

# Data-Driven Innovations in Supply Chain Management with Qlik Insights

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## 1. Define Problem / Problem Understanding

### 1.1 Specify the Business Problem

In the competitive landscape of modern business, optimizing supply chain management is crucial for enhancing efficiency, reducing costs, and improving customer satisfaction. The key challenges include:

- Inconsistent delivery times affecting customer satisfaction.
- High inventory costs due to inefficient stock management.
- Limited visibility into supply chain operations.
- Inability to accurately predict demand and manage supply accordingly.

### 1.2 Business Requirements

To address these challenges, we need to:

- Improve visibility across the supply chain.
- Enhance delivery performance and reduce late deliveries.
- Optimize inventory management.
- Leverage data analytics to forecast demand accurately.
- Develop a comprehensive dashboard to monitor and manage supply chain metrics in real-time.

### 1.3 Literature Survey

A thorough review of existing literature on supply chain management and data analytics reveals several critical insights:

- The importance of real-time data for supply chain visibility (Source: Journal of Supply Chain Management).
- The impact of predictive analytics on inventory management and demand forecasting

(Source: Harvard Business Review).

- Case studies of companies successfully implementing data-driven supply chain solutions (Source: MIT Sloan Management Review).

## **1.4 Social or Business Impact**

Improving supply chain management through data-driven innovations can lead to significant social and business impacts:

- Enhanced customer satisfaction due to timely deliveries.
- Reduction in carbon footprint through optimized logistics.
- Cost savings from efficient inventory management.
- Improved competitiveness and market share for the business.

## **2. Data Collection**

### **2.1 Collect the Dataset**

Gather data from various sources including:

- Order management systems (order dates, delivery dates, order quantities, etc.).
- Inventory management systems (stock levels, restocking dates, etc.).
- Customer relationship management (CRM) systems (customer demographics, purchase history, etc.).
- Transportation and logistics systems (shipment schedules, delivery performance, etc.).

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

### **2.2 Connect Data with Qlik Sense**

- Use Qlik Sense connectors to integrate data from different sources.
- Ensure data is loaded accurately and efficiently into Qlik Sense for analysis.

## **3. Data Preparation**

### **3.1 Prepare the Data for Visualization**

- Clean and preprocess the data to handle missing values, duplicates, and inconsistencies.
- Aggregate data as needed to create meaningful metrics (e.g., total sales, average

delivery time).

- Create calculated fields for key performance indicators (KPIs) such as on-time delivery rate, inventory turnover ratio, etc.
- Normalize data to ensure consistency across different datasets.

## 4. Data Visualizations

### 4.1 Number of Unique Visualizations

Develop a set of unique visualizations to capture various aspects of supply chain management, including:

1. **KPI Cards:** Total sales, total profit



2. **Bar Charts:** Top 5 average profit customer city, Top 10 cities sales distribution, Sales and Profit category distribution, Order region analysis



Top 5 average profit customer city

#### Profit by customer description

##### Calculated measure (KPI)

- The Average Profit is 21.97.

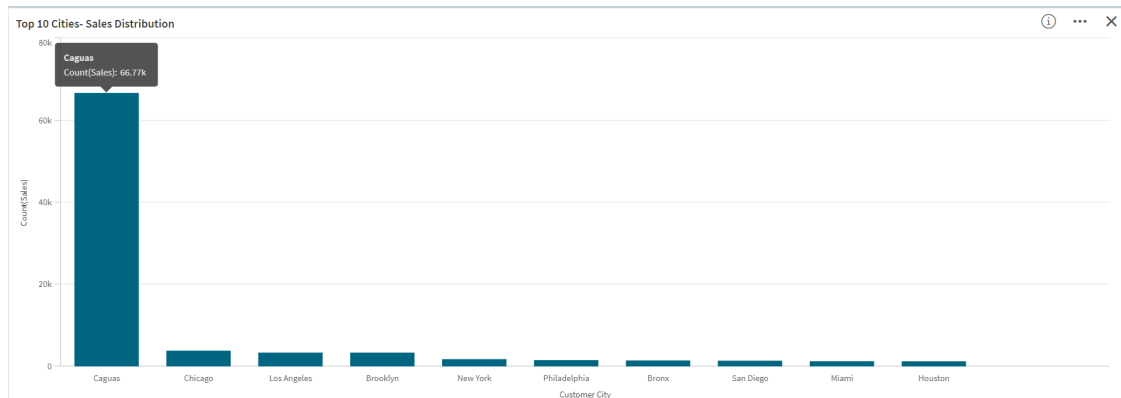
##### Ranking

- The top Customer City is Birmingham with Average Profit average equal to 59.26.

