NORTHWIND

LEVERAGING DATA INSIGHTS FOR GROWTH

DATA ANALYSIS REPORT

By Alex Suris | Februar 2024

Introduction

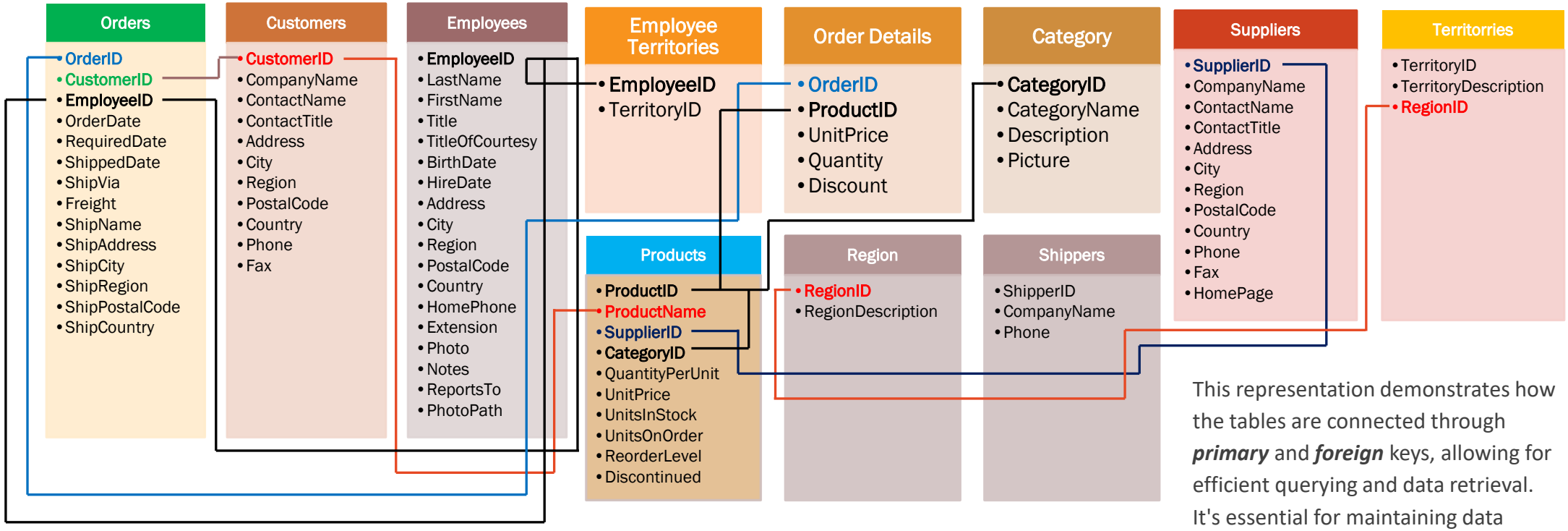
NORTHWIND is a leading provider in the food industry, renowned for its products and services. With a robust presence in the market, it has established a reputation for quality, customer service and innovation. NORTHWIND's current position reflects strong. Revenue growth, market share and a loyal customer base. However, in a competitive landscape, there's ample opportunity to further capitalize on market trends and drive increased profitability through strategic initiatives.

Contents

About The Data

To show the connections between the **11 tables** in the **Northwind.xlsx** file, we can illustrate the relationships using an entity-relationship diagram

Tables details and their connections:



This representation demonstrates how the tables are connected through ***primary*** and ***foreign*** keys, allowing for efficient querying and data retrieval. It's essential for maintaining data integrity and facilitating data analysis within the database.

