

PROJECT REPORT

1. INTRODUCTION

Data-Driven Innovations In Supply Chain Management With Qlik Insights

1.1 Overview:

This project describes about the DataCo SMART SUPPLY CHAIN FOR BIG DATA ANALYSIS datasets.

This project is made using Qlik cloud app, it is a very useful app for business and data analytics.

With this Qlik cloud app we can make various visualizations, create stories and dashboards in an easier way.

The data is taken from the DataCo company, and describes about the supply chain management. It consists of big data, big data means the data which consists of a huge amount of data.

So in short, the project deals with the dataset of DataCo company, in the field of supply chain management. The analytics is done using Qlik cloud, the domain of the project is Business Analytics.

In this project, we are going to see the solutions to solve the problems of the supply chain management.

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1.2 Purpose:

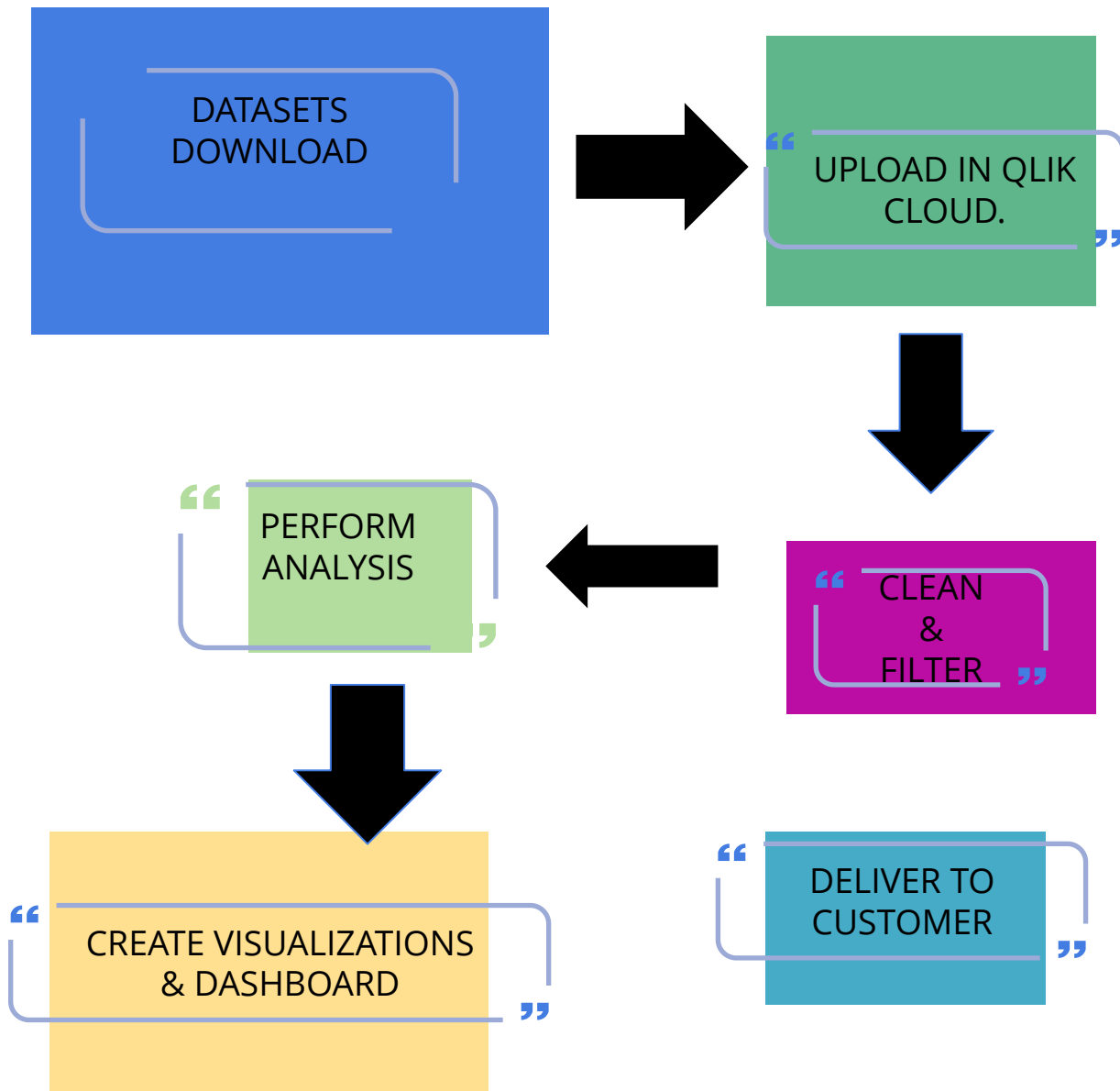
The use of this project is to deliver the solutions for some of the business problems which are faced in supply chain management.

This project is very useful for analysis of the company's datasets and get insights so that the business can be improved and quick decisions can be made through it.

Generally when we look at a dataset, suppose a company's dataset, we will not be able to understand it in a clear way, to get insights in an easy, efficient and quick way, we will use dashboards etc.

Through this project, we can achieve the solutions for common questions about the company, its sales and about its profit, etc.

1.3 Technical Architecture



2 . PROBLEM STATEMENT

2.1 Business Problem:

DataCo Global , a retail company, has a lot of data about how it manages its products, from getting them ready to selling them. This data provides valuable insights for optimizing inventory management , enhancing product offerings, improving supply chain efficiency, personalizing customer experience and driving data-driven decision-making.

This project provides insights for improving the efficiency of DataCo Global's supply chain operations, enhancing customer satisfaction, and driving informed decision-making across the organization.

As the company cannot make decisions randomly due to various factors, the company needs a data analyst or business analyst, who can work in an efficient way to make data to visualize in an efficient and convenient way.

Even though there are various solutions to make the company to visualize about its working, an efficient solution can drive the company in a better and quick manner, reducing the unnecessary charges and supply time, through efficient analysis of its data, solutions can be designed and developed.

This project aims to 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.

This transformative project endeavors to reshape the landscape of supply chain management by harnessing the power of Qlik's data-driven insights. Employing cutting-edge analytics, it strives to revolutionize key facets such as logistics, forecasting, and inventory management, with the overarching goal of elevating operational efficiency and responsiveness to new heights.

2.2 Business requirements:

Qlik cloud , datasets, Business analytics skills and data management skills.

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 into the entire supply chain ecosystem. Leverage Qlik's advanced analytics features to analyse historical logistics data, identify patterns, and optimize transportation routes. Implement real-time tracking and monitoring solutions to enhance visibility into the movement of goods, reducing lead times and minimizing transportation costs.

Implement real-time analytics to facilitate quick decision-making in response to unforeseen events or changes in demand, ensuring a proactive and responsive supply chain.

2.3 Literature Survey

Literature Survey on Supply Chain Management for Big Data Analysis

Introduction

Supply Chain Management (SCM) is a critical component of business operations, encompassing the management of the flow of goods and services from raw material procurement to final product delivery. With the advent of big data analytics, SCM has undergone significant transformations, allowing companies to leverage vast amounts of structured and unstructured data to optimize their operations. This literature survey examines the integration of big data analytics in SCM, focusing on its benefits, challenges, and case studies, particularly emphasizing the DataCo Smart Supply Chain dataset.

Big Data Analytics in Supply Chain Management

Big data analytics refers to the process of examining large and varied datasets to uncover hidden patterns, unknown correlations, market trends, customer preferences, and other useful business information. In the context of SCM, big data analytics helps in enhancing decision-making processes, improving efficiency, and reducing costs.

Key Components

- **Structured Data:** Typically involves data that is highly organized and easily searchable, such as the DataCoSupplyChainDataset.csv, which includes metrics like days for shipping, sales per customer, and delivery status.
- **Unstructured Data:** Includes data that lacks a predefined data model, such as clickstream data from tokenized_access_logs.csv, which can be used to analyze customer behavior and preferences.

Benefits of Big Data Analytics in SCM

Improved Demand Forecasting

Big data analytics enables more accurate demand forecasting by analyzing historical sales data, market trends, and customer behavior. This helps in minimizing inventory costs and avoiding stockouts or overstock situations.

Enhanced Operational Efficiency

By leveraging big data, companies can optimize various aspects of their supply chain operations, from production scheduling to logistics management. For example, analyzing delivery status and late delivery risk can help in identifying bottlenecks and improving delivery times.

Better Supplier Relationship Management

Big data analytics allows businesses to evaluate supplier performance more effectively by analyzing various parameters such as on-time delivery rates, quality of goods, and cost efficiency. This leads to better supplier selection and improved supplier relationships.

Customer Insights and Personalization

Analyzing customer data helps businesses understand buying patterns and preferences, enabling personalized marketing strategies and improved customer satisfaction.

Challenges in Implementing Big Data Analytics in SCM

Data Integration

Integrating data from multiple sources, especially when dealing with both structured and unstructured data, poses significant challenges. Ensuring data quality and consistency is critical for accurate analysis.

Data Security and Privacy

With the increasing amount of data being collected and analyzed, ensuring data security and privacy is a major concern. Companies need to implement robust security measures to protect sensitive information.

Technical Expertise

Implementing big data analytics requires specialized skills and knowledge. Companies need to invest in training their workforce or hiring experts in data science and analytics.

Cost

The initial investment in big data infrastructure and tools can be high. Companies need to weigh the costs against the potential benefits to justify the investment.

Case Studies and Applications

DataCo Global's Supply Chain

The DataCo Smart Supply Chain dataset provides a comprehensive example of how big data analytics can be applied in SCM. The dataset includes various metrics that allow for detailed analysis of supply chain performance, such as shipping times, sales data, and customer demographics. This enables companies to identify trends, optimize processes, and improve overall efficiency.

