Documentation : Data-Driven Innovations In Supply Chain Management With Qlik Insights

Business Problems in Supply Chain Management :

This project aims to improve supply chain management using Qlik Sense by tackling key challenges that reduce efficiency and resilience. The focus is on enhancing data quality, integration, security, technology, workforce skills, change management, real-time data processing, predictive analytics, costs, and data relevance through advanced analytics on Qlik Sense's cloud platform.

Objective to Achieve

This project seeks to transform supply chain management by leveraging Qlik Sense's data-driven insights. Using Qlik Sense's advanced analytics and cloud capabilities, it aims to optimize logistics, demand forecasting, and inventory management. The main goal is to boost operational efficiency and responsiveness, ensuring seamless data integration, strong data security, skilled workforce development, and real-time decision-making. By addressing these challenges, the project aims to make supply chain operations more efficient, resilient, and competitive.

Business Requirements for Enhancing Supply Chain Management :

- **Improve Data Quality:** Use Qlik Sense tools for data cleaning and validation to ensure reliable data for decision-making.
- **Integrate Data:** Combine data from various sources into Qlik Sense for a unified view and better analysis.
- **Ensure Security and Compliance:** Follow data security protocols and comply with regulations using Qlik Sense.
- **Upgrade Infrastructure:** Invest in IT infrastructure to support Qlik Sense for improved performance.
- **Develop Skills:** Train employees to effectively use Qlik Sense, enhancing their ability to utilize data-driven tools.
- **Manage Change:** Create a strategy for the smooth adoption of Qlik Sense, ensuring an easier transition and higher adoption rates.
- **Enable Real-Time Processing:** Implement real-time data capabilities in Qlik Sense for faster decision-making.
- **Use Predictive Analytics:** Apply Qlik Sense's predictive analytics for better forecasting and inventory management.
- **Manage Costs:** Plan a budget for the setup and maintenance of Qlik Sense for cost-effective implementation.
- **Maintain Data Relevance:** Continuously monitor and update data in Qlik Sense to keep it current and relevant.

Literature Survey :

This literature survey explores the role of Qlik Sense, a data analytics platform, in enhancing supply chain management practices. Researchers investigate various aspects, including the integration of Qlik Sense in decision-making processes, challenges in implementation, and the impact on supply chain performance metrics. Additionally, the survey discusses the importance of data security and compliance, future trends in supply chain analytics, and case studies of successful Qlik Sense implementations. Overall, the findings emphasise Qlik Sense's potential to drive supply chain innovation, improve resilience, and pave the way for sustainable practices in the future.

Social Impact and Business Impact :

Social Impact Analysis :
Qlik Sense visualises demographic distribution in supply chain management and evaluates its effects on social welfare programs, financial inclusion, and broader societal aspects. Correlation analysis identifies relationships between data-driven innovations and social welfare indicators.

Business Impact Analysis:
The influence of data-driven innovations in supply chain management on key sectors like banking, telecommunications, and e-commerce is explored. The analysis evaluates impacts on sales, customer onboarding, and operational efficiency, emphasising benefits from improved supply chain visibility and optimised processes.

Data Collection & Extraction From Database :

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.

Understanding 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 Zip-code:** Customer dialling 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 Zip-code:** Customer dialling 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.

Preparing The Data For Visualization :

To prepare data for visualisation effectively, it's crucial to clean the data by removing irrelevant or missing entries, transform it into a visual-friendly format, explore it for patterns and trends, filter it to focus on relevant subsets, and ensure its accuracy and completeness. This thorough process ensures that the data is clear and ready for visualization, enabling the creation of insightful visualisations to enhance performance and efficiency analysis. With the data already cleaned, we can proceed directly to visualisation.

Data Visualization in Qlik Sense :

In Qlik Sense, data visualisation transforms raw data into meaningful visual displays, such as charts and graphs, to reveal insights and trends. With its user-friendly interface, users can effortlessly create interactive visuals and explore data dynamically by selecting and manipulating fields. Qlik Sense's associative engine enables seamless connections between data points for deeper analysis. It offers a wide array of visualisation options, customization features, and interactivity capabilities, allowing users to tailor visuals to their needs. Ultimately, Qlik Sense empowers users to unleash the full potential of their data through compelling and actionable visualisations.

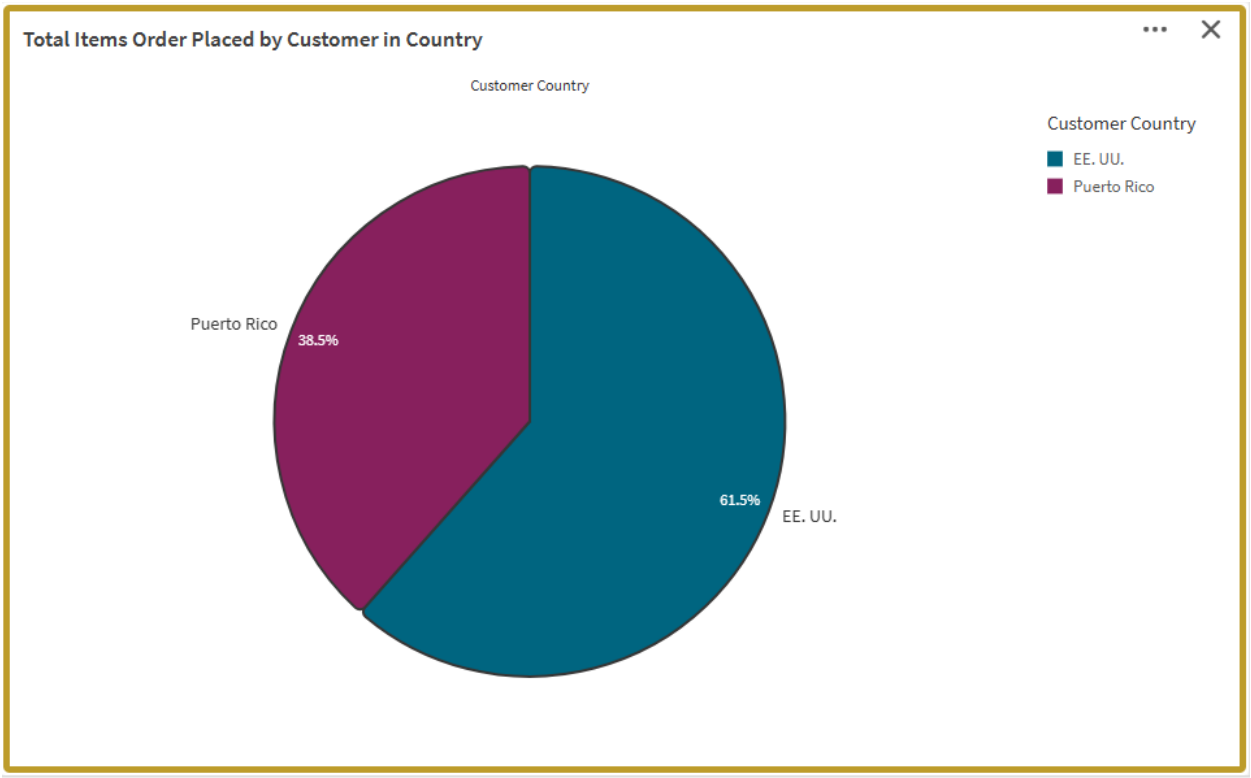
Unique Visualizations using Qlik Sense :

Qlik Sense offers a wide variety of visualisations that can be tailored to analyse the performance and efficiency of banks. These include bar charts, line charts, heat maps, scatter plots, pie charts, and maps. These visualisations enable comparisons of performance, tracking changes over time, displaying distributions and relationships between variables, as well as analysing revenue breakdowns and customer demographics. Additionally, they facilitate analysis of workload, resource allocation, and the geographical distribution of banks.