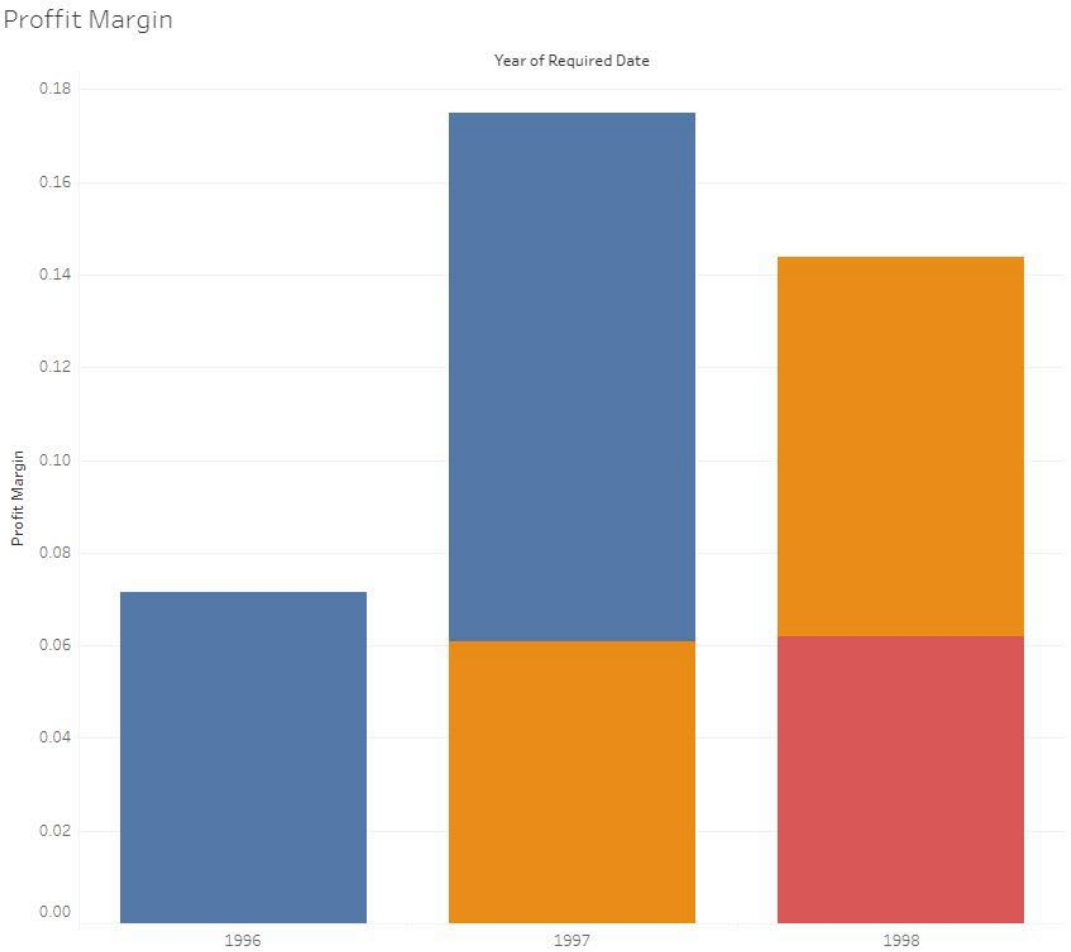
Key Metrics Overview

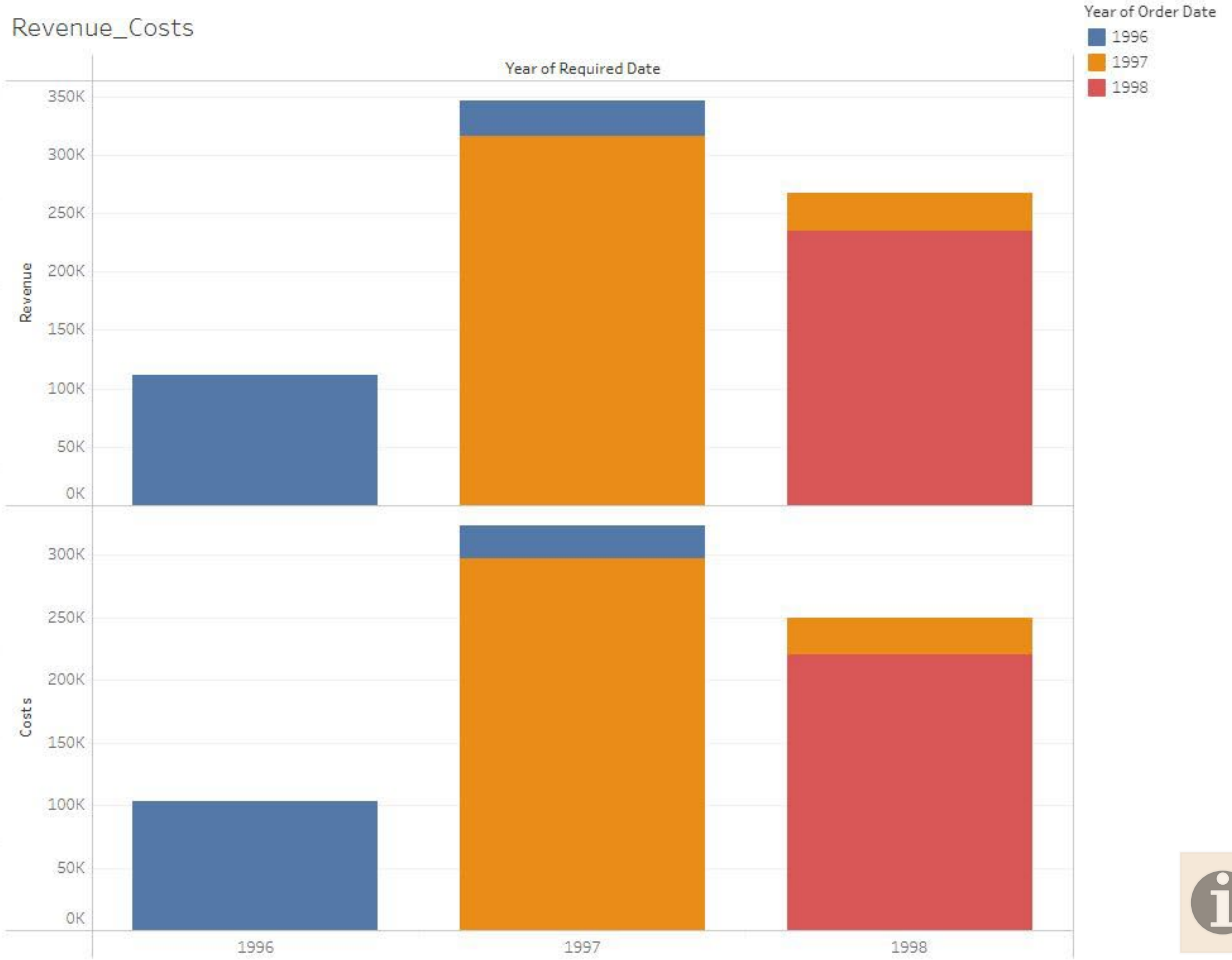
Presenting Historical Trends of key financial metrics:
Revenue, Costs, and Profit Margin.

Total Orders
830

Total Profit
1,332,908.59

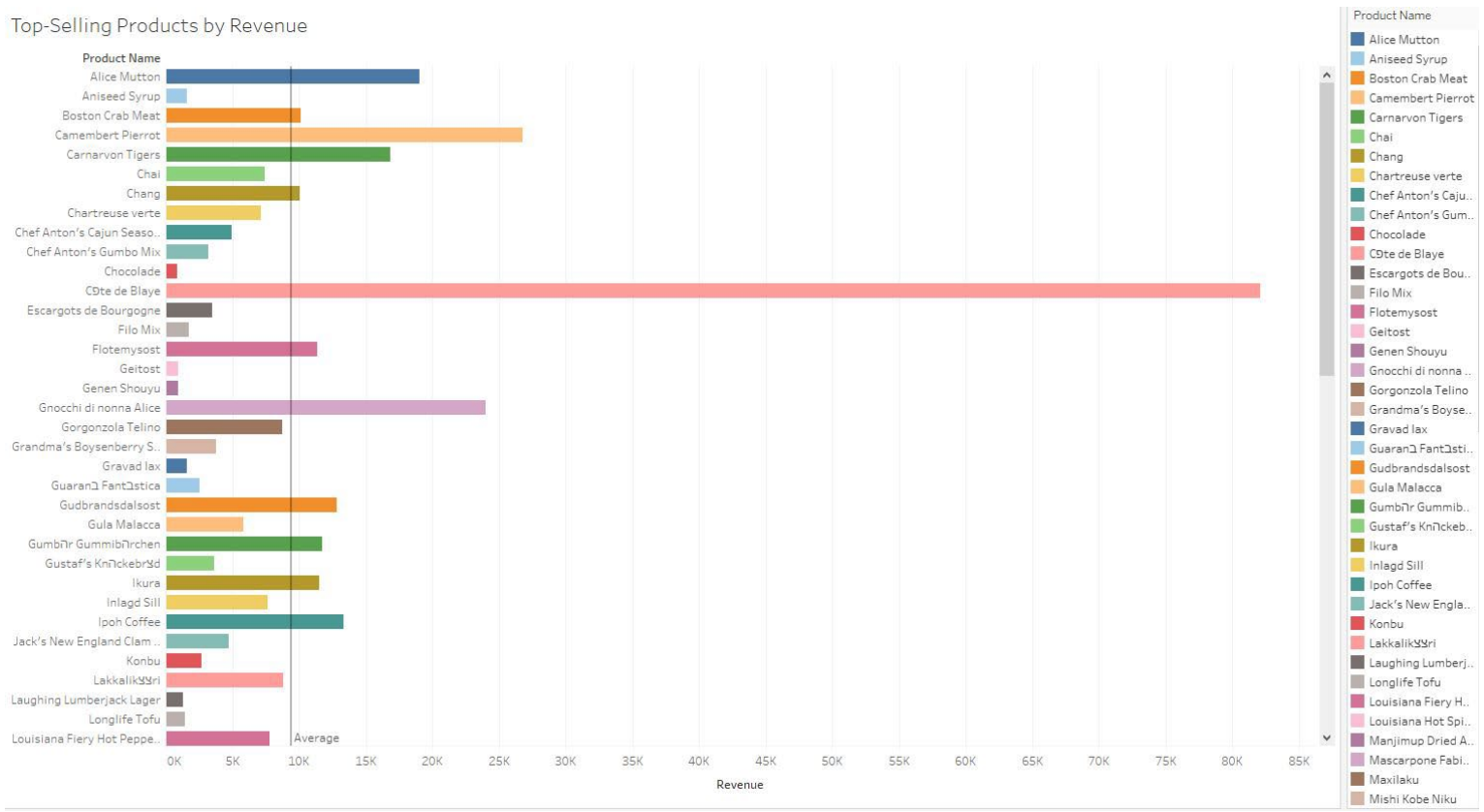
Total Revenue
1,354,458.59

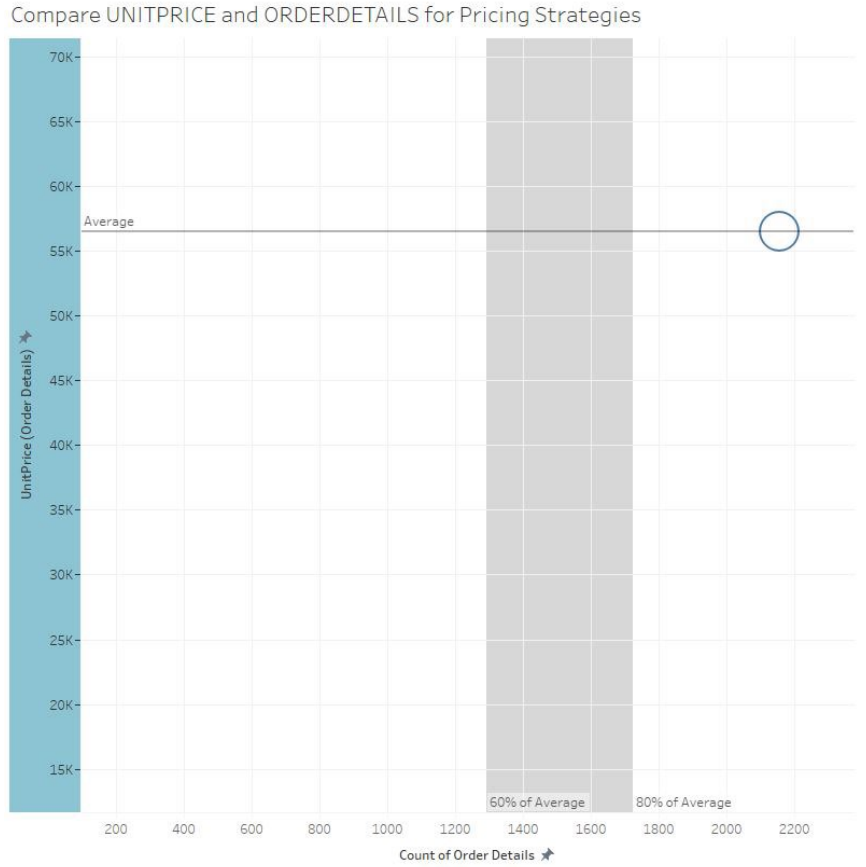




Product Analysis

Displaying top-selling products by revenue
and comparing the UNITPRICE and ORDER DETAILS to identify pricing strategies.