Retail Industry

Retail companies have widely adopted big data analytics to optimize their supply chains. By analyzing customer purchase data, retailers can forecast demand more accurately, manage inventory more effectively, and enhance customer experience through personalized marketing.

Manufacturing Sector

In manufacturing, big data analytics is used to monitor equipment performance, predict maintenance needs, and improve production processes. This leads to reduced downtime, lower maintenance costs, and increased productivity.

Conclusion

Big data analytics has revolutionized supply chain management by providing deeper insights and enabling data-driven decision-making. While there are challenges to its implementation, the benefits in terms of improved efficiency, cost savings, and enhanced customer satisfaction are substantial. The DataCo Smart Supply Chain dataset exemplifies the potential of big data analytics in transforming SCM. As technology continues to evolve, the integration of big data analytics in supply chains will become increasingly sophisticated, offering even greater opportunities for optimization and growth.

3 DATA COLLECTION:

Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, evaluate outcomes and generate insights from the data.

3.1: DataSet

DataCo SMART SUPPLY CHAIN FOR BIG DATA ANALYSIS | Kaggle..

SUPPLY CHAIN FOR BIG DATA ANALYSIS..

<https://www.kaggle.com/datasets/shashwatwork/dataco-smart-supply-chain-for-big-data-analysis/data>

From the above link the dataset can be downloaded.

About Dataset

Content

A DataSet of Supply Chains used by the company DataCo Global was used for the analysis. Dataset of Supply Chain , which allows the use of Machine Learning Algorithms .

Areas of important registered activities : Provisioning , Production , Sales , Commercial Distribution.It also allows the correlation of Structured Data with Unstructured Data for knowledge generation.

Type Data :

Structured Data : DataCoSupplyChainDataset.csv

Unstructured Data : tokenized_access_logs.csv (Clickstream)

Types of Products : Clothing , Sports , and Electronic Supplies

Additionally it is attached in another file called DescriptionDataCoSupplyChain.csv, the description of each of the variables of the DataCoSupplyChainDataset.csv.

3.2 Connect Data With Qlik Sense:

To connect data with Qlik Sense,

Login into your Qlik cloud, Click on add data and there you can load your data into Qlik cloud by selecting your data and click on upload button.

Now your data is being successfully loaded into Qlik cloud.

And you can perform further operations on your data now.

4 DATA PREPARATION:

4.1 How to prepare data for visualization:

Preparing data involves the process of removing the irrelevant data or missing data, and formatting the data to make visualization accurate .

Next step is to explore the data, i.e., to identify the trends and patterns and trends within the dataset based on the specific subset of data.

In this step, we prepare the data to be suitable for visualization and to make it accurate and complete.

By doing this process, the data can be easily understandable and ready for creating visualization to gain insights into performance and efficiency.

After these steps, the data gets cleaned and can be used for visualization.

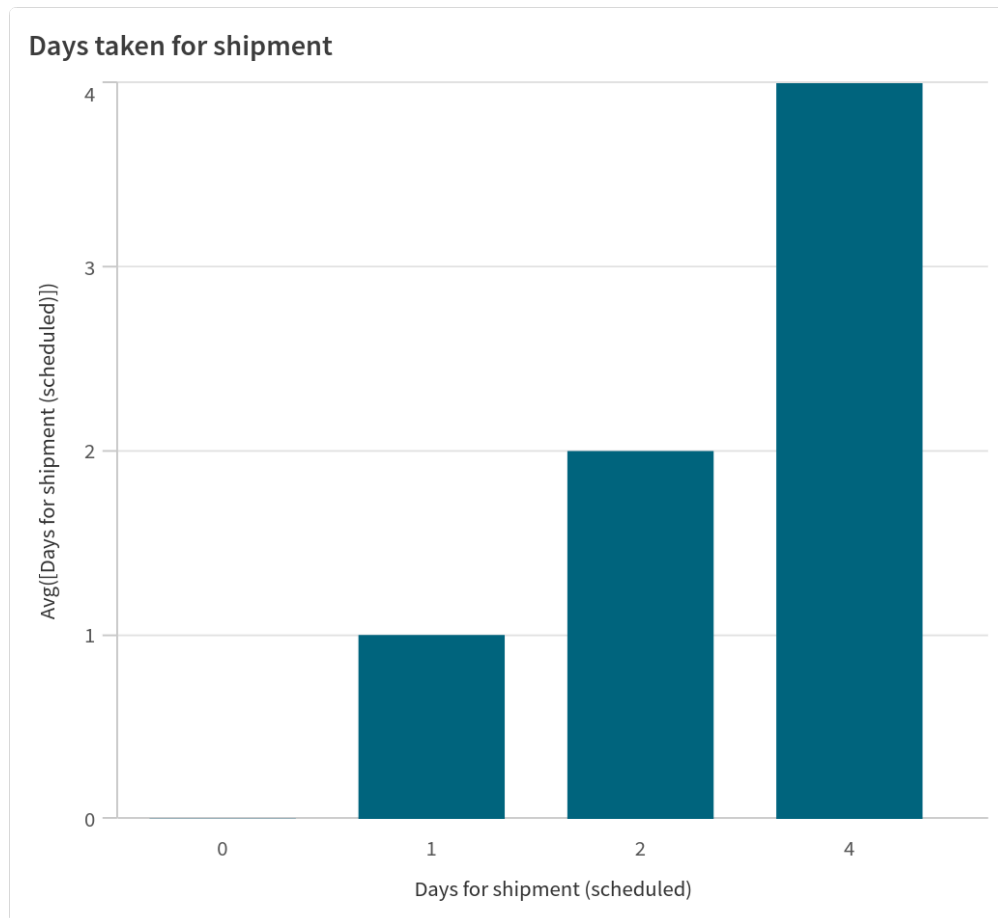
5 DATA VISUALIZATION

We can create manyline charts , heat maps, number of visualizations with the given dataset.

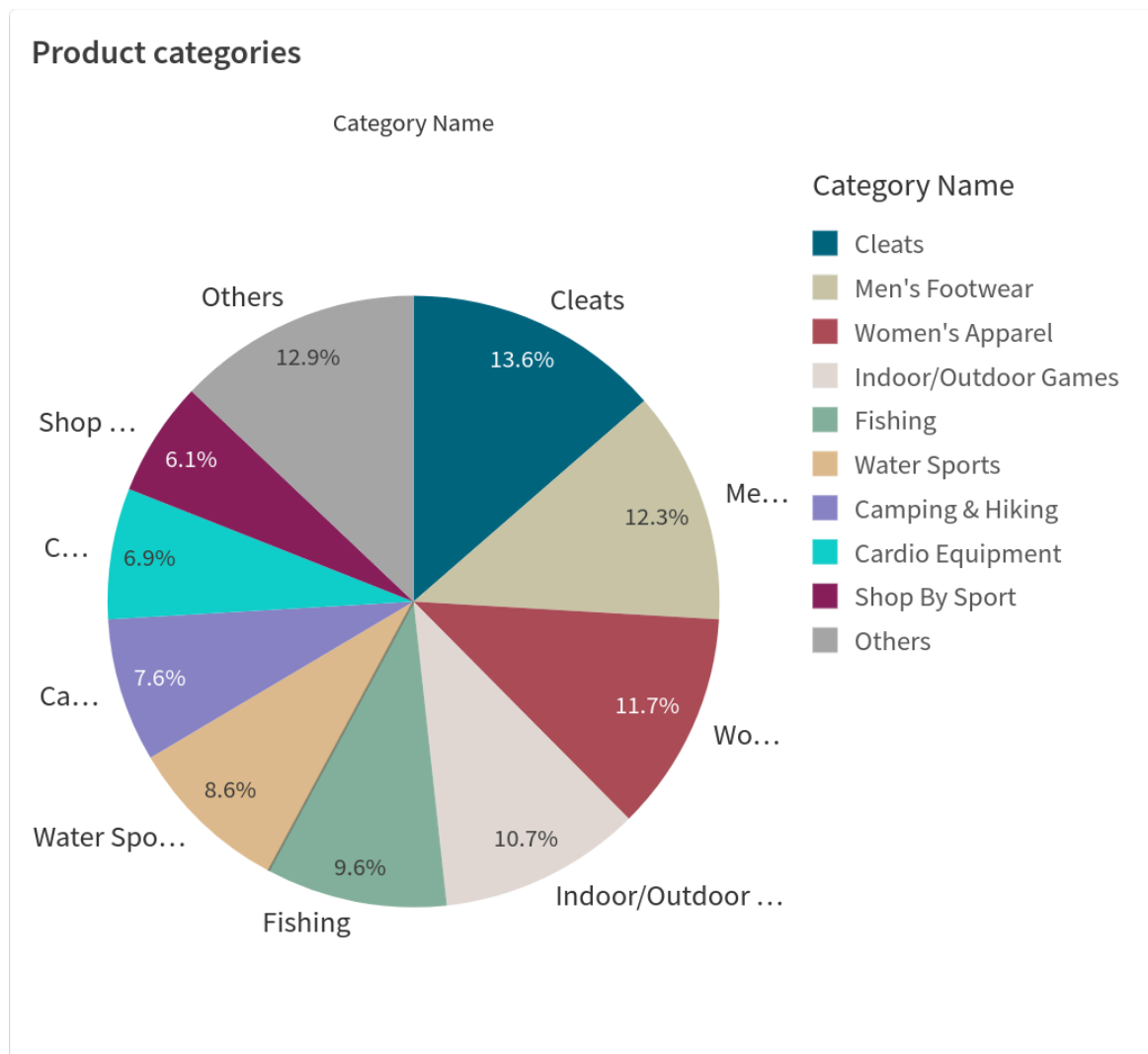
Some of the common visualizations include, bar charts, Scatterplots , pie charts, Maps etc.;

These visualizations helps to compare performance , track changes over time, show distribution and relationships among the variables.