Visualization :

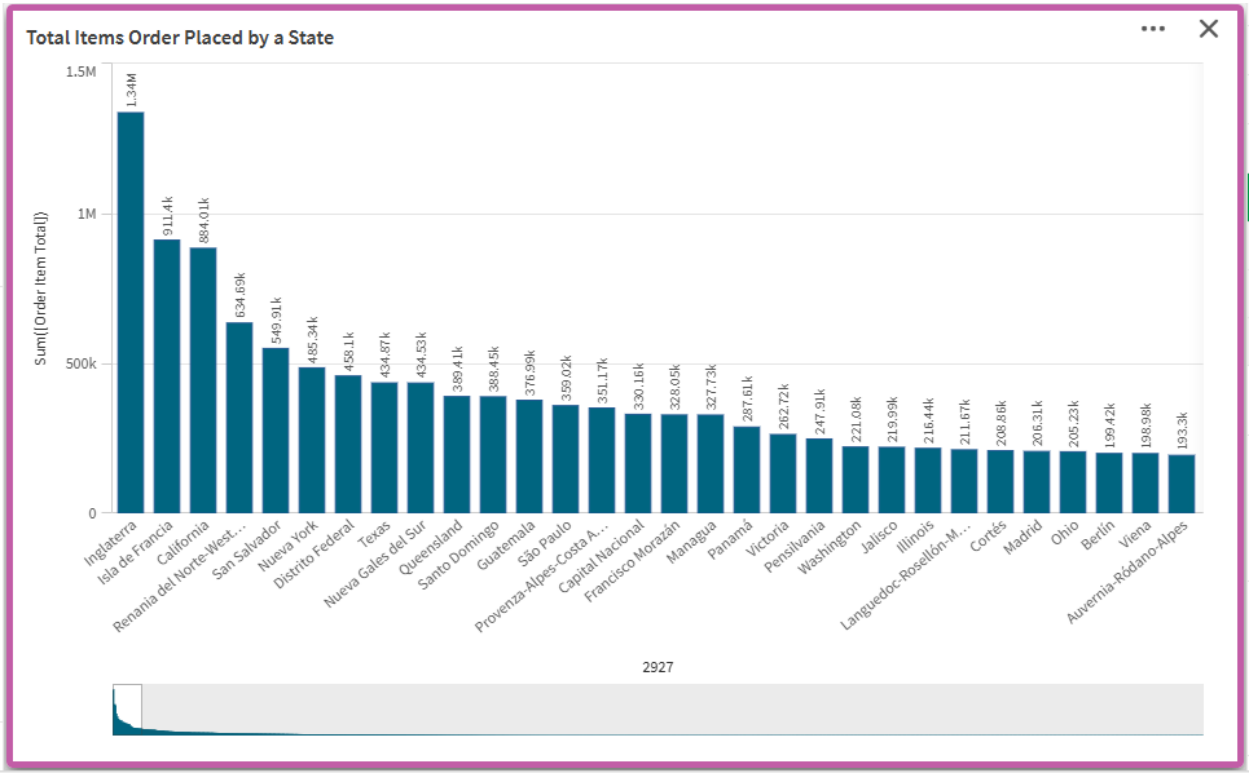
Total Items placed by customer in country :

Pie Chart :



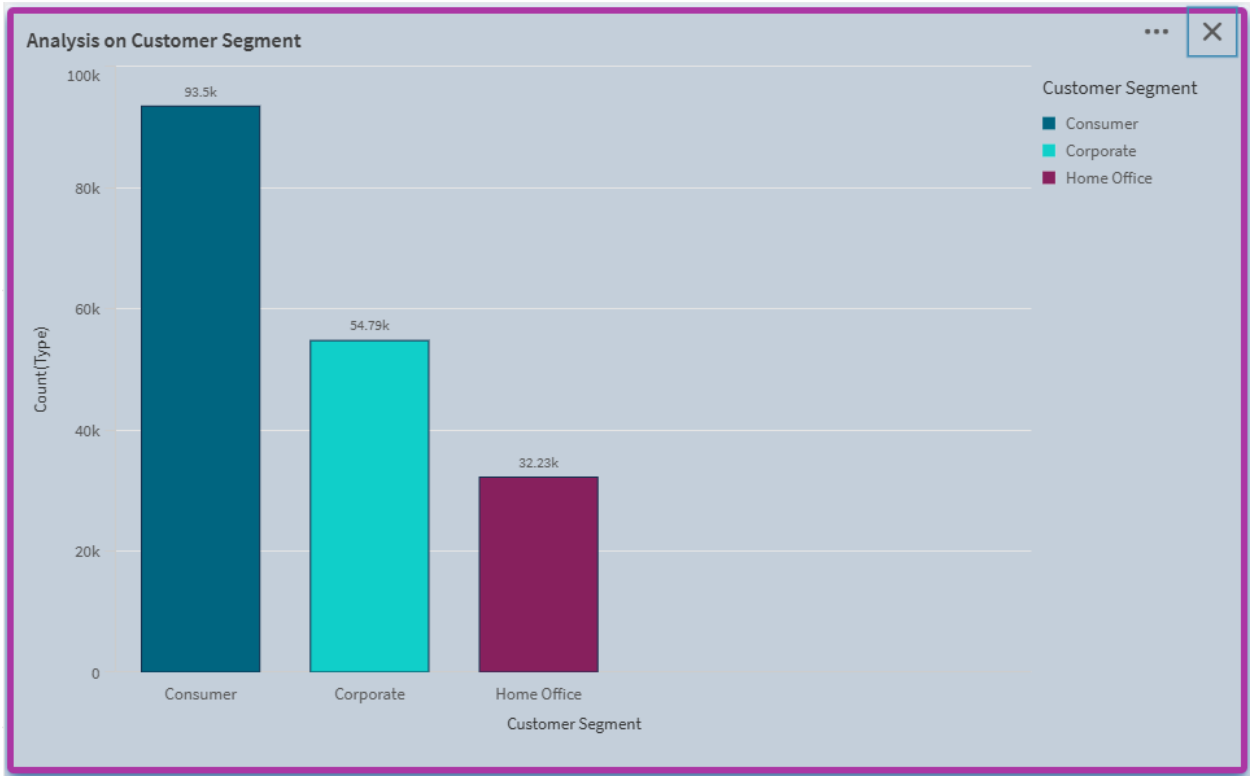
Total Items placed by a state :

Bar Chart :



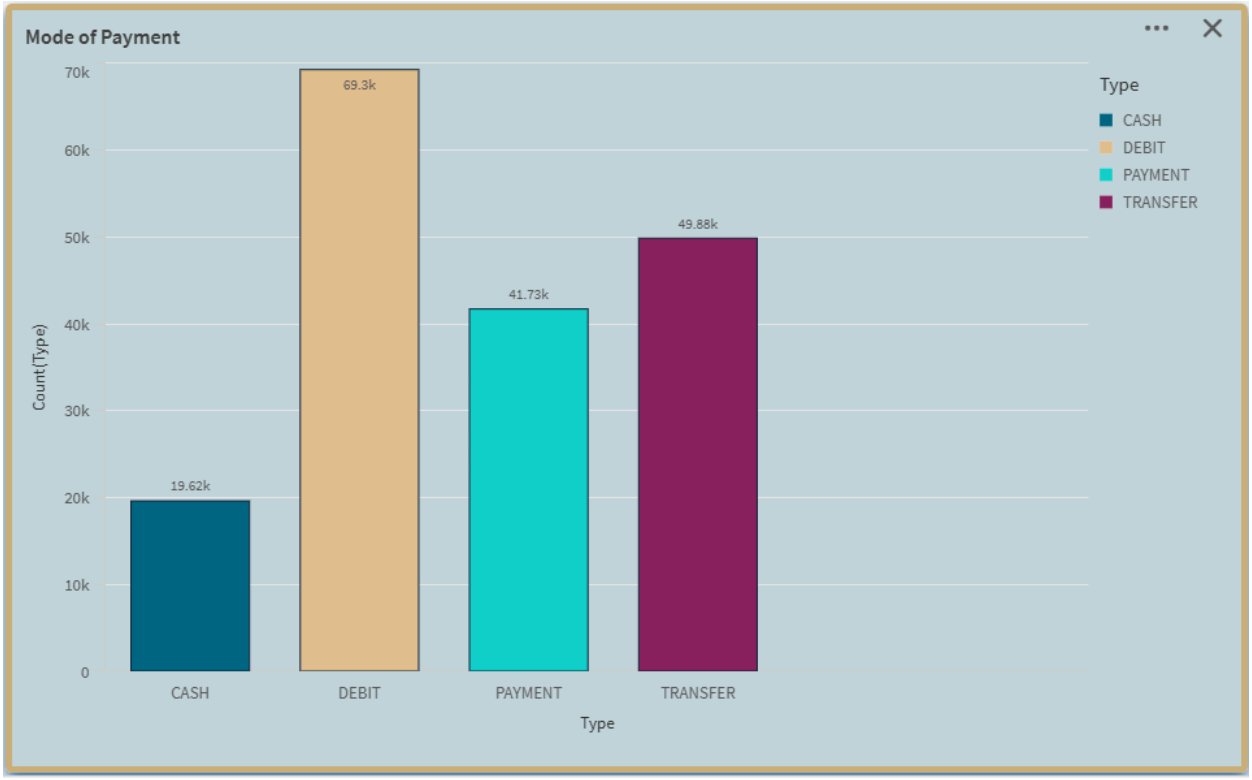
Analysis on customer segment :

Bar Chart :



