Data-Driven Innovations In Supply Chain Management With Qlik Insights

1. **Introduction**

   In today's fast-paced and increasingly complex business environment, supply chain management (SCM) has emerged as a critical determinant of organizational success. The ability to efficiently manage logistics, forecasting, and inventory directly impacts operational efficiency and customer satisfaction. To address these challenges, this project aims to revolutionize supply chain management by harnessing the power of Qlik's advanced data-driven insights. By leveraging Qlik's state-of-the-art analytics and visualization capabilities, the project seeks to optimize key aspects of SCM, enhancing overall operational responsiveness and efficiency.

   a. **Overview:**

      The project's primary objective is to implement a robust data integration and analytics strategy to centralize and analyze data from various sources within the supply chain. By employing Qlik's advanced analytics tools, the project will provide stakeholders with clear and actionable insights into the supply chain ecosystem. Key areas of focus include logistics optimization, forecasting accuracy, inventory management, and real-time decision-making.

      The project will deliver the following specific outcomes:

      - **Data Integration:** Aggregation and centralization of data from diverse supply chain sources.
      - **Visualization and Dashboards:** Creation of intuitive and dynamic dashboards using Qlik's visualization capabilities.
      - **Logistics Optimization:** Analysis of historical logistics data to identify patterns and optimize transportation routes.
      - **Real-Time Tracking:** Implementation of real-time tracking and monitoring solutions to enhance visibility and reduce lead times.
      - **Proactive Decision-Making:** Utilization of real-time analytics to facilitate quick decision-making in response to changing demand and unforeseen events.

b. Purpose:

The purpose of this project is to revolutionize supply chain management by leveraging Qlik's advanced data-driven insights to enhance operational efficiency, optimize logistics, improve forecasting accuracy, and streamline inventory management. By integrating and centralizing data from diverse sources within the supply chain, the project aims to provide stakeholders with clear, actionable insights through intuitive and dynamic dashboards. Ultimately, the project seeks to foster a proactive and responsive supply chain environment that can quickly adapt to changing demands and unforeseen events, thereby achieving significant improvements in both business and social outcomes.

c. Technical Architecture:

The technical architecture of the project is designed to support the seamless integration, analysis, and visualization of supply chain data. The architecture comprises the following key components:

- Data Sources: The project will integrate data from various sources within the supply chain, including ERP systems, logistics databases, inventory management systems, and external data sources such as supplier and customer databases.
- Data Integration Layer: A robust data integration layer will aggregate and centralize data from these diverse sources. This layer will utilize ETL (Extract, Transform, Load) processes to ensure data consistency and accuracy.
- Data Storage: Centralized data will be stored in a scalable data warehouse, optimized for fast retrieval and analysis. The data warehouse will support the storage of both historical and real-time data, enabling comprehensive analysis.
- Analytics Engine: Qlik's advanced analytics engine will be employed to perform data analysis. This engine will leverage machine learning algorithms and statistical models to identify patterns, trends, and insights within the supply chain data.
- Visualization and Reporting: Qlik's visualization tools will be used to create dynamic and intuitive dashboards. These dashboards

will provide stakeholders with real-time insights into key supply chain metrics, facilitating data-driven decision-making.

- Real-Time Monitoring: Real-time tracking and monitoring solutions will be implemented to provide visibility into the movement of goods across the supply chain. This component will utilize IoT (Internet of Things) devices and sensors to collect real-time data.
- User Interface: The project will develop user-friendly interfaces for different stakeholder groups, ensuring that insights are easily accessible and actionable. These interfaces will be customizable to meet the specific needs of various users within the organization.

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2. Define Problem / Problem Understanding

a. Specify the business problem:

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.

b. 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 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.

c. **Literature Survey:**

A literature survey on the project theme of revolutionizing supply chain management through data-driven insights and advanced analytics reveals a growing body of research and scholarly articles focused on similar endeavors. Studies underscore the increasing recognition of the pivotal role that data analytics plays in transforming traditional supply chain processes. Research highlights the effectiveness of leveraging advanced analytics tools, such as Qlik, to enhance visibility and decision-making in supply chain operations. The study emphasizes the positive impact on logistics optimization, forecasting accuracy, and inventory management efficiency. Moreover, delves into the broader landscape of data-driven supply chain transformations, exploring diverse analytical techniques and technologies. The findings showcase successful implementations, demonstrating notable improvements in operational efficiency and responsiveness across various industry sectors. In addition, examines the challenges and opportunities associated with the adoption of data-driven insights in supply chain contexts. The literature emphasizes the need for organizations to develop robust data governance frameworks and cultivate a data-driven culture to fully unlock the potential benefits.

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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.

a. **Collect the Dataset:**

- **Identify the Dataset:** The first step in data collection is to identify the relevant dataset from Kaggle that aligns with the objectives of the

supply chain management project. This dataset should include key variables related to logistics, inventory, forecasting, and other supply chain operations.