Visualizations Created using refined version of the given dataset:



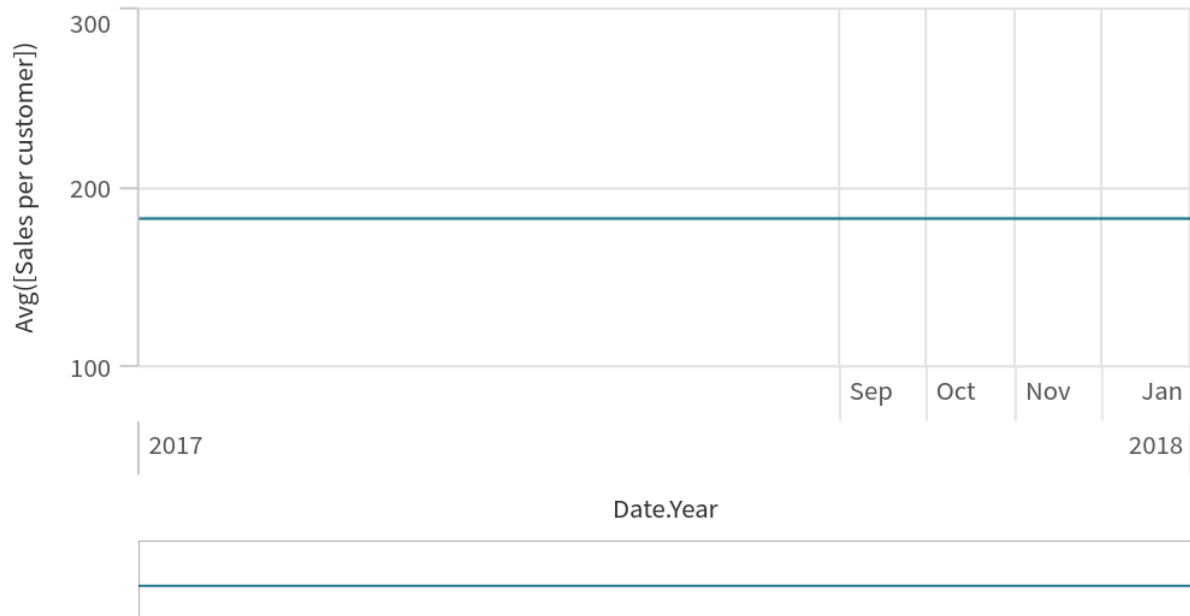
In this plot , we can see that a bar graph is plotted for days of shipment and an average days of shipment.



The above image represents a pie chart of various products , according to the category name , and percentage of its in the all products.

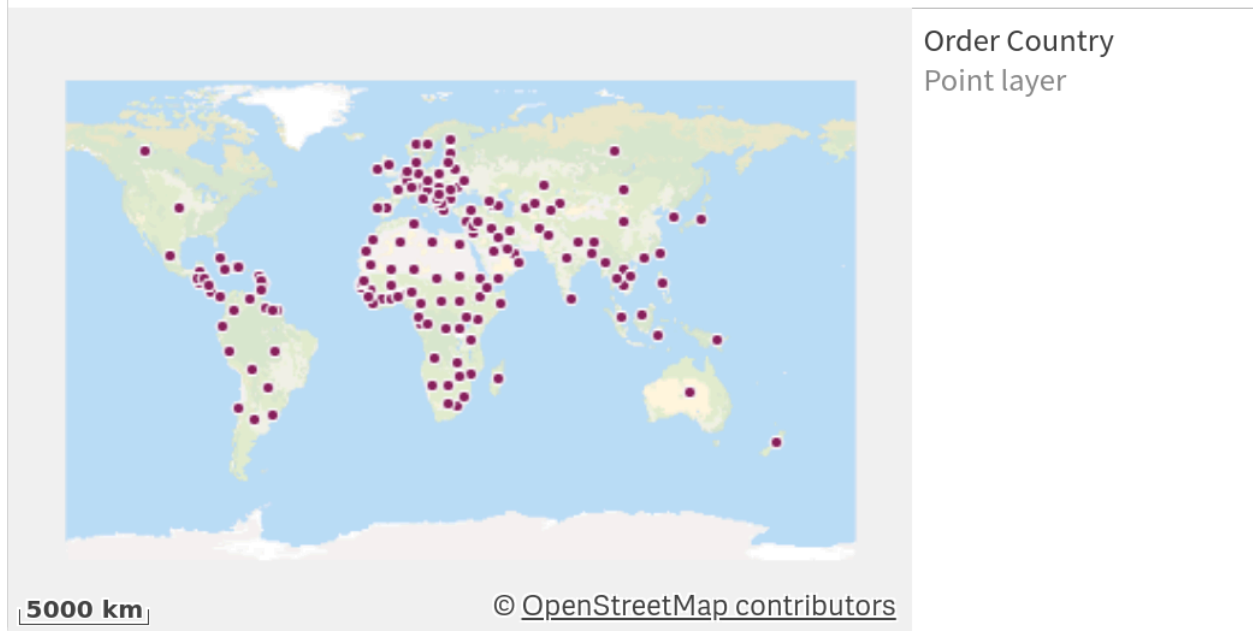
From the chart , we can see that Cleats stands in the highest position among all and the least is Shop By Sport.

SALES TRENDS



The above picture illustrates the line plot of Average sales per customer in the dates of the year.

orders from countries



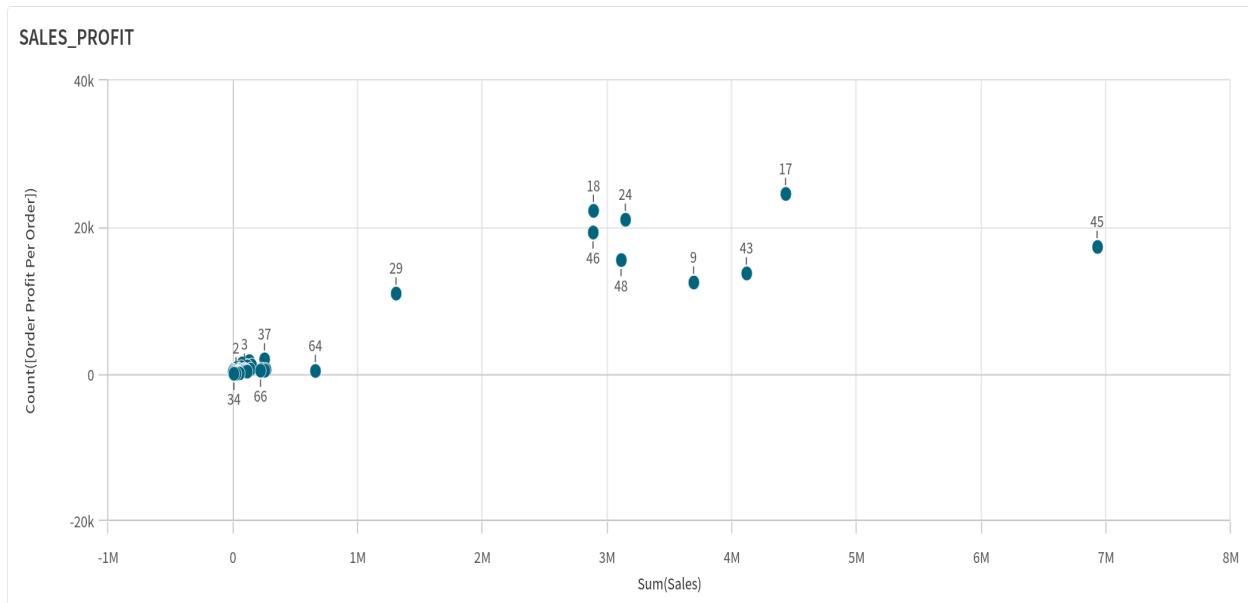
The above picture represents a map. It is representing the order countries. The order countries are marked with pink dots, and from the map, we can see that North America and the north part

of Asia are having fewer orders.

So here two strategies can be implemented.

One is to try to improve business in those areas by influencing the customers.

The next is to decrease the sales if it is not needed, because the loss can be more than profit in those areas due to high services and low customers.



From the above image, we can say that it represents the Scatterplot of sum of sales and Profit per order.

- Sales is 0.

Breakdown (geospatial)