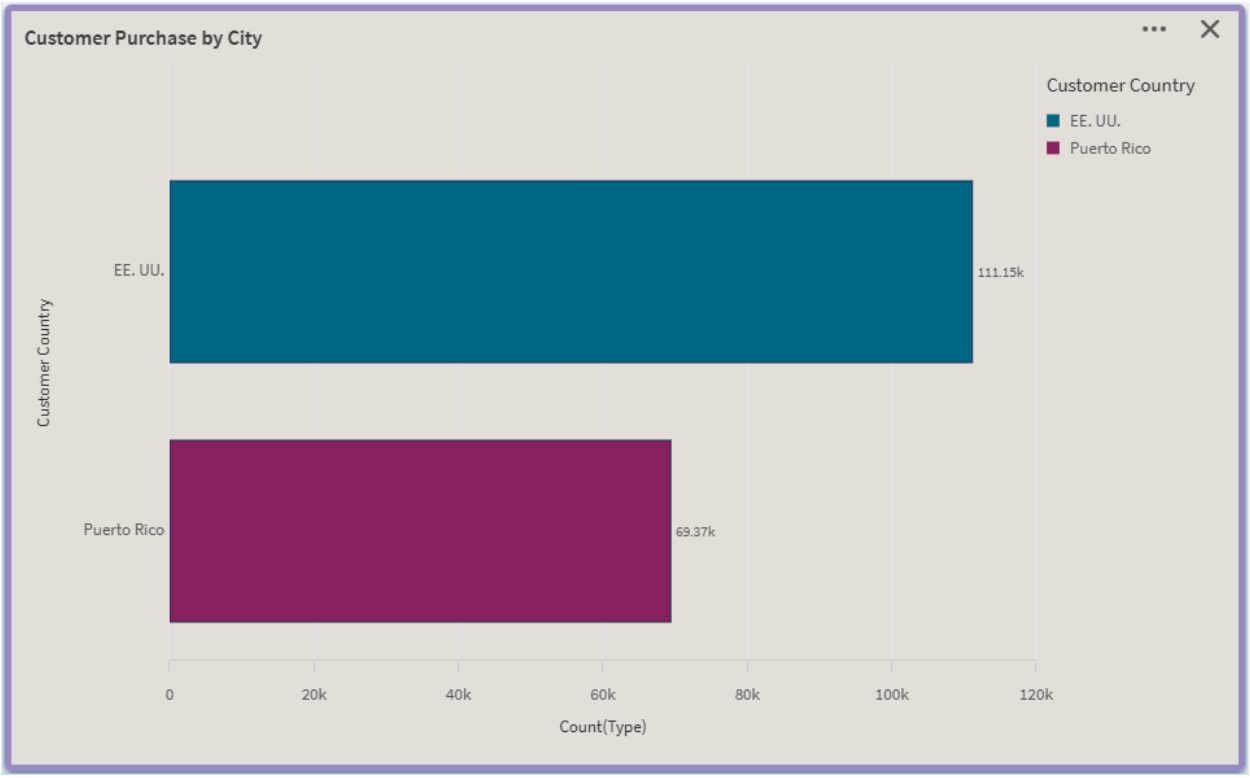
Mode of payment :

Bar Chart :



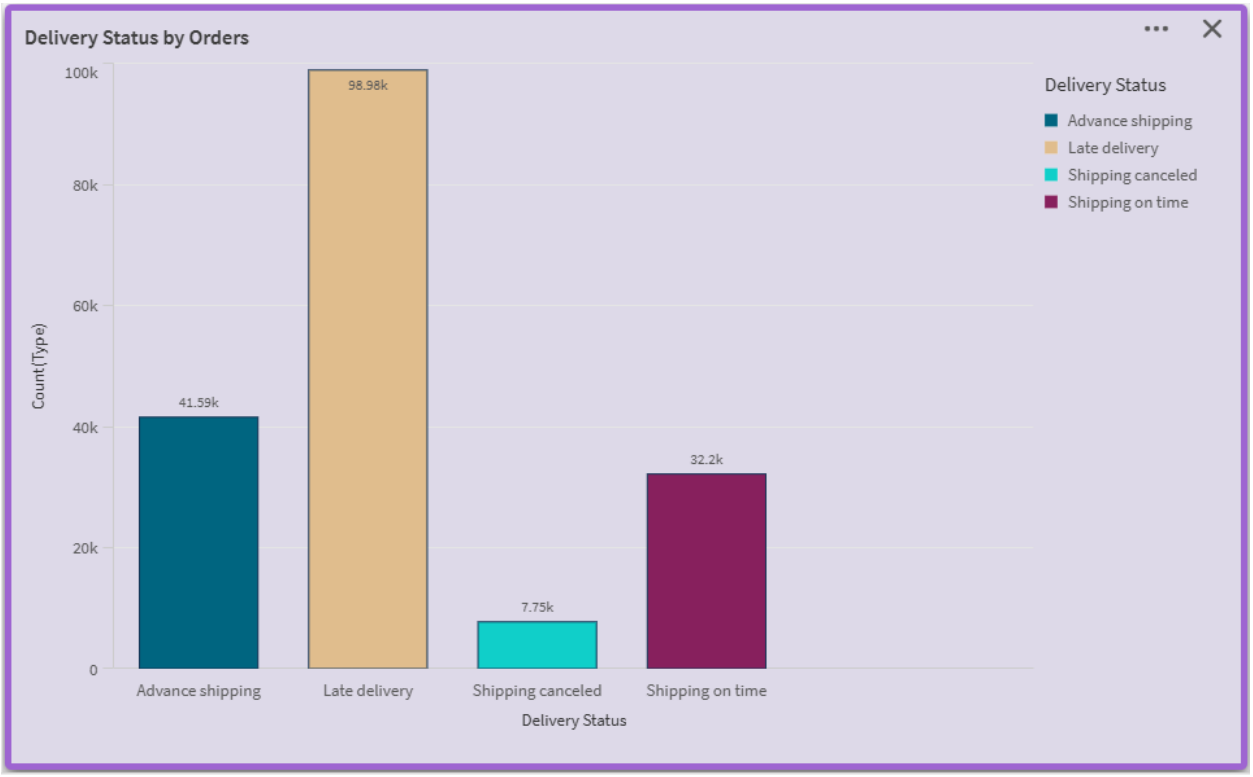
Customer purchase by city :

Bar Chart :



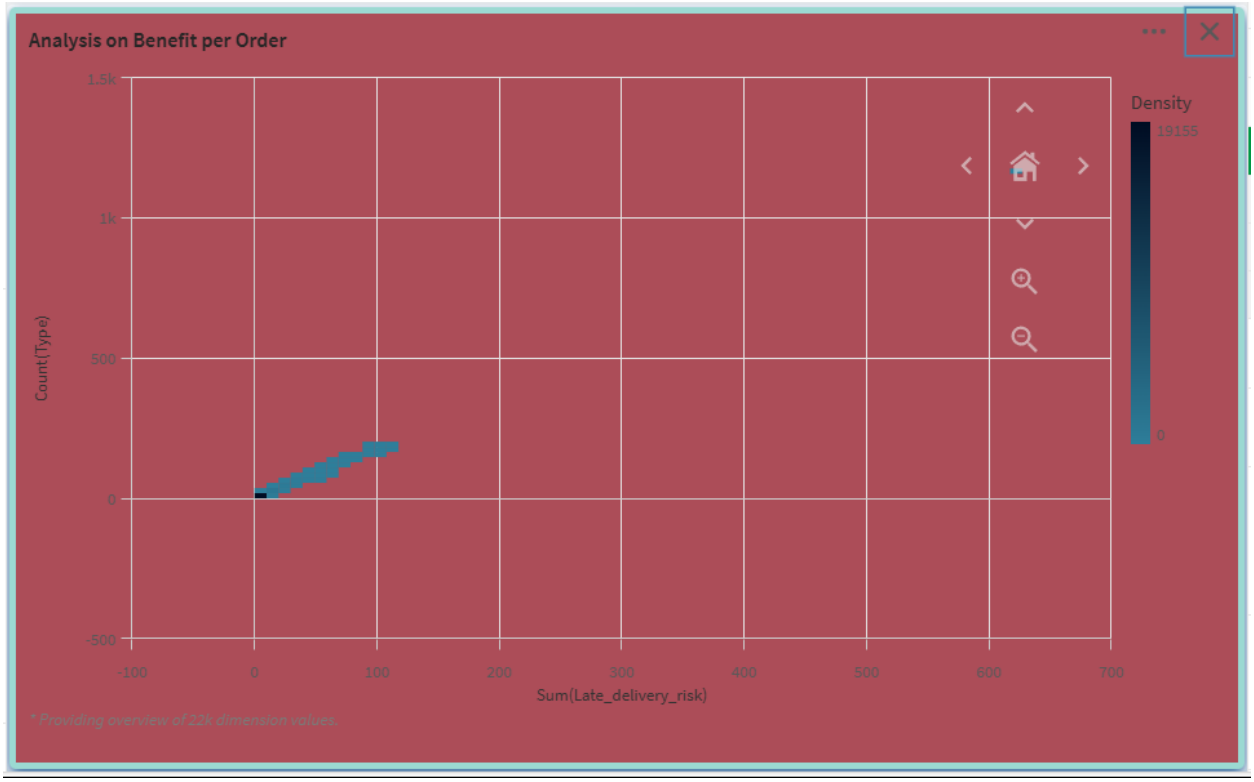
Delivery status of orders :

Bar Chart :



