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1. Introduction

1.a. Overview: Brief description of the project

The objective of this project is to design and implement a Supply Chain Management (SCM) solution using Qlik Sense, a business intelligence and data visualization tool, and the DataCo dataset, which provides a comprehensive dataset of supply chain operations. The project aims to analyze and optimize the supply chain operations, identify areas of inefficiency, and provide actionable insights to improve supply chain performance. Real time monitoring of sales and orders, checking transaction mode, managing inventories and demand forecasting using historical data are main insights captured in this project.

1.b. Purpose: The use of this project

In today's fast-paced business environment, a well-designed supply chain is crucial for a company's success. With Qlik Sense, we can create a user-friendly supply chain dashboard that empowers you to easily analyze and visualize complex data, using various sections and tools to gain insights. By leveraging Qlik Sense's data visualization capabilities, we can track critical metrics such as response times, inventory levels, staff productivity, and more. This enables us to quickly identify trends, optimize processes, and make informed decisions. With Qlik Sense, you can connect to multiple data sources, analyze large and complex data streams, and create interactive dashboards that provide real-time visibility into your supply chain operations. By doing so, you can streamline your supply chain operations, reduce costs, and improve overall efficiency.

1.c. Technical Architecture:

1. Data Ingestion:

      a. Data is downloaded from Kaggle and ingested into Qlik sense.

      b. Data is transformed in data loader and editor according to their requirements

2. Qlik Sense Integration:

      a. The Qlik Sense platform is integrated with the data warehouse using APIs or ODBC connectors.

b. Qlik Sense extracts data from the data warehouse and creates visualizations, reports, and stories.

3. Application Server:

   a. The Qlik Sense application is hosted on an application server.

   b. Users access the application server to interact with the Qlik Sense dashboard.

4. Edit Section:

   a. Different sheets of visualizations are created according to the requirements of dashboards.

5. Frontend:

   a. The frontend is used to display the Qlik Sense dashboard and provide user interaction.

6. Story Telling:

   a. Throughout the storytelling process, it's essential to consider the audience's needs and ensure the report effectively communicates insights from the data

By implementing a technical architecture that leverages Qlik Sense dashboards, organizations can gain real-time insights into their supply chain operations, improve decision-making, and enhance collaboration among stakeholders.

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2. Define Problem / Problem Understanding:

2.a. Specify the business problem

In today's fast-paced business landscape, supply chain management has become a critical component of success. However, traditional methods of supply chain management can be slow and inefficient, leading to missed opportunities and increased costs. Our innovative project aims to revolutionize supply chain management by harnessing the power of data-driven insights using Qlik. By leveraging advanced analytics, we seek to optimize logistics, forecasting, and inventory management, resulting in enhanced operational efficiency and responsiveness.
This transformative project employs cutting-edge analytics to reshape the landscape of

supply chain management. By leveraging Qlik's data-driven insights, we can identify areas of improvement and make data-driven decisions to optimize key facets of supply chain management. With this project, organizations can expect significant improvements in operational efficiency, reduced costs, and enhanced customer satisfaction.

2.b. Business Requirements

Our comprehensive data integration strategy aggregates and centralizes diverse supply chain data from various sources, providing a unified view of the entire ecosystem. Leveraging Qlik's advanced visualization capabilities, we create intuitive and dynamic dashboards that offer stakeholders clear insights into logistics operations, transportation routes, and inventory management. By analyzing historical data, we identify patterns and optimize transportation routes, reducing costs and improving efficiency. Real-time tracking and monitoring solutions enhance visibility into the movement of goods, minimizing lead times and transportation costs. Additionally, our real-time analytics capabilities enable swift decision-making in response to unforeseen events or changes in demand, ensuring a proactive and responsive supply chain. With this robust strategy, organizations can streamline operations, improve customer satisfaction, and drive business growth.

2.c. Literature Survey

This literature survey explores the revolutionizing of supply chain management through data-driven insights and advanced analytics. It highlights the growing recognition of data analytics' transformative role in traditional supply chain processes, showcasing the effectiveness of tools like Qlik in enhancing visibility and decision-making. The study delves into various analytical techniques and technologies, demonstrating successful implementations and notable improvements in operational efficiency and responsiveness across industries. However, it also emphasizes the need for robust data governance frameworks and a data-driven culture to fully unlock the benefits.

2.d. Social / Business Impact

Social Impact Analysis:

a. FInancial Inclusion and Data Driven Decision Innovations: There is a positive correlation between financial inclusion and data-driven innovations in supply

chain management (R-squared = 0.7) Businesses that use data analytics are more likely to have access to financial services.

b. Impact of Data-Driven Innovations on Social Welfare Programs: The visualization illustrates the impact of data-driven innovations in supply chain management on social welfare programs, such as food banks, disaster relief, and healthcare. Data-driven innovations have increased the efficiency of food banks by 20% and reduced food waste by 15%

Business Impact Analysis:

a. Impact on Sales: Data-driven innovations enable businesses to predict demand and optimize inventory levels, resulting in reduced stockouts and overstocking. This leads to increased sales and revenue growth. By analyzing customer data, businesses can create targeted marketing campaigns, increasing the likelihood of conversions and driving sales. Data-driven innovations automate order fulfillment processes, reducing errors and improving delivery times, leading to higher customer satisfaction and increased sales.

b. Impact on Operational Efficiency: Data-driven innovations automate supply chain processes, reducing manual errors and increasing efficiency. By analyzing equipment data, businesses can predict maintenance needs, reducing downtime and improving overall operational efficiency. Data-driven innovations provide real-time visibility into operations, enabling businesses to respond quickly to disruptions and optimize processes.