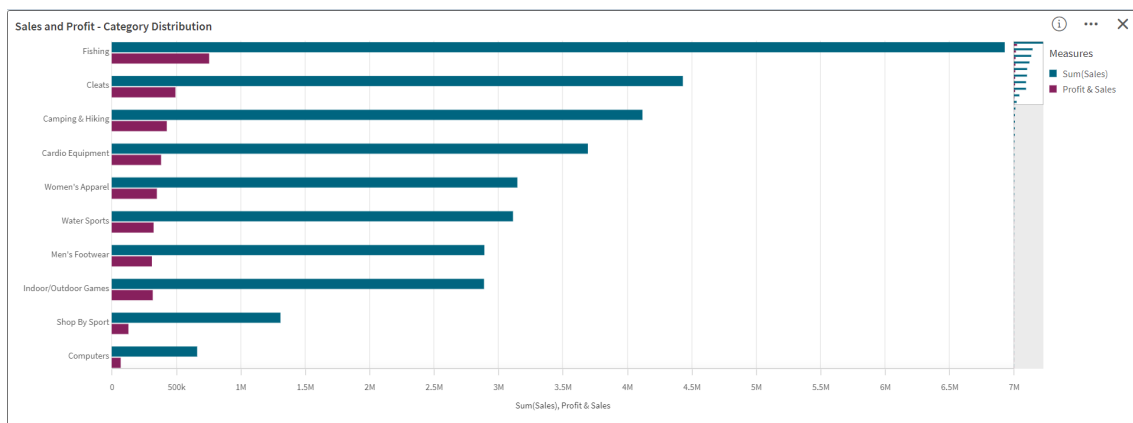
##### Breakdown (geospatial)

- Average Profit is 21.97 across 563 Customer City.
- Top Average Profit is 59.26 where Customer City is Birmingham.

## Top 5 average profit customer city Description



## Top 10 cities sales distribution



## Sales and Profit category distribution

### Sales and Profit - Category Description

#### Calculated measure (KPI)

- The total Sum(Sales) is 36.78M.

#### Ranking

- The top Category Name is Fishing with Sum(Sales) that is 18.8% of the total.
- 77% of Sum(Sales) is represented by top 7 Category Name.

#### Comparison

- Comparison: total Sum(Sales) is 36.78M and total Profit & Sales is 3.97M.

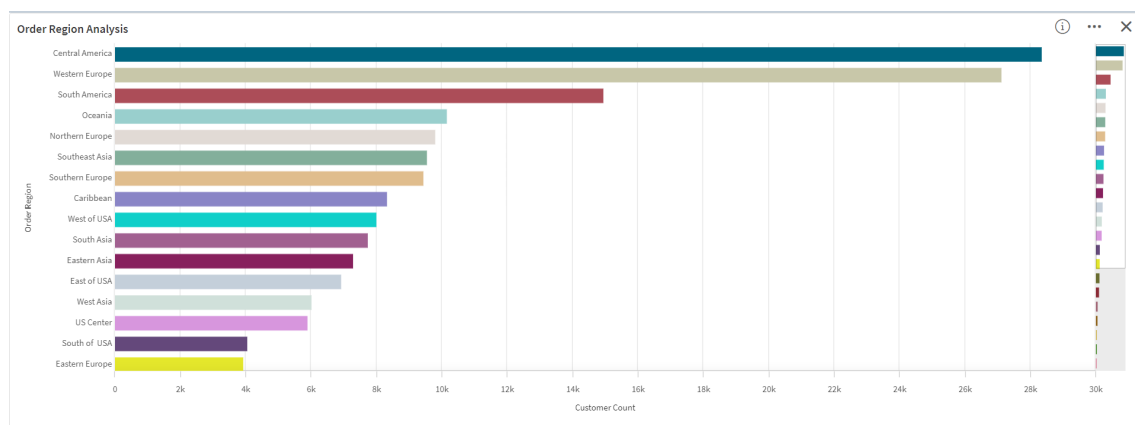
#### Mutual information

- The mutual dependence between Sales and Order Profit Per Order is 88.32%.