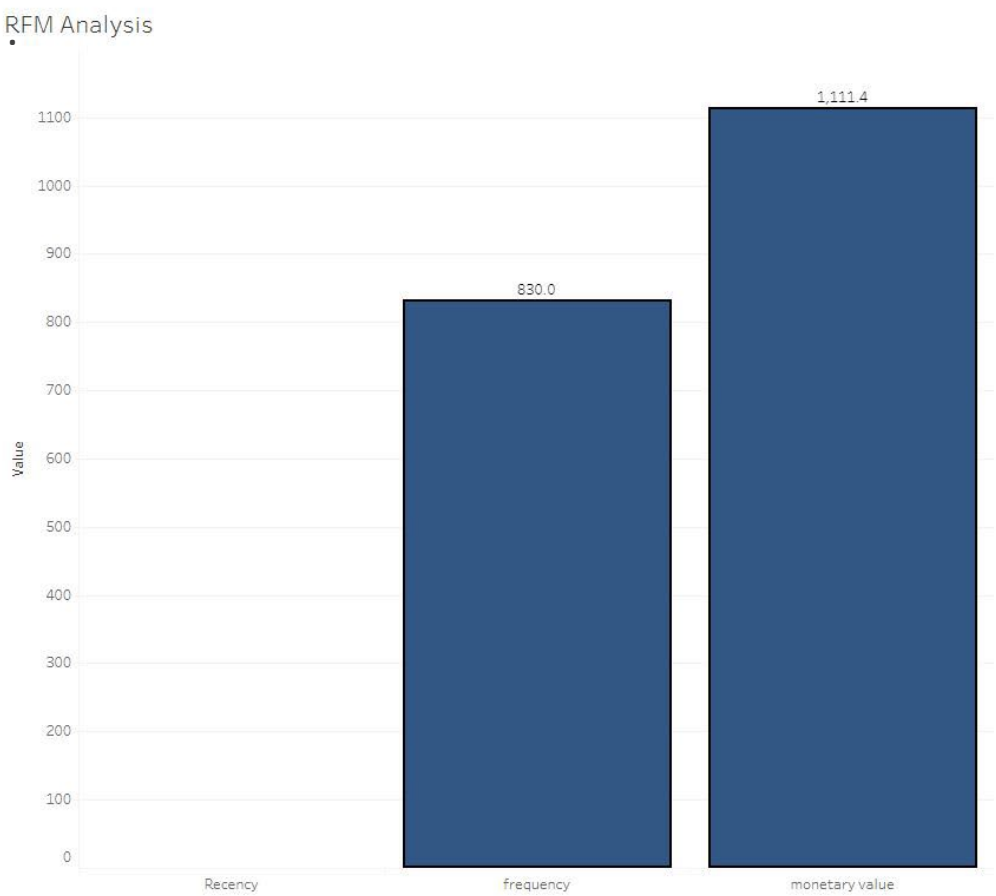


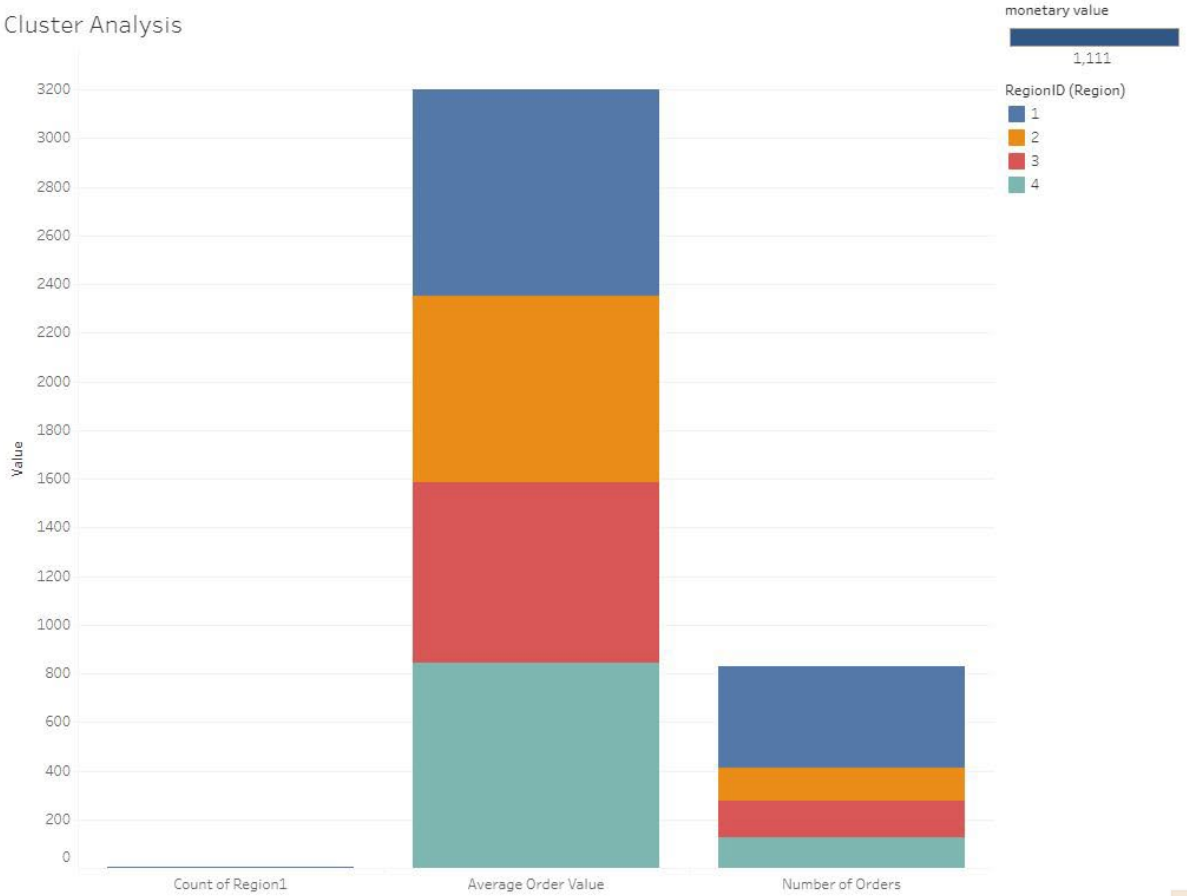
Identifying pricing strategies involves analyzing factors such as pricing structures, competitor pricing, customer behavior, and market trends. By studying these elements, monitoring performance metrics, and adapting based on data-driven insights, businesses can develop effective pricing strategies that maximize profitability and competitiveness.

The "count of order details" represents the total number of individual products or services included in each order.

Customer Segmentation

Creating customer segmentation involves analyzing your customer data to identify distinct groups based on common characteristics such as demographics, behaviour, purchasing patterns, or preferences.



