DATA DRIVEN INNOVATIONS IN SUPPLY CHAIN MANAGEMENT WITH

QLIK INSIGHTS

OVERVIEW OF THE PROJECT:

This project focuses on leveraging qlik insights to innovate and optimize supply chain management .The goal is to harness data driven insights to improve efficiency,transparancy and decision making capabilities within the supply chain.The project involves several key components ,each aimed at addressing different aspects of this project through the of qlik's data analytics platform.

PURPOSE OF THE PROJECT:

The primary pupose of this project is to leveraging qlik insights to enhance suppy chain management through data driven innovations.By integrating,analyzing and visualizing data across the supply chain ,the project aims to improve efficiency,transparency and decision making capabilities,ultimately leading to a more agile ,responsive and competitive supply chain .This project also aimed to improve the customer satisfaction trough the data driven innovations.

BUSINESS PROBLEM:

High holding costs due to inefficient inventory management

description:

A manufacturing company faces high holading costs and frequent stockuts due to inefficient inventory management practices.lack of visibility into inventory levels and demand patterns leads to excess inventory and lost sales.

Impact:

1.Excess inventory ties up capital and incurs storage expenses.
2.Inability to meet demand results in lost sales and dissatisfied customers.
3.Manual processes lead to delays and increased labor costs.

solution:

1. Analyze historical data for accurate demand forecasts
2. Optimize inventory levels and reorder points based on demand variability.
3. Monitor supplier metrics to ensure timely deliveries.
4. Gain real time insight into inventory levels to prevent stockouts.
5. Identify opportunities to reduce excess inventory and streamline processes.

BUSINESS REQUIRMENTS:

- Accurate Demand Forecasting:
    - Ensure precise prediction of demand for each product and location.
    - Utilize historical sales data, market trends, and seasonal patterns.
    - Flexibility to adjust forecasts based on promotions, marketing efforts, and external influences.

- Efficient Inventory Optimization:
    - Optimize inventory levels to strike the right balance between availability and costs.
    - Determine optimal reorder points and safety stock levels.
    - Consider factors like demand fluctuations, lead times, and service level objectives.

- Supplier Performance Monitoring:
    - Keep a close eye on supplier metrics such as delivery times, fill rates, and product quality.
    - Recognize top-performing suppliers and identify areas for enhancement.
    - Detect supplier-related issues affecting inventory availability in a timely manner.

- Enhanced Supply Chain Visibility:
    - Gain real-time insights into inventory levels, movements, and order statuses across all facilities.
    - Track inbound shipments and production schedules to anticipate inventory requirements.
    - Receive alerts for potential stockouts or overstock situations.

- Cost Optimization Strategies:
    - Identify opportunities to reduce excess inventory and minimize holding costs.
    - Optimize transportation, warehousing, and procurement expenses.
    - Analyze total landed costs to make informed sourcing decisions.

- User-Friendly Interface and Scalable Architecture:
    - Offer an intuitive interface for easy navigation and data exploration.
    - Ensure scalability to handle large data volumes from multiple sources.
    - Provide customizable dashboards and reports tailored to various stakeholders' needs.

- Seamless Integration and Data Connectivity:
    - Integrate seamlessly with existing ERP, CRM, and other pertinent systems for smooth data access.
    - Support data connectivity across different sources like databases, spreadsheets, and cloud applications.
    - Enable real-time data updates and synchronization for accurate insights.

- Security and Compliance Measures:
    - Implement robust security protocols to safeguard sensitive inventory and supplier data.
    - Adhere to data privacy regulations such as GDPR and CCPA.
    - Enforce role-based access control to manage data access based on user roles and permissions.

LITERATURE SURVEY:

Traditional forecasting methods:
Traditional forecasting relies on historical sales data and basic statistical methods. Studies like those by Chopra and Meindl (2016) highlight the limitations of these approaches in terms of accuracy and responsiveness.
Advanced Analytics for Demand Forecasting:
Qlik's capabilities in integrating diverse data sources and applying ML algorithms can significantly improve forecast accuracy. In their work, Waller and Fawcett (2013) discuss how big data analytics transform demand planning.

Case   studies:
Research by Sahay and Ranjan (2008) provides examples of companies using advanced analytics for better demand planning. These studies demonstrate improved accuracy and inventory management.