#### Correlation

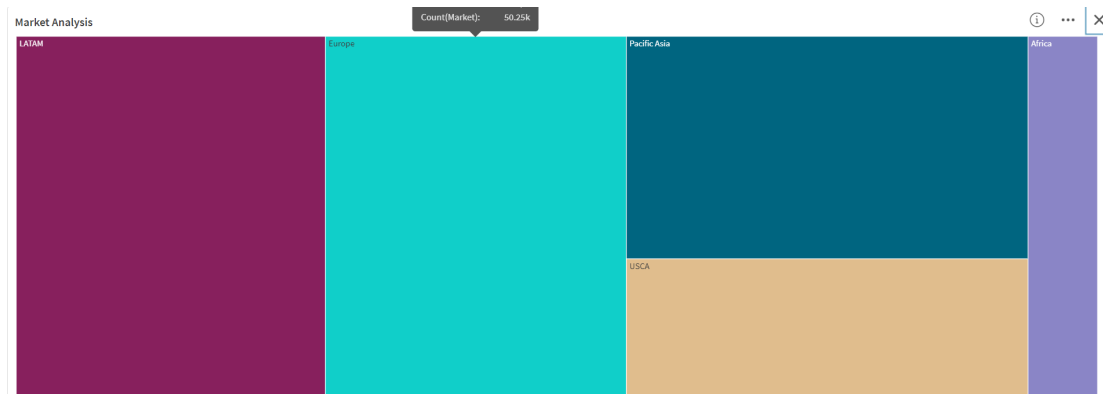
- Correlation: Order Profit Per Order and Sales have a 13.18% correlation.