- **Download the Dataset:** Once the appropriate dataset is identified, it can be downloaded from Kaggle. This involves:
  - Logging into Kaggle.
  - Navigating to the dataset page.
  - Clicking on the download button to save the dataset to the local system.
- **Dataset Characteristics:** The chosen dataset should ideally contain:
  - Historical logistics data (e.g., shipment times, routes, costs).
  - Inventory levels and turnover rates.
  - Demand forecasts.
  - Supplier and customer information.
  - Real-time tracking data.

b. Connect Data with Qlik Sense:

- **Upload the Dataset:**
  - Log into Qlik Sense: Access the platform using your credentials.
  - Create a New App: Start a new app for your analysis.
  - Upload the Dataset: Navigate to the data load editor and upload the dataset (CSV, Excel, JSON) from your local system.
- **Data Preparation:**
  - Profile the Data: Examine data types, check for missing values, and understand key variables.
  - Clean the Data: Handle missing values, remove duplicates, and correct inconsistencies.
- **Data Integration:**
  - Combine Multiple Sources: Integrate additional datasets if needed, using common keys like shipment IDs.
  - Create Data Model: Define relationships between tables for seamless analysis and visualization.
- **Data Transformation:**
  - Apply Transformations: Use the data load editor for aggregations, calculations, and normalization.

        - Script Editor: Write custom scripts for advanced data manipulation.
    - **Data Visualization:**
        - Create Visualizations: Use Qlik Sense's tools to build intuitive dashboards with charts, graphs, and maps.
        - Dashboard Development: Design user-friendly dashboards displaying key supply chain metrics.
    - **Real-Time Data Integration:**
        - Set Up Real-Time Feeds: Integrate IoT devices or APIs for live data updates.
        - Real-Time Analytics: Implement real-time analytics for immediate insights and responsive decision-making.

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4. **Data Preparation**
    a. **Prepare the Data for Visualization:**
    Preparing the data for visualization involves cleaning the data to remove irrelevant or missing data, transforming the data into a format that can be easily visualized, exploring the data to identify patterns and trends, filtering the data to focus on specific subsets of data, preparing the data for visualization software, and ensuring the data is accurate and complete. This process helps to make the data easily understandable and ready for creating visualizations to gain insights into performance and efficiency. Since the data is already cleaned, we can move to visualization.

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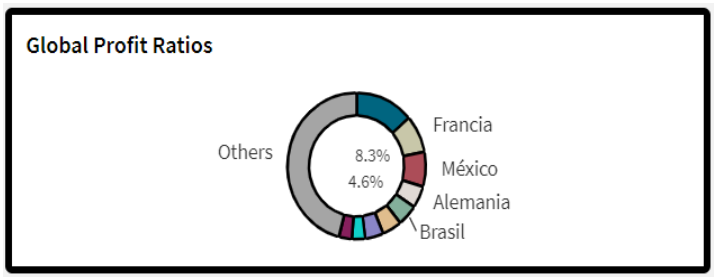
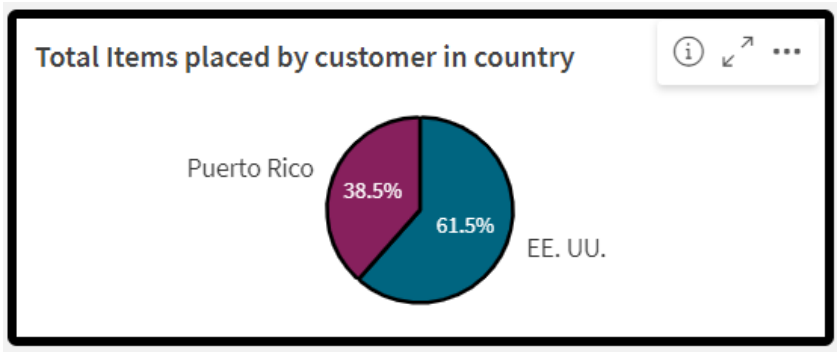
5. **Data Visualizations**
    Data visualization is the process of creating graphical representations of data to help people understand and explore the information. The goal of data visualization is to make complex data sets more accessible, intuitive, and easier to interpret. By using visual elements such as charts, graphs, and maps, data visualizations can help people quickly identify patterns, trends, and outliers in the data.
    a. **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 banks include bar charts, line charts, heat maps, scatter plots, pie charts,]Maps etc. These visualizations can be used to compare performance, track changes over time, show distribution, and relationships between variables, breakdown of revenue and customer demographics, workload, resource allocation and location of banks.