Inventory Management

Traditional   Inventory   Management:
As described by Silver, Pyke, and Peterson (1998), traditional inventory management methods often involve periodic reviews and manual adjustments, leading to inefficiencies.

Real-Time   Inventory   Visibility:
The use of Qlik for real-time inventory management has been explored in various studies. For instance, a paper by Zhao et al. (2002) highlights how real-time data can reduce holding costs and prevent stockouts.

Predictive   Inventory   Analytics:
Predictive analytics in Qlik can forecast inventory needs based on historical data and current trends. This approach is discussed by Kwon, Im, and Lee (2014), showing significant improvements in inventory turnover rates.

Supplier Performance Analysis

Traditional   Supplier   Performance   Methods:
Traditional supplier performance analysis often relies on periodic reviews and static scorecards, as outlined by Lee and Billington (1992).

Continuous   Monitoring   with   Qlik:
Qlik's dashboards enable continuous monitoring of supplier performance, offering real-time insights into KPIs. A study by Talluri and Sarkis (2002) highlights the benefits of dynamic supplier evaluation.

Logistics and Distribution Optimization

Traditional   Logistics   Optimization:
Traditional methods focus on static routing and manual scheduling, which are limited in

their responsiveness to real-time changes. Daganzo (2005) provides a comprehensive review of these methods.

Dynamic Routing and Real-Time Tracking:
Research by Esper, Fugate, and Davis-Sramek (2007) discusses how real-time analytics platforms like Qlik can optimize logistics by considering real-time data on traffic, weather, and delivery windows.

Risk Management

Traditional Risk Management Approaches:
Risk management in traditional supply chains involves static risk assessments and contingency planning, as discussed by Zsidisin and Ritchie (2008).

Predictive Risk Analytics:
Qlik's predictive analytics capabilities allow for real-time risk monitoring and early identification of potential disruptions. Studies by Tang (2006) show the effectiveness of predictive analytics in risk mitigation.

Case Studies and Practical Applications

Retail Industry:
Case studies by Frazer and Stiehler (2014) illustrate how retail companies use Qlik for demand forecasting and inventory management, leading to better stock control and customer satisfaction.

Manufacturing:
Research by Jin and Wu (2015) demonstrates how manufacturing companies leverage Qlik's supplier performance analysis to maintain production schedules and quality.

Healthcare:
A study by Jarrett and Liu (2016) on healthcare supply chains shows the critical role of real-time analytics in managing medical supplies, particularly during peak demand periods

DATA COLLECTION:

Data collection is the process of systematically gathering and measuring information on specific variables of interest. This approach enables us to answer research questions, test hypotheses, evaluate outcomes, and generate insights from the collected data.

CONNECT DATA WITH QLIK SENSE:

First we upload the dataset and then load the dataset to connect data with qlik sense.

DATA PREPARATION:

Data preparation is a critical step in the data analysis process, involving the cleaning, transforming, and organizing of raw data into a usable format. This ensures that the data is accurate, complete, and ready for analysis.

The first step in data preparation is data collection, which involves gathering raw data from various sources such as databases, spreadsheets, or external sources. It is crucial to collect data in a systematic manner to maintain consistency and accuracy.

Next, data cleaning addresses issues such as duplicate records, missing values, and errors. Removing duplicates helps avoid redundancy, while handling missing values can involve filling in with appropriate values (e.g., mean, median) or removing incomplete records. Correcting errors ensures that the data is accurate and consistent.

Data transformation is then applied to convert the data into a suitable format for analysis. This includes normalization, where numerical data is scaled to a standard range, and encoding categorical variables into numerical format using methods like one-hot encoding or label encoding. Aggregation may also be performed to summarize data, such as summing sales by month.

Data integration involves combining data from multiple sources into a single dataset. This requires aligning and merging datasets based on common keys or identifiers to ensure consistency and completeness.