## Sales and profit category description



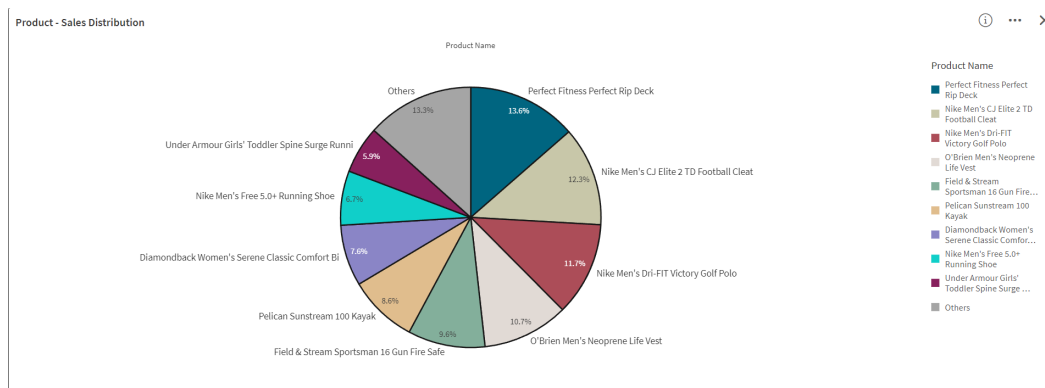
Order region analysis

### 3. Treemaps: Market Analysis

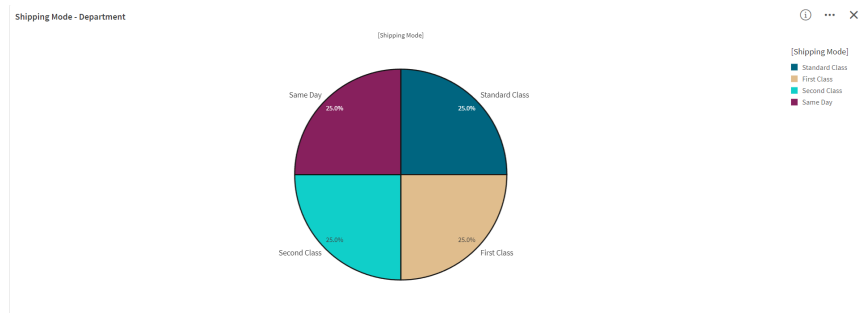


market Analysis

### 4. Pie Charts: Product sales Distribution, Shipping Mode Department

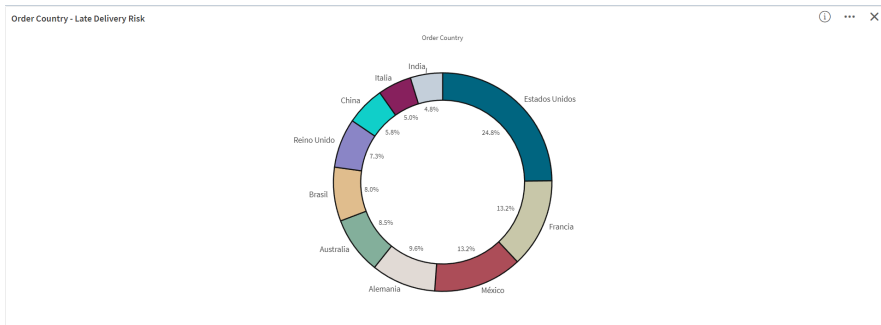


Product sales Distribution

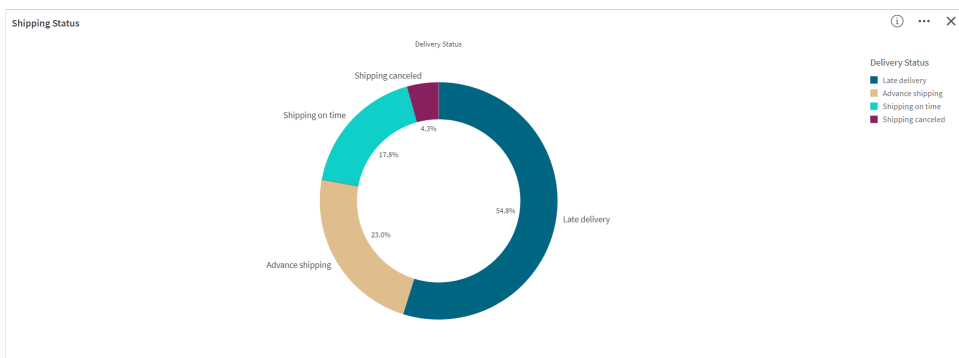


## Shipping Mode Department

### 5. Donut Chart: Order country late delivery risk, Shipping Status



## Order country late delivery risk



## Shipping Status

## 6. Word Map: Categories



## Categories

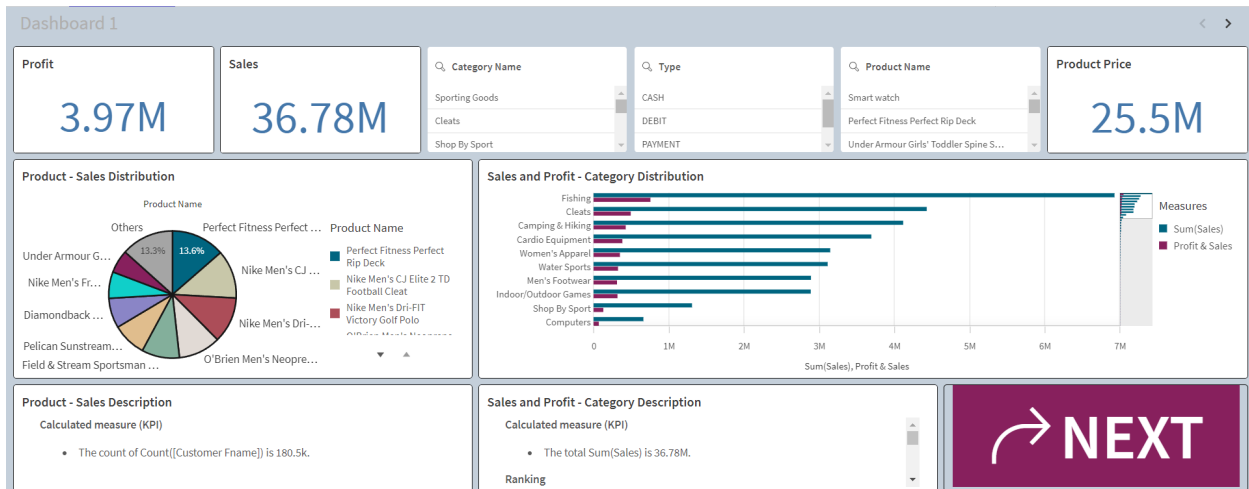
## 7. Filter Pane: Market and Shipping Mode

Market	Shipping Mode
Pacific Asia	Standard Class
USCA	First Class
Africa	Second Class
Europe	Same Day
LATAM	