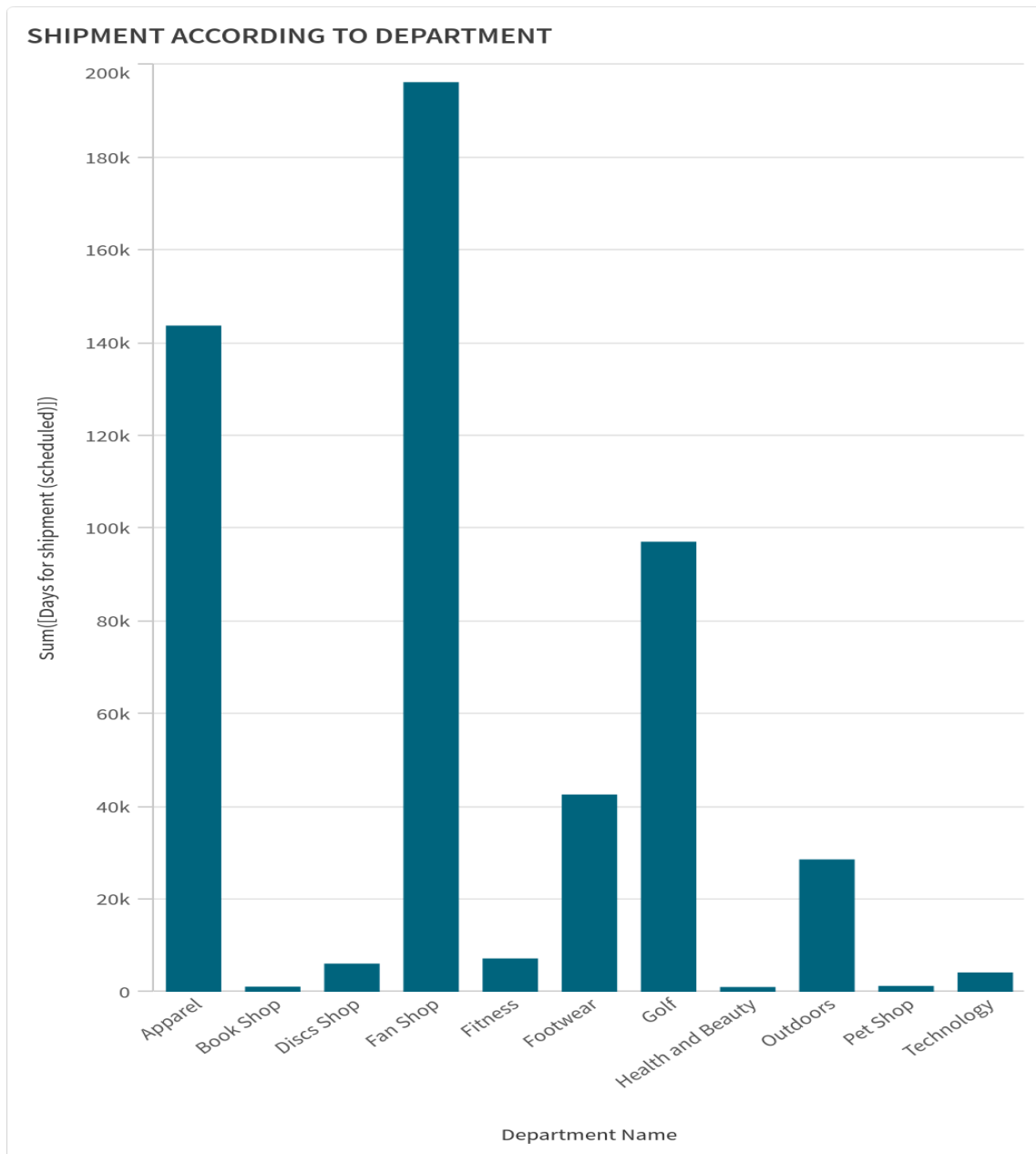
- Sales is 0 across 164 Order Country.

Relative importance

- The total Sales is 36.78M.
- The top Product Category Id is 45 with Sales that is 18.8% of the total.
- 77% of Sales is represented by top 7 Product Category Id.
- The bottom 32 Product Category Id produce 4.9% of Sales.

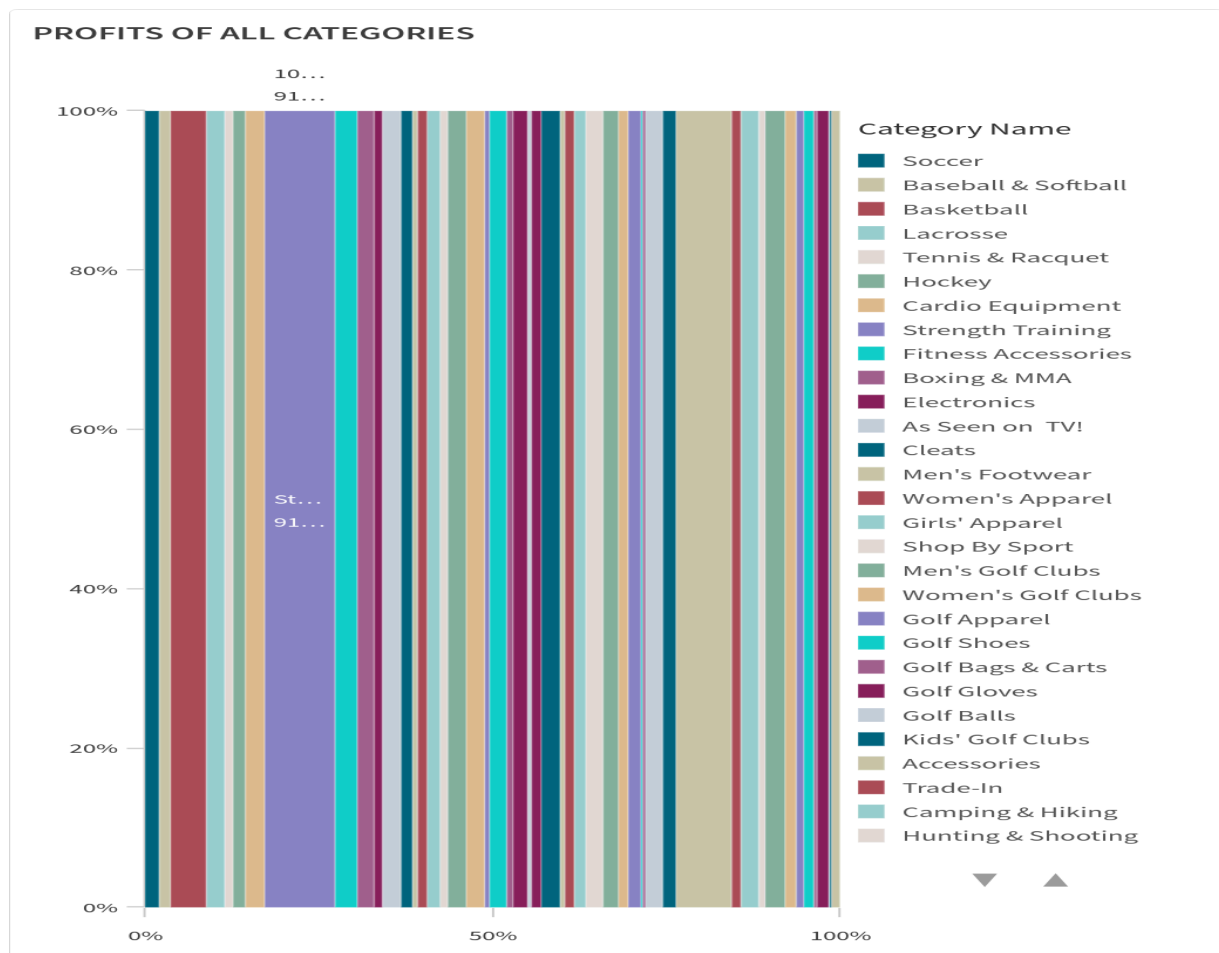
The above image represents the NL insights of few fields.

These insights help us to know about the data in the easy way.

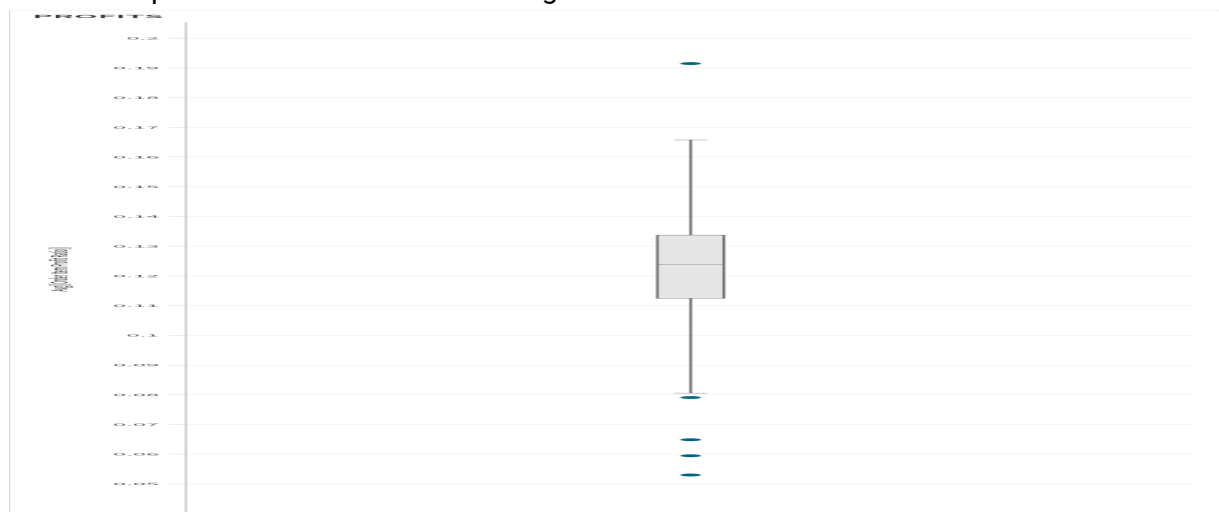


The above image represents the bar chart of the days of shipment scheduled according to various departments.