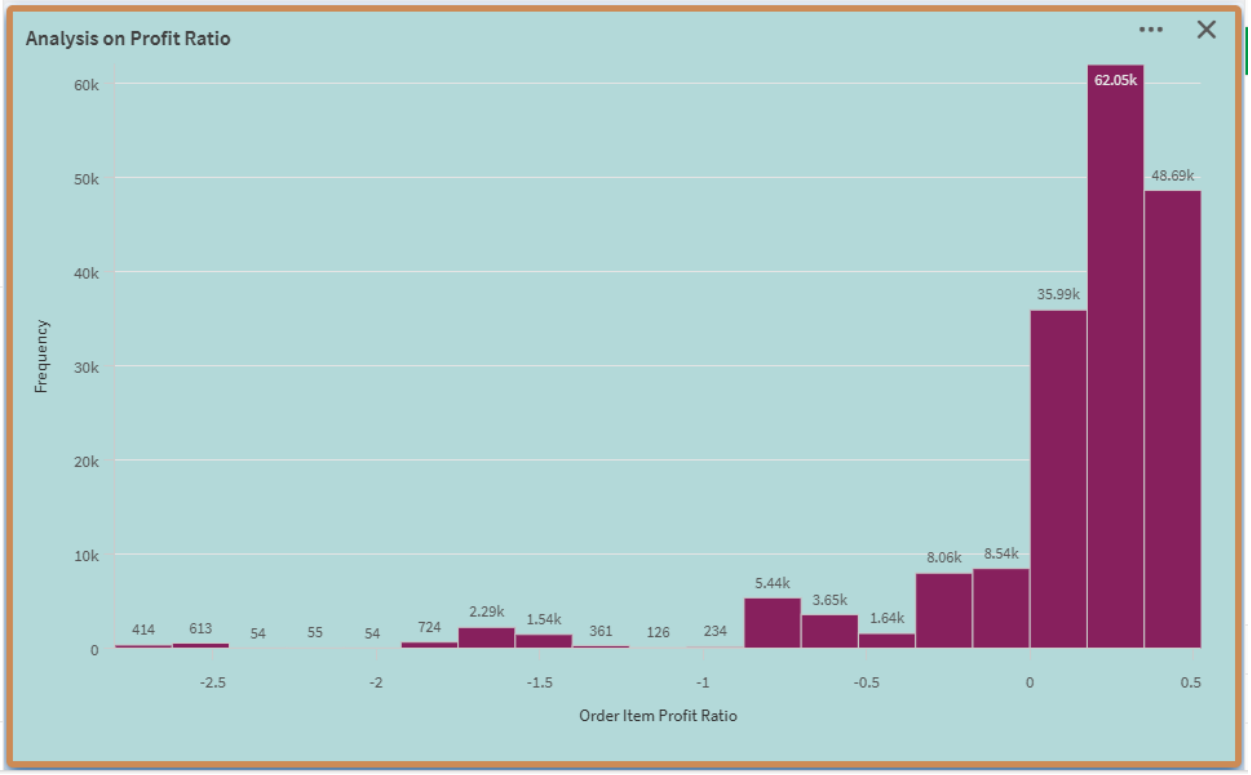
Analysis of benefit per order :

Scatter Plot :



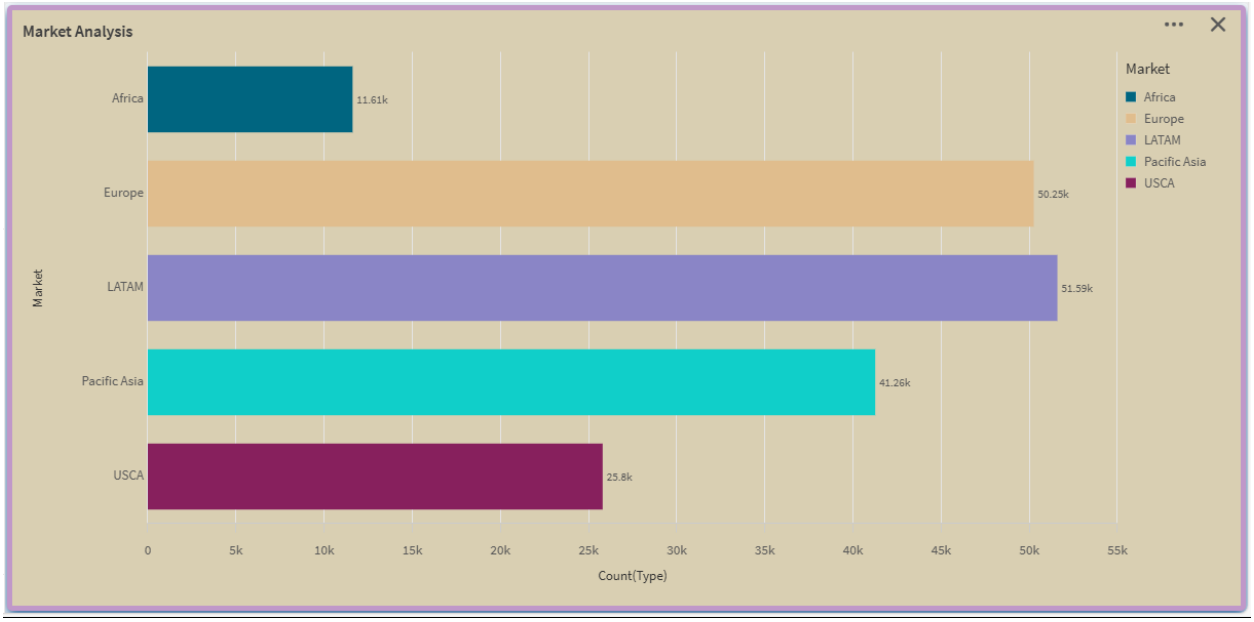
Analysis on Profit Ratio :

Histogram :



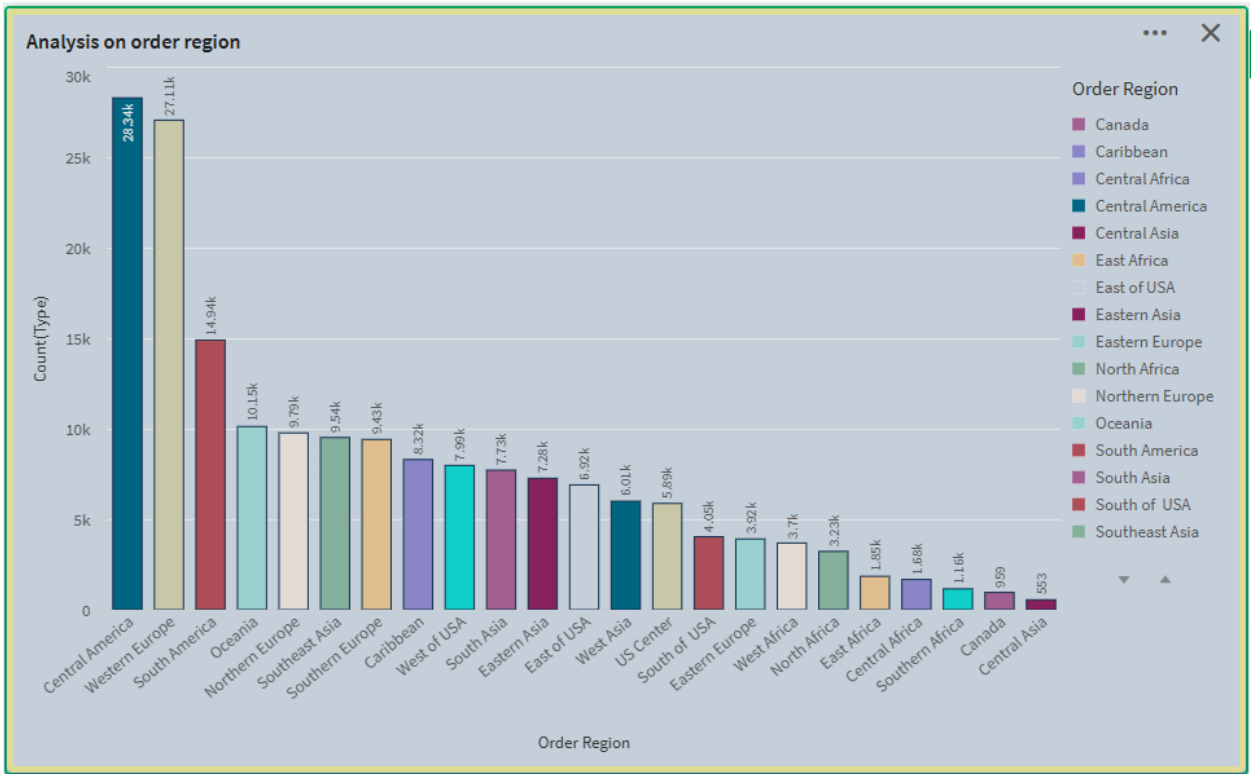
Market Analysis :

Bar Chart :