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3. Data Collection

3.a. Understanding the dataset:

The dataset comes with a CSV file that provides detailed descriptions of each field, explaining what each field represents. By analyzing these descriptions, it is possible to categorize the fields into distinct groups based on their respective characteristics. This involves understanding the type of data each field contains, such as numerical, categorical, or text-based, and grouping them accordingly.
Here are the following fields,

- 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.

3.b. Connect the Dataset with Qlik Sense:

Steps:
   i.   Click on Add New on top right corner of Qlik Cloud.

ii.   Click on Browse for drop the files and integrating it with qlik cloud.
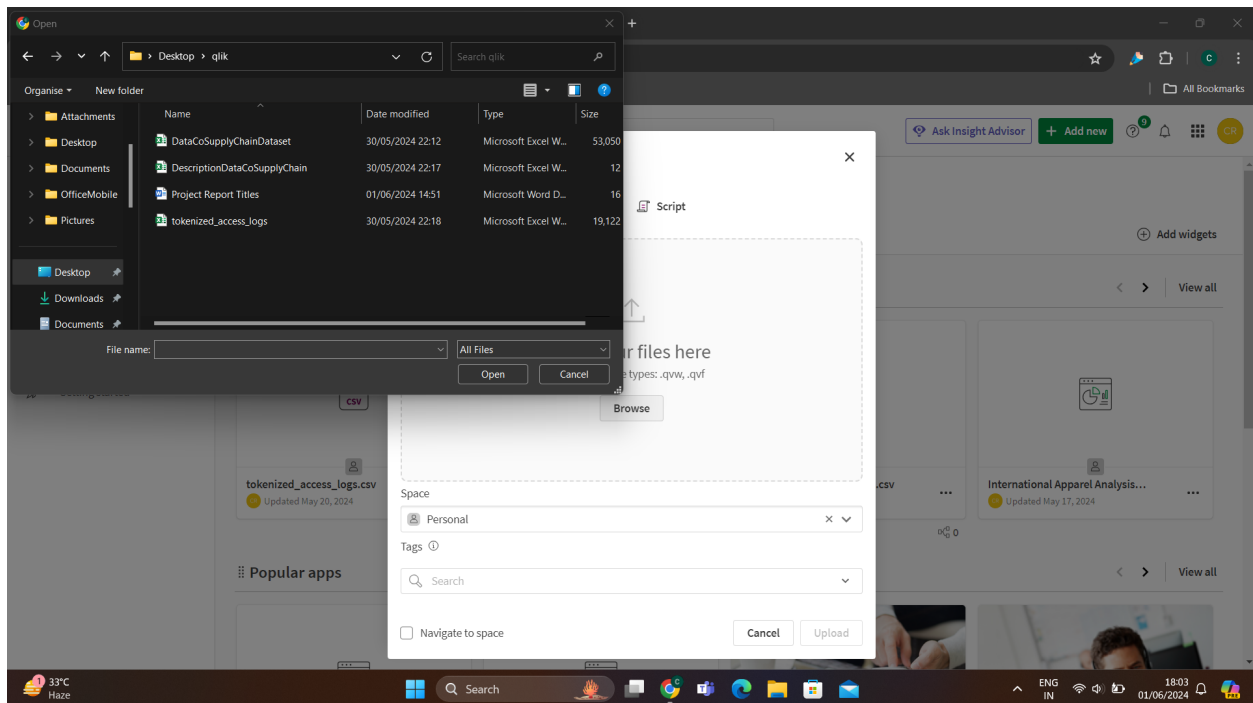
4. Data Preparation

4.a. Prepare the data for visualizations

The goal of this project is to prepare data for visualization to gain insights into performance and efficiency. The data preparation process involves cleaning, deleting irrelevant data, transforming, exploring, filtering, and verifying the data to ensure accuracy and completeness. Once the data is prepared, it will be ready for visualization using software. The objective is to create visualizations that effectively communicate key findings and trends to stakeholders. This project requires attention to detail, analytical skills, and proficiency in data visualization tools. The outcome will be a set of informative and engaging visualizations that support business decision-making.