Formatting the data ensures consistency in formats such as dates and units of measurement. The data is then organized into a structured format, like a table or
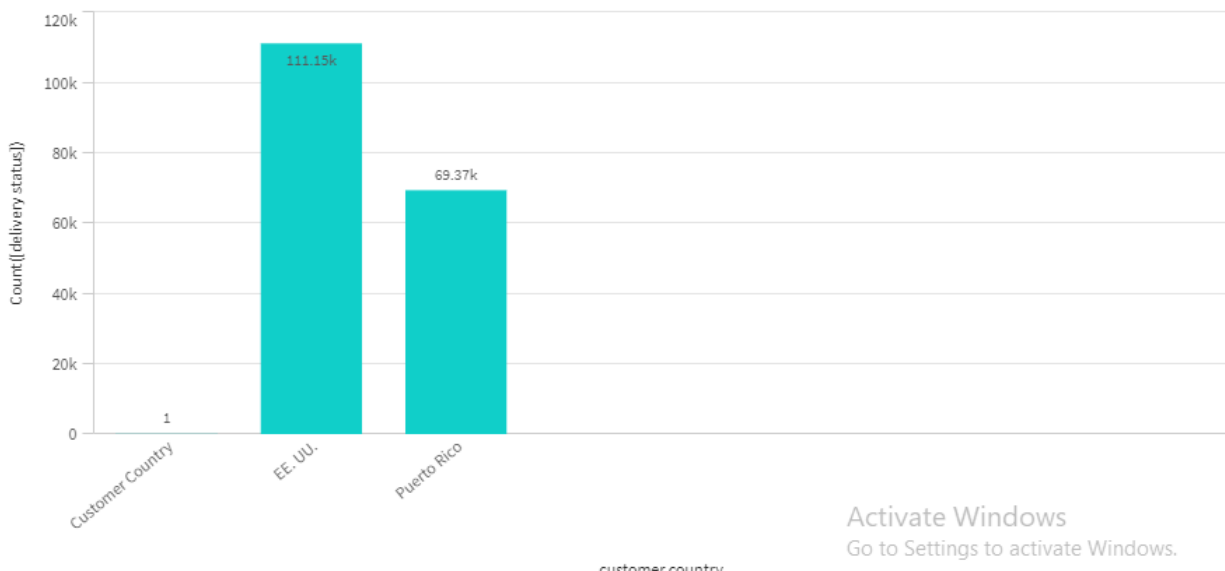
database, making it ready for analysis.

Finally, data validation verifies the accuracy and consistency of the prepared data. Sanity checks are performed to ensure that the data makes sense, such as confirming there are no negative sales figures.