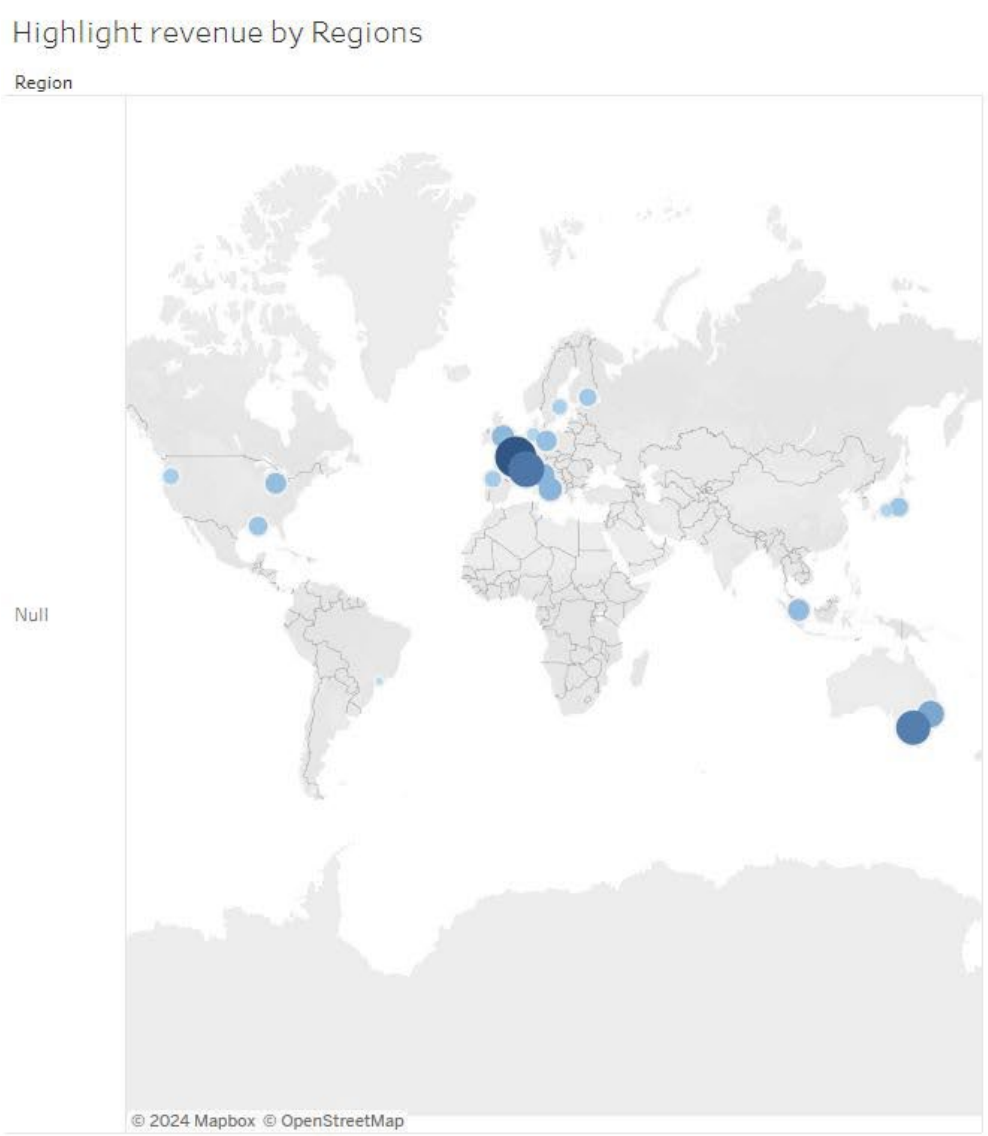


Analyze customer behavior based on **recency** (last purchase), **frequency** (number of purchases), and **monetary value** (total spend).

Use algorithms like k-means clustering to group customers based on similarities in their characteristics or behavior.

Sales Performance by Region

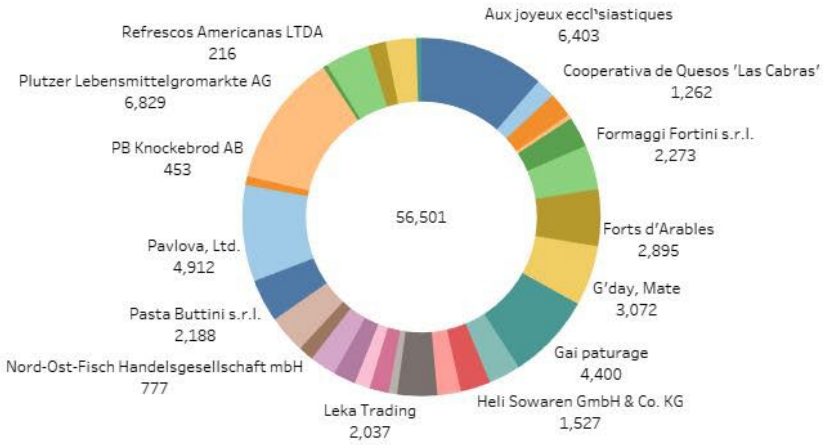
Highlight revenue generated from different regions. Identify regions with high potential for growth.



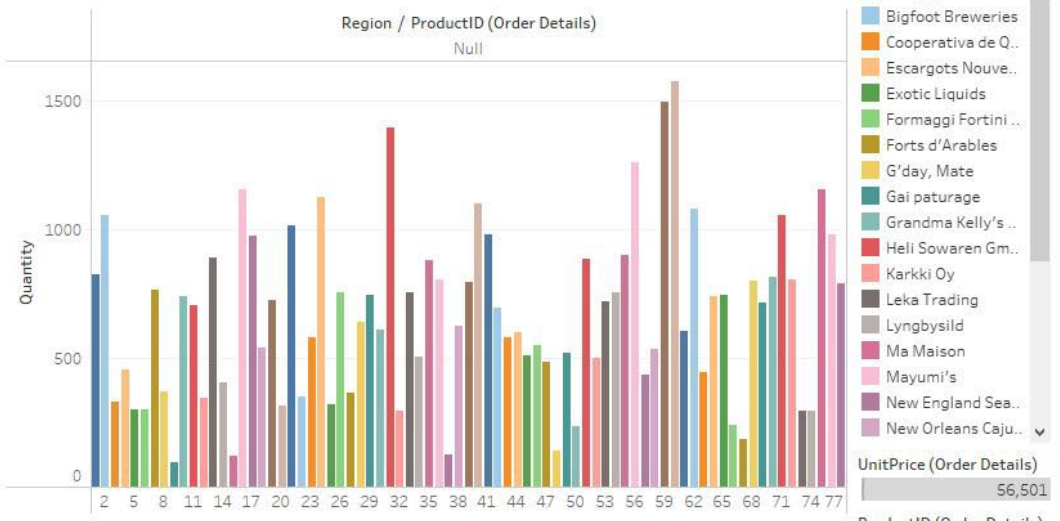
Supplier Analysis

Suppliers performance, suppliers offering competitive pricing.