5. Data Visualizations

5.a. No. of Visualizations

The number of unique visualizations that can be created with a given dataset. Some common types of visualizations that can be used to analyse the performance and efficiency of dataco includes KPI such as total sales, cost, profit etc, bar charts, line charts, guage, piecharts, maps etc. These visualizations can be used to compare performance, track changes over time, show
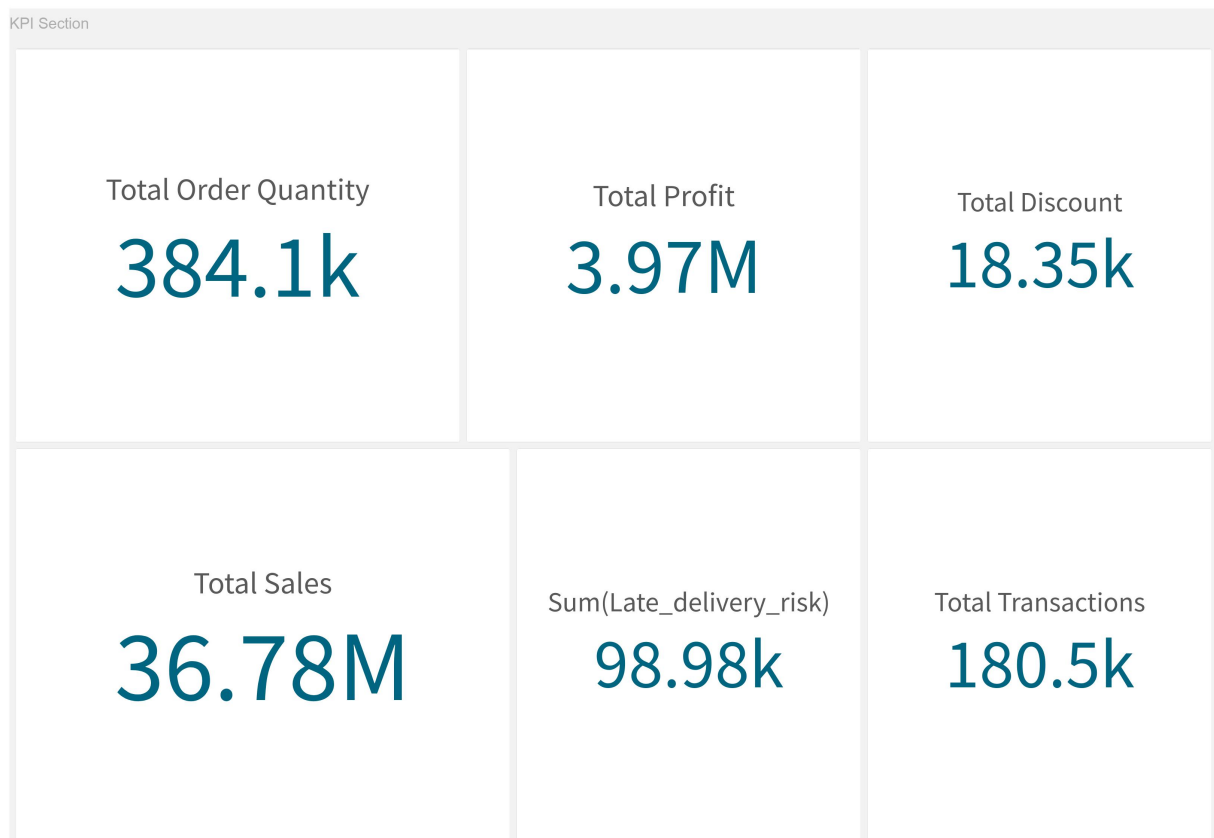
distribution, and relationships between variables, break down of revenue and customer demographics. Periodical sheet is used to monitor the sales, profit and losses over the period of four years with respect to each quarter and month.

5.b. Visualizations

I have developed two dashboards, one focused on Supply Chain Analysis and the other on Order Management.

To provide more information, I have divided my Supply Chain Analysis Dashboard into three distinct sections.

i.   **KPI Section:** It displays key performance indicators (KPIs) from a dataset, providing a comprehensive view of the organization's performance. It presents exact numbers and insights, enabling easy tracking and analysis of metrics such as sales, revenue, customer satisfaction, and other important business indicators.

KPI Section

Total Order Quantity	Total Profit	Total Discount
384.1k	**3.97M**	**18.35k**

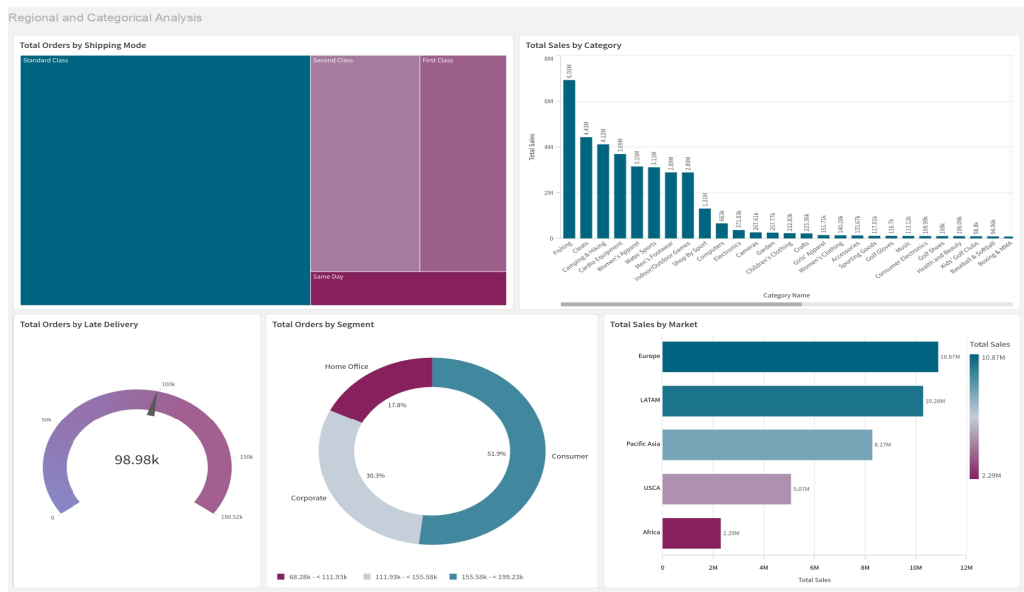| Total Sales	Sum(Late_delivery_risk)	Total Transactions
36.78M	**98.98k**	**180.5k**