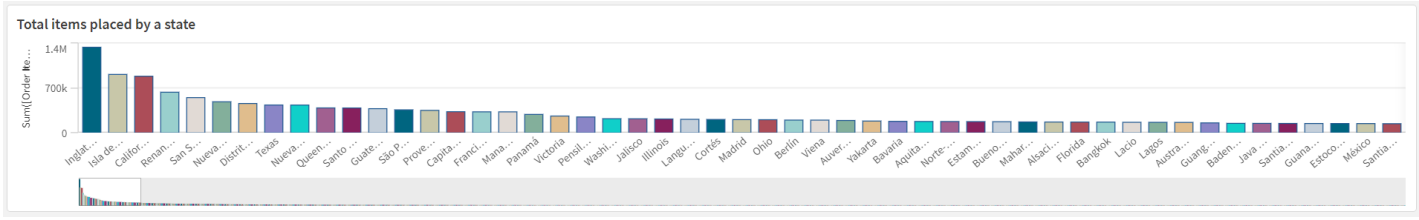
Global Profit Ratios



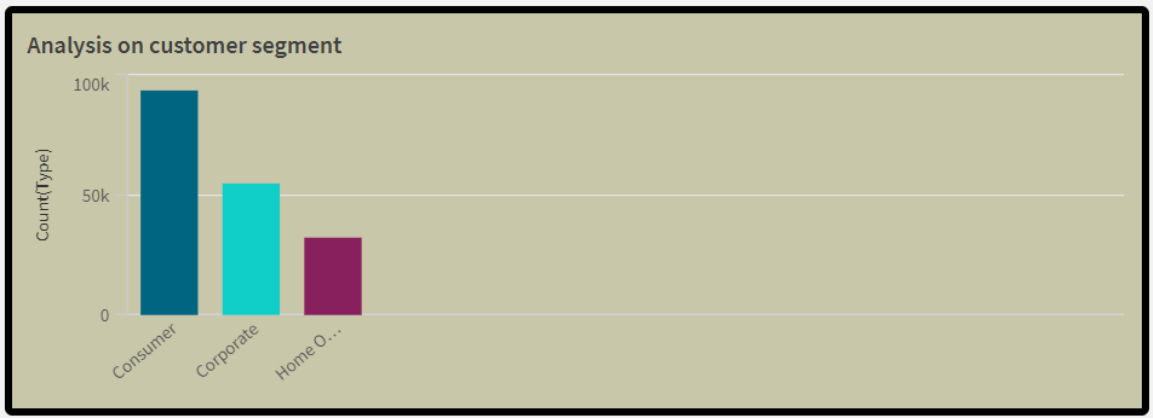
Total Items placed by customer in country