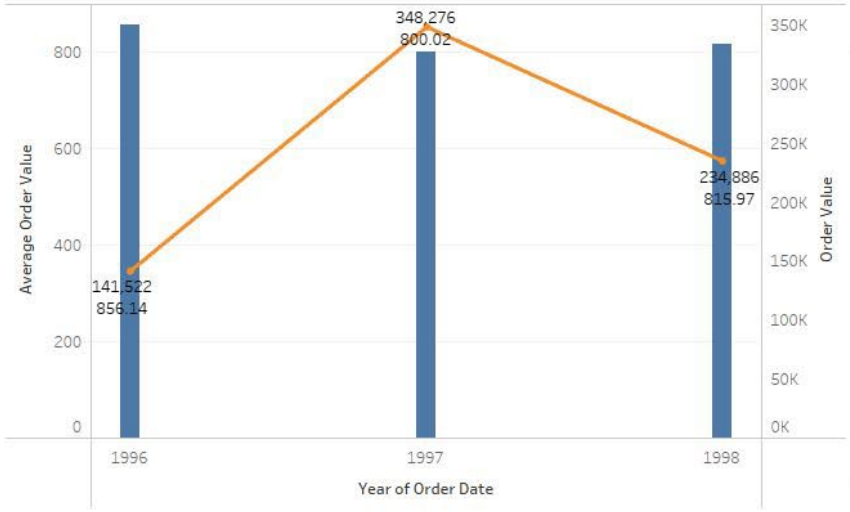
Supplier performance



Product demand by region



Average Order Value



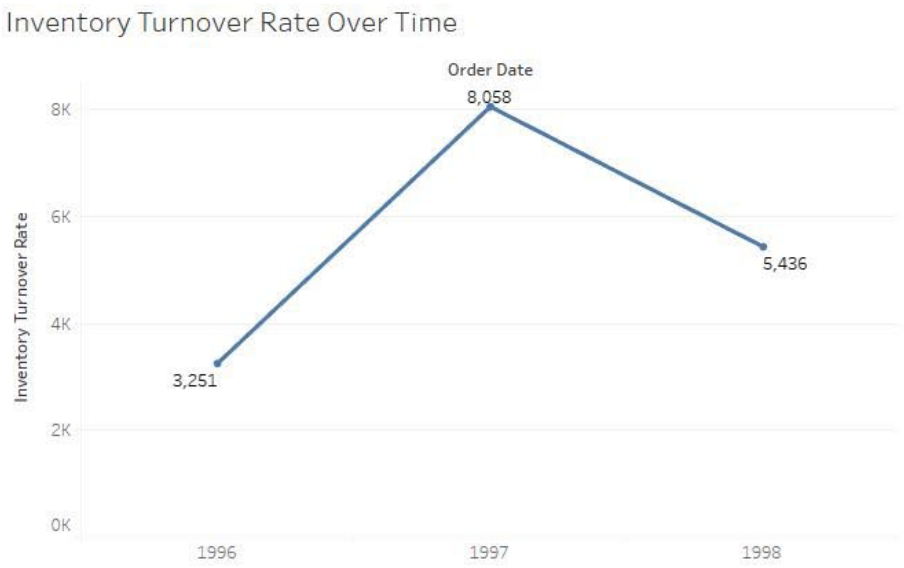
Customer Growth Rate

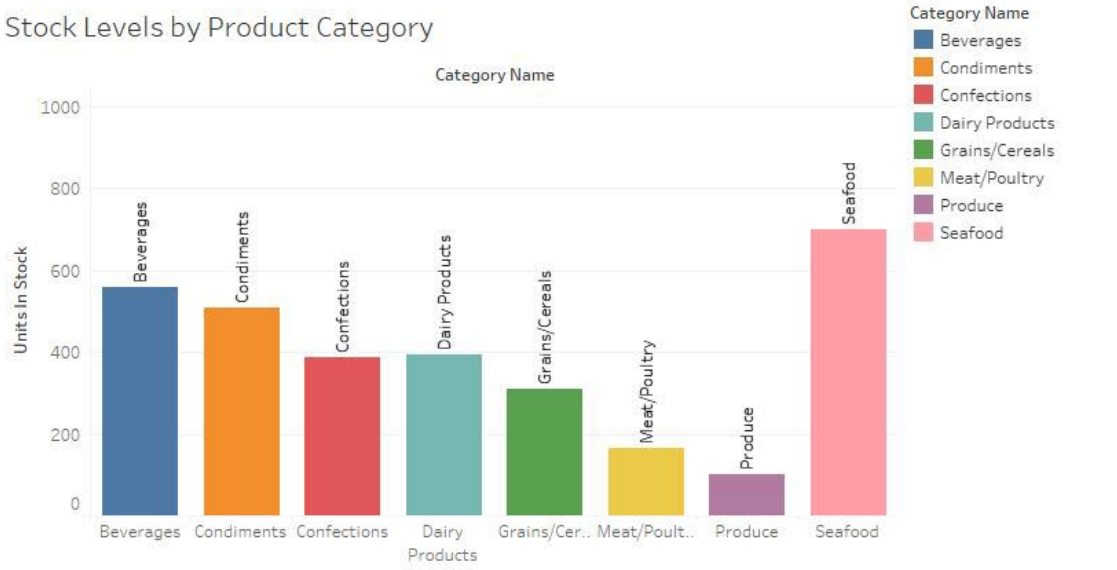
Supplier analysis evaluates supplier performance to optimize procurement, enhance collaboration, and ensure quality and delivery reliability.

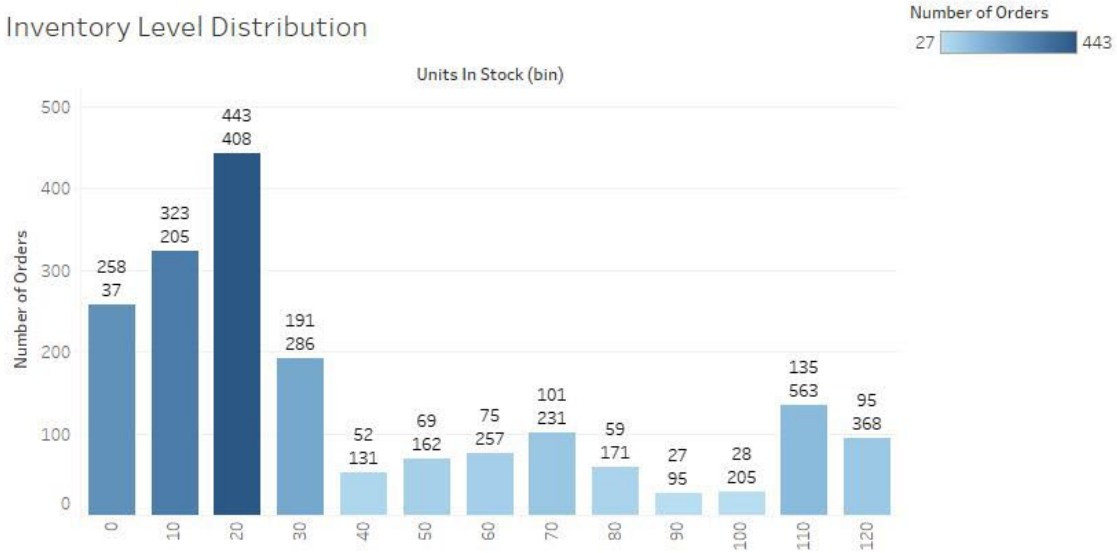
It considers factors like customer growth, regional demand, and average order value to inform decisions and improve supply chain efficiency.

Inventory Management

Analyze inventory turnover rate and stock levels. Recommend optimizing stock levels to reduce costs.







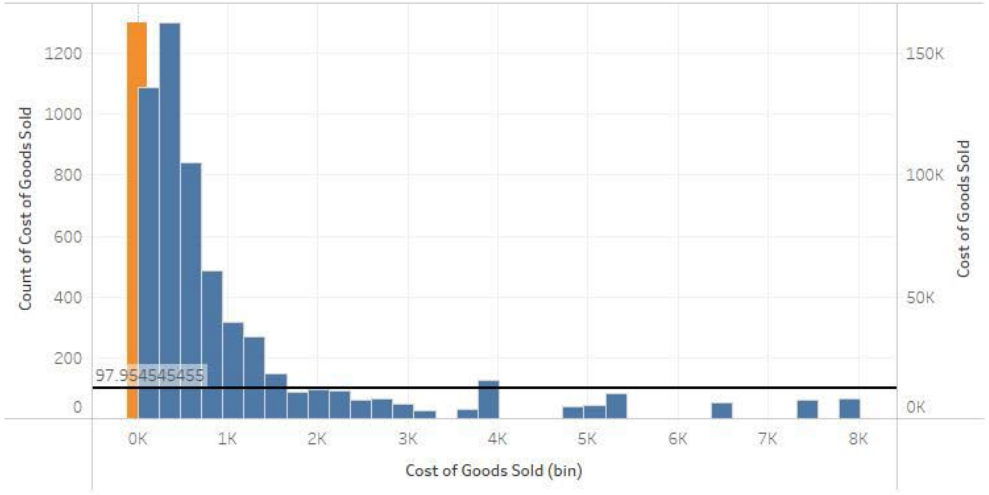
Inventory management

involves overseeing the flow of goods from manufacturers to warehouses and ultimately to customers. It includes tasks like tracking inventory levels, ordering and restocking products, optimizing storage space, and minimizing carrying costs. Effective inventory management ensures that a company has the right amount of stock at the right time to meet customer demand while avoiding stockouts or excess inventory.

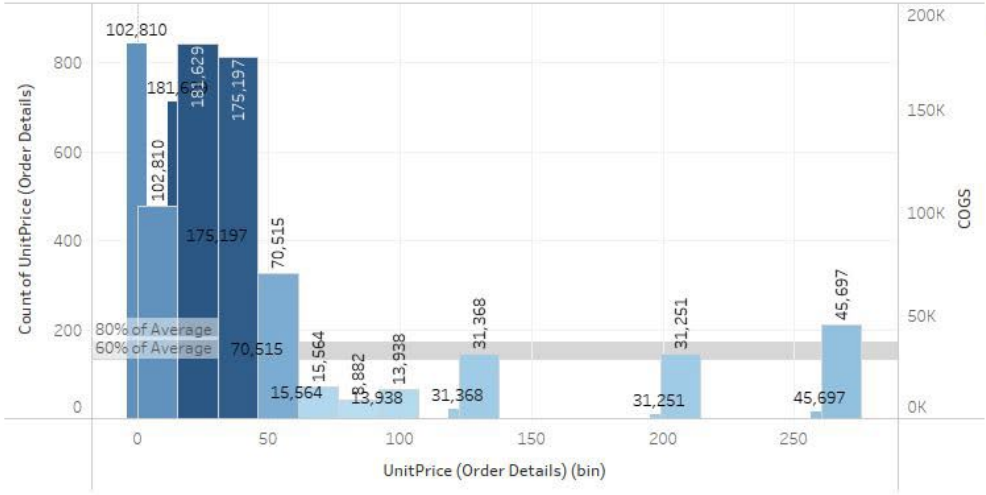
Pricing Strategy

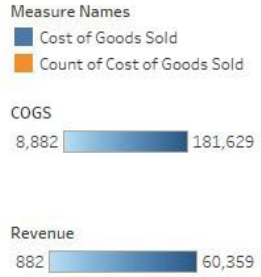
Recommend adjustments to UNITPRICE based on market analysis.
Show potential impact on profit margin with different pricing scenarios.