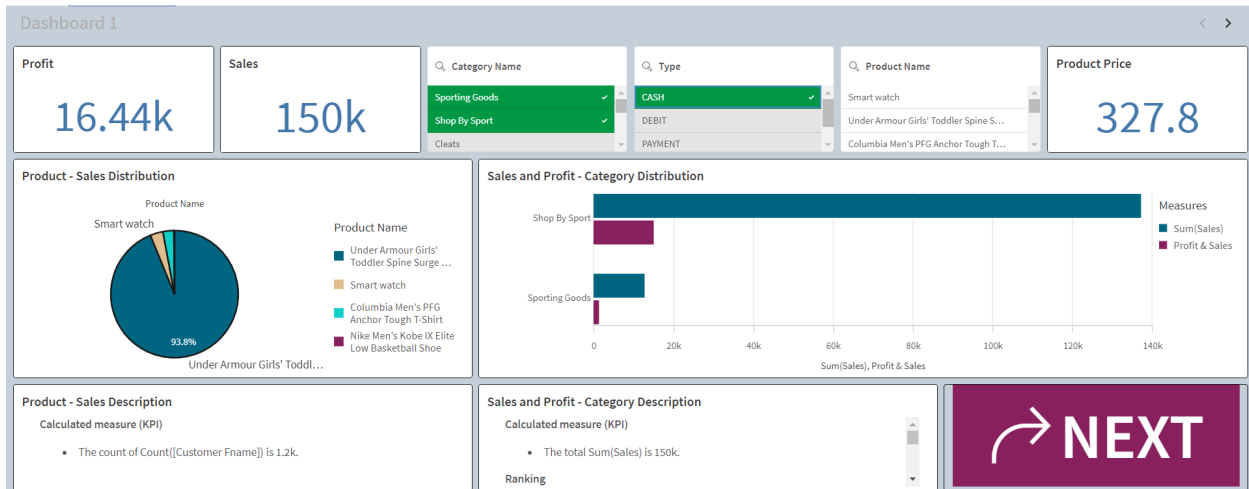
## 5. Dashboard

## 5.1 Responsive and Design of Dashboard

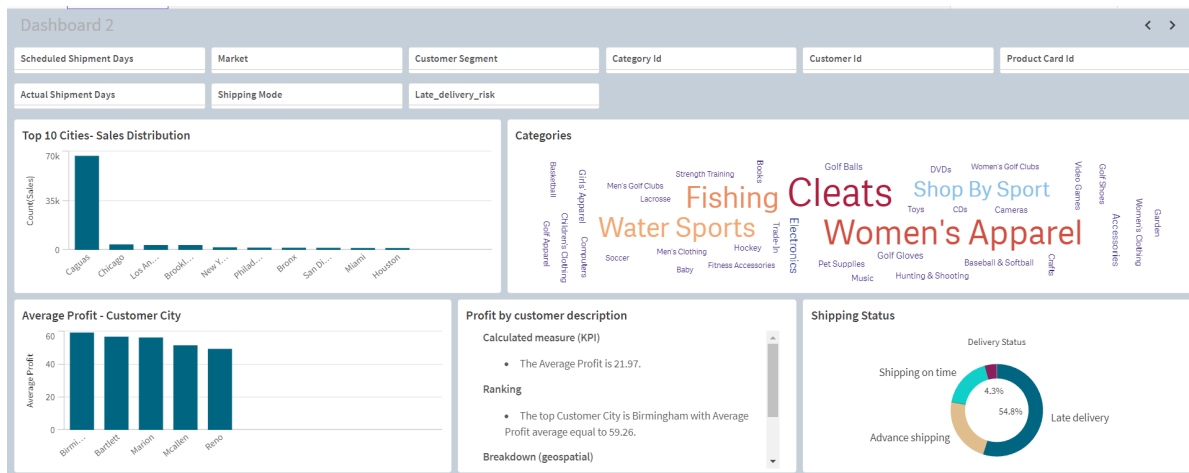
- Design a user-friendly and responsive dashboard using Qlik Sense.
- Ensure the dashboard is accessible on various devices (desktop, tablet, mobile).
- Organize visualizations logically to provide a cohesive and intuitive user experience.
- Use interactive elements such as filters and drill-downs to enable detailed analysis.