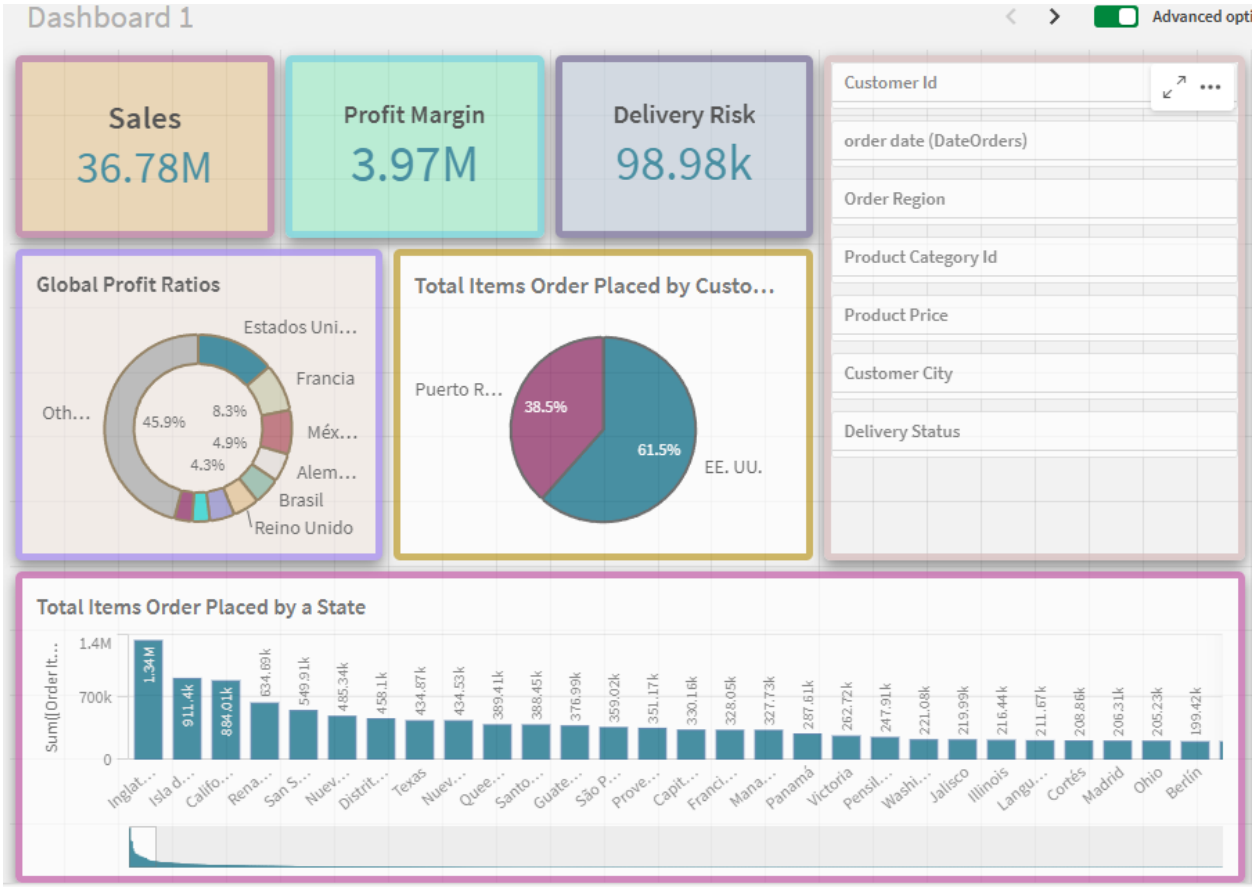
Analysis on Order Region :

Bar Chart :

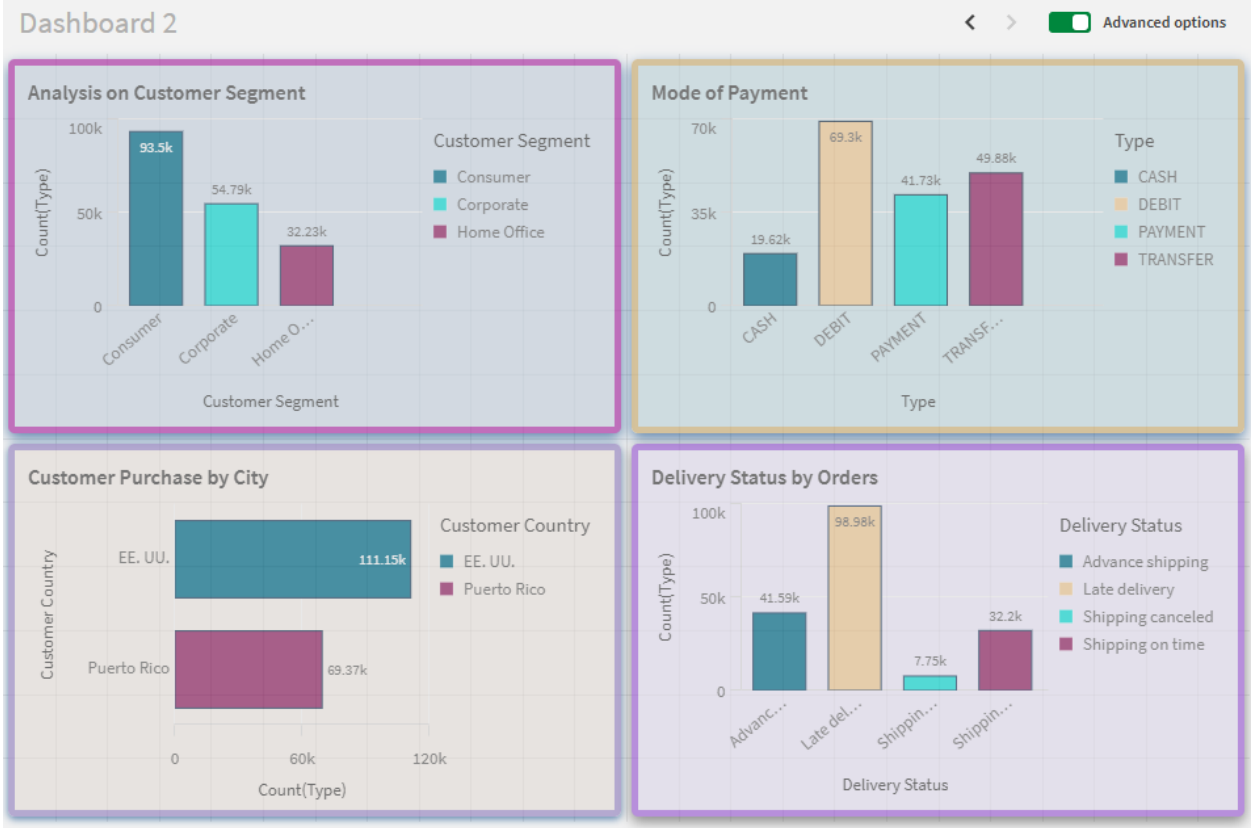


Dashboard :

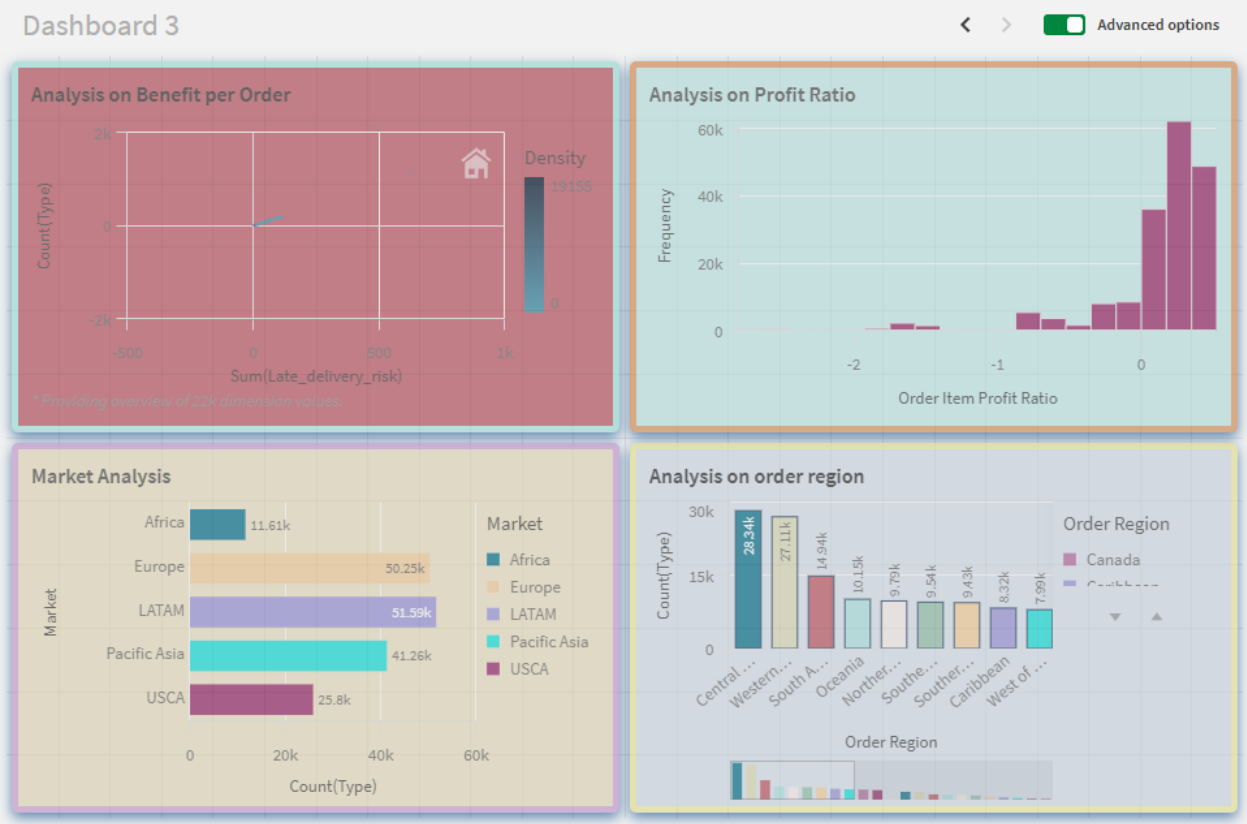
Dashboard 1 :