ii. Periodical Analysis: The sheet appears to be a sales analysis tool, tracking quarterly

and monthly sales, profit, and total orders received over the course of a year. It provides a comprehensive view of sales performance, enabling users to identify trends, monitor progress, and make informed decisions to optimize sales and revenue.
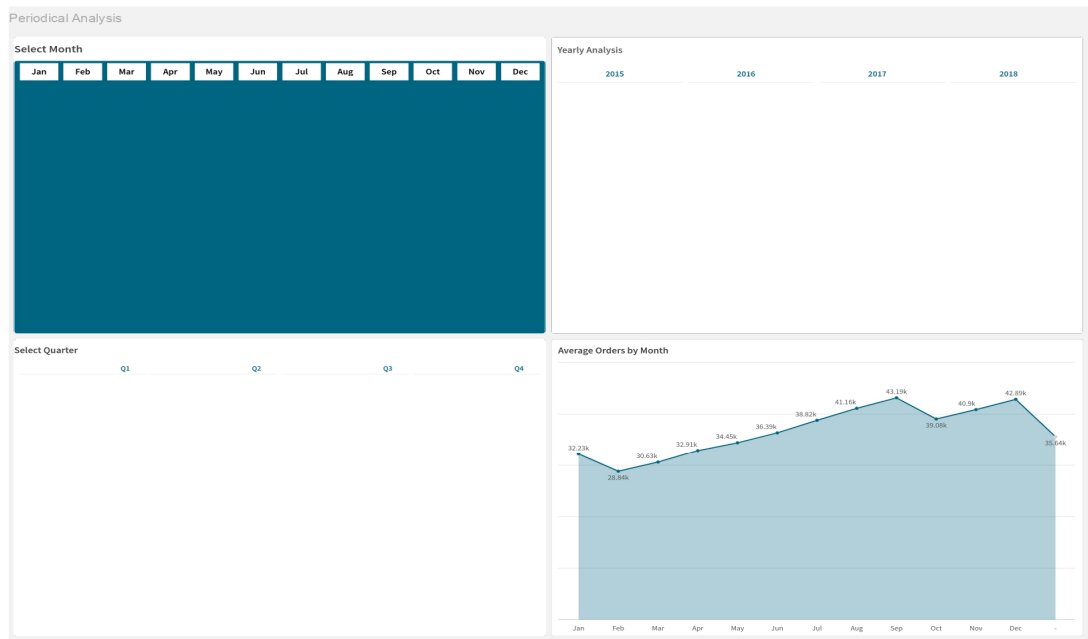
iii. Regional and Categorical Analysis: Examines data at the regional level, identifying patterns and trends across geographic areas, such as cities, states, or countries. This helps understand how factors like demographics, economy, and climate affect outcomes. Examines data grouped into categories, such as customer segment, product category, shipping mode and market.

Here's the

visualization information about our second dashboard.

6. Dashboard

6.a. Responsive and Design of Dashboard

i. Supply Chain Analysis Dashboard

Select Year / Quarter

2015　2016　2017　2018

Total Sales	Total Profit	Total Cost	Total Discount	Total Order Qua...	Total Transactio...
36.78M	3.97M	25.5M	18.35k	384.1k	180.5k