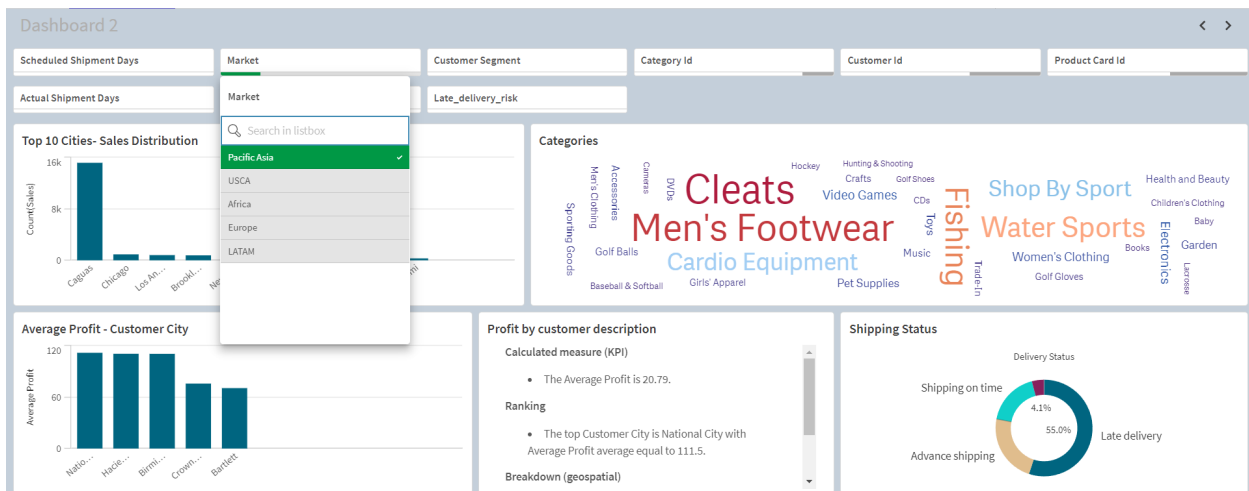
## Dashboard - 1



Interactive Dashboard - 1

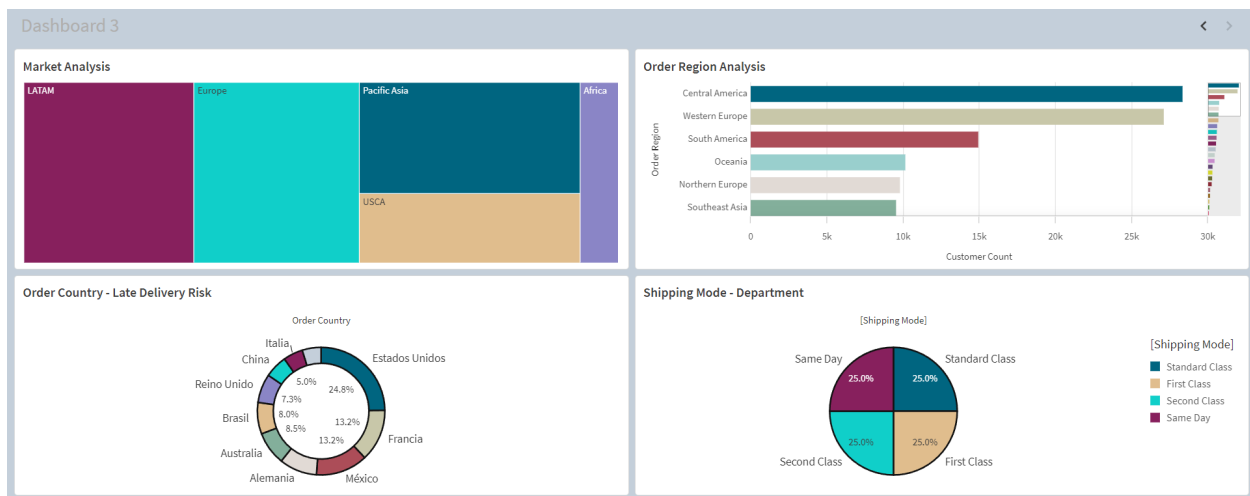


Dashboard - 2

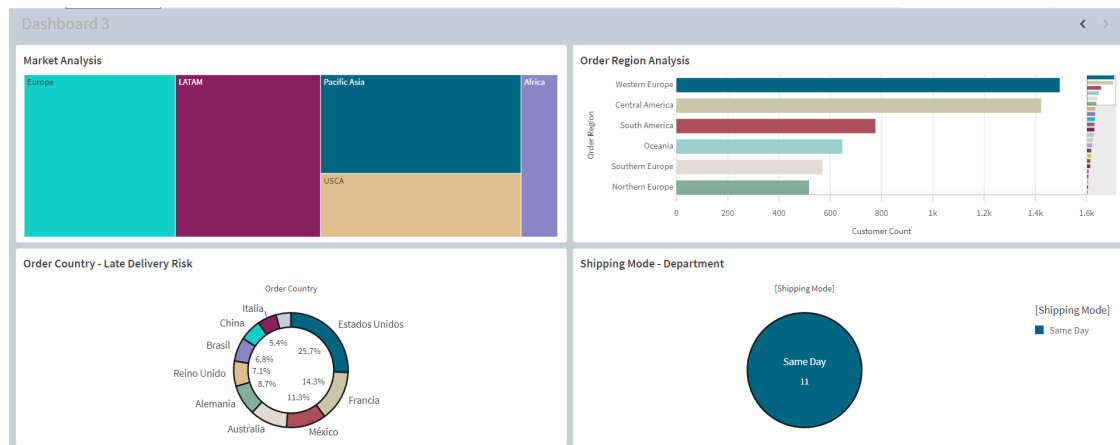


Interactive Dashboard - 2





Dashboard - 3



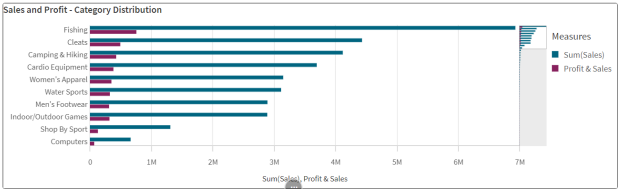
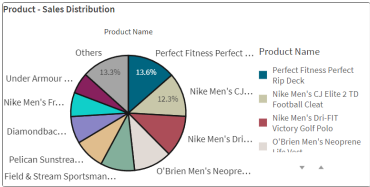
Interactive Dashboard -3