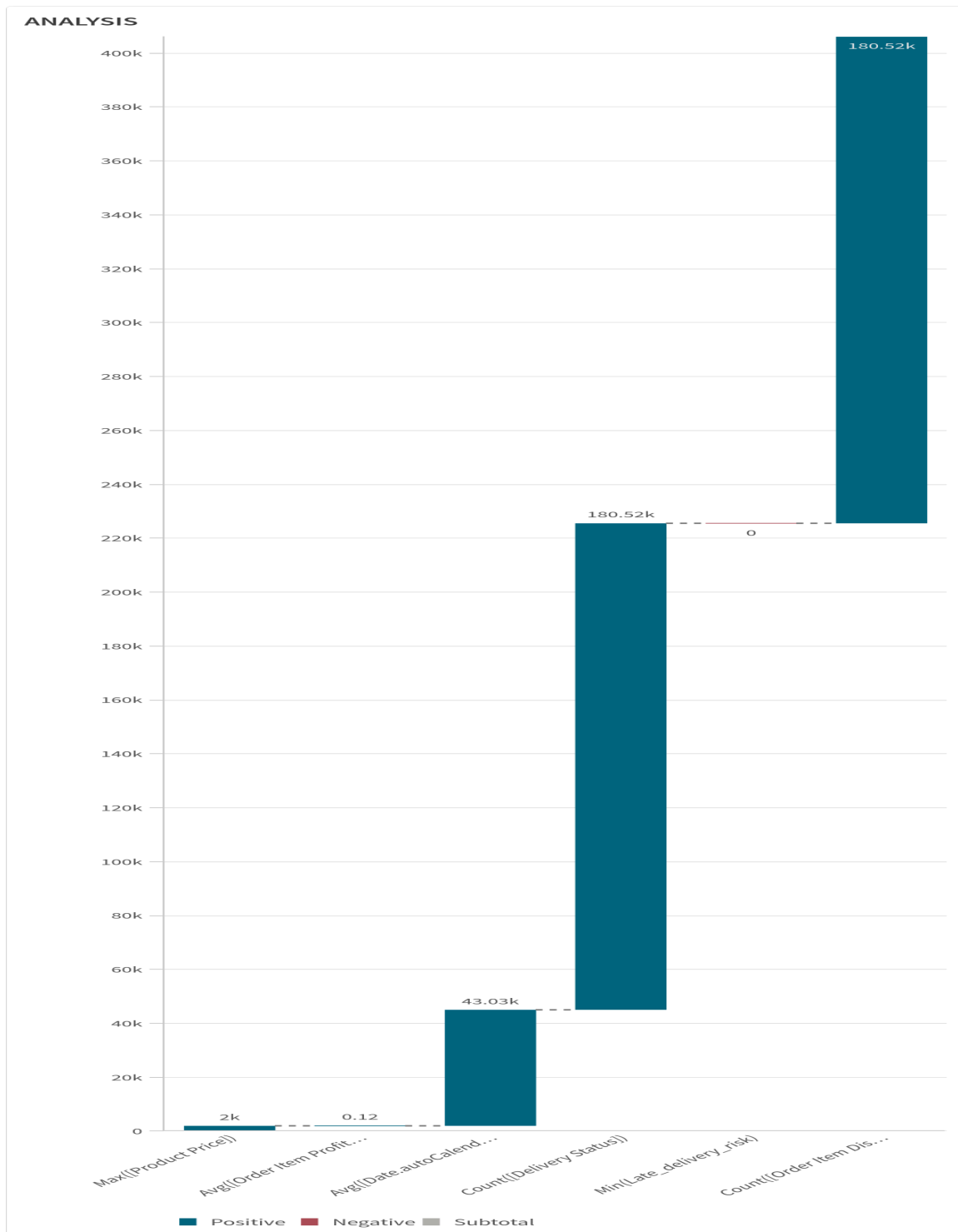
From this, we can predict the shipment allotments for sustainable and save expenses of shipping. This can be really helpful for scheduling the shipments according to the orders, and new products can be purchased as the stock of products gets completed.



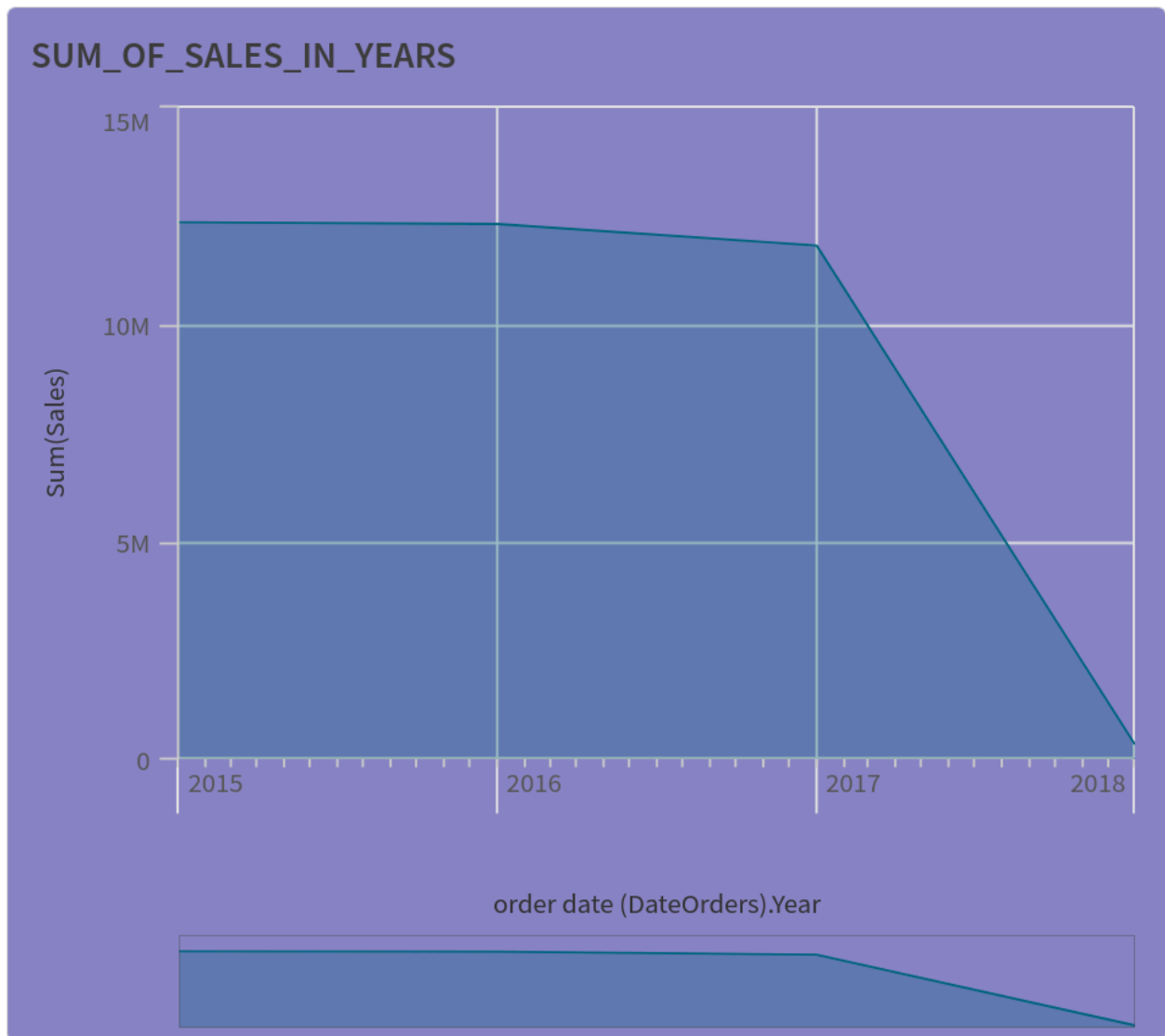
The above picture illustrates various categories in the dataset.



The above picture represents the box plot of the Average of order item profit ratio.



The above analysis involves the WaterFall Chart of the data . It shows the cumulative effect of positive and negative values on the initial value.

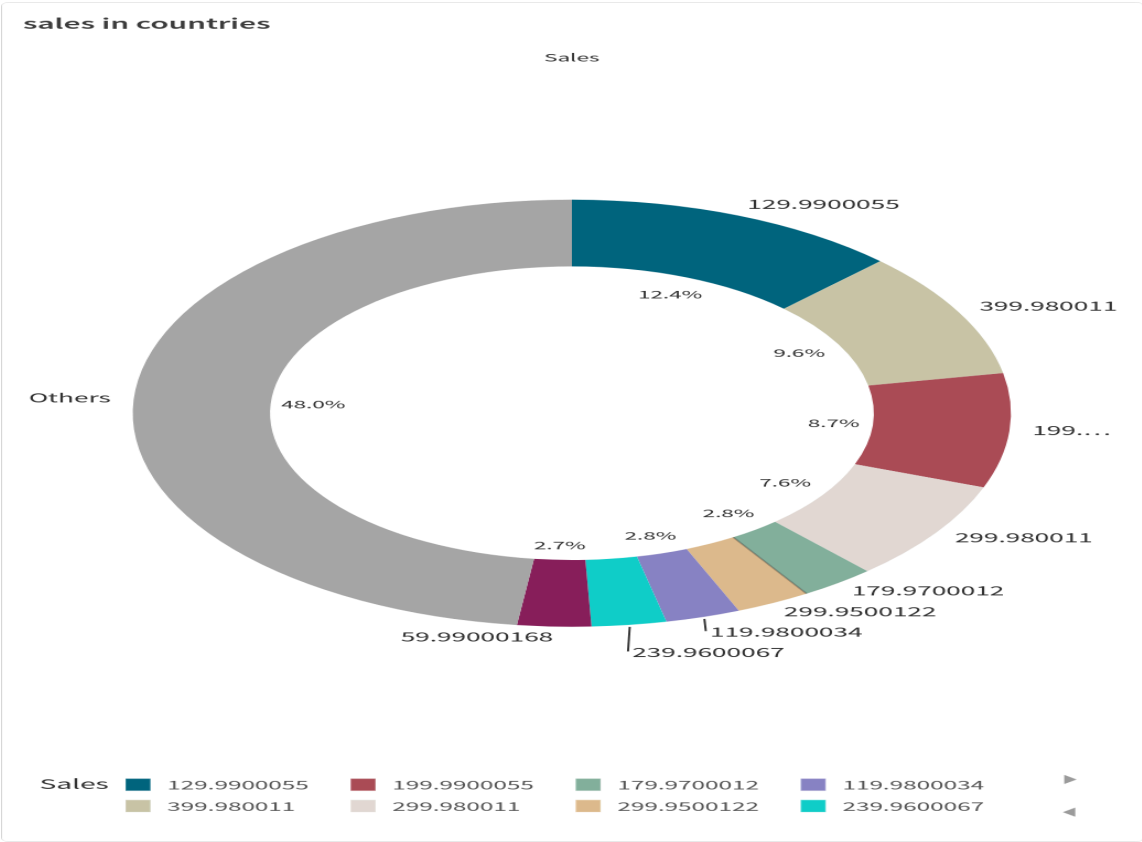


This image represents the line plot of sum of sales and order date.