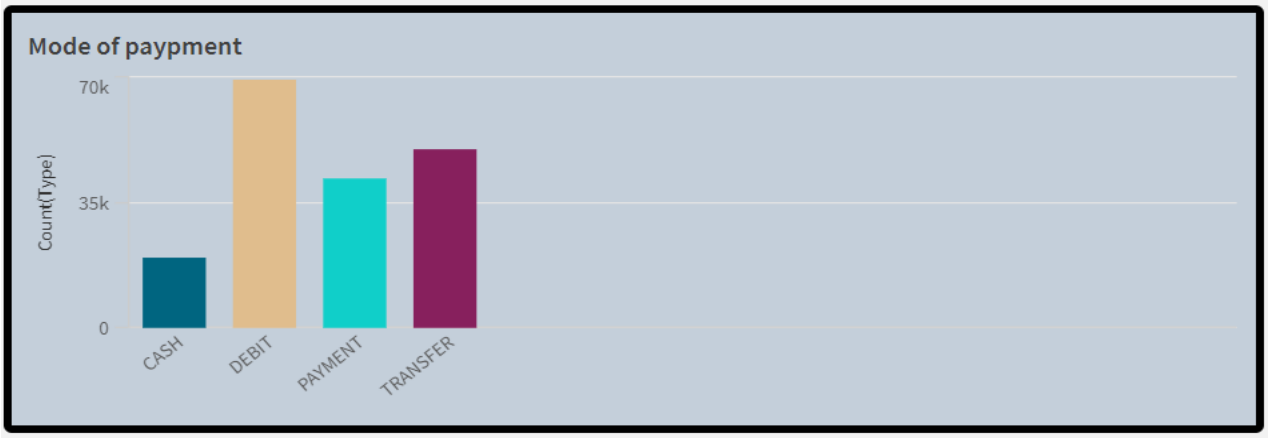
Total items placed by a state



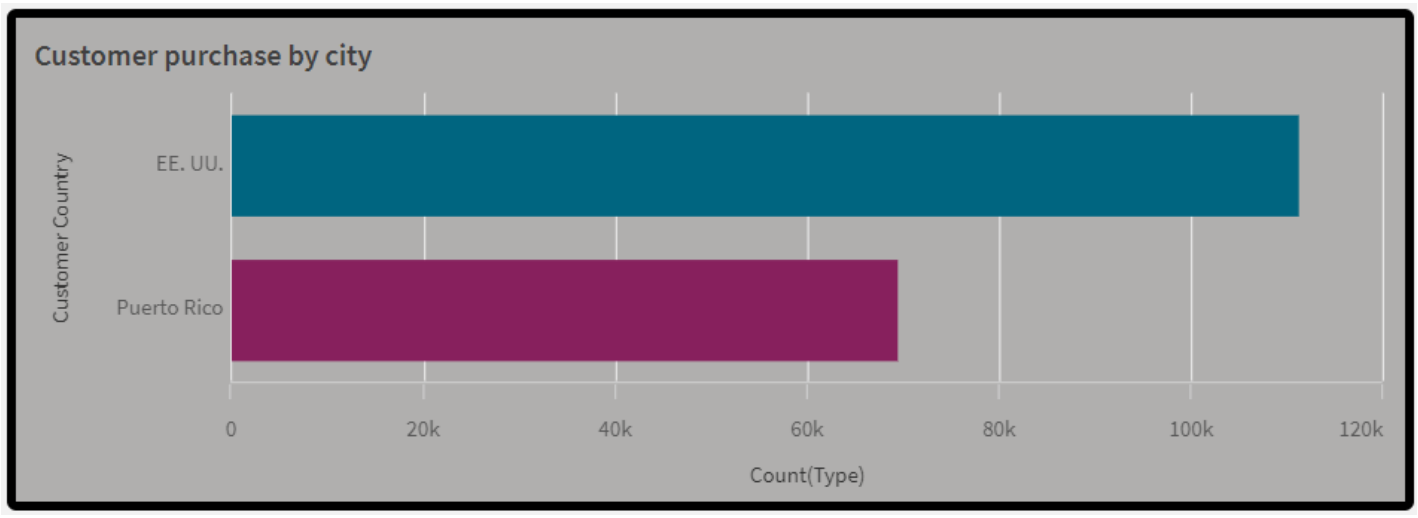
Analysis on customer segment



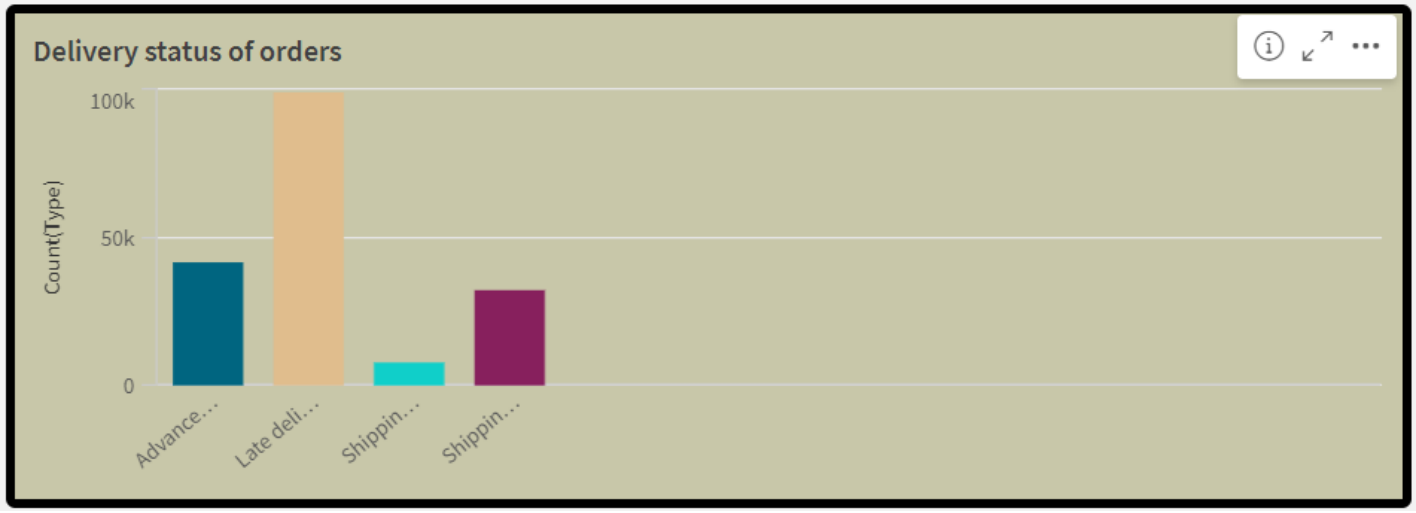
Mode of payment



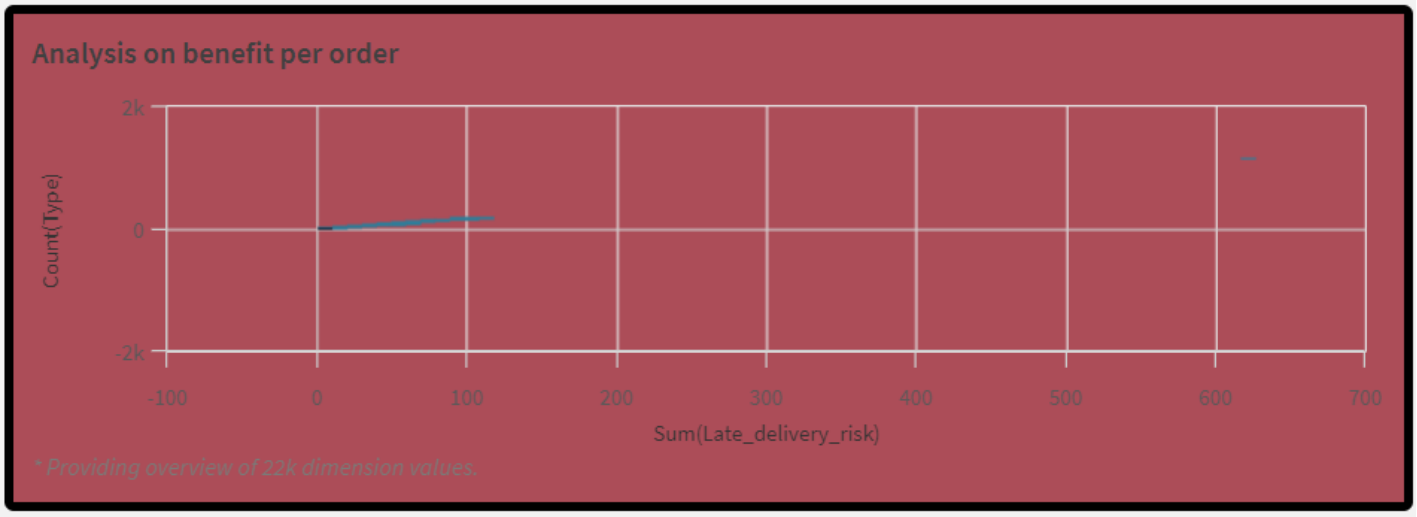
Customer purchase by city



Delivery status of orders

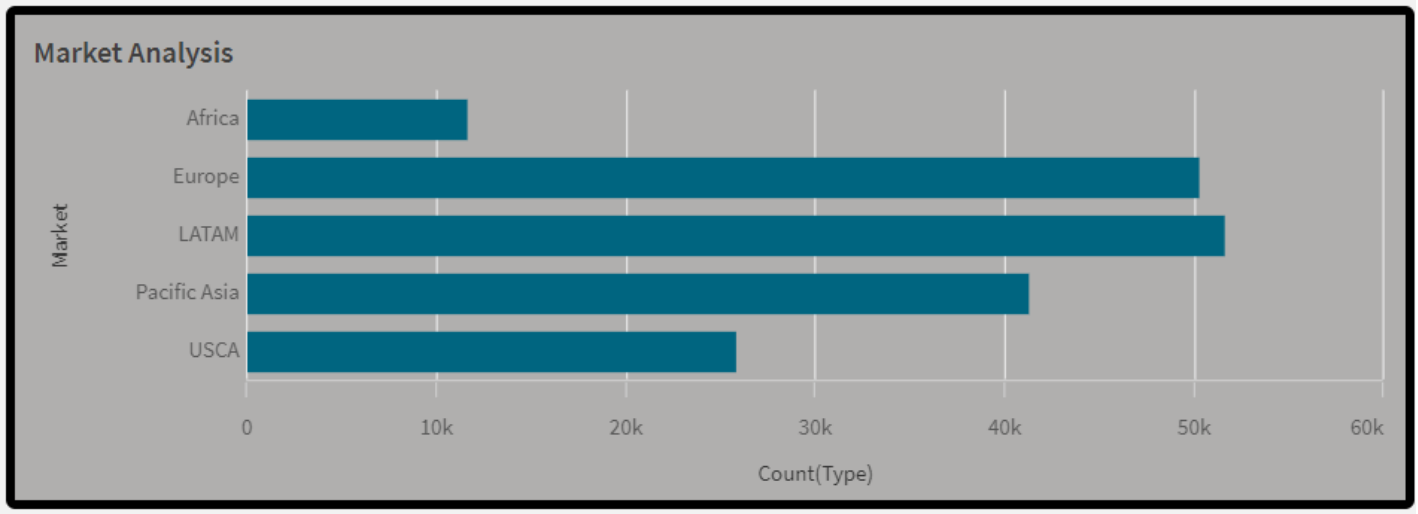


Analysis on benefit per order