## 6. Story

### 6.1 Story Creation

- Craft a narrative that guides users through the key insights and findings from the data.
- Start with an overview of the business performance (total sales, profit).
- Highlight key areas of interest such as top-performing products, regions, and customer segments.
- Discuss delivery performance and late delivery risks.
- Conclude with actionable recommendations based on the insights derived from the data.

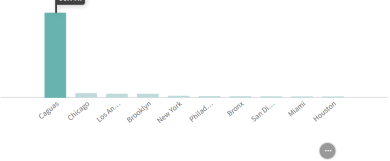
# Sales And Profit Distribution



# Market & City Analysis

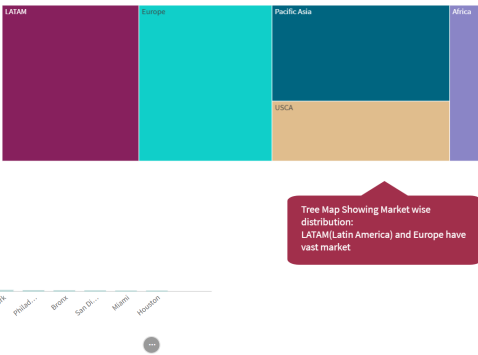
Top 10 cities according to sales. Highest Sales from Chicago followed by Chicago and so on

Top 10 Cities - Sales Distribution



Tree Map Showing Market wise distribution: LATAM(Latin America) and Europe have vast market

Market Analysis

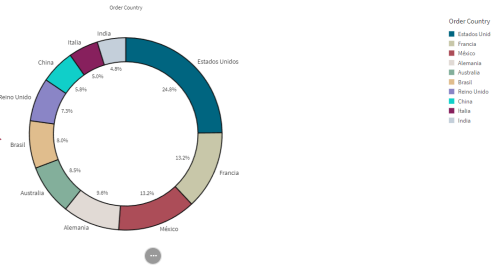


# Top 10 Countries By Order Count

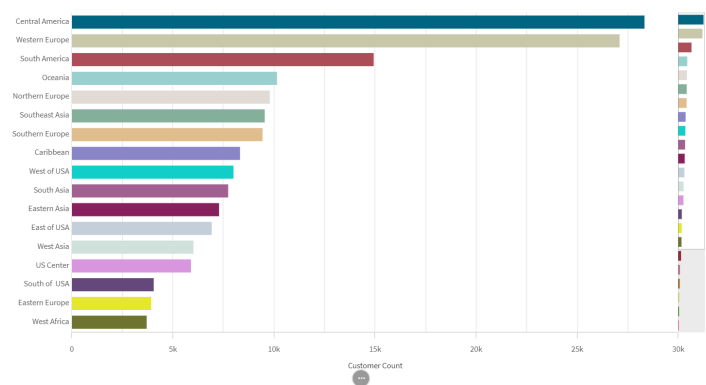
Order Country - Late Delivery Risk

-> Estados Unidos has highest Order Count. Thus, being at 1st position. (24.8%).

-> Whereas, India is at 10th position (4.8%).