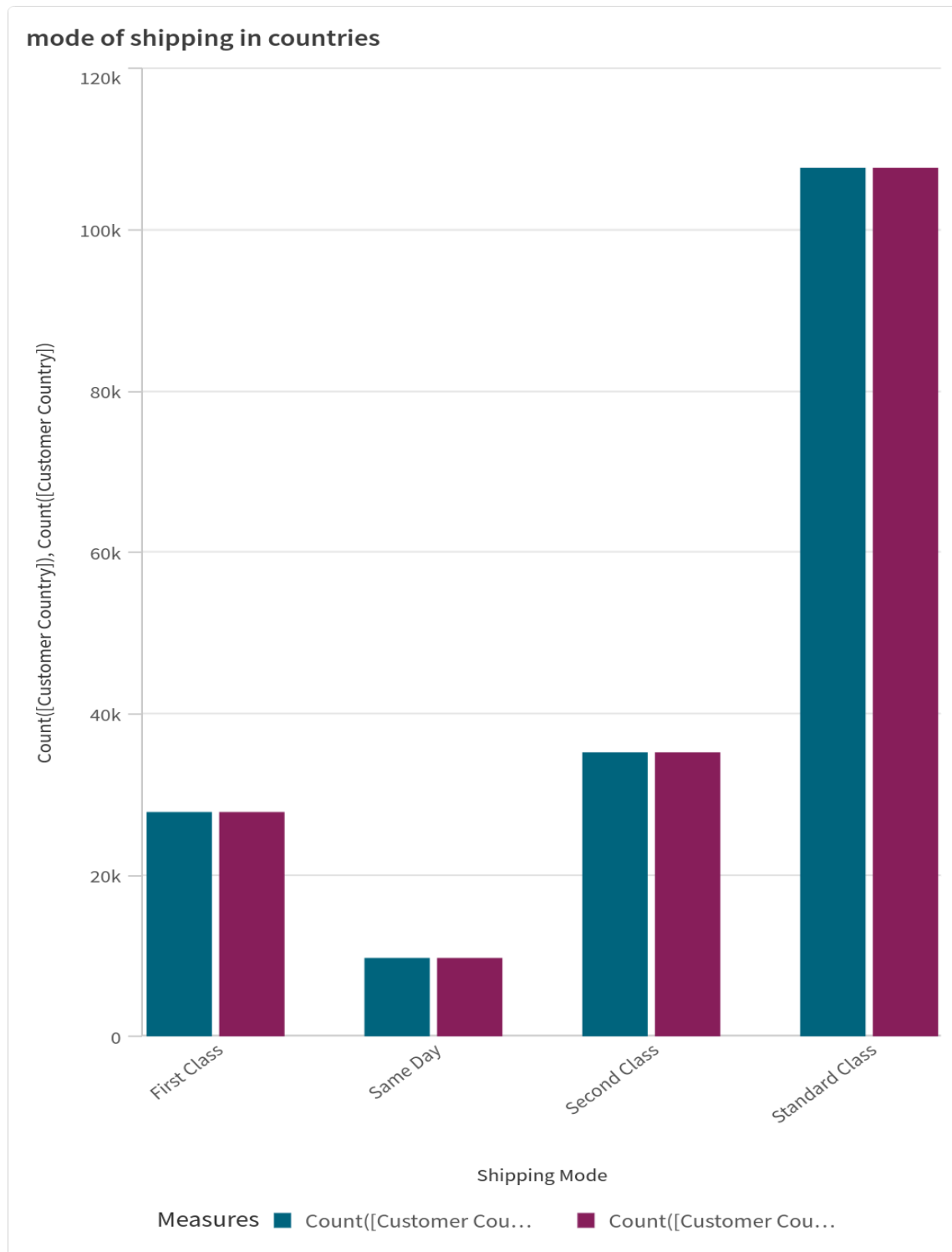
We can see that the sum of sales are decreasing, so strategies can be applied to make business effective.



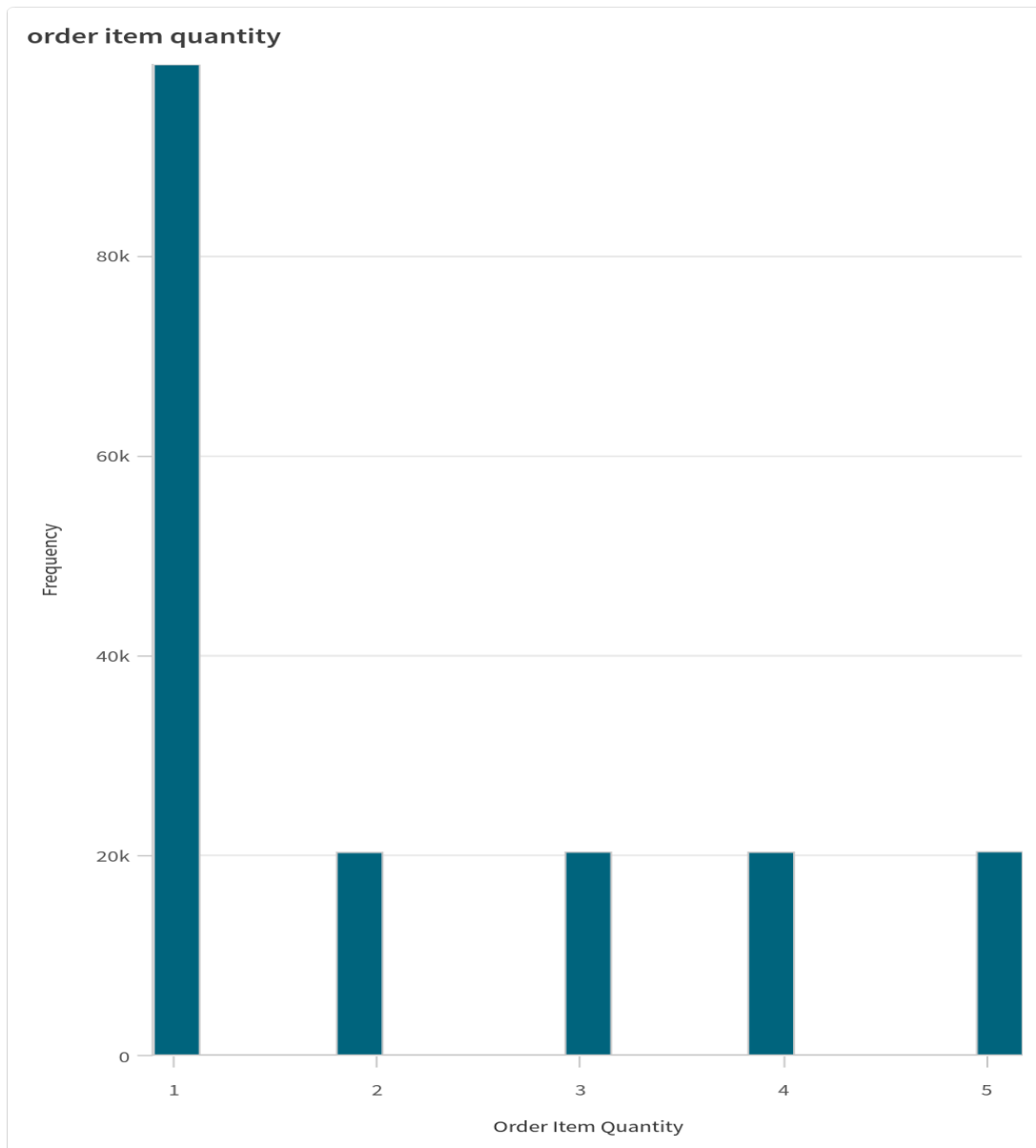
The above represents a Guage of the Discounts given accoring to the order item.



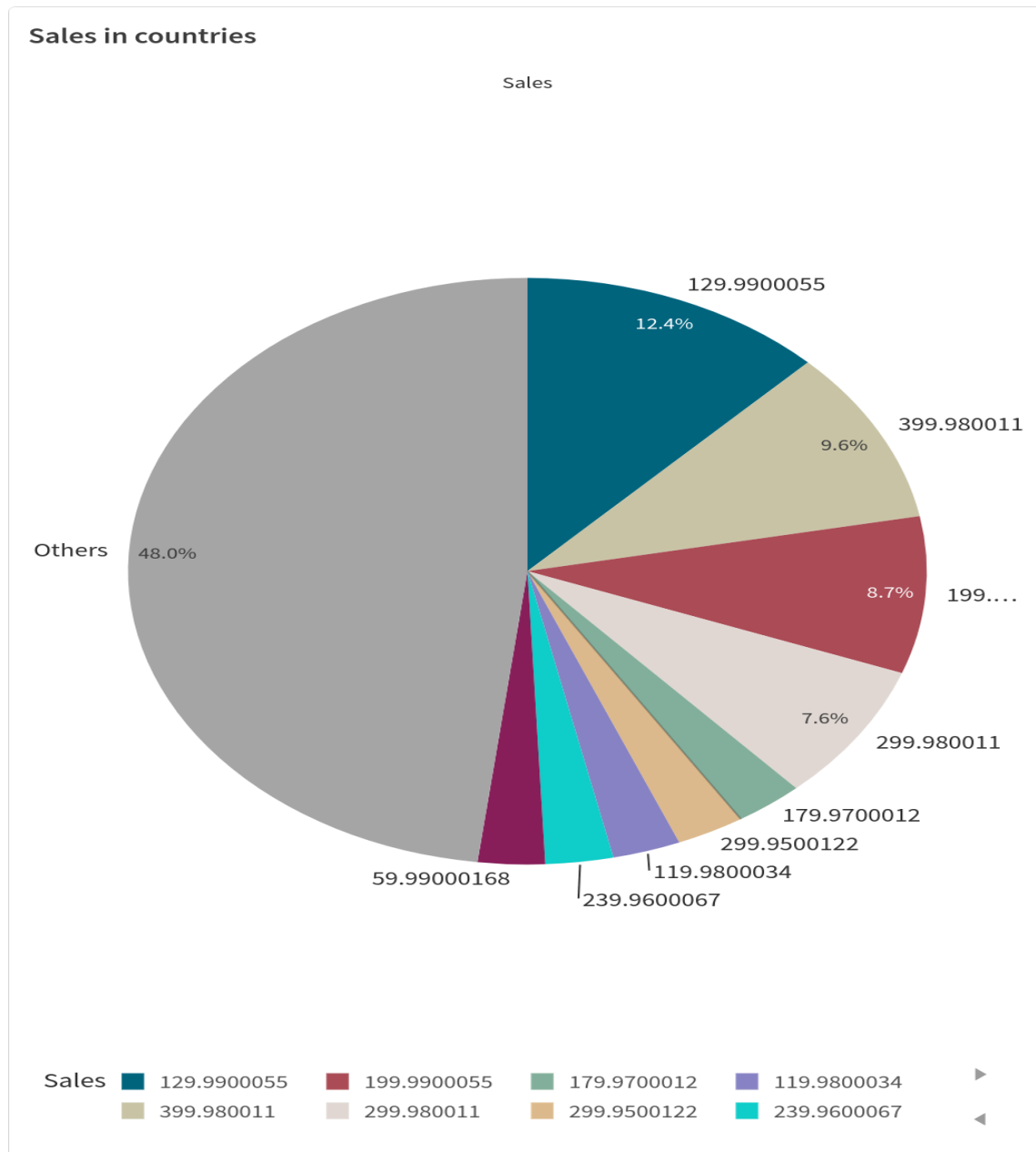
The above chart represents the Donut chart of sales in countries.