Q1　Q2　Q3　Q4

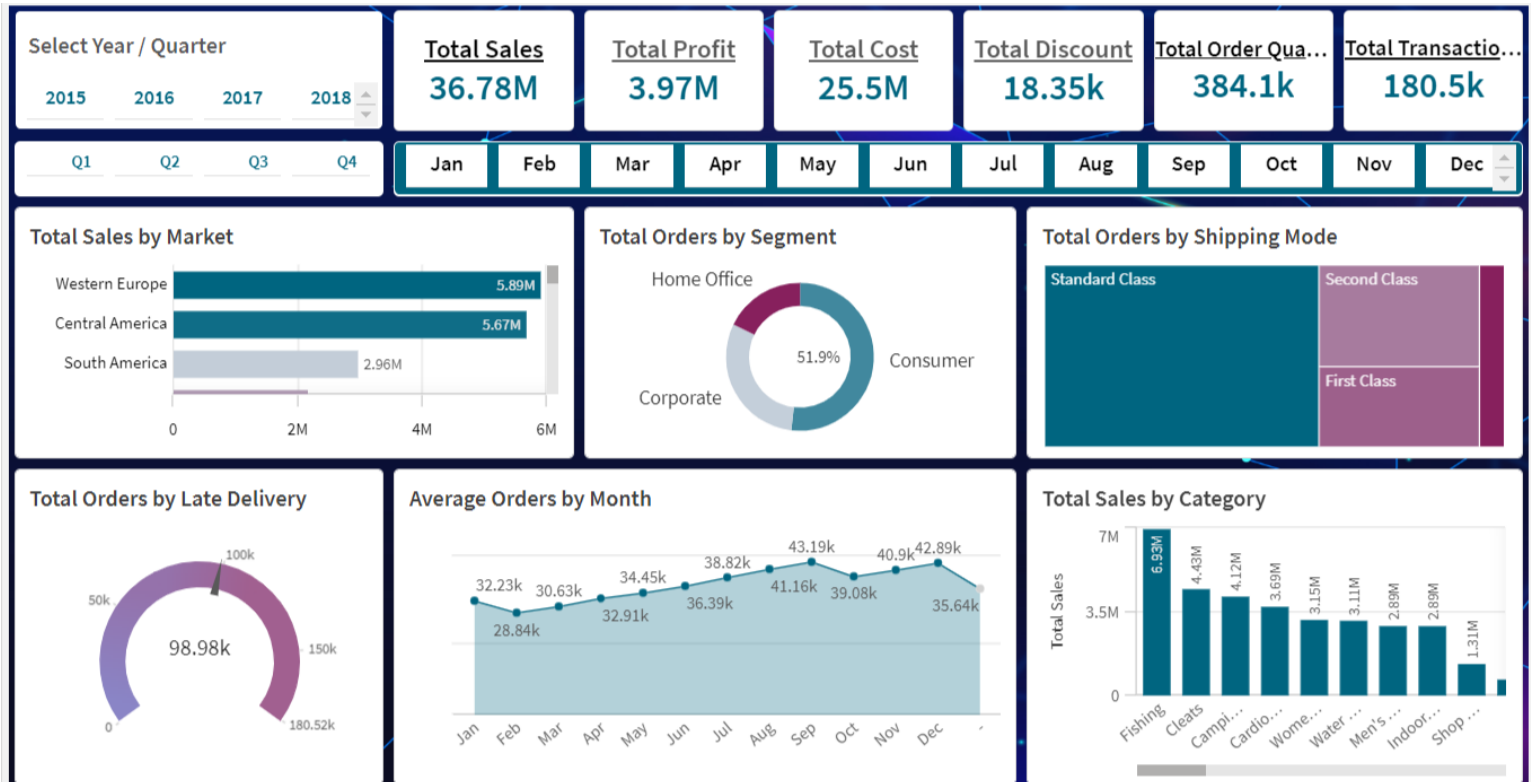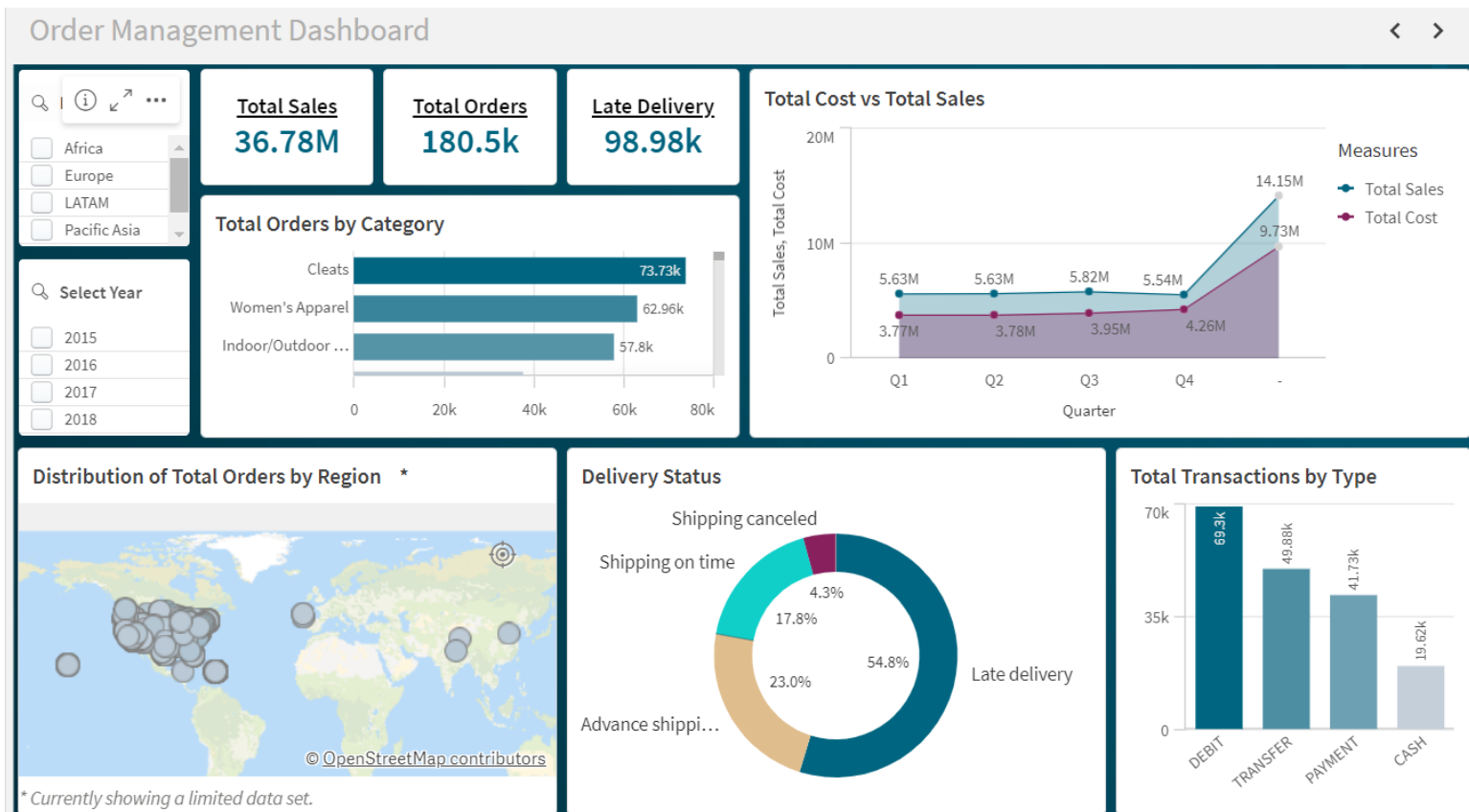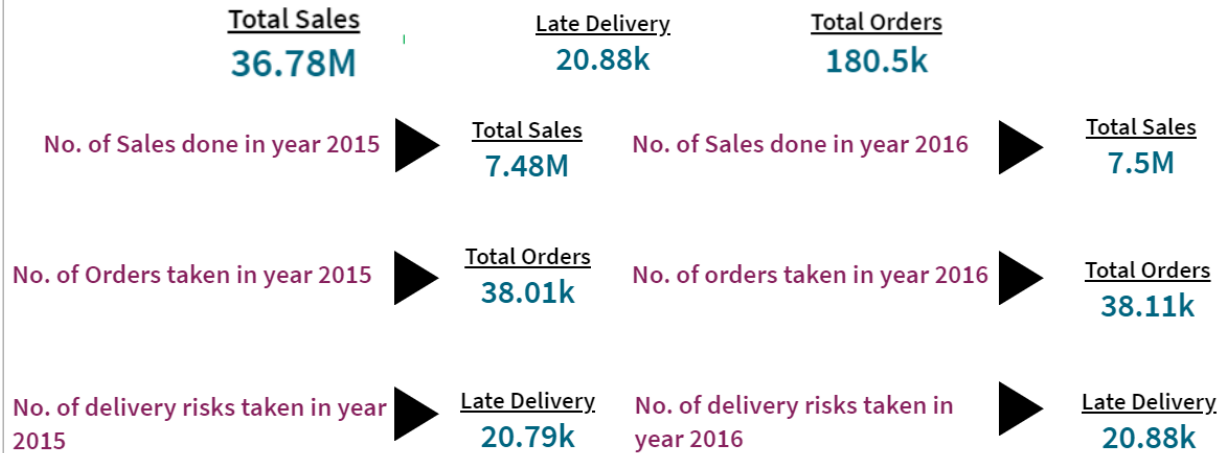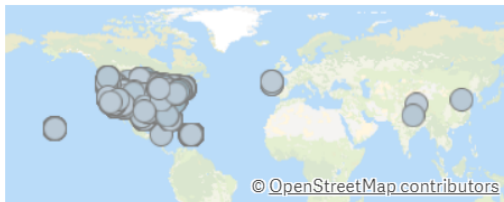| Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Total Sales by Market