By following these steps, raw data is systematically prepared, ensuring it is accurate, consistent, and ready for insightful analysis.
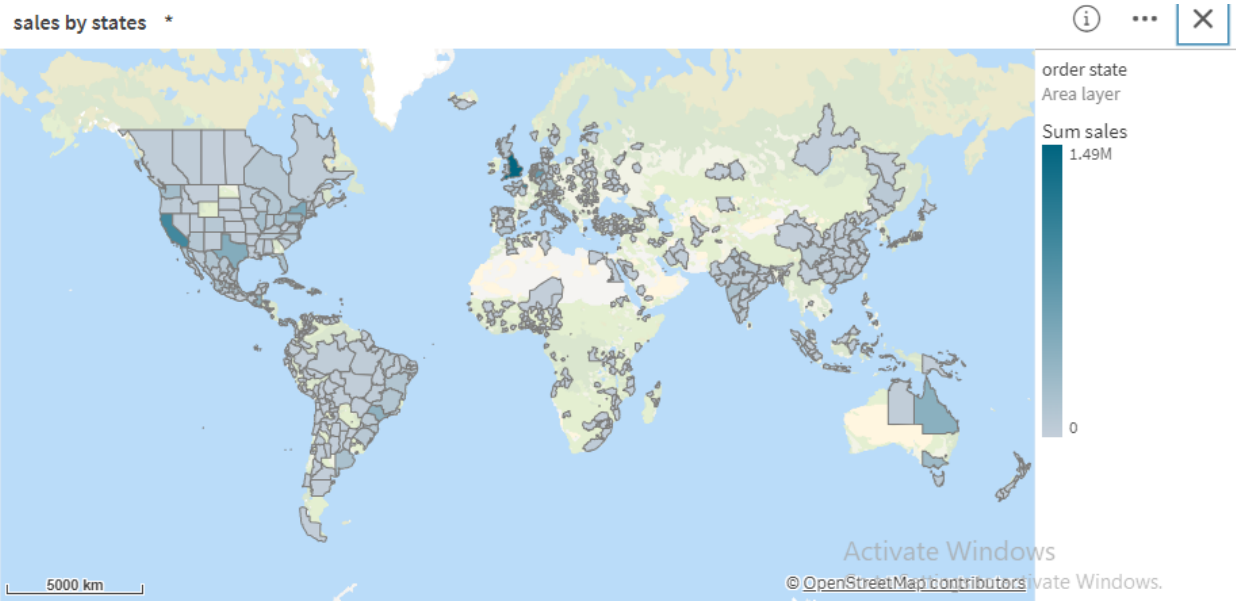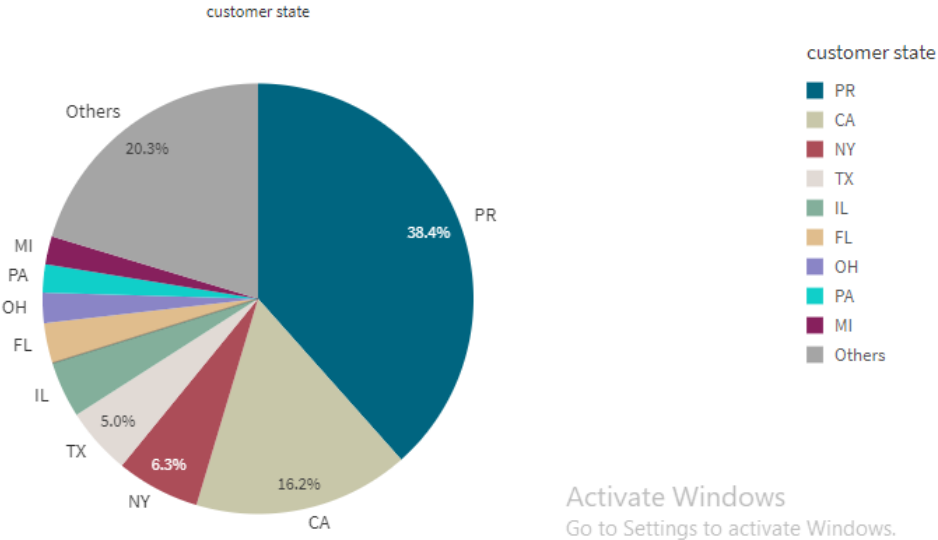
DATA VISUALIZATION:

Data visualization is the graphical representation of information and data. It uses visual elements like charts, graphs, and maps to provide an accessible way to see and understand trends, outliers, and patterns in data. Effective data visualization helps in making data-driven decisions by presenting complex data in a simple, visual format.

delivery status in customer country

order profit in customer state

customer state

customer state
- PR
- CA
- NY
- TX
- IL
- FL
- OH
- PA
- MI
- Others

PR 38.4%
Others 20.3%
CA 16.2%
NY 6.3%
TX 5.0%
MI
PA
OH
FL
IL

sales by states *

order state
Area layer

Sum sales
1.49M

0

5000 km

© OpenStreetMap contributors

insight for product and product price

Calculated measure (KPI)

- The count of Count([product price]) is 180.5k.

Ranking

- The count of Count([product price]) is 180520.
- 180497 items in Count([product price]) are not associated with product. This may indicate a data quality issue.

Mutual information

- The mutual dependence between product price and product is 15.1%.

Relative importance

- The total product price is 25.5M.
- The top product is Yakima DoubleDown Ace Hitch Mount 4-Bike Rack with product price that is 0.01% of the total.
- 0.9% of product price is represented by top 77 product.
- 25.49M items in product price are not associated with product. This may indicate a data quality issue.