It represents the bar chart of shipping modes in various countries.



It represents the bar chart of order item quantity.
Order item 1 has more frequency than others.



The above chart represents the pie chart of sales in various countries.

6 DASHBOARD

It represents the various analytics in a single snapshot.

SUPPLY CHAIN DASHBOARD

SUPPLY CHAIN DASHBOARD

Sum(Sales)
36.78M

ORDER PROFITS

Sum([Order Profit Per Order])
3.97M

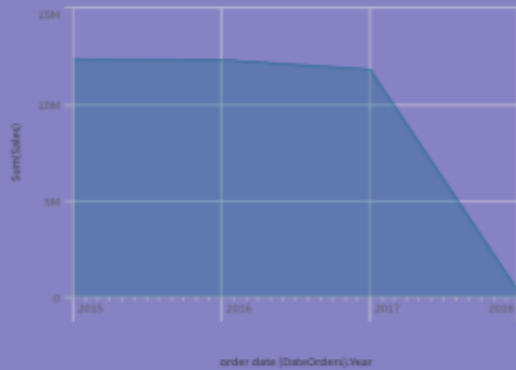
LATE DELIVERY RISK

Sum(Late_Delivery_Risk)
98.98k

Category Name

Accessories
As Seen on TV
Baby
Baseball & Softball
Basketball
Books
Boxing & MMA
Cameras
Camping & Hiking
Cardio Equipment
CDs
Children's Clothing
Cleats
Computers

SUM_OF_SALES_IN_YEARS



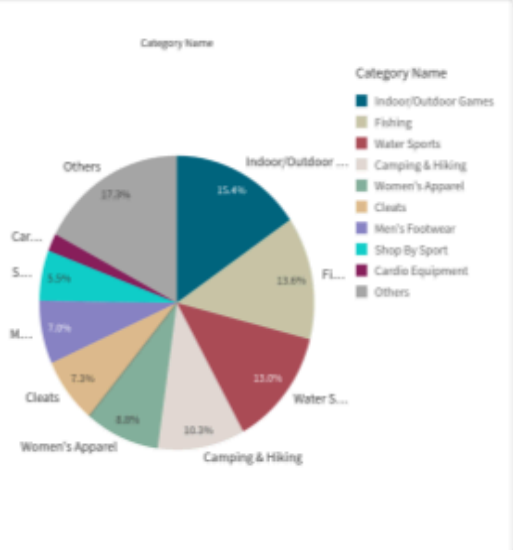
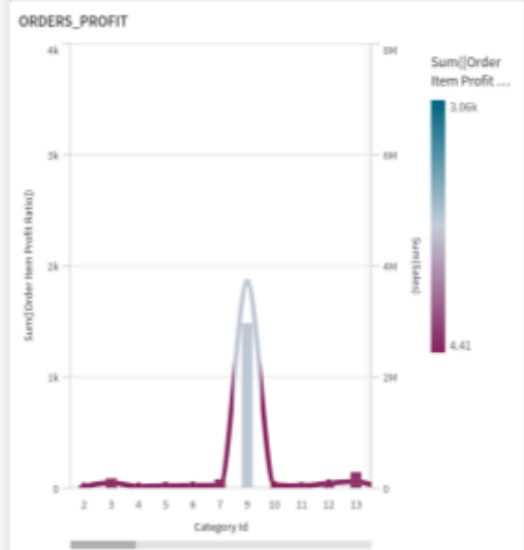
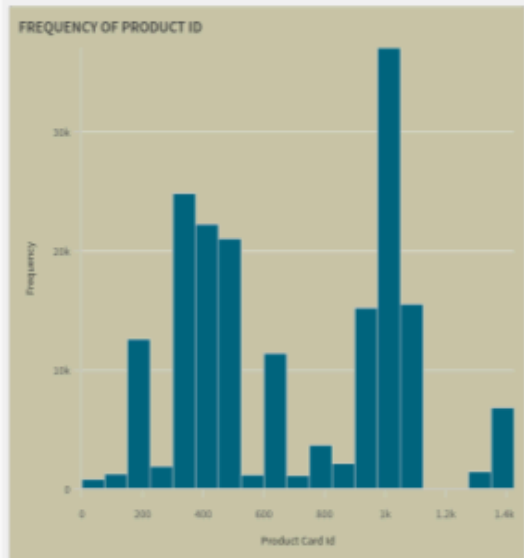
QUARTERLY



DISCOUNTS GIVEN



PROFIT_DASHBOARD



PREVIOUS SHEET



SUMMARY_SHEET



Customer City

Order City

Order Country

Customer Id

Customer Fname

Month

Product Name

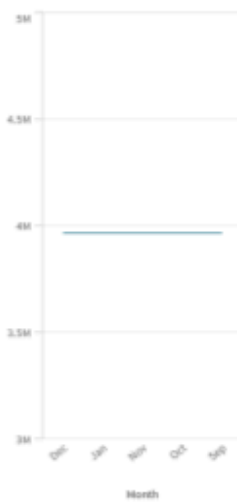
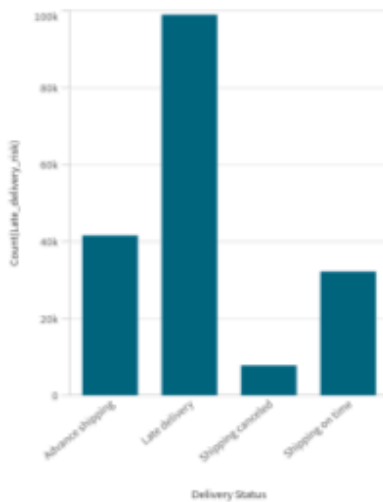
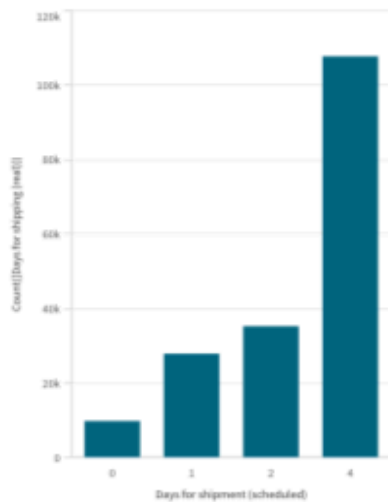
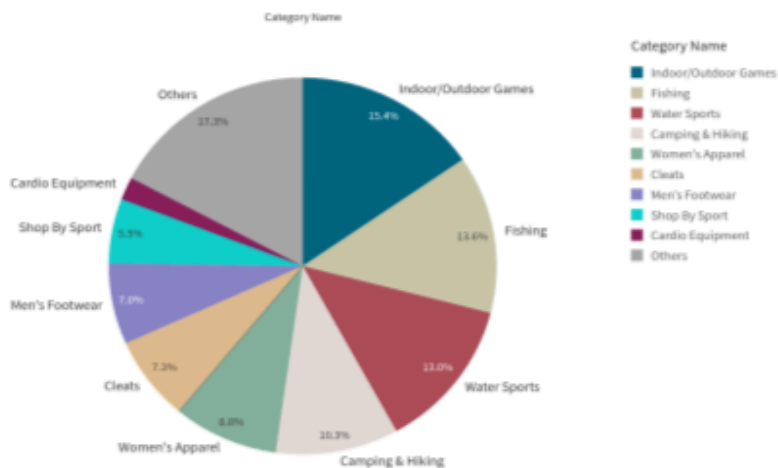
Category Name