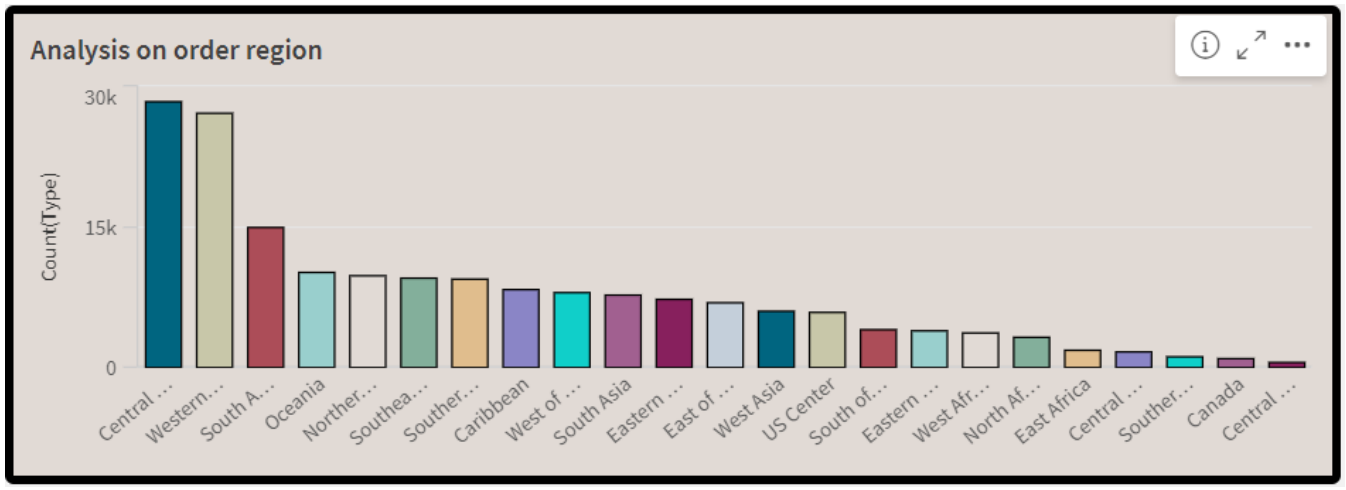


Analysis on profit ratio

Market Analysis



Analysis on order region



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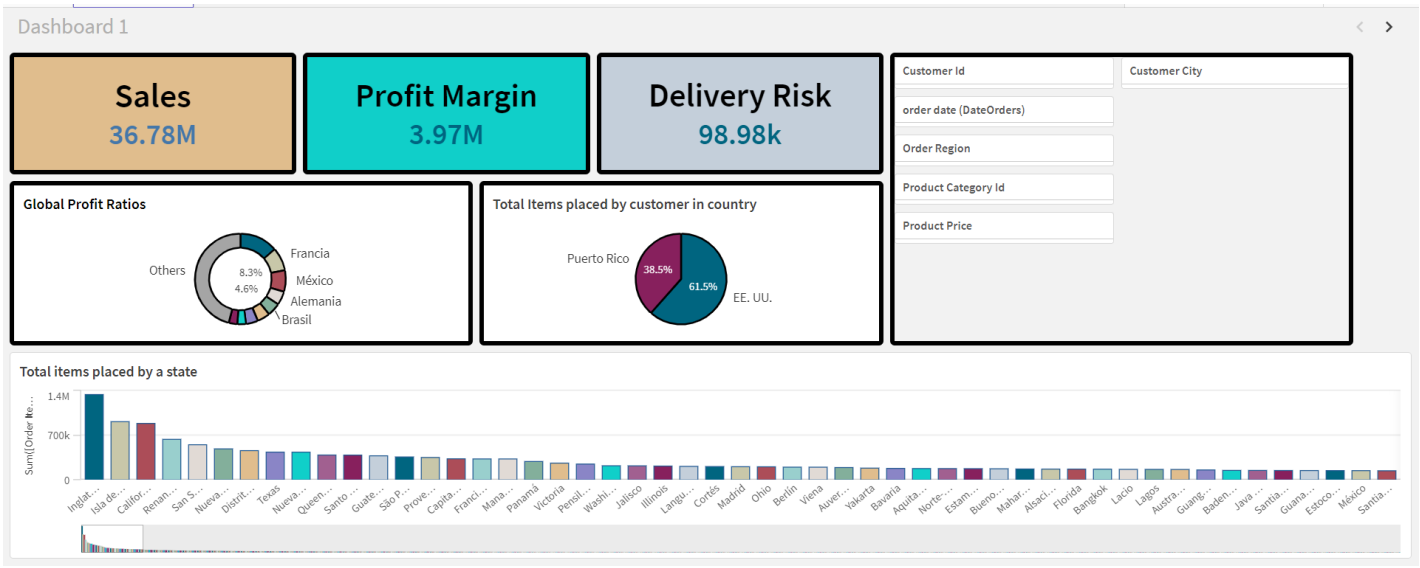
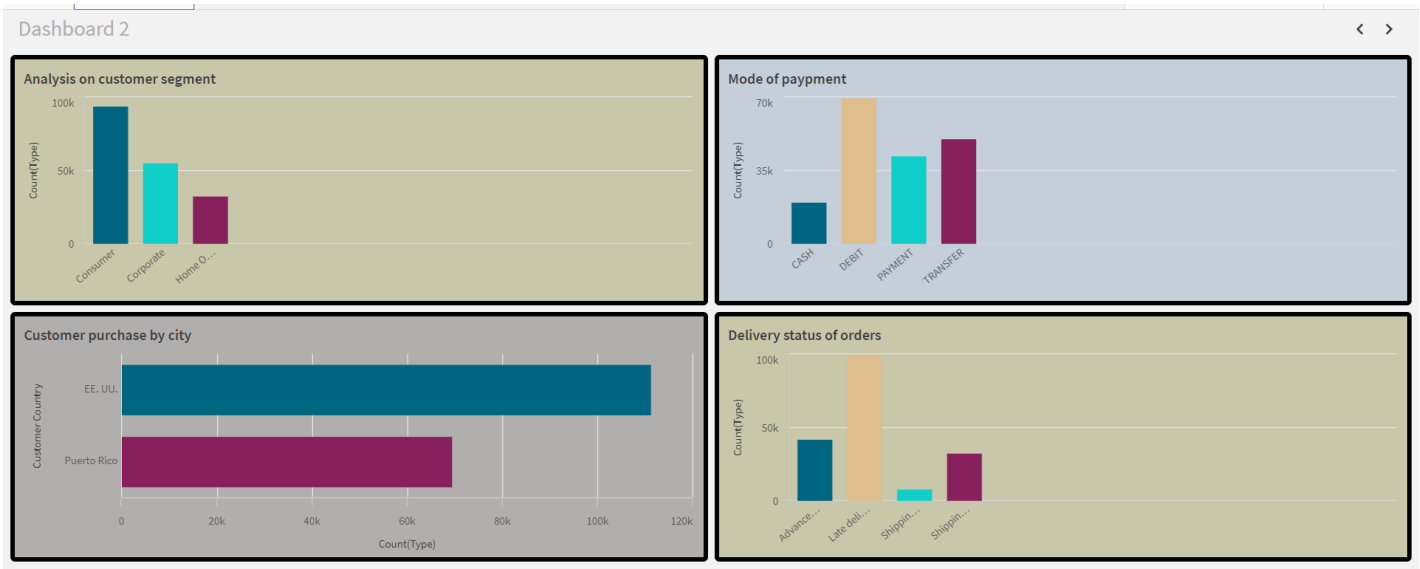
6. **Dashboard**

   A dashboard is a graphical user interface (GUI) that displays information and data in an organized, easy-to-read format. Dashboards are often used to provide real-time monitoring and analysis of data and are typically designed for a specific purpose or use case. Dashboards can be used in a variety of settings, such as business, finance, manufacturing, healthcare, and many other industries. They can be used to track key performance indicators (KPIs), monitor performance metrics, and display data in the form of charts, graphs, and tables.

