Tech Saksham

Case Study Report

Data Analytics with Power BI

“Supply Chain Analysis of inventories”

“Government Arts and Science College, Aundipatti”

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ABSTRACT

In the digital age, data has become an invaluable asset for businesses, particularly in the banking sector. The proposed project, “Real-Time Analysis of Bank Customers,” aims to leverage PowerBI, a leading business intelligence tool, to analyze and visualize real-time customer data. This project will enable banks to gain deep insights into customer behavior, preferences, and trends, thereby facilitating data-driven decision-making and enhancing customer satisfaction. The real-time analysis will allow banks to respond promptly to changes in customer behavior or preferences, identify opportunities for cross-selling and up-selling, and tailor their products and services to meet customer needs. The project will also contribute to the broader goal of digital transformation in the banking sector, promoting efficiency, innovation, and customer-centricity.

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INTRODUCTION

1.1 Problem Statement

In today's competitive banking landscape, understanding customer behavior and preferences is crucial for customer retention and revenue generation. However, banks often face challenges in analyzing customer data due to the sheer volume and velocity of data generated. Traditional data analysis methods are time-consuming and often fail to provide real-time insights. This lack of real-time analysis can lead to missed opportunities for customer engagement, cross-selling, and up-selling, impacting the bank's revenue generation and customer satisfaction. Furthermore, the complexity and diversity of customer data, which includes transaction history, customer feedback, and demographic data, pose additional challenges for data analysis.

1.2 Proposed Solution

The proposed solution is to develop a PowerBI dashboard that can analyze and visualize real-time customer data. The dashboard will integrate data from various sources such as transaction history, customer feedback, and demographic data. It will provide a comprehensive view of customer behavior, preferences, and trends, enabling banks to make informed decisions. The dashboard will be interactive, user-friendly, and customizable, allowing banks to tailor it to their specific needs. The real-time analysis capability of the dashboard will enable banks to respond promptly to changes in customer behavior or preferences, identify opportunities for cross-selling and up-selling, and tailor their products and services to meet customer needs.

POWER BI

Microsoft Power BI is a data visualization and reporting platform that is used by businesses and professionals every day. While the platform is

commonly used by business analysts, it is also designed to be easily accessible for those without any specialized data knowledge.

In this article, you'll learn more about Power BI, what modern businesses use it for, and the professionals who typically work with it. Toward the end, you'll also explore some alternatives and explore online specializations and guided projects that can help you get started with this important business intelligence tool.

Microsoft Power BI is a data visualization platform used primarily for business intelligence purposes. Designed to be used by business professionals with varying levels of data knowledge, Power BI's dashboard is capable of reporting and visualizing data in a wide range of different styles, including graphs, maps, charts, scatter plots, and more. Power BI's "AI Insights" functionality, meanwhile, uses artificial intelligence to find insights within data sets for users.

Power BI itself is composed of several interrelated applications: Power BI Desktop, Pro, Premium, Mobile, Embedded, and Report Server. While some of these applications are free-to-use, paid subscriptions to the pro and premium versions provide greater analytics capabilities.

Power BI is also a part of Microsoft's Power Platform, which includes Power Apps, Power Pages, Power Automate, and Power Virtual Agents. Created as "low-code tools," these applications help businesses analyze and visualize data, design business solutions, automate processes, and create no-code chatbots.

- Creating reports and dashboards that present data sets in multiple ways using visuals
- Connecting various data sources, such as Excel sheets, onsite data warehouses, and cloud-based data storage, and then transforming them into business insights
- Turning data into a wide range of different visuals, including pie charts, decomposition trees, gauge charts, KPIs, combo charts, bar and column charts, and ribbon charts – among many other options
- Providing company-wide access to data, data visualization tools, and insights in order to create a data-driven work culture

Power query editor

In Power Query, you can use the function and formulas almost as you use in a worksheet. Power Query has a long list of functions, and you can write formulas using different functions or calculation operators.

And in this tutorial, we will understand functions and formulas in detail.

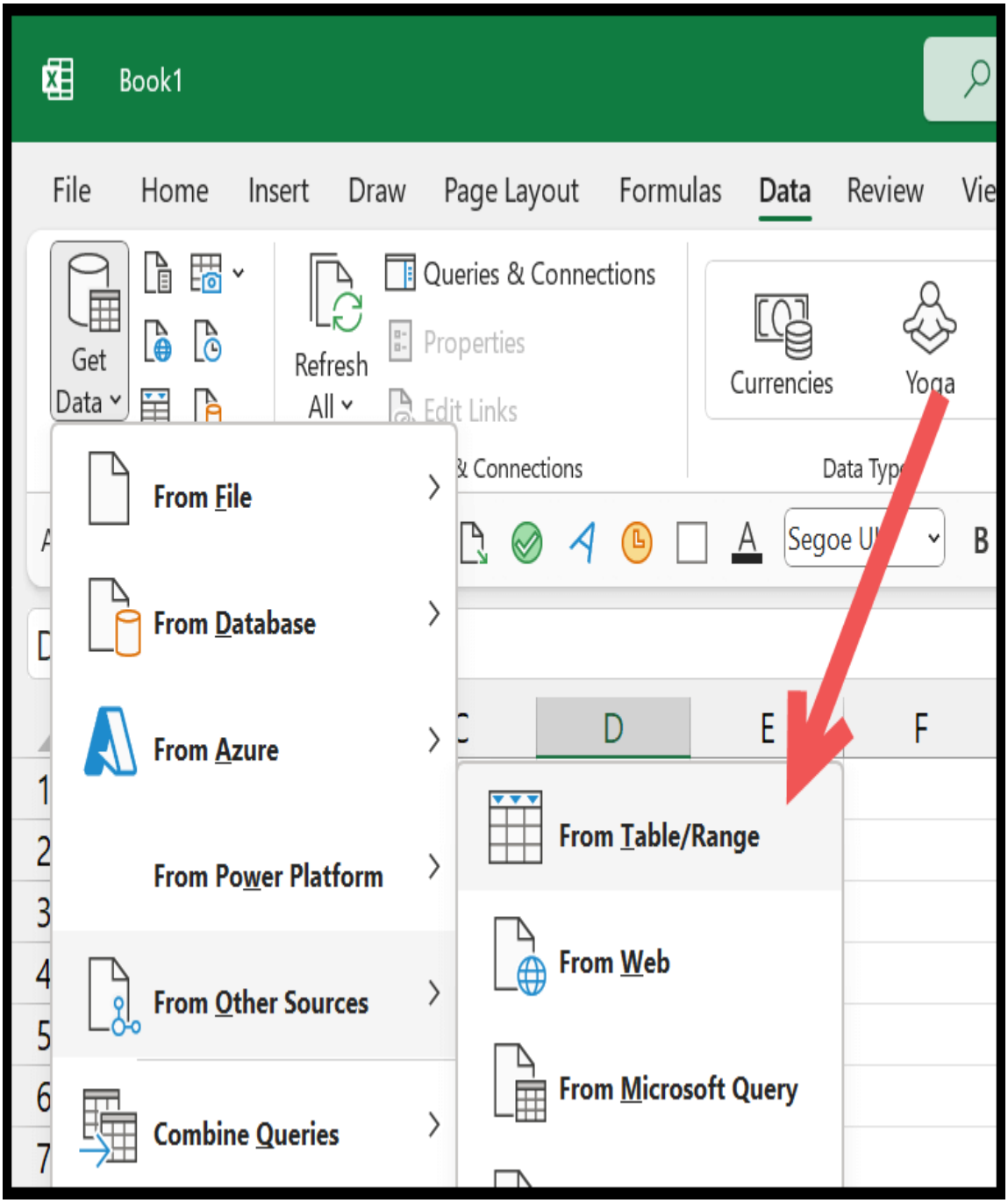
Writing Your First Formula in Power Query