Dashboard 1
Advanced opti
Sales
36.78M
Profit Margin
3.97M
Delivery Risk
98.98k
Customer Id
order date (DateOrders)
Order Region
Product Category Id
Product Price
Customer City
Delivery Status
Global Profit Ratios
Estados Uni...
Francia
Méx...
Alem...
Brasil
Reino Unido
Oth...
45.9%
8.3%
4.9%
4.3%
Total Items Order Placed by Custo...
Puerto R...
38.5%
61.5%
EE. UU.
Total Items Order Placed by a State
Sum([Order It...
1.4M
700k
0
1.34M
911.4k
884.01k
634.69k
549.91k
485.34k
458.1k
434.87k
434.53k
389.41k
388.45k
376.99k
359.02k
351.17k
330.16k
328.05k
327.73k
287.61k
262.72k
247.91k
221.08k
219.99k
216.44k
211.67k
208.86k
206.31k
205.23k
199.42k
Inglat...
Isla d...
Califo...
Rena...
San S...
Nuev...
Distrit...
Texas
Nuev...
Quee...
Santo...
Guate...
São P...
Prove...
Capit...
Franci...
Mana...
Panamá
Victoria
Pensil...
Washi...
Jalisco
Illinois
Langu...
Cortés
Madrid
Ohio
Berlín

Dashboard 2 :


Dashboard 2
Advanced options
Analysis on Customer Segment
Count(Type)
100k
50k
0
93.5k
54.79k
32.23k
Consumer
Corporate
Home O...
Customer Segment
Customer Segment
Consumer
Corporate
Home Office
Mode of Payment
Count(Type)
70k
35k
0
19.62k
69.3k
41.73k
49.88k
CASH
DEBIT
PAYMENT
TRANSF...
Type
Type
CASH
DEBIT
PAYMENT
TRANSFER
Customer Purchase by City
Customer Country
EE. UU.
Puerto Rico
111.15k
69.37k
0
60k
120k
Count(Type)
Customer Country
EE. UU.
Puerto Rico
Delivery Status by Orders
Count(Type)
100k
50k
0
41.59k
98.98k
7.75k
32.2k
Advanc...
Late del...
Shippin...
Shippin...
Delivery Status
Delivery Status
Advance shipping
Late delivery
Shipping canceled
Shipping on time

Dashboard 3 :


Dashboard 3
Advanced options
Analysis on Benefit per Order
Density
19155
0
Count(Type)
2k
0
-2k
-500
0
500
1k
Sum(Late_delivery_risk)
* Providing overview of 221 dimension values.
Analysis on Profit Ratio
Frequency
60k
40k
20k
0
-2
-1
0
Order Item Profit Ratio
Market Analysis
Market
Africa
Europe
LATAM
Pacific Asia
USCA
11.61k
50.25k
51.59k
41.26k
25.8k
0
20k
40k
60k
Count(Type)
Analysis on order region
Count(Type)
30k
15k
0
28.34k
27.11k
14.94k
10.15k
9.79k
9.54k
9.43k
8.32k
7.99k
Central ...
Western...
South A...
Oceania
Norther...
Southe...
Souther...
Caribbean
West of ...
Order Region
Order Region
Canada

Story :

Story

Supply Chain Management Analysis Story

Sales	Profit Margin	Delivery Risk
36.78M	3.97M	98.98k

No of Sales done in Asian Country. — Sales 109.8k

Sales 1.26M — No of Sales done in US.

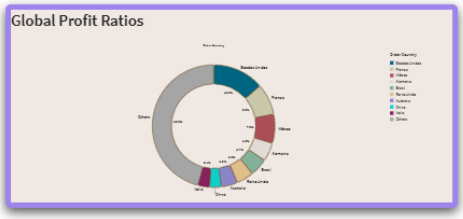
No of Profit Margin taken in Asian Country. — Profit Margin 13.04k

Profit Margin 144.1k — No of Profit Margin taken in US.

No of Delivery Risk taken in Asian Country. — Delivery Risk 306

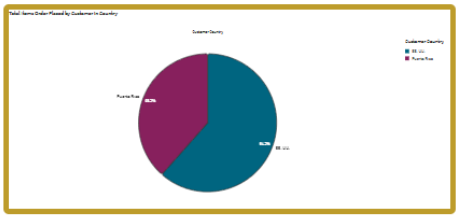
Delivery Risk 3.56k — No of Delivery Risk taken in US.

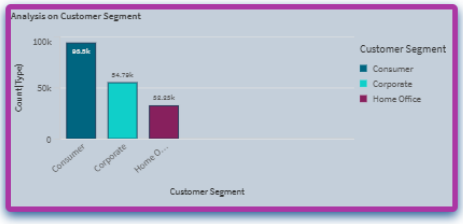
Story



Top 10 Countries with highest Profit ratios in Supply Chain Management.

Total items placed by Customers in countries.

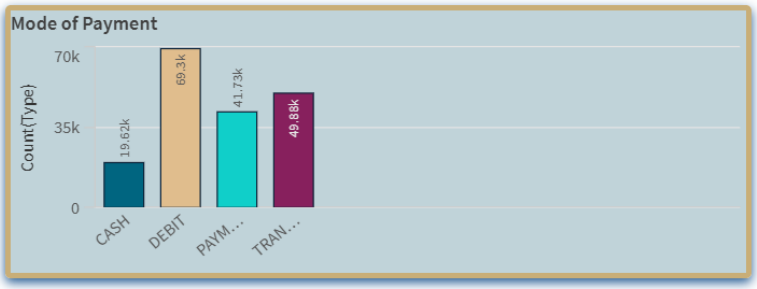




Analyzing Customer segments - encompassing consumer, corporate, and home categories.

Story

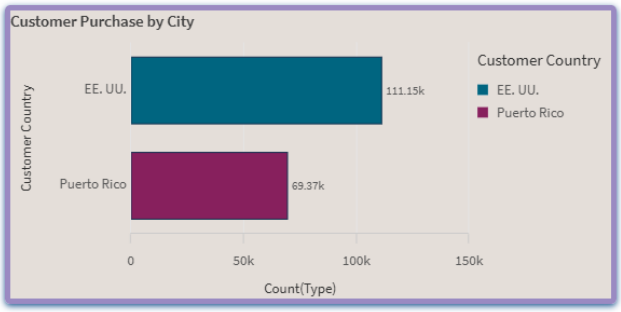
Mode of Payment for Purchases



- Cash transaction offer immediate liquidity, providing a straightforward and tangible method of payment.
- Debit payments, directly linked to bank accounts, offer convenience and real-time deduction of funds.
- Credit Payments provide a differed payment option allowing customers to make purchases.
- Transfer Payments leverage electronic methods for seamless and secure fund.

Story

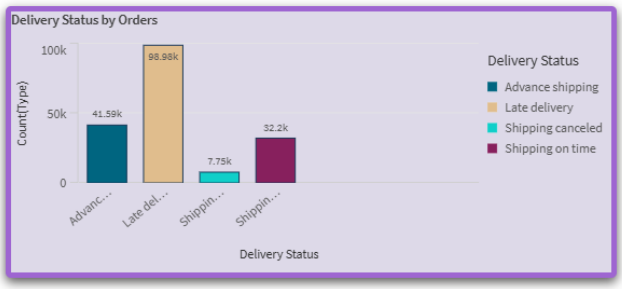
Customer Purchase item by City



- Customer Purchase count in Puerto Rico reflects the transactional dynamics in this vibrant location, capturing the local consumer behavior and market engagement.
- Customer purchase count in the United States provides a comprehensive overview of buying patterns across diverse cities.

Story

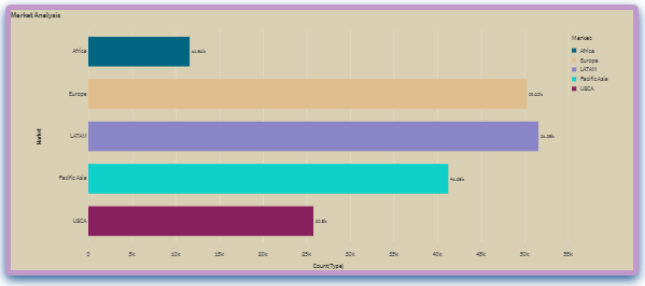
Delivery Status of Orders



- Analyzing the delivery of orders, including Advanced Shipping, Late Shipping, Shipping Canceled, and Shipping on Time.
- This allows businesses to evaluate the efficiency of their logistics operations, address potential delays, and enhance customer satisfaction.
- Ensuring timely and reliable deliveries based on varied shipping scenarios.

