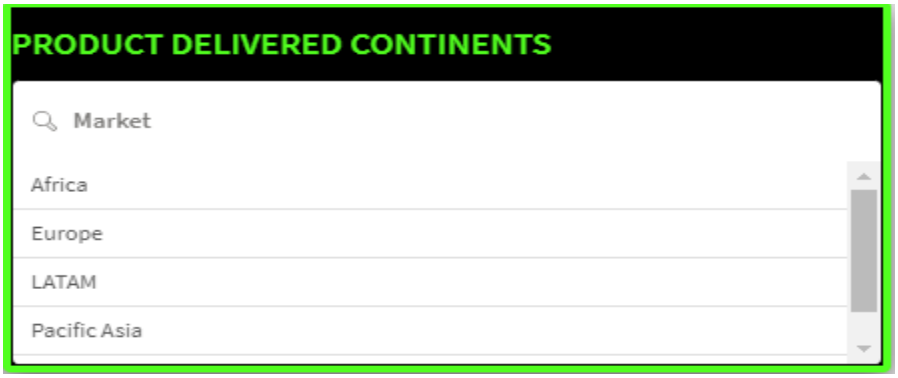
Utilization of Data Filters

FILTER by YEAR:



FILTER by CATEGORY NAME:

FILTER by PRODUCT DELIVERED CONTINENTS:



No of Visualizations/ Graphs:

- OVERALL TOTAL PROFIT vs LOSS FACED BY THE COMPANY
- TOTAL SALE as per YEAR
- Analysis on CATEGORY by SALE
- Analysis on CUSTOMER PURCHASE COUNTRY by SALE
- Analysis on CUSTOMER SEGMENT
- Analysis on CONTINENTS by SALE
- Analysis on DELIVERY STATUS

Project Demonstration Video :

https://drive.google.com/file/d/1GnLJtip57YUX1N-MgyNCajUWuHsikWBk/view?usp=sharing