In Power Query, unlike Excel, you need to add a new column to enter a formula. However, you can enter it in a single cell. Let's understand it with an example. Below we have some values in the columns A and B.

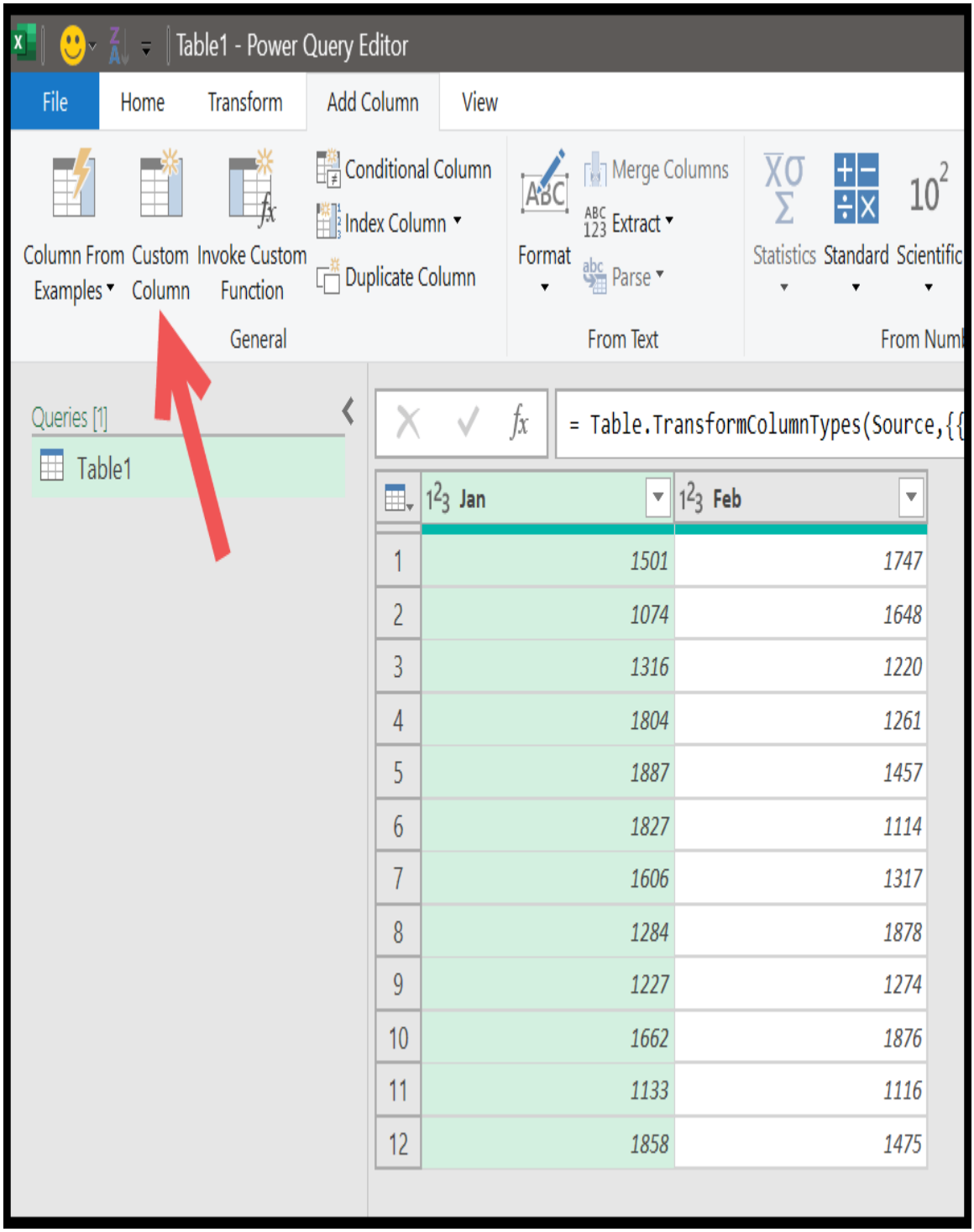
	A	B
1	Jan	Feb
2	1501	1747
3	1074	1648
4	1316	1220
5	1804	1261
6	1887	1457
7	1827	1114
8	1606	1317
9	1284	1878
10	1227	1274
11	1662	1876
12	1133	1116
13	1858	1475

And now, insert a new column with the total of both columns. To get this you can is use the below steps:

1. First, load the data into the power query editor (Data Tab > From Other Sources > From Range/Table).

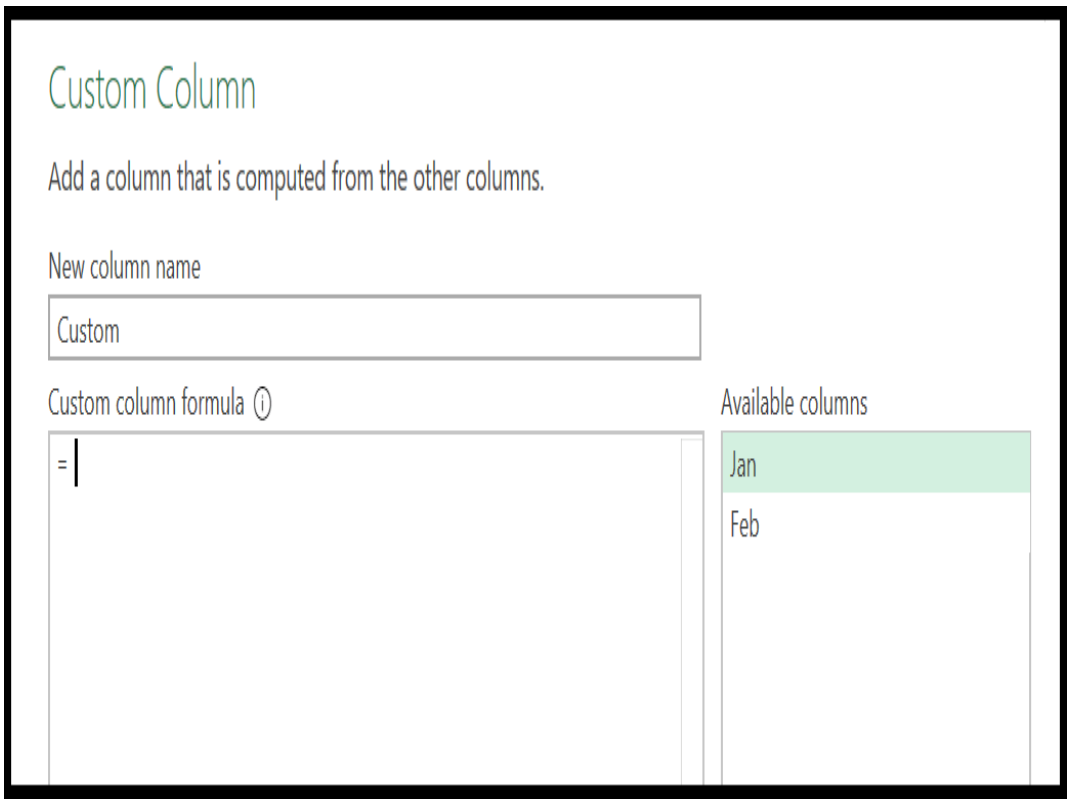


2. In the editor, you need to go to the Add Column Tab and click the Custom Column button to open the dialog box.



3. From here, in the dialog box, you must enter the formula you want to use. The equal to sign is already there, so you don't need to

enter it.



4. Next, you need to write the formula:
    - Click on the Jan in the available columns to enter it in the formula.
    - Enter the plus (+) sign.
    - Click on the Feb in the available columns to enter it in the formula.
    - Also, type a name for the column.

User interface

Power BI has an intuitive and user-friendly interface1. The dashboard is clean, easy to navigate, and offers a variety of ways to organize, categorize, and drill down data into understandable visualizations2. Power BI allows users to easily integrate data from various sources, including Excel, SQL Server, and cloud-based sources like Azure and Salesforce1.

Microsoft Power BI is an interactive data visualization software product developed by Microsoft with a primary focus on business intelligence.[2] It is part of the Microsoft Power Platform. Power BI is a collection of software services, apps, and connectors that work together to turn various sources of data into static and interactive data visualizations. Data may be input by reading directly from a database, webpage, PDF, or structured files such as spreadsheets, CSV, XML, JSON,[3] XLSX, and SharePoint.[4]

About my project

Certainly! Supply chain analysis of inventories is a crucial aspect of optimizing supply chain management. Let's delve into the details:

What Is Supply Chain Analysis?

Supply chain analysis involves evaluating processes throughout the entire supply chain, from sourcing raw materials to delivering the final product to customers.

Key steps in supply chain analysis include:

Supply Chain Mapping: This provides an overview of the supply chain, including the position of various actors (suppliers, manufacturers, distributors) and the flow of products.

Economic Accounts of Supply Chain Agents: Quantifying the activities of different agents in terms of both physical and monetary contributions to the materials flow. This helps identify weak areas and find solutions1.

Benefits of Supply Chain Analysis:

Optimized Inventory Management: By analyzing data from customers and suppliers, supply chain analytics helps optimize inventory levels. It

aids in predicting future demand, minimizing stockouts, and reducing excess inventory2.

Strategic Opportunities: Information obtained from sustainability reporting and performance metrics allows businesses to predict strategic opportunities.

Value-Added Processes: Supply chain analysis helps create value-added processes by removing redundancies and streamlining operations.

Tools for Supply Chain Analysis:

Predictive Analytics: Forecast future events by leveraging historical data.

Prescriptive Analytics: Utilize AI and machine learning to recommend the next course of action. For instance, it can address unexpected events and propose supply chain models.

Descriptive Analytics: Display current and past performance on dashboards, answering complex questions1.

Best Practices:

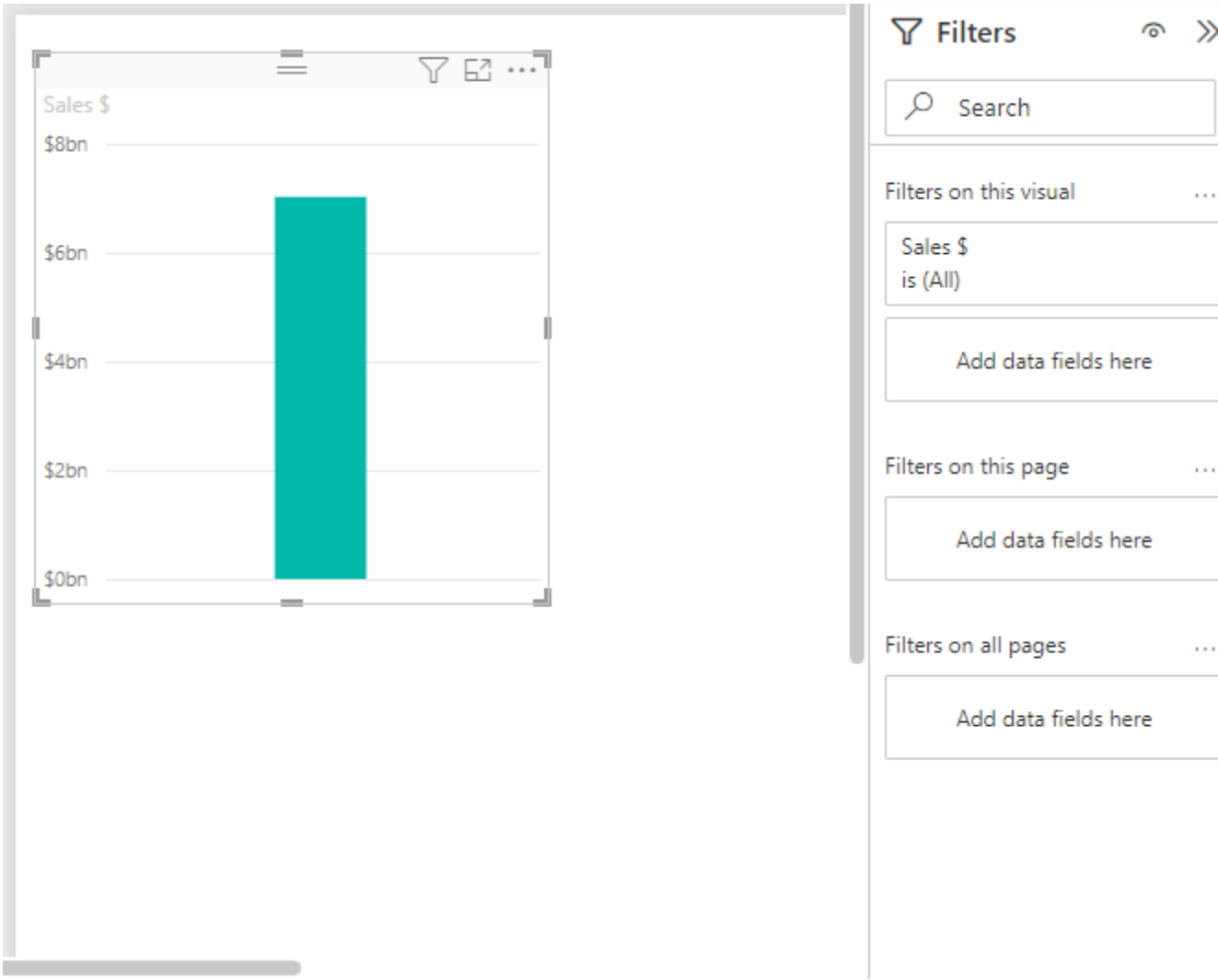
Invest in Training: Ensure internal personnel have the necessary skills to work with supply chain analytics tools.