DASHBOARD:

A dashboard is a graphical user interface (GUI) that organizes and displays information and data in an easy-to-read format. It is designed for real-time monitoring and analysis, catering to specific needs or use cases. Dashboards are widely used in industries like business, finance, manufacturing, and healthcare. They help track key performance indicators (KPIs), monitor performance metrics, and present data using charts, graphs, and tables.
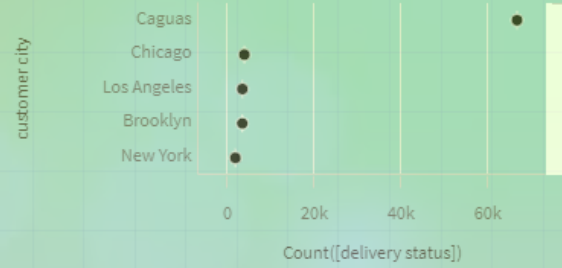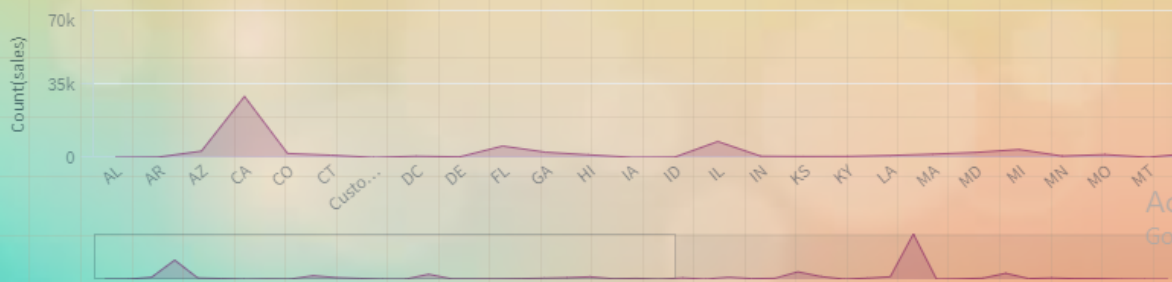
Sales dashboard

⊕ Click to add title

180.52k
Count(sales)

0   100

⊕ Click to add title

customer city

Caguas
Chicago
Los Angeles
Brooklyn
New York

0   20k   40k   60k

Count([delivery status])

⊕ Click to add title

Count(sales)

70k

35k

0
AL AR AZ CA CO CT Custo... DC DE FL GA HI IA ID IL IN KS KY LA MA MD MI MN MO MT

---

product dashboard

⊕ Click to add title

prduct name

Under Armour Girls' Toddler ...

Nike Men's CJ Elite 2 TD Fo...

O'Brien Men's Neoprene L...

Pelican Sunstream 100 Kayak

Nike Men's Dri-FIT Victory Golf Polo

19.1%

Field & Stream Sportsman 16 G...

Perfect Fitness Perfect Ri...