Profit Margin Analysis



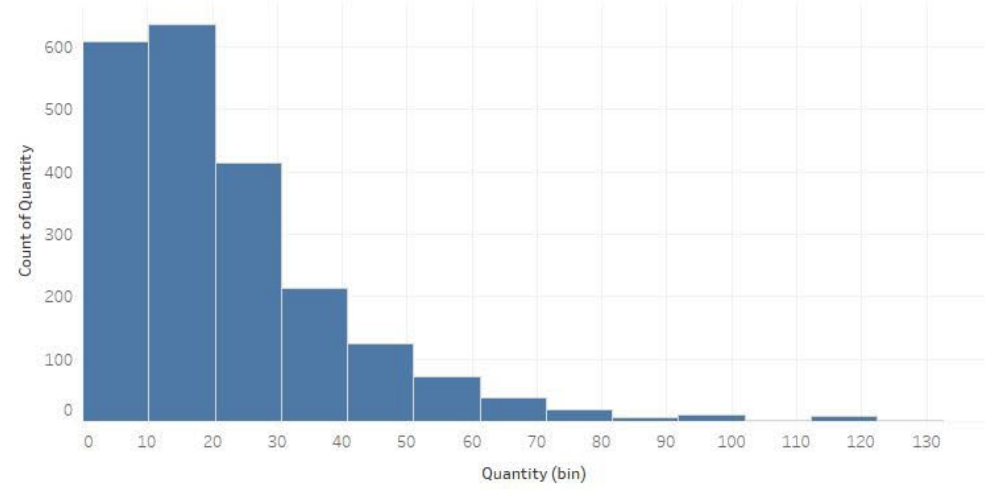
Cost Analysis





Revenue Analysis

Price Elasticity Analysis



Profit Margin Analysis
This chart provides a visual representation of the components contributing to profit margins.

Cost Analysis
This chart displays the cost breakdown for each product or service

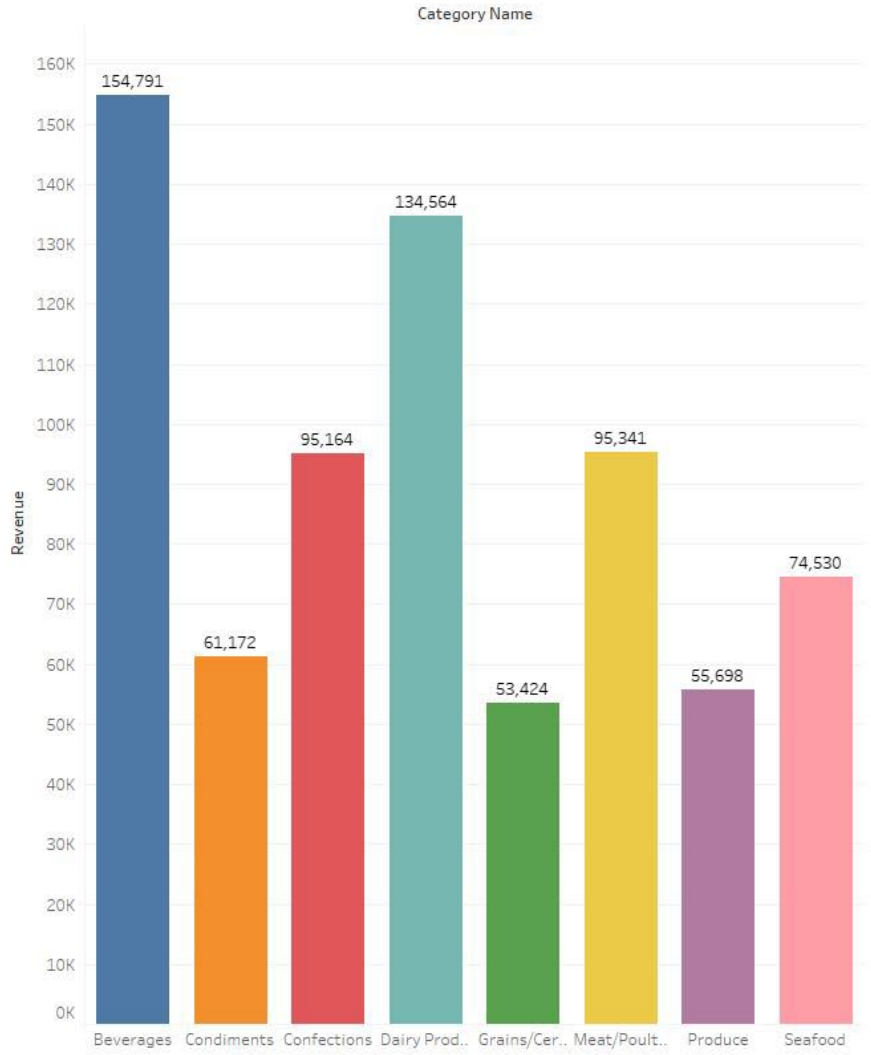
Revenue Analysis
This chart illustrates the revenue generated at different price points

Price Elasticity Analysis
This chart shows the relationship between changes in price and changes in demand quantity. It helps identify the optimal price point for maximizing revenue or profit.

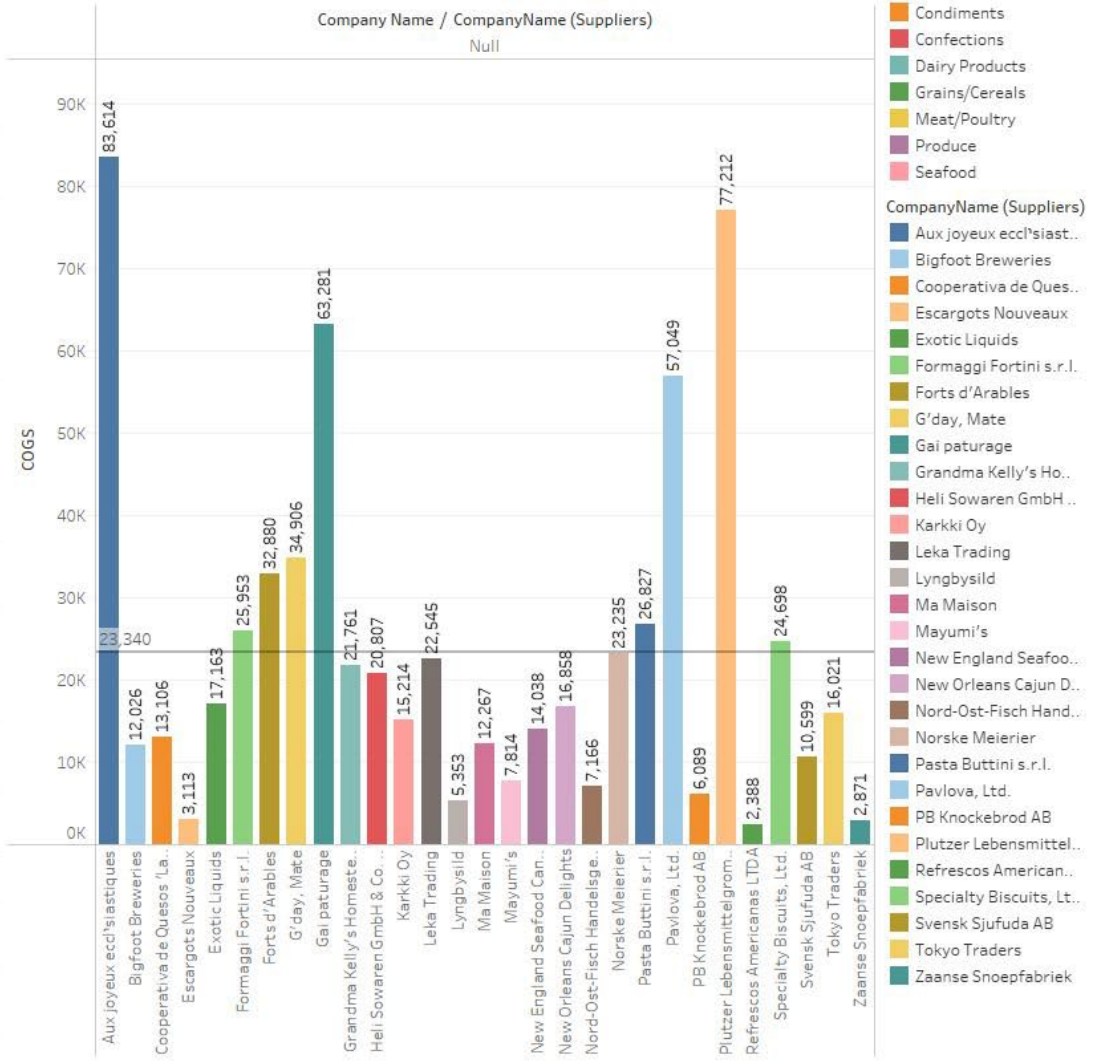
Cost Reduction Opportunities

Identify areas where costs can be reduced without compromising quality.
Provide examples such as optimizing logistics or renegotiating supplier contracts.