Continuous Monitoring: Regularly evaluate the performance of your supply chain analytics implementation.

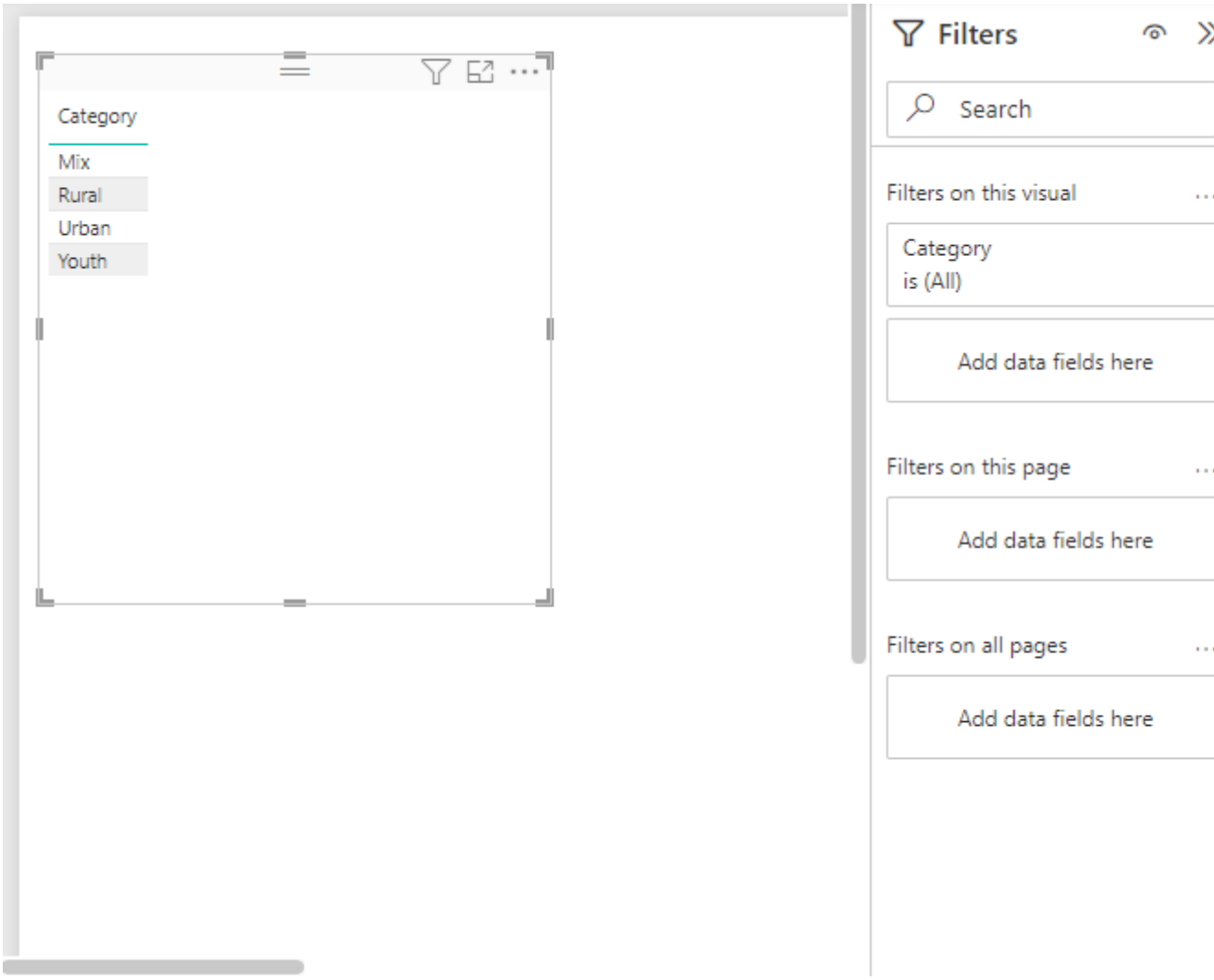
Visualization

In this section, you create a visualization by selecting a field from the **Data** pane.