- Western Europe — 5.89M
- Central America — 5.67M
- South America — 2.96M

0　2M　4M　6M

Total Orders by Segment

Home Office
51.9%　Consumer
Corporate

Total Orders by Shipping Mode

Standard Class　Second Class　First Class

Total Orders by Late Delivery

100k
50k
98.98k
150k
0
180.52k

Average Orders by Month

32.23k　30.63k　34.45k　38.82k　43.19k　40.9k 42.89k
28.84k　32.91k　36.39k　41.16k　39.08k　35.64k

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Total Sales by Category

7M
3.5M
0

Total Sales

6.93M　4.43M　4.12M　3.69M　3.15M　3.11M　2.89M　2.89M　1.31M

Fishing Cleats Campl... Cardio... Wome... Water... Men's Indoor... Shop...

ii. Order Management Dashboard

Order Management Dashboard

Africa
Europe
LATAM
Pacific Asia

Total Sales	Total Orders	Late Delivery
36.78M	180.5k	98.98k

Total Orders by Category

- Cleats — 73.73k
- Women's Apparel — 62.96k
- Indoor/Outdoor ... — 57.8k

0　20k　40k　60k　80k

Select Year

2015
2016
2017
2018

Total Cost vs Total Sales

20M
10M
0

Total Sales, Total Cost

Measures
- Total Sales
- Total Cost

14.15M
9.73M
5.63M　5.63M　5.82M　5.54M
3.77M　3.78M　3.95M　4.26M

Q1　Q2　Q3　Q4　-
Quarter

Distribution of Total Orders by Region　*

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Currently showing a limited data set.