Order Region Analysis



## 7. Performance Testing

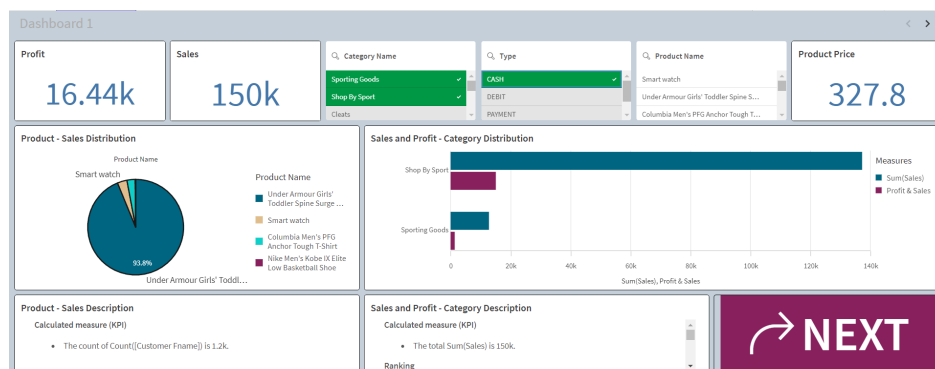
### 7.1 Amount of Data Rendered to DB

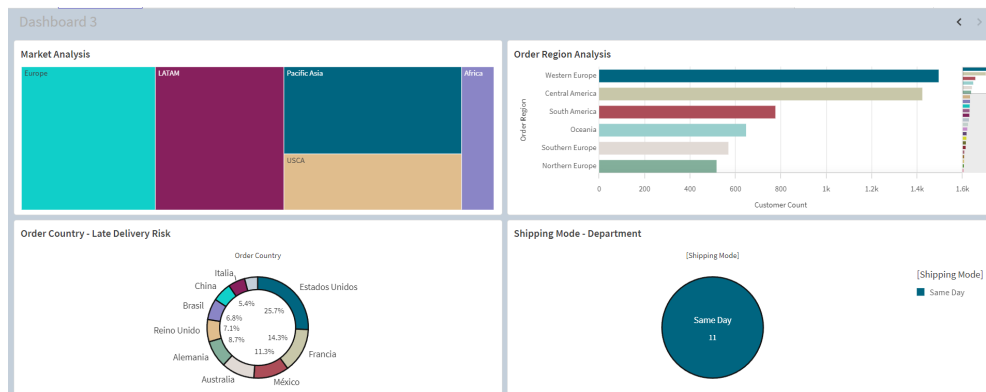
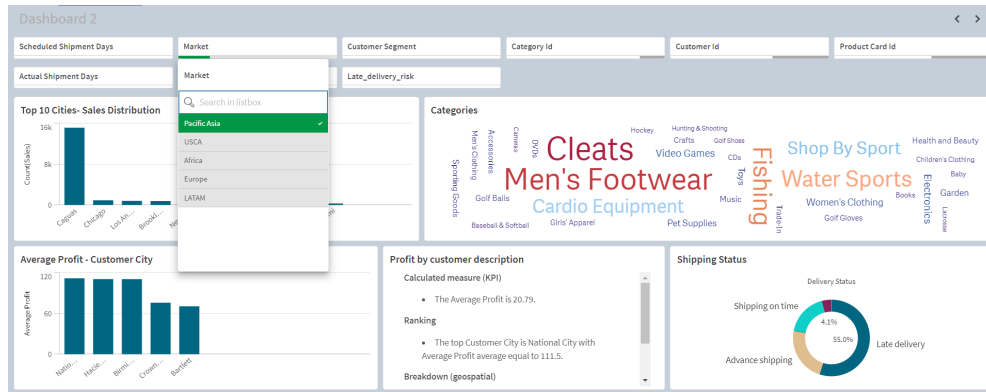
- Evaluate the performance of the Qlik Sense application by testing with different volumes of data.
- Ensure that the system can handle large datasets without significant delays.

DataCoSupplyChainDataset	Order Id
Type	Order Item Cardprod Id
Days for shipping (real)	Order Item Discount
Days for shipment (scheduled)	Order Item Discount Rate
Benefit per order	Order Item Id
Sales per customer	Order Item Product Price
Delivery Status	Order Item Profit Ratio
Late_delivery_risk	Order Item Quantity
Category Id	Sales
Category Name	Order Item Total
Customer City	Order Profit Per Order
Customer Country	Order Region
Customer Fname	Order State
Customer Id	Order Status
Customer Lname	Order Zipcode
Customer Segment	Product Card Id
Customer State	Product Category Id
Customer Street	Product Description
Customer Zipcode	Product Image
Department Id	Product Name
Department Name	Product Price
Latitude	Product Status
Longitude	shipping date (DateOrders)
Market	Shipping Mode
Order City	DataCoSupplyChainDataset.Customer City_GeoInfo
Order Country	Longitude_Latitude
Order Customer Id	DataCoSupplyChainDataset.Order City_GeoInfo
order date (DateOrders)	DataCoSupplyChainDataset.Order Country_GeoInfo

### 7.2 Utilization of Data Filters

- Test the efficiency and responsiveness of data filters.
- Ensure that users can quickly and easily filter data to drill down into specific details.





## 7.4 Number of Visualizations/Graphs

- Evaluate the performance of the dashboard with the full set of visualizations.
- Ensure that all visualizations load efficiently and do not hinder the user experience.
- Total number of Visualizations/Graphs: 15

## 8. Project Demonstration & Documentation

### 8.1 Record explanation Video for project end to end solution:

Link:

<https://drive.google.com/file/d/1J7KteyIlgR3H0Co41kPclUpqF8WWFQJZ/view?usp=sharing>