Story

Global Market Analysis

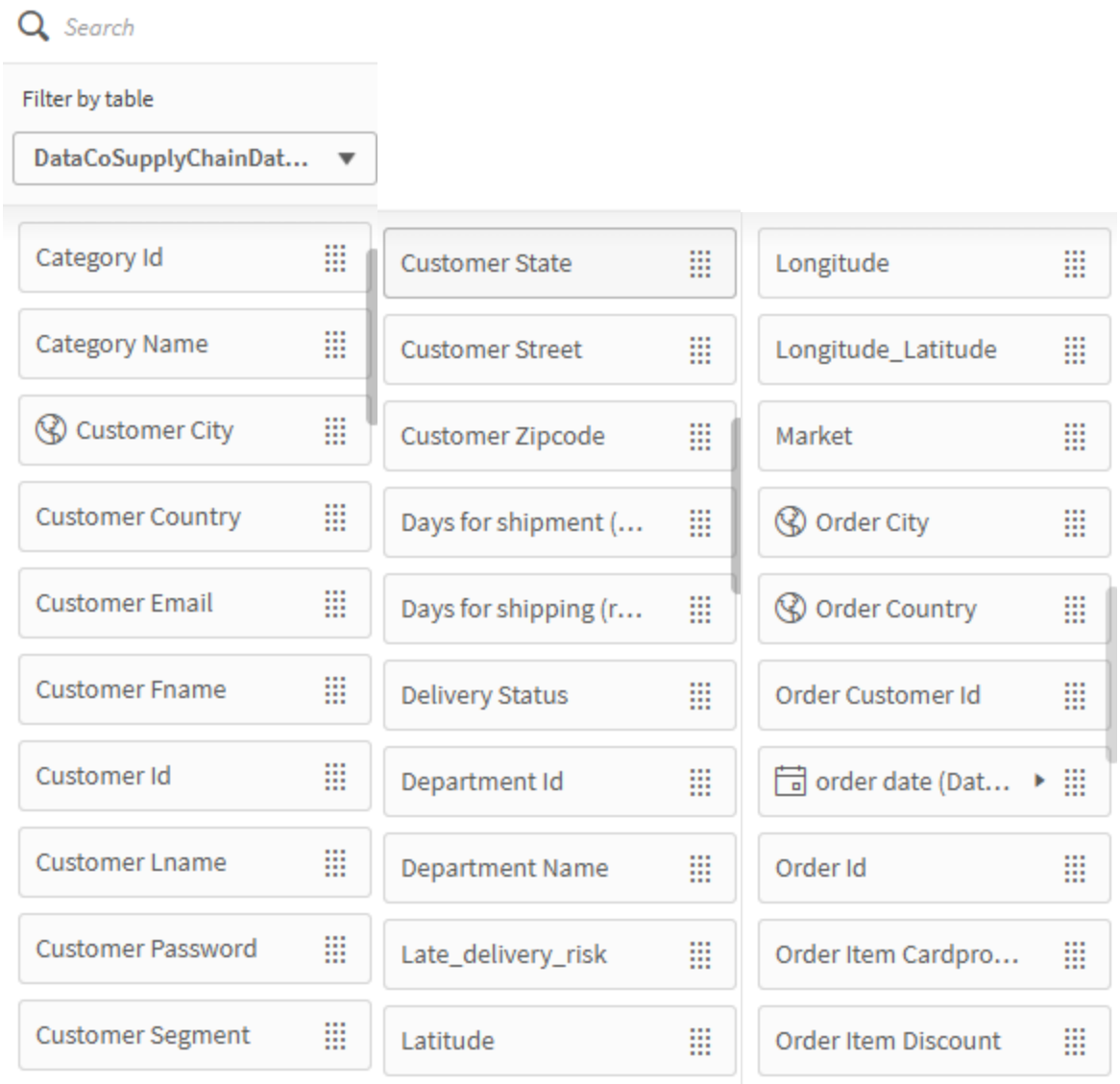


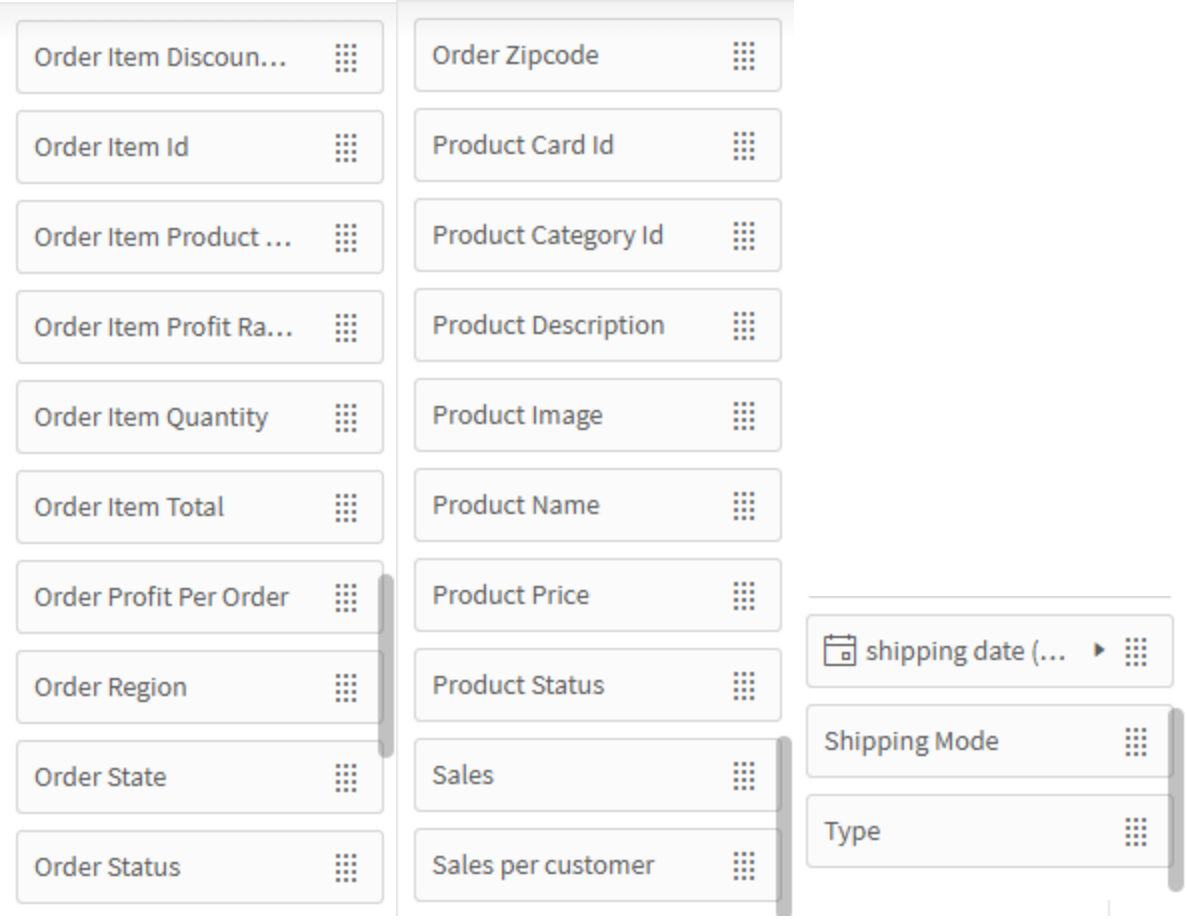
- Conducting a market analysis across Africa, Europe, LATAM (Latin America), Pacific Asia, and USCA (United States and Canada) enables businesses to gain strategic insights.
- Regional economic landscapes, consumer behaviors, and market dynamics.
- This comprehensive assessment supports informed decision-making, tailored marketing strategies, and targeted expansion efforts to capitalize on diverse opportunities within each distinct market.

Performance Testing :

Amount of Data Loaded :

"Amount of Data Loaded" refers to the total volume of data that has been imported or retrieved into a system, software application, database, or any other data storage environment. This term measures how much data has been successfully processed and is now available for analysis, manipulation, or use within the system. Essentially, it indicates the quantity of data that the system can work with, providing a foundation for further data operations and insights.