Product Sales by Category



Supplier Contracts



Product Sales by Category

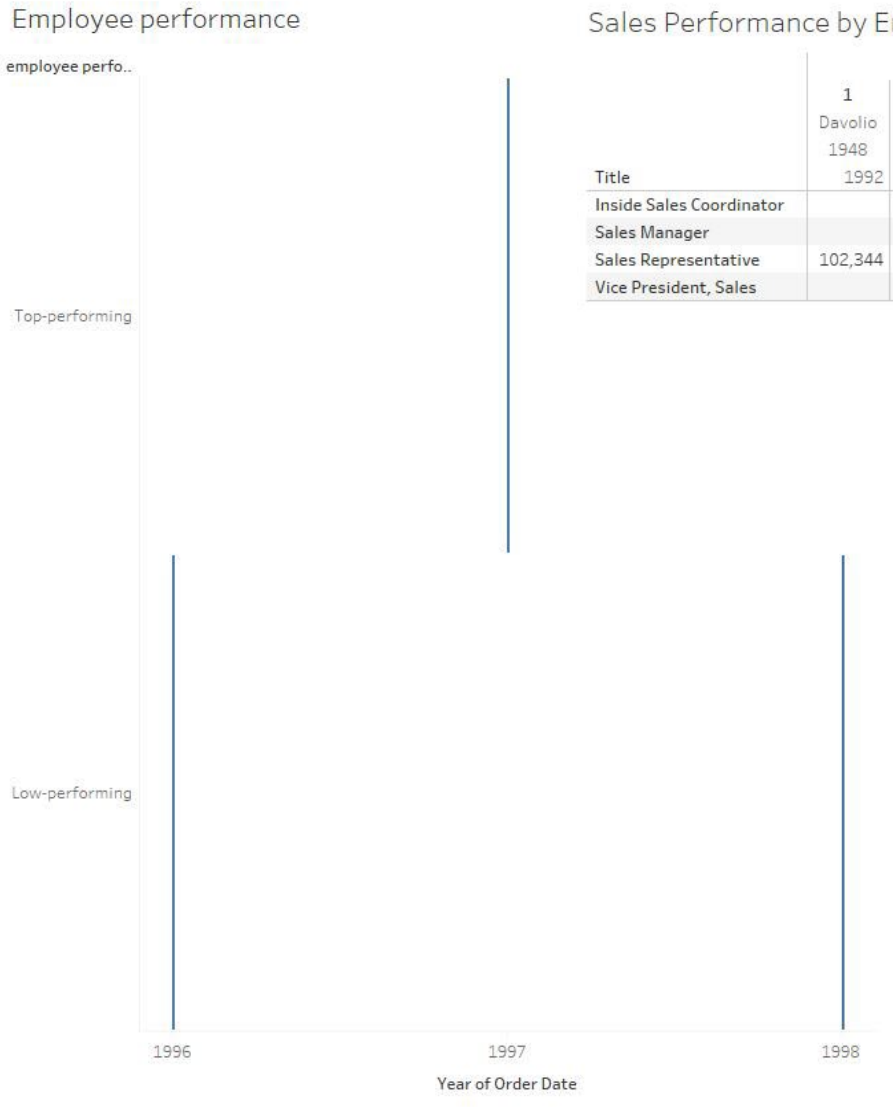
This chart visualizes the sales performance of different product categories and can help identify which product categories contribute the most to overall sales and where potential opportunities or challenges lie within the product offerings

Supplier Contracts

This chart will show the breakdown of costs associated with supplier contracts, helping us identify opportunities for renegotiation.

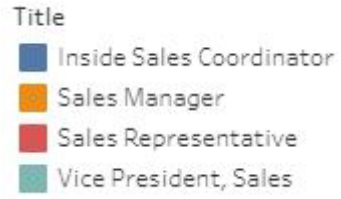
Employee Performance

Assess sales performance by employee.
Identify top-performing employees and areas for improvement.



Sales Performance by Employee

	EmployeeID (Employees) / Last Name / Birth Date / Hire Date								
	1 Davolio 1948	2 Fuller 1952	3 Leverling 1963	4 Peacock 1937	5 Buchan.. 1955	6 Suyama 1963	7 King 1960	8 Callahan 1958	9 Dodswo.. 1966
Title	1992	1992	1992	1993	1993	1993	1994	1994	1994
Inside Sales Coordinator								68,567	
Sales Manager					37,023				
Sales Representative	102,344		107,443	128,038		39,531	66,761		40,207
Vice President, Sales		86,938							



Employee Performance

These charts will provide insights into sales performance by employee, helping identify top performers and areas for improvement. They can assist in making informed decisions related to sales team management, training, and incentive programs.

Conclusion

In conclusion, our analysis of the Northwind dataset has provided valuable insights into various aspects of the company's operations. By leveraging data-driven approaches, we have identified key opportunities and strategies to enhance profitability.

Recommendations

1. **Pricing Optimization**: Adjusting UNITPRICE based on market analysis can improve competitiveness and increase revenue. Conduct sensitivity analysis to understand the potential impact on profit margins.

2. **Customer Segmentation**: Segmenting customers based on purchasing behavior or demographics allows for targeted marketing strategies and personalized experiences, ultimately driving revenue growth.

3. **Inventory Management**: Analyzing inventory turnover rates and optimizing stock levels can reduce carrying costs and improve cash flow. Implementing inventory optimization techniques can lead to significant cost savings.

4. **Supplier Analysis**: Evaluate supplier performance based on UNITPRICE to identify opportunities for cost savings. Renegotiating contracts or sourcing from suppliers offering competitive pricing can positively impact profitability.

5. **Employee Performance**: Continuously monitor and assess sales performance by employee. Recognize top-performing employees and provide training or support to improve overall performance.

By implementing these recommendations, Northwind can streamline operations, enhance customer satisfaction, and ultimately increase profitability. Data-driven decision-making will be crucial in driving sustainable growth and maintaining a competitive edge in the market.

Thank You

Appendix

About The Data

tables connections

To show the connections between the 11 tables in the Northwind.xlsx file, we can illustrate the relationships using an entity-relationship diagram.
An ERD visually represents the tables and their relationships within a database. Here's how we can represent the connections:

Products to Category:
Products (ProductID) -> Category (CategoryID)
Products (ProductID) -> Category (CategoryID)

Products to Customers:
Products (Product name) -> Customers (CustomerID)

Orders to Customers and Employees:
Orders (CustomerID) -> Customers (CustomerID)
Orders (EmployeeID) -> Employees (EmployeeID)

Orders details to Orders and Products:
Order Details (OrderID) -> Orders (OrderID)
Order Details (ProductID) -> Products (ProductID)

Employees to Employee Territories:
Employees (EmployeeID) -> Employee Territories (EmployeeID)

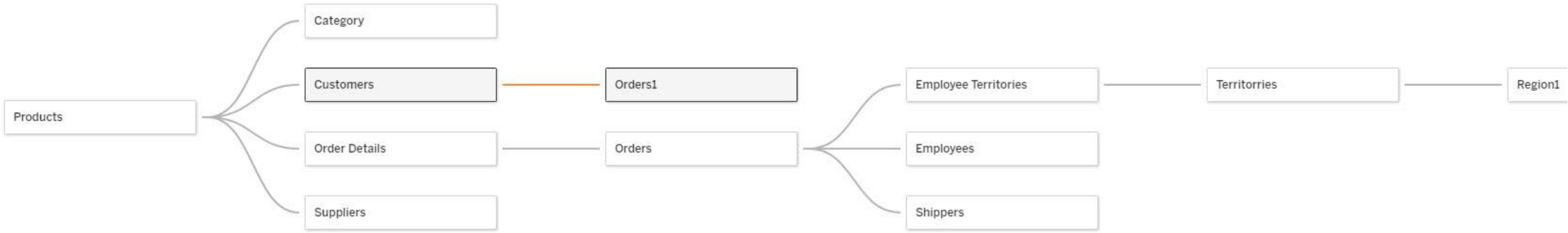
Territories to Region:
Territories (RegionID) -> Region (RegionID)

Suppliers to Products:
Suppliers (SupplierID) -> Products (SupplierID)

Shippers to Orders:
Shippers (ShipperID) -> Orders (ShipVia)

Categories to Products:
Category (CategoryID) -> Products (CategoryID)

This representation demonstrates how the tables are connected through ***primary*** and ***foreign*** keys, allowing for efficient querying and data retrieval. It's essential for maintaining data integrity and facilitating data analysis within the database.