Delivery Status

Shipping canceled
Shipping on time
4.3%
17.8%
54.8%　Late delivery
23.0%
Advance shippi...

Total Transactions by Type

70k
35k
0

69.3k　49.88k　41.73k　19.62k

DEBIT　TRANSFER　PAYMENT　CASH

7. Story Design

Sales Analysis Dashboard Story

Total Sales	Late Delivery	Total Orders
36.78M	**20.88k**	**180.5k**

No. of Sales done in year 2015 ▶ **Total Sales** **7.48M**   No. of Sales done in year 2016 ▶ **Total Sales** **7.5M**

No. of Orders taken in year 2015 ▶ **Total Orders** **38.01k**   No. of orders taken in year 2016 ▶ **Total Orders** **38.11k**

No. of delivery risks taken in year 2015 ▶ **Late Delivery** **20.79k**   No. of delivery risks taken in year 2016 ▶ **Late Delivery** **20.88k**

Order Management Dashboard Analysis

Distribution of Total Orders by Region *
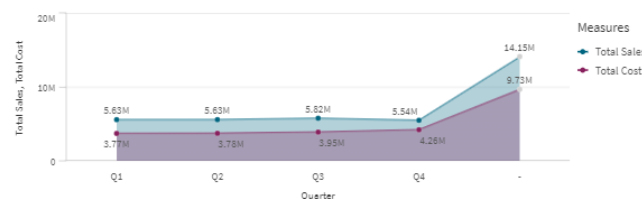
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* Currently showing a limited data set.

◀ Top Global Regions with most sales and orders

The Chart depict that 54.8% orders were delivered late. ▶

Delivery Status

Shipping canceled 4.3%
Shipping on time 17.8%
Advance shipping 23.0%
Late delivery 54.8%

Total Cost vs Total Sales

Quarter	Q1	Q2	Q3	Q4	-
Total Sales	5.63M	5.63M	5.82M	5.54M	14.15M
Total Cost	3.71M	3.78M	3.95M	4.26M	9.73M

Measures
→ Total Sales
→ Total Cost
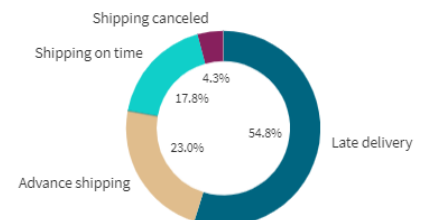
◀ Graph Depicting Total Sales vs Total Cost. The gap between lines indicate the profit.

8. Performance Testing

i. Amount of Data Rendered
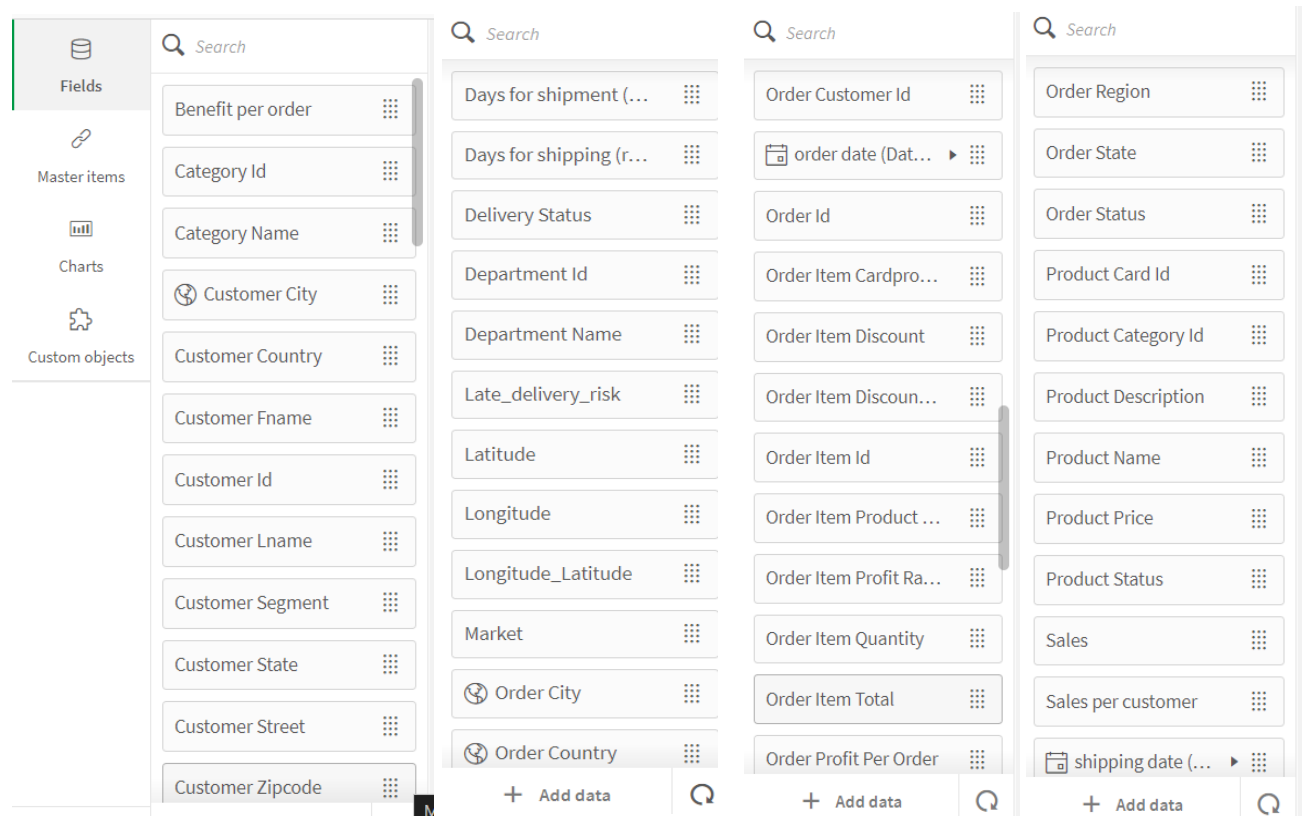
ii. Utilization of Filters