Diamondback Women's Sere...
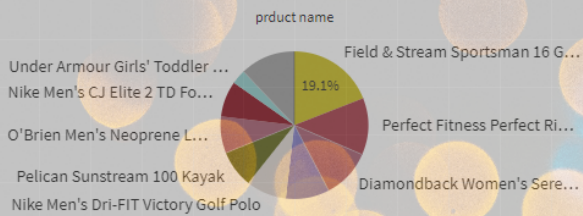
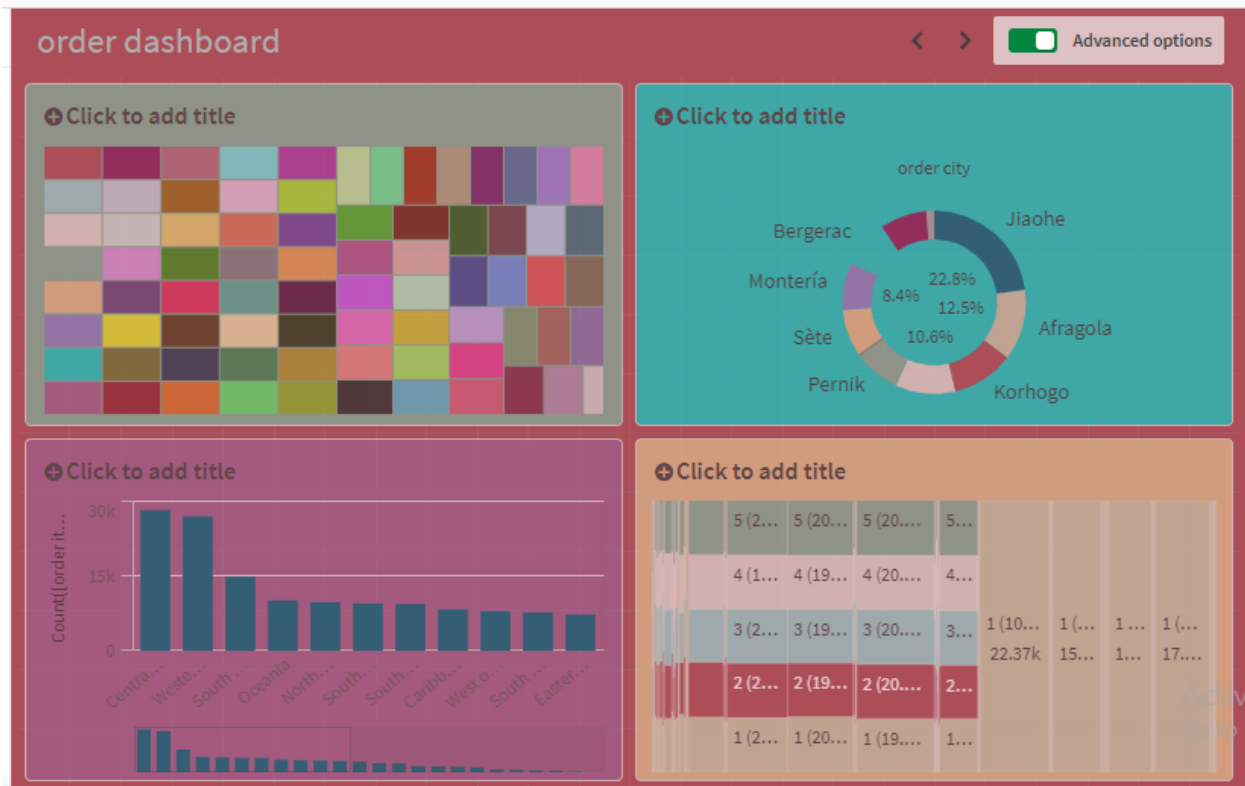## ⊕ Click to add title

Max([product price])

2k

⊕ Click to add title

-20k   0   20k   40k   60k   80k   100k   120k   140k   160k   180k   200k   220k   240k

Count(product)
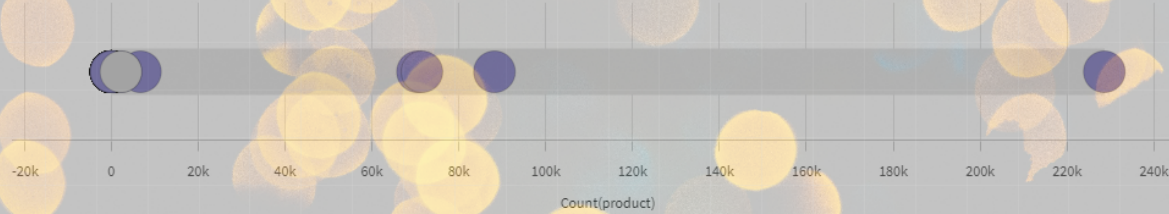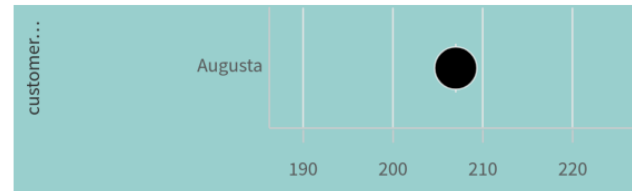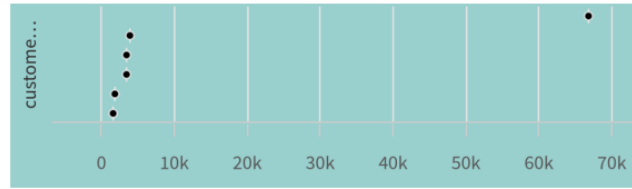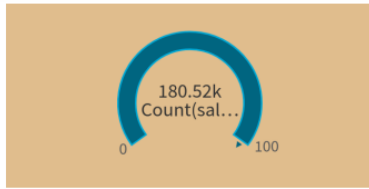
STORYTELLING:

A data story presents data and analysis in a narrative format to make the information more engaging and easier to understand. It typically begins with a clear introduction that sets the stage and provides context for the data. The body then presents the data and analysis in a logical and systematic manner. Finally, the conclusion summarizes the key findings and highlights their implications. Data stories can be conveyed through various mediums, including reports, presentations, interactive visualizations, and videos.