Customer Zipcode

Sum(Sales)
36.78M

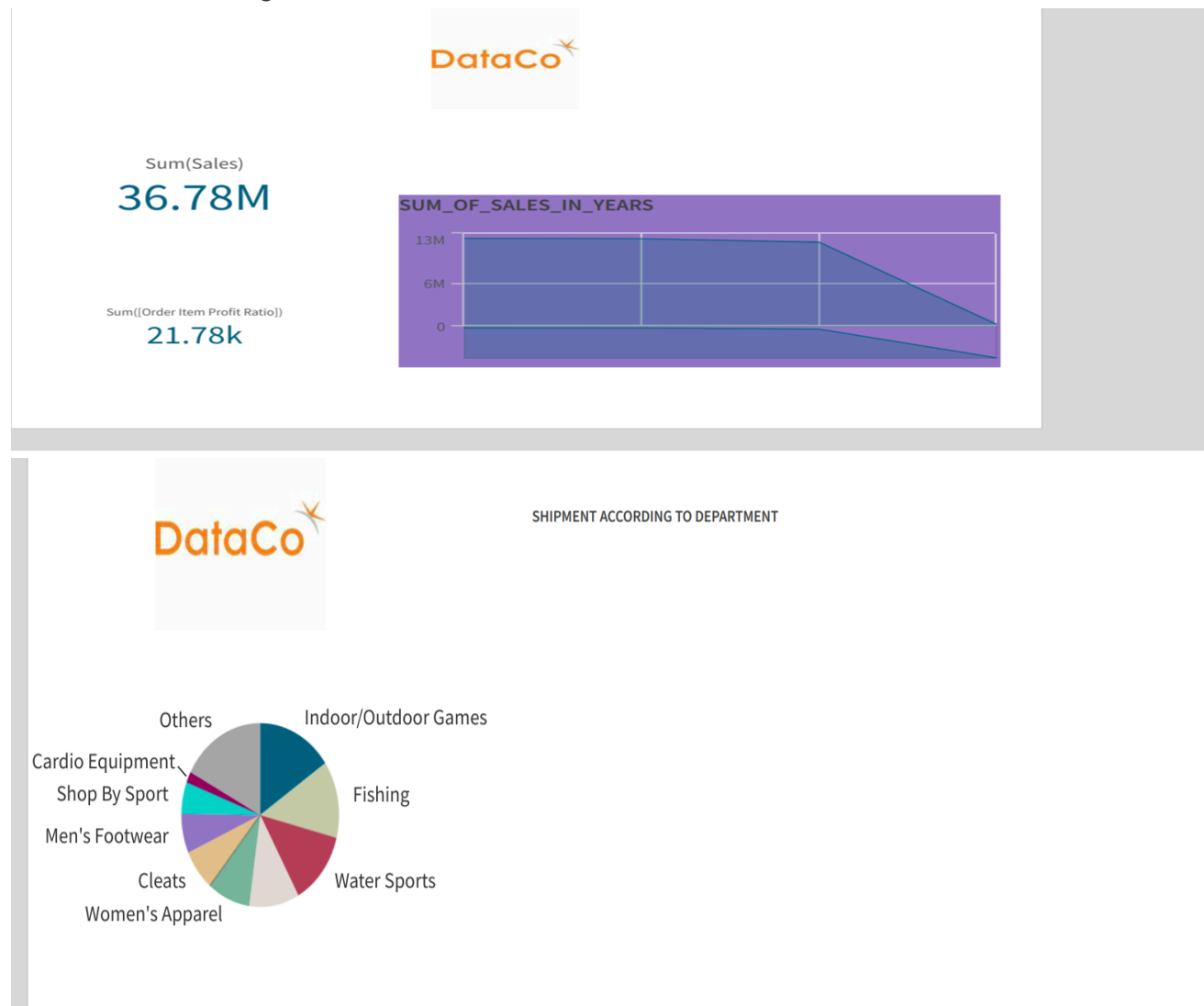
Sum([Benefit per order])
3.97M

Sum([Order Item Profit Rati...])
21.78k



STORY DESIGN :

Designing a report in Power BI involves connecting to data sources, creating visualizations like charts and graphs, customizing their appearance and interactivity, organizing them logically on the canvas, formatting elements for consistency and clarity, and optionally creating dashboards for a summarized view. Throughout the process, it's essential to consider the audience's needs and ensure the report effectively communicates insights from the data.



DataCo

Sum(Sales)
36.78M

DISCOUNTS GIVEN



QUARTERLY



t0hhsg8zc.sg.qlikcloud.com/sense/app/b0a010e8-1273-4775-9150-4a1c2dc7355e/story/RAEpDjc/state/editstory/slide/mJFvZC

ortal



Analyze
Sheet

Narrate
Storytelling

DataCoSupplyChainDataset



CHAIN STORY

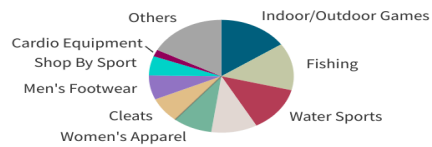
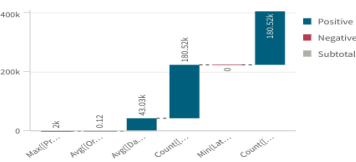
SUPPLY CHAIN ANALYSIS STORY

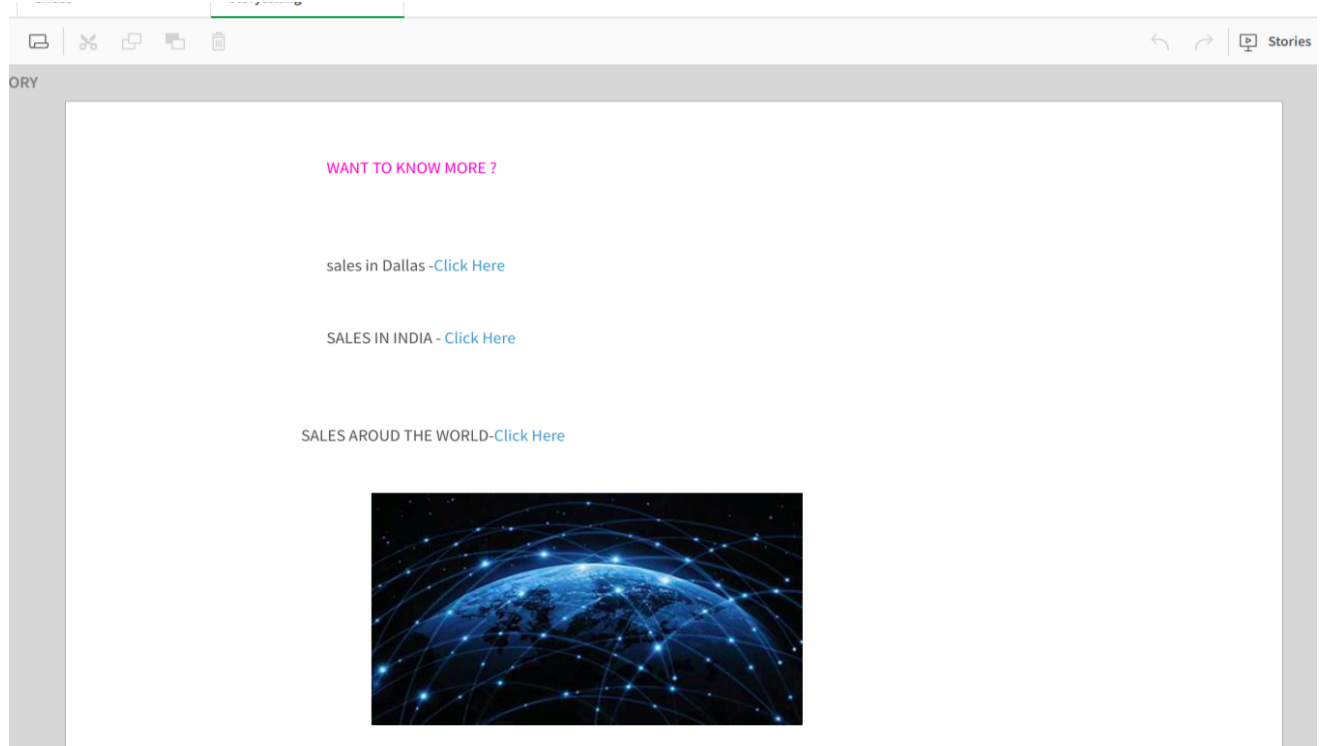
DataCo



Sum(Sales)
36.78M

ANALYSIS





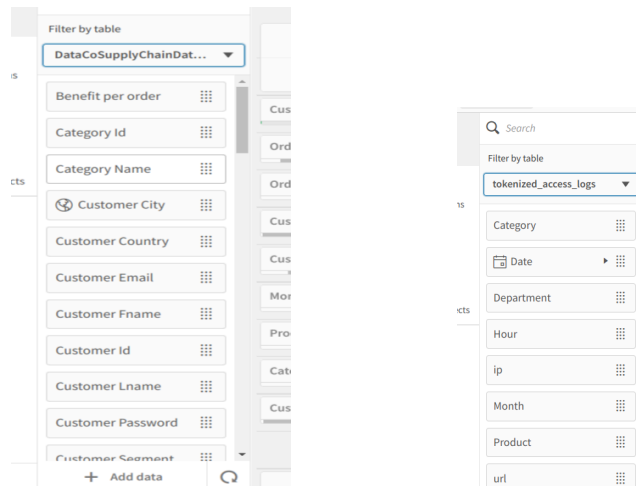
7 REPORT CREATION:

From the above analysis , we saw various trends and how to improve in them, using plots , charts and stories, we have analyzed that where the sales should be improved and what mode of shipment is best.

By knowing these all insights, we can easily able to track the trends and perform actions to improve the supply chain efficiency and cost.

8 PERFORMANCE TESTING:

"Amount of Data Loaded" refers to the quantity or volume of data that has been imported, retrieved, or loaded into a system, software application, database, or any other data storage or processing environment. It's a measure of how much data has been successfully processed and made available for analysis, manipulation, or use within the system.



DATA FILTERS:

Utilization of Filters" refers to the application or use of filters within a system, software application, or data processing pipeline to selectively extract, manipulate, or analyze data based on specified criteria or conditions. Filters are used to narrow down the scope of data, focusing only on the relevant information that meets certain predefined criteria.

Thank you for reading this documentation.