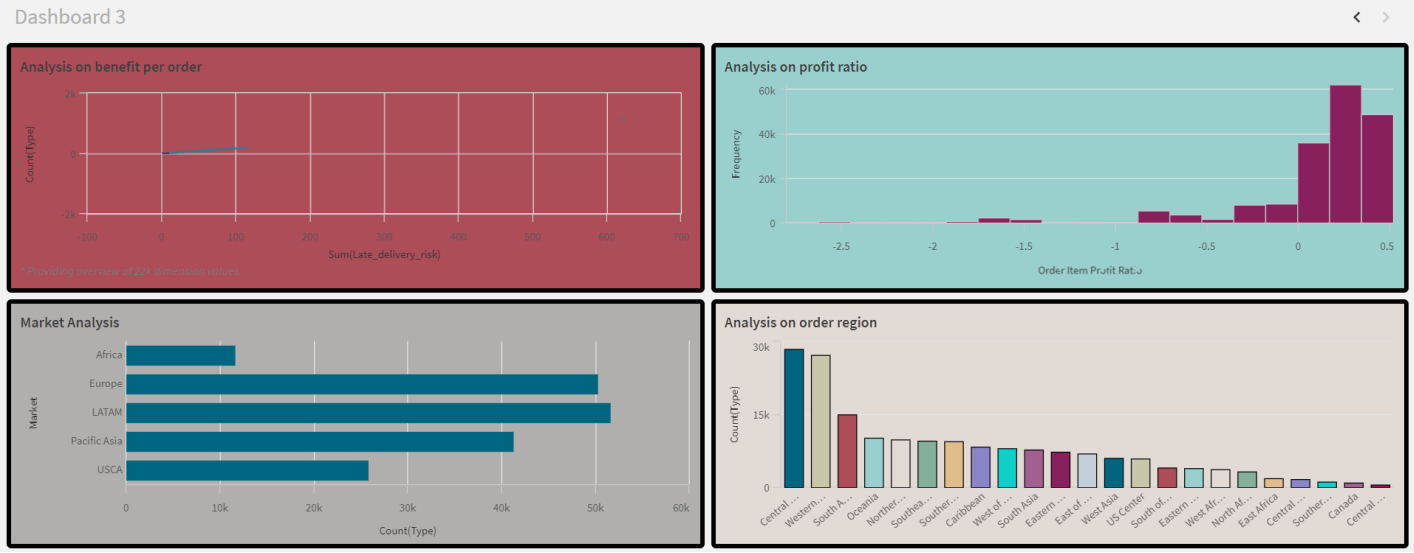
   a. **Responsive and Design of Dashboard:**



Dashboard 1



Dashboard 2



Dashboard 3

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7. Report

A data story is a way of presenting data and analysis in a narrative format, with the goal of making the information more engaging and easier to understand. A data story typically includes a clear introduction that sets the stage and explains the context for the data, a body that presents the data and analysis in a logical and systematic way, and a conclusion that summarizes the key findings and highlights their implications. Data stories can be told using a variety of mediums, such as reports, presentations, interactive visualizations, and videos.

a. Report Creation:

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. Finally, iterate based on feedback to continually improve the report's design and usefulness.

Supply Chain Management Analysis Story

Sales
36.78M

Profit Margin
3.97M

Delivery Risk
98.98k

No of sales done in Asian Country → **Sales** 109.8k

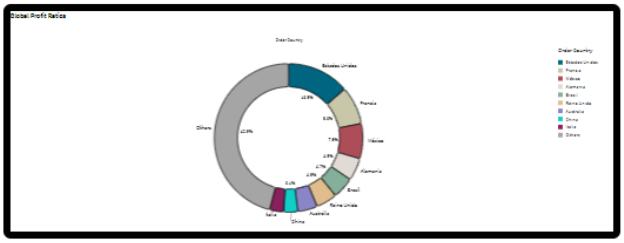
No of Sales done in US Country → **Sales** 1.15M

No of Profit margin taken in Asian country → **Profit Margin** 13.04k

No of Profit margin taken in US Country → **Profit Margin** 131.1k

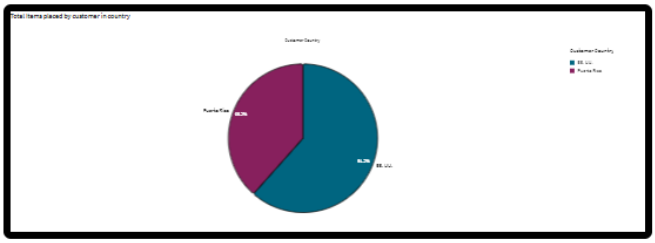
No of Delivery Risk taken in Asian Country → **Delivery Risk** 306