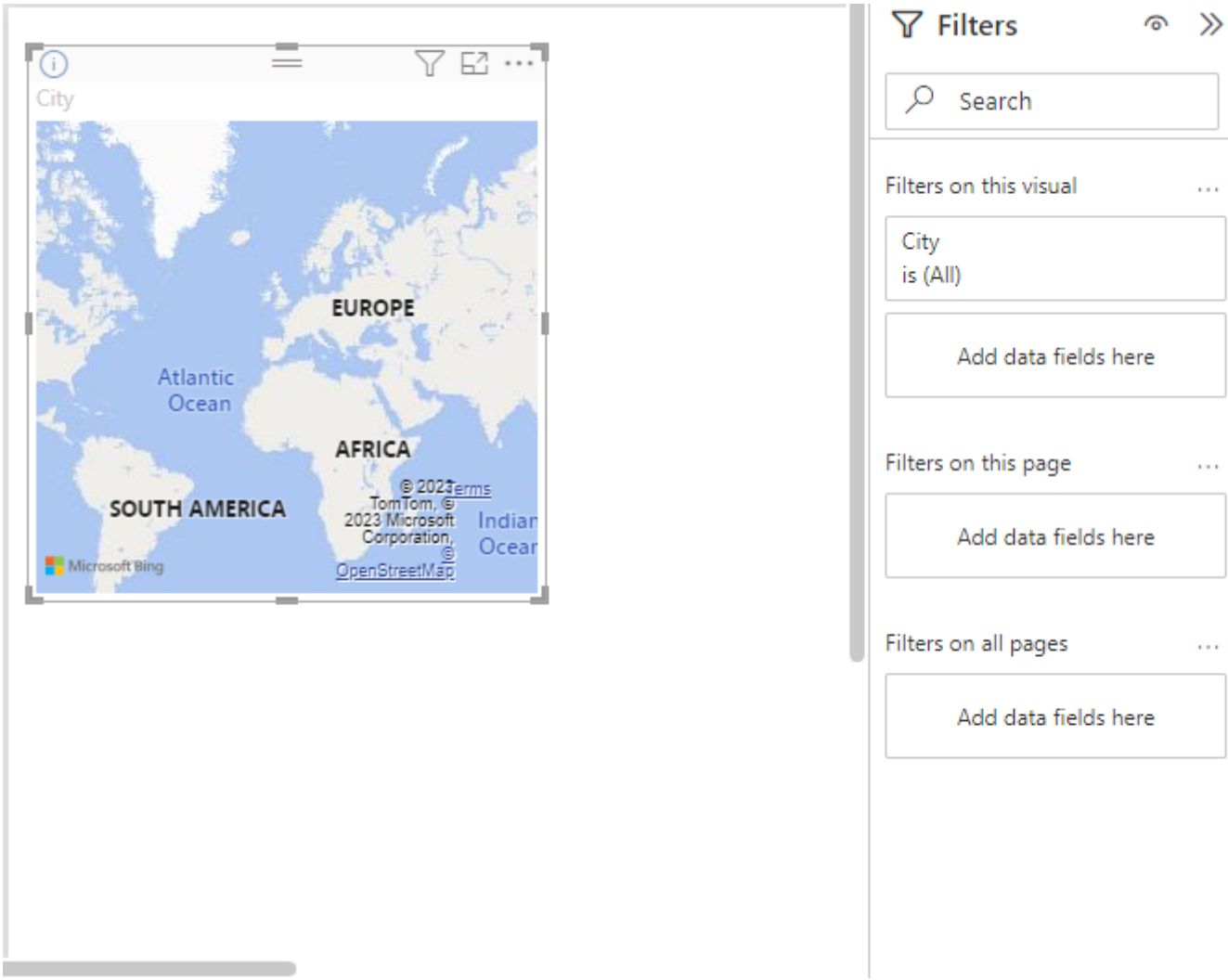
- Start with a numeric field like **SalesFact > Sales $**. Power BI creates a column chart that has a single column:



- Or start with a field like **Product > Category**. Power BI creates a table and adds that field to the **Columns** section:



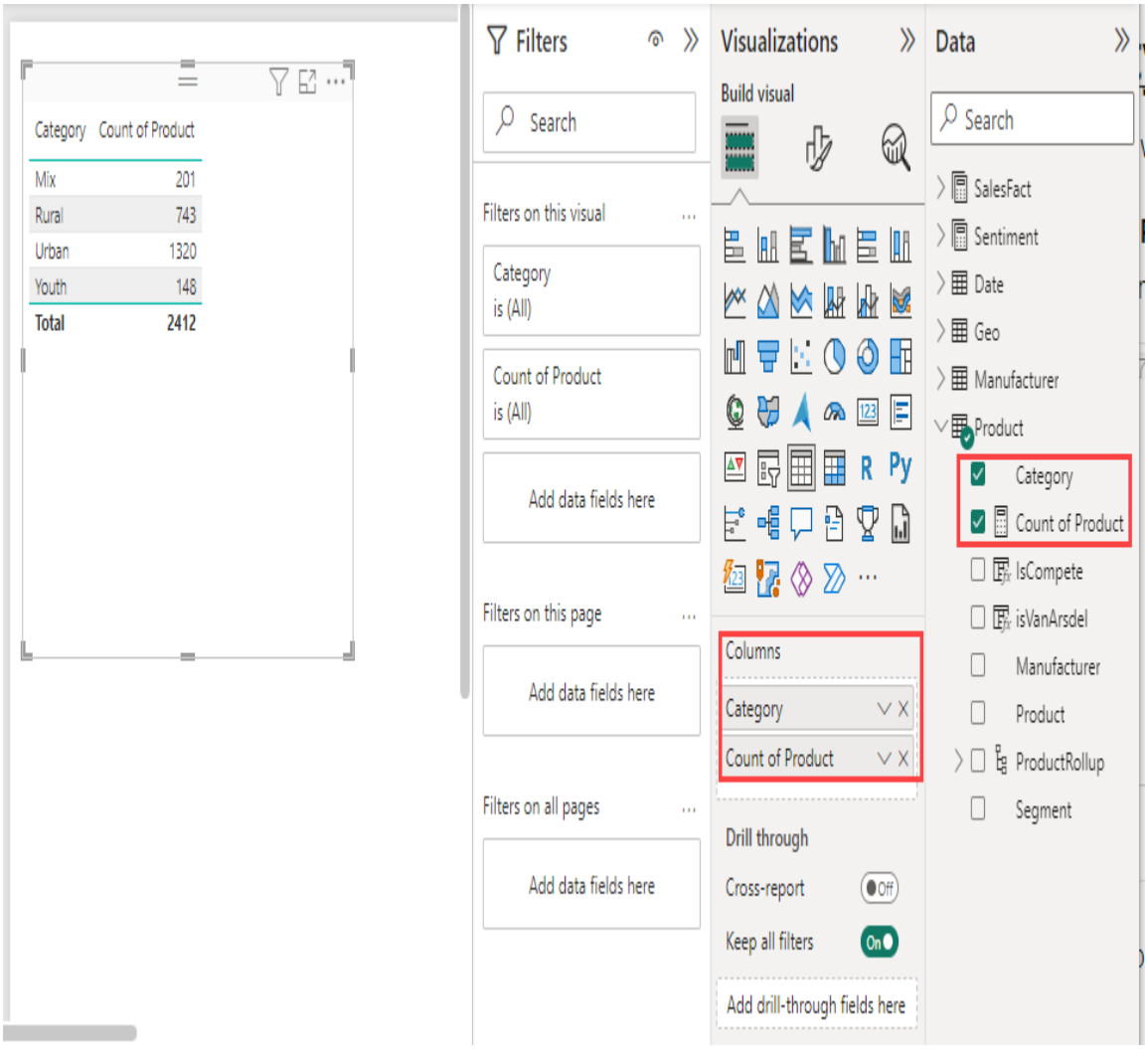
- Or select the **Filled map** button and then select a geography field, like **Geo > City**. Power BI and Bing Maps create a map visualization:



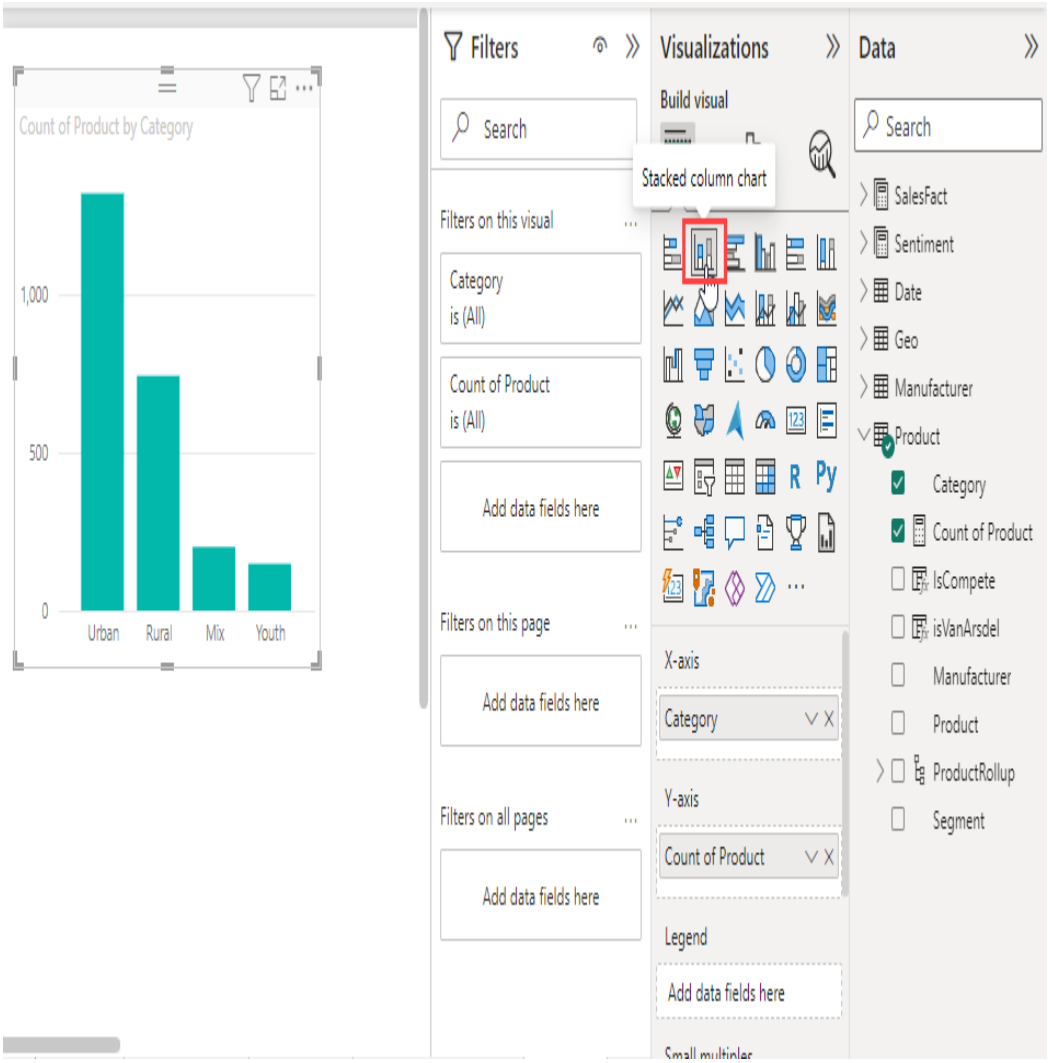
Change the type of visualization

In this section, you create a visualization and then change its type.

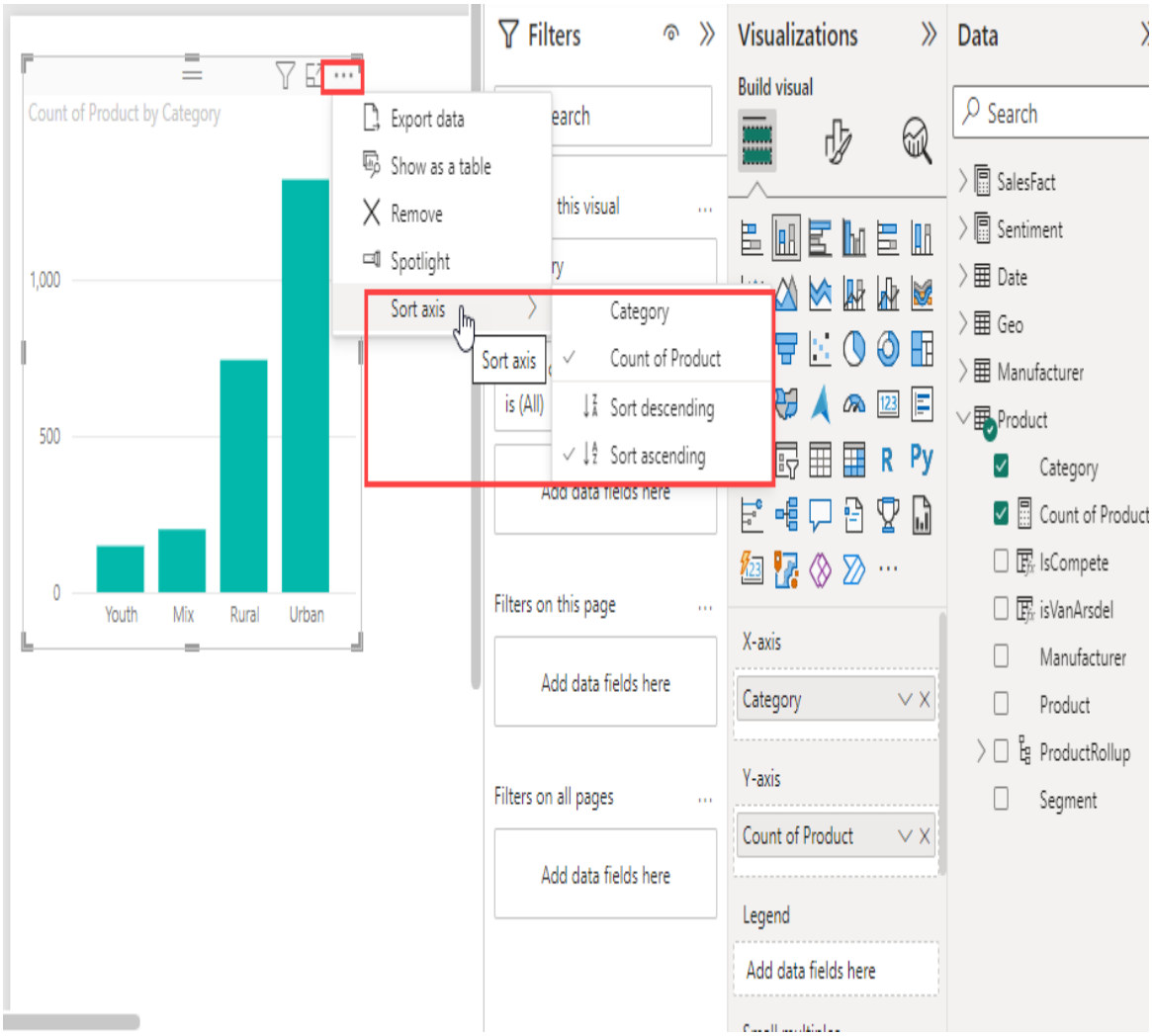
1. On a new page, select **Product > Category** and then **Product > Count of Product** to add both fields to the **Columns** section:



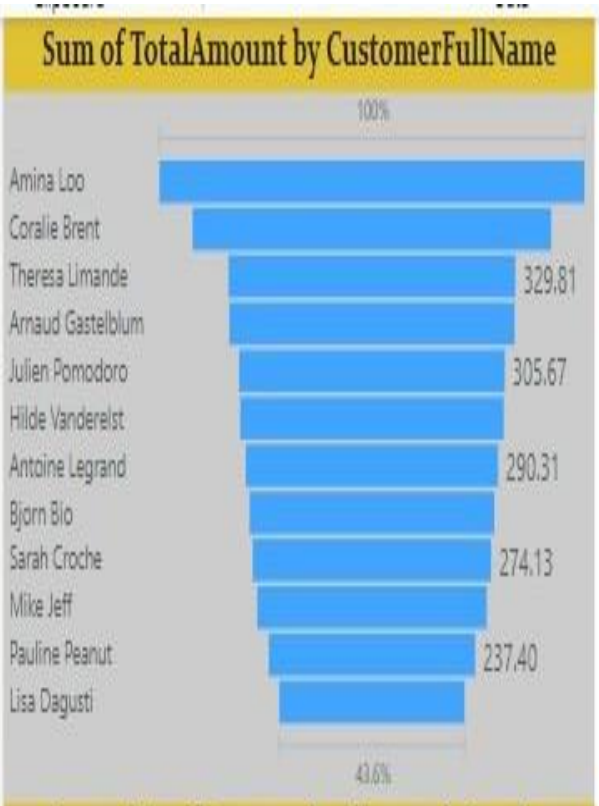
2. Change the visualization to a column chart by selecting the **Stacked column chart** button on the **Visualizations** pane:

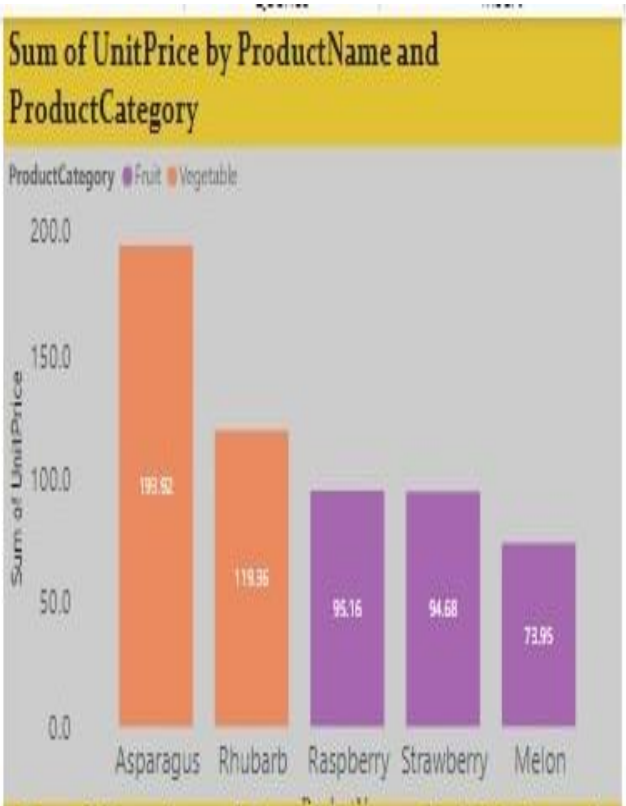


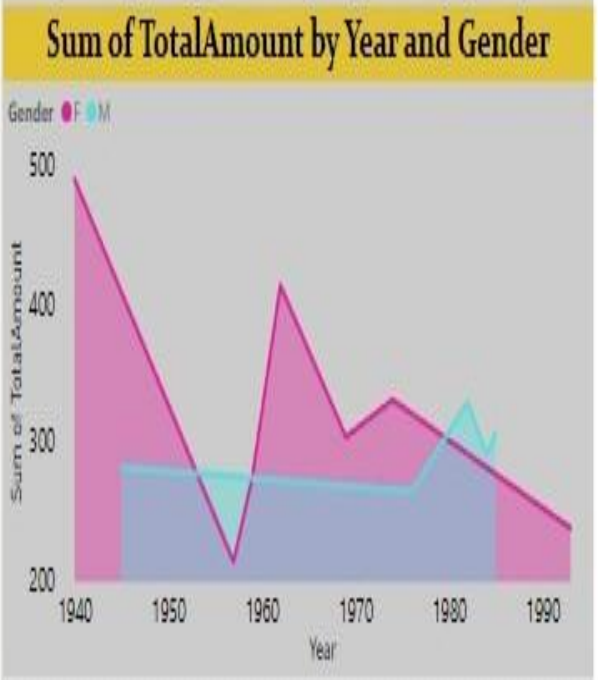
3. To change the way the visual is sorted, select **More options** (...) and then **Sort axis** on the chart. Use the menu options to change the direction of the sort axis (ascending or descending) or to change the column that's being sorted on:

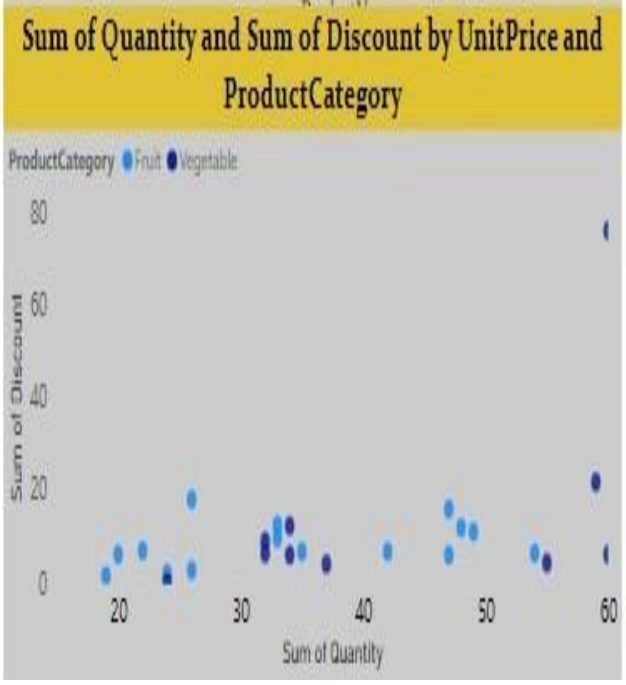


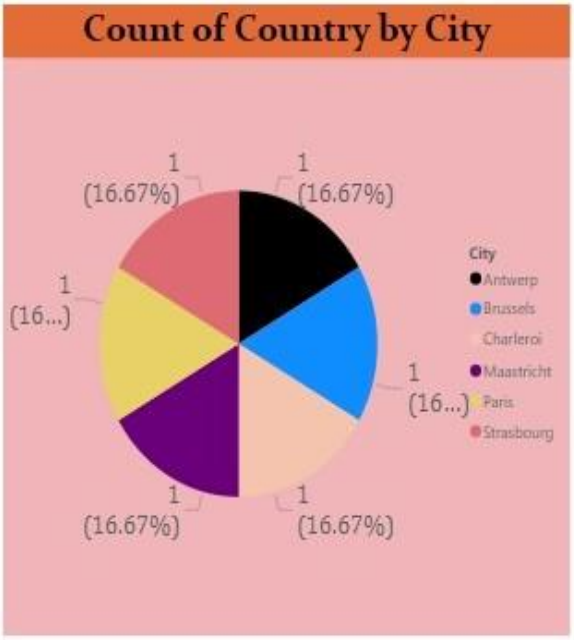
Dashboard and report

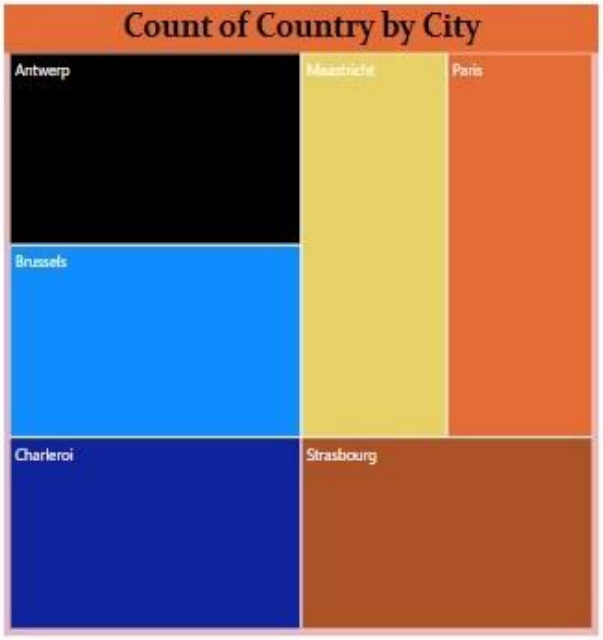

Sum of TotalAmount by CustomerFullName
100%
Amina Loo
Coralie Brent
Theresa Limande
Arnaud Gastelblum
Julien Pomodoro
Hilde Vanderelst
Antoine Legrand
Bjorn Bio
Sarah Croche
Mike Jeff
Pauline Peanut
Lisa Dagusti
329.81
305.67
290.31
274.13
237.40
43.6%


Sum of UnitPrice by ProductName and ProductCategory
ProductCategory Fruit Vegetable
200.0
150.0
100.0
50.0
0.0
Sum of UnitPrice
193.52
119.96
95.16
94.68
73.95
Asparagus
Rhubarb
Raspberry
Strawberry
Melon


Sum of TotalAmount by Year and Gender
Gender F M
500
400
300
200
Sum of TotalAmount
1940
1950
1960
1970
1980
1990
Year


Sum of Quantity and Sum of Discount by UnitPrice and ProductCategory
ProductCategory Fruit Vegetable
80
60
40
20
0
Sum of Discount
20
30
40
50
60
Sum of Quantity





Supply chain analysis involves evaluating and optimizing the processes that facilitate the movement of products from suppliers to customers. By meticulously examining each step, we gain a deeper understanding of how materials flow physically and monetarily within the supply chain. Here are the key components:

Supply Chain Mapping:

Provides an overview of the supply chain, including the position of various actors (such as suppliers and customers) and the flow of products.

Helps identify critical touchpoints and potential bottlenecks.

Enables better decision-making by visualizing the entire chain.

Economic Accounts of Supply Chain Agents:

Quantifies the activities of different agents within the supply chain.

Measures their contributions to material flow (both physically and financially).

Identifies areas for improvement and solutions to existing issues.

Tools for Effective Supply Chain Analysis

To conduct robust supply chain analysis, we rely on several essential tools:

Predictive Analytics:

Leverages historical data to forecast future events.

Helps fine-tune supply chains by anticipating demand fluctuations.

Enables proactive decision-making.

Prescriptive Analytics:

Utilizes AI and machine learning to recommend optimal actions.

Answers questions like “how can we make it happen?” or suggests alternative supply chain models.

Aids in handling unexpected disruptions effectively.

Descriptive Analytics:

Presents current and past performance data through dashboards (graphs or charts).

Allows us to answer complex questions about supply chain efficiency.

Key Benefits of Supply Chain Analysis

Optimized Inventory Management:

By analyzing data from customers and suppliers, supply chain analytics helps optimize inventory levels.

Predict future demand, minimize stockouts, and reduce excess inventory.

Improved Forecasting:

Accurate forecasts lead to better planning and resource allocation.

Supply chain analysis enhances demand prediction.

Reduced Costs:

Identifying inefficiencies and streamlining processes saves costs.

Efficient inventory management reduces holding costs.

Possible Issues and Best Practices

Financial Challenges:

Balancing costs, investments, and returns.

Monitoring financial health throughout the supply chain.

Physical Considerations:

Ensuring timely delivery without compromising quality.

Managing physical flows efficiently.

Conclusion

Supply chain analysis empowers organizations to make informed decisions, enhance processes, and create value. By leveraging the right tools and practices, businesses can navigate disruptions and build resilient supply chains.

GITHUB Links:

https://github.com/2003kamali/Supply-chain-analysis-of-inventory-.git