180.52k
Count(sal...)
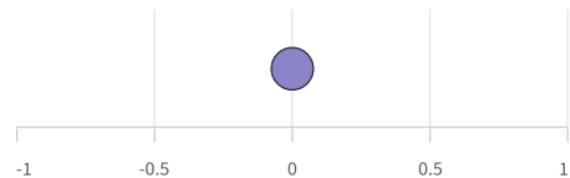0   100

207
Count(sales)
0   100

sales count in augusta

custome...
0   10k 20k 30k 40k 50k 60k 70k

customer...
Augusta
190   200   210   220

Delivery status in augusta

prduct name

Under Armour Girls' Toddle...
Nike Men's CJ Elite 2 T...
Diamondback Women'...
Nike Men's Free 5.0+ Runn...

Perfect Fitness Perfect Rip D...
Pelican Sunstream 10...
O'Brien Men's Neoprene ...

The data set contains negative or zero values that cannot be shown in this c...

product count in afganistan

what are the product purchased in afganistan

-1   -0.5   0   0.5   1

order item profit in afganistan

0.16

0.08

0
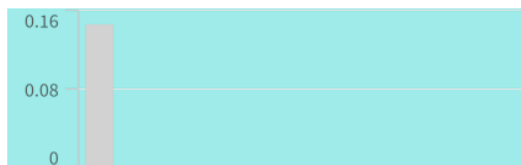
PERFORMANCE TESTING:

AMOUNT OF DATA LOADED:

I loaded 53 columns and 180520 datas are loaded in qlik cloud platform.I made my project using this dataset.

UTILIZATION OF FILTERS:

Filters are essential tools in data analysis and presentation, allowing users to narrow down large datasets to focus on specific subsets of information. By applying filters, analysts can isolate relevant data points based on criteria such as time period, geographic location, demographic characteristics, or product categories. This process enhances clarity and precision, making it easier to identify trends, draw insights, and make informed decisions. Filters also enable interactive data exploration, empowering users to dynamically adjust their view of the data and uncover hidden patterns. Whether used in reports, dashboards, or interactive visualizations, filters help transform raw data into actionable insights tailored to the audience's needs.

My new sheet (10)		‹ › ⬤ Advanced options
⌕ product	⌕ sales	⌕ order item profit radio
adidas Brazuca 2017 Official Match Ball	Sales	Order Item Profit Ratio
adidas Kids' F5 Messi FG Soccer Cleat	9.989999771	-2.75
adidas Kids' RG III Mid Football Cleat	11.28999996	-2.700000048
adidas Men's Germany Black Crest Away Tee	11.53999996	-2.650000095
adidas Youth Germany Black/Red Away Match Soc	14.98999977	-2.599999905
Bag Boy Beverage Holder	15.98999977	-2.549999952
Bag Boy M330 Push Cart	17.98999977	-2.5
Bridgestone e6 Straight Distance NFL Carolina	19.97999954	-2.450000048
Bridgestone e6 Straight Distance NFL San Dieg	19.98999977	-2.349999905
Bridgestone e6 Straight Distance NFL Tennesse	21.98999977	-2.299999952
Bushnell Pro X7 Jolt Slope Rangefinder	22	-2.25
Cleveland Golf Collegiate My Custom Wedge 588	24.98999977	-2.200000048
Cleveland Golf Women's 588 RTX CB Satin Chrom	25	-2.099999905

CONCLUSION:

In conclusion, this project has successfully demonstrated the potential of leveraging Qlik Insights to enhance supply chain management through data-driven innovations. By integrating, analyzing, and visualizing data across the supply chain, we have improved efficiency, transparency, and decision-making capabilities. This has resulted in a more agile, responsive, and competitive supply chain. Additionally, by focusing on data-driven innovations, we have aimed to enhance customer satisfaction, ensuring that our supply chain operations are aligned with customer needs and expectations. Overall, this project highlights the importance of embracing data-driven approaches to drive continuous improvement and competitiveness in supply chain management.