No of Delivery Risk taken in US Country → **Delivery Risk** 3.25k



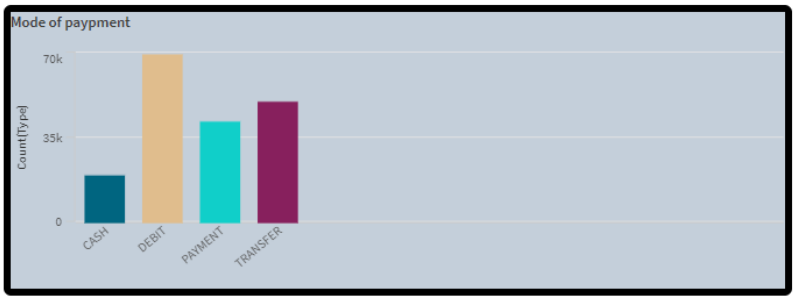
Top 10 countries with highest Profit ratios in supply chain management

Total items placed by customers in country's



Analyzing customer segments, encompassing consumer, corporate and home categories

Mode of Payment for Purchase



- ✔ Cash transactions 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 deferred payment option, allowing customers to make purchases
- Transfer payments leverage electronic methods for seamless and secure funds

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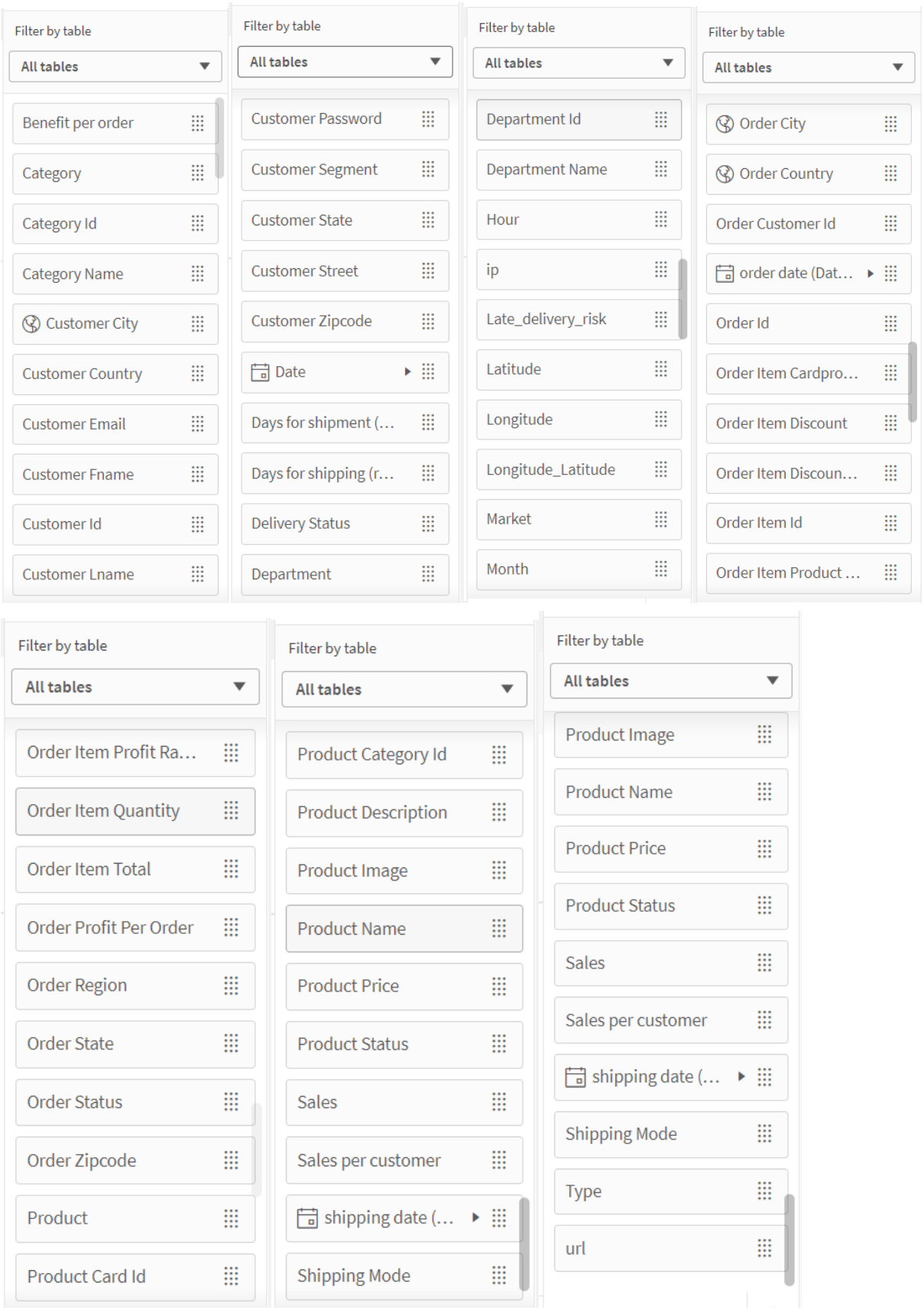
8. **Performance Testing**
    a. **Amount of Data Rendered:**

    "Amount of Data Rendered" 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.



b. Utilization of 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.