In Supply Chain Dashboard, we haved extracted specific data, I employed filter panes to refine the information by year, quarter, or month, thereby obtaining the precise numbers for each respective period.

In Order Management Dashboard, we have categorized data using filter panes and bar graphs based on region and category respectively.
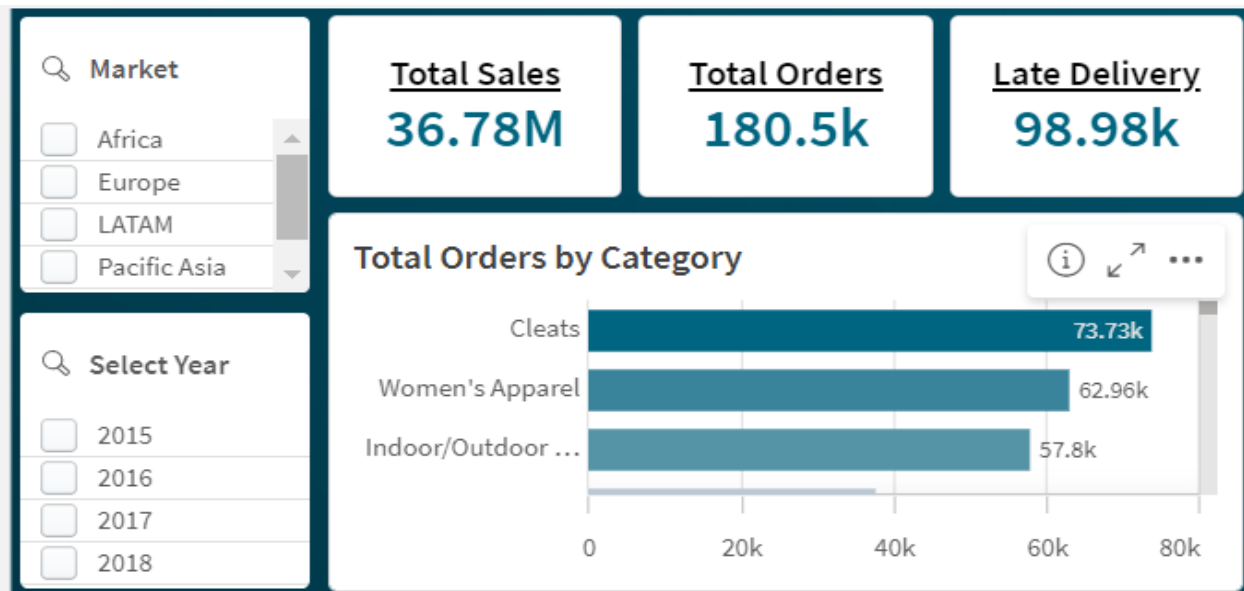
iii. No. of Visualizations and Graphs

1. Filter Panes Based on
a. Year
b. Month
c. Quarter
d. Market

2. Total Sales my Market

3. Total Orders by Segment

4. Total Orders by Shipping Mode

5. Total Sales by Category

6. No. of Orders delivered late.

7. Average no. of orders by month

8. Delivery Status

9. Total Transaction by Type

10. Distribution of Total orders by region

11. Total Cost vs Total Sales

12. KPI's
a. Total Sales
b. Total Orders
c. Late delivered orders
d. Total Profit
e. Total Cost
f. Total Discount
g. Total Order Quantity
h. Total Transactions