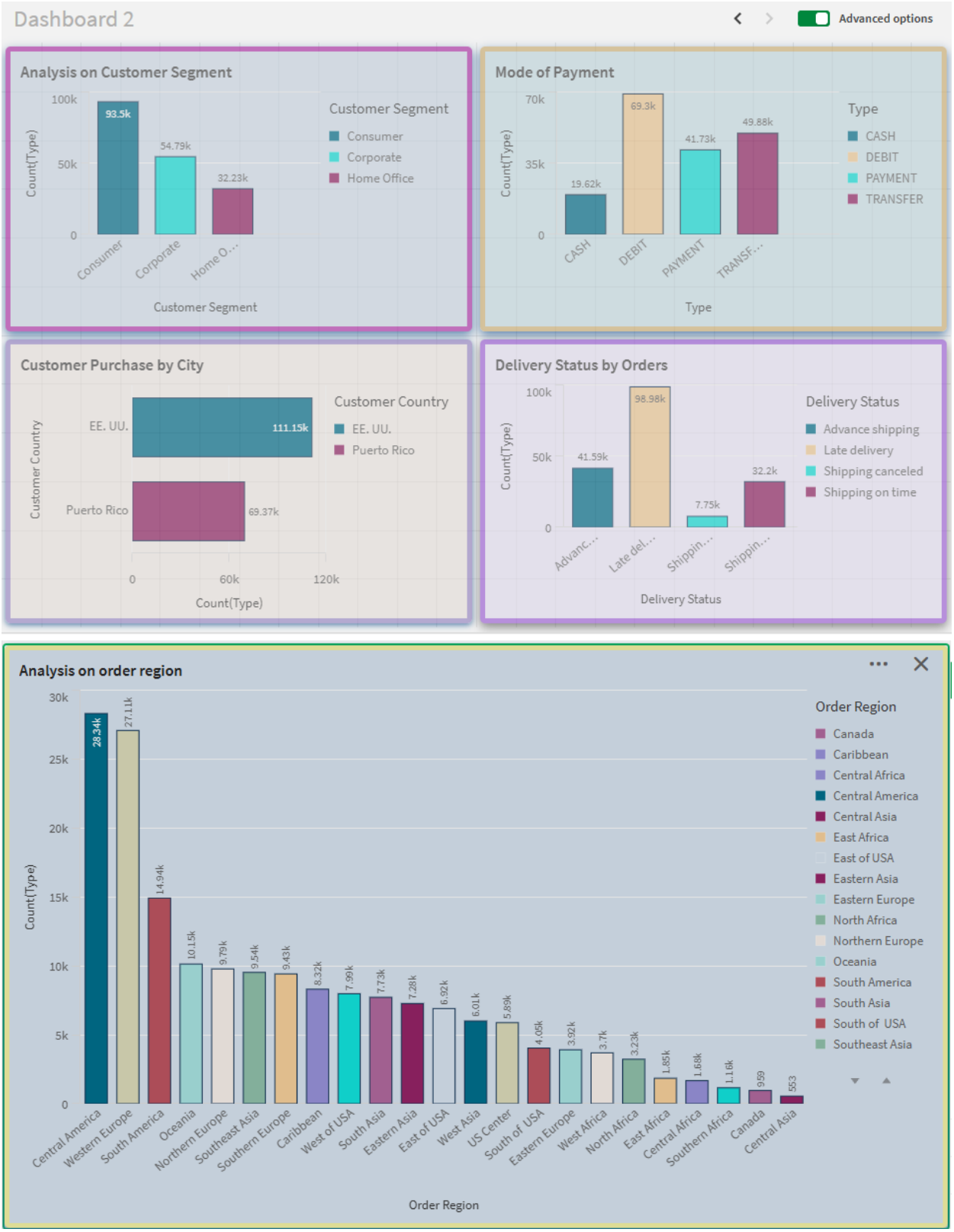


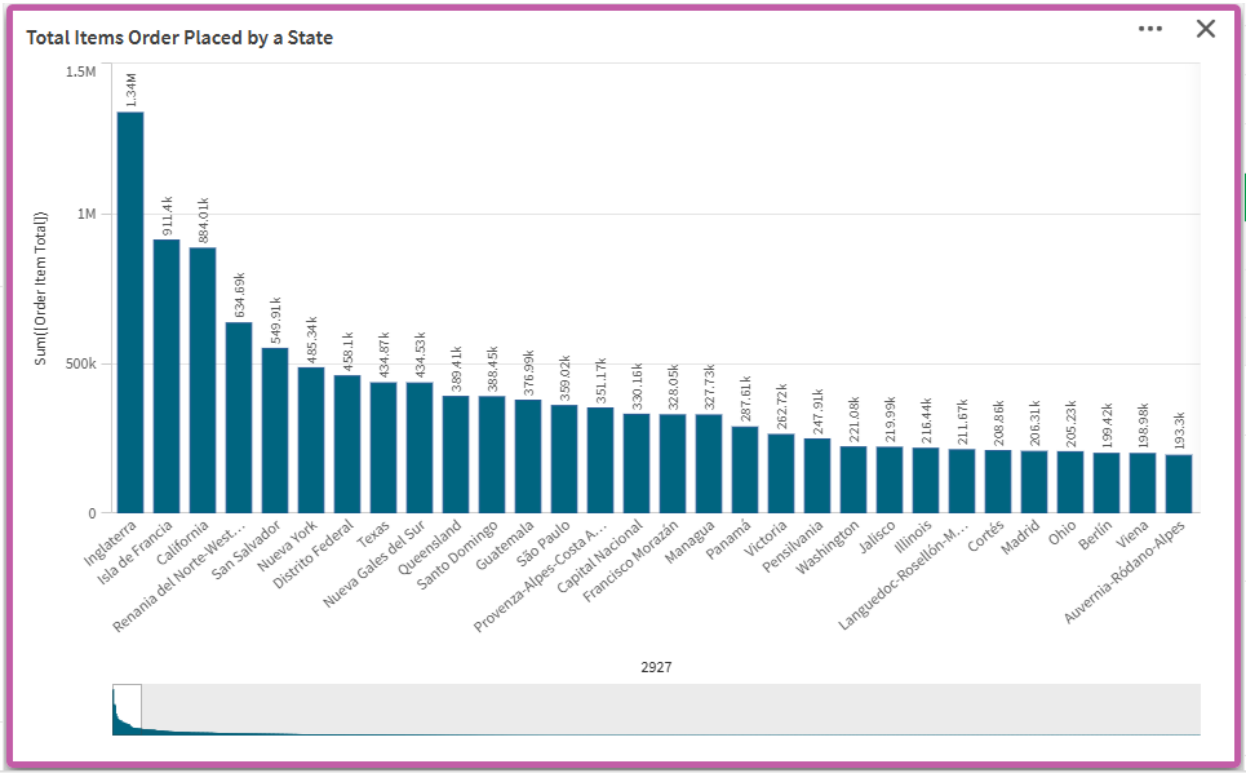


Using fields (shown in the above mentioned screenshots) as filter and Visualization units, we can perform various operations over the data in the dataset and also generate an insight into the amount of data size available in the dataset.

Utilization of Data Filters :

"Utilization of Filters" refers to the use of filters in a system, software application, or data processing pipeline to extract selectively, manipulate, or analyse data based on specific criteria. By applying these filters, users can narrow down the data to focus only on the relevant information that meets predefined conditions. This process helps in managing large datasets by highlighting the most pertinent information, making analysis more efficient and targeted.


Dashboard 2
Advanced options
Analysis on Customer Segment
Count(Type)
100k
50k
0
93.5k
54.79k
32.23k
Consumer
Corporate
Home O…
Customer Segment
Customer Segment
Consumer
Corporate
Home Office
Mode of Payment
Count(Type)
70k
35k
0
19.62k
69.3k
41.73k
49.88k
CASH
DEBIT
PAYMENT
TRANSF…
Type
Type
CASH
DEBIT
PAYMENT
TRANSFER
Customer Purchase by City
Customer Country
EE. UU.
111.15k
Puerto Rico
69.37k
0
60k
120k
Count(Type)
Customer Country
EE. UU.
Puerto Rico
Delivery Status by Orders
Count(Type)
100k
50k
0
41.59k
98.98k
7.75k
32.2k
Advanc…
Late del…
Shippin…
Shippin…
Delivery Status
Delivery Status
Advance shipping
Late delivery
Shipping canceled
Shipping on time
Analysis on order region
Count(Type)
30k
25k
20k
15k
10k
5k
0
28.34k
27.11k
14.94k
10.15k
9.79k
9.54k
9.43k
8.32k
7.99k
7.73k
7.28k
6.92k
6.01k
5.89k
4.05k
3.92k
3.7k
3.23k
1.85k
1.68k
1.16k
959
553
Central America
Western Europe
South America
Oceania
Northern Europe
Southeast Asia
Southern Europe
Caribbean
West of USA
South Asia
Eastern Asia
East of USA
West Asia
US Center
South of USA
Eastern Europe
West Africa
North Africa
East Africa
Central Africa
Southern Africa
Canada
Central Asia
Order Region
Order Region
Canada
Caribbean
Central Africa
Central America
Central Asia
East Africa
East of USA
Eastern Asia
Eastern Europe
North Africa
Northern Europe
Oceania
South America
South Asia
South of USA
Southeast Asia



As we can see in the above pictures, we achieved multiple visualisations using data in the same dataset, but we kept unwanted data out of the visualisation and used only required data using the filtering feature, and this applies to fields and events under certain conditions.

No of Visualizations / Graphs :

- Global Profit Ratios
- Total Items placed by customer in country
- Total Items placed by a state
- Analysis on customer segment
- Mode of payment
- Customer purchase by city
- Delivery status of orders
- Analysis of benefit per order
- Analysis on profit ratio
- Market Analysis
- Analysis on order region