Page 5

Key Metrics Overview

TABLEAU

To present **key financial metrics**: Revenue, Costs, and Profit Margin. Create Calculated Fields: Create calculated fields for Revenue, Costs, and Profit Margin:

Revenue: SUM(UnitPrice * Quantity)
Costs: SUM(UnitPrice * Quantity * (1 - Discount))
Profit Margin: ([Revenue] - [Costs]) / ([Revenue])

Page 6

Product Analysis

TABLEAU

Create Graph for Top-Selling Products by Revenue:

Drag the *product name* field to the **Rows** shelf.
Drag the calculated field for **revenue** [SUM(UnitPrice * Quantity)] to the **Columns** shelf.
Sort the products by revenue to display the top-selling products at the top.
Choose a bar chart or heatmap from the Show Me panel to visualize the top-selling products by revenue.

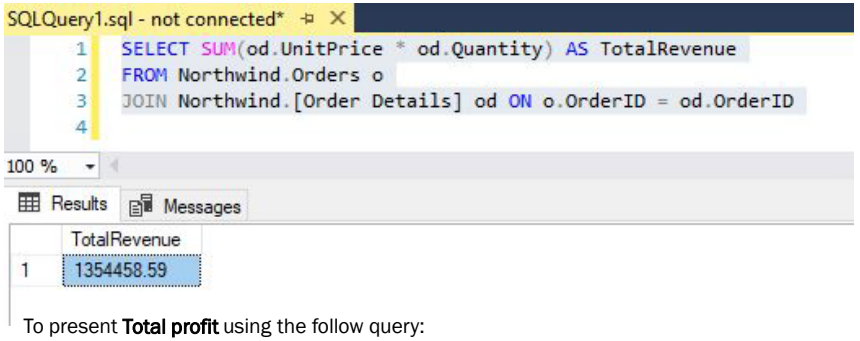
Compare UNITPRICE and ORDERDETAILS for Pricing Strategies:

Drag the **UNITPRICE** field to the **Rows** shelf.
Drag the **ORDERDETAILS** field to the **Columns** shelf.
Choose a bar chart or heatmap from the Show Me panel
to compare unit prices and order details.

SQL SERVER

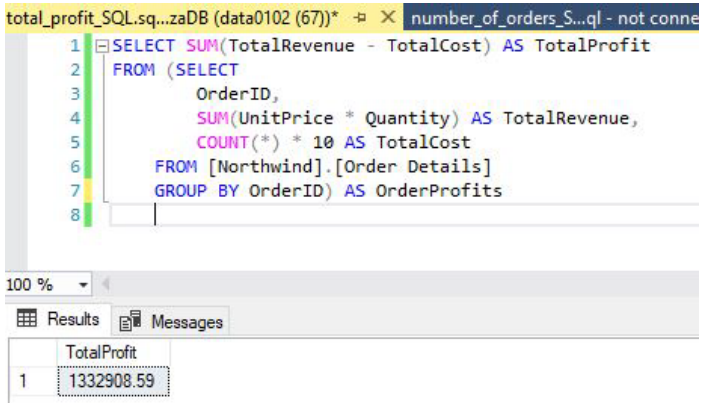
To present **Total Revenue** using the follow query:

```
SELECT SUM(od.UnitPrice * od.Quantity) AS TotalRevenue
FROM Northwind.Orders o
JOIN Northwind.[Order Details] od ON o.OrderID = od.OrderID
```



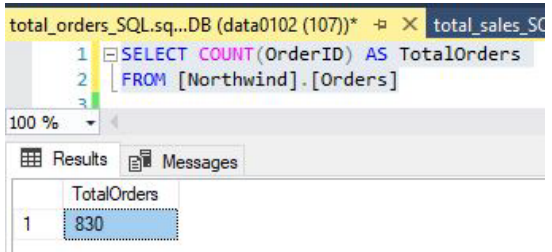
To present **Total profit** using the follow query:

```
SELECT SUM(TotalRevenue - TotalCost) AS TotalProfit
FROM (SELECT
        OrderID,
        SUM(UnitPrice * Quantity) AS TotalRevenue,
        COUNT(*) * 10 AS TotalCost
    FROM [Northwind].[Order Details]
    GROUP BY OrderID) AS OrderProfits
```



To present **Total orders** using the follow query:

```
SELECT COUNT(OrderID) AS TotalOrders
FROM [Northwind].[Orders]
```



Customer Segmentation

TABLEAU

Segmentation Analysis Techniques:

- **RFM Analysis: Analyze customer behavior based on recency (last purchase), frequency (number of purchases), and monetary value (total spend).**
- **Cluster Analysis: Use algorithms like k-means clustering to group customers based on similarities in their characteristics or behavior.**
- **Behavioral Segmentation: Segment customers based on their interactions with your products or services, such as browsing history, purchase history, or engagement level.**

RFM Analysis

1) **Recency**
   Create Calculated field recency
   DATEDIFF('day', {FIXED [CustomerID]: MAX([Order Date])}, TODAY())

2) frequency
Create Calculated field frequency
COUNTD([Order ID])

3) monetary value
Create Calculated field monetary value
SUM([UnitPrice])

In the Northwind database, the "Transaction Amount" equivalent would likely be the total price of an order, considering the quantity of each product ordered and its Unit Price. In the Northwind schema, this information is typically stored in the "**Order Details**" table.

Cluster Analysis

Dimensions:
Customer ID: Unique identifier for each customer.
Region: Geographic region of the customer.
Product Category: Category of the products purchased.

Measures:
Total Sales: Total sales revenue generated by each customer.
Number of Orders: Count of orders placed by each customer.
Average Order Value: Average value of orders placed by each customer.

Drag Dimensions and Measures:
Drag "Region" to the Color shelf to distinguish between different regions.
Drag "Total Sales" to the Columns shelf.
Drag "Number of Orders" to the Rows shelf.
Drag "Average Order Value" to the Size shelf to represent the size of each data point.

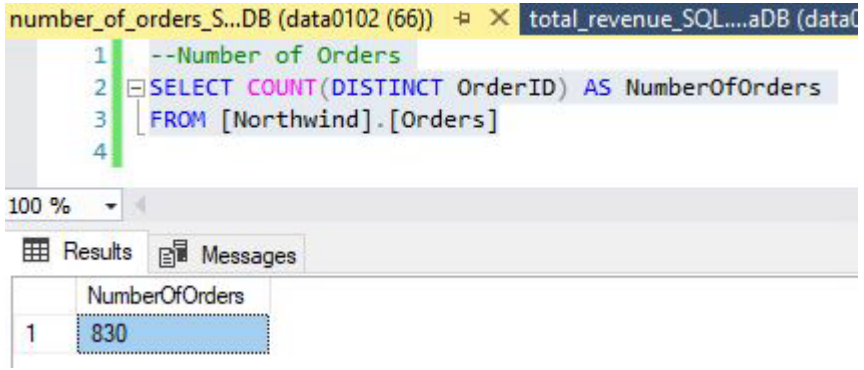
Culculated Fields

```
Revenue: SUM(UnitPrice * Quantity)
Costs: SUM(UnitPrice * Quantity * (1 - Discount))
Profit Margin: ([Revenue] - [Costs]) / ([Revenue])
Average Order Value
SUM(UnitPrice * Quantity * (1 - Discount)) / COUNTD(OrderID)
Number of Orders
COUNTD([OrderID])
Total Sales CF
--SUM(UnitPrice * Quantity * (1 - Discount))
```

SQL SERVER

To present **Number of Orders** using the follow query:

```
SELECT COUNT(DISTINCT OrderID) AS NumberOfOrders
FROM [Northwind].[Orders] OrderID
```



Supplier Analysis

Supplier analysis evaluates supplier performance to optimize procurement, enhance collaboration, and ensure quality and delivery reliability. It considers factors like customer growth, regional demand, and average order value to inform decisions and improve supply chain efficiency.

TABLEAU

Product demand by region

Drag Region and Product ID:
Drag the "Region" field from the Customers table to the Rows shelf.
Drag the "Product ID" field from the Order Details table to the Columns shelf.
Drag Quantity:
Drag the "Quantity" field from the Order Details table to the Text shelf. This will display the total quantity sold for each product in each region.

Average Order Value

Create a calculated field named "**Order Value**" that calculates the total value of each order and then calculated field **Average Order Value**.

Order Value

SUM(UnitPrice * Quantity)

Average Order Value

SUM([Unit Price] * Quantity * (1 - Discount)) / COUNTD([Order ID])

Customer Growth Rate

New Customers CF

IF [OrderDate] = [First Order Date] THEN [CustomerID] END

Customer Growth Rate CF

(COUNTD([New Customers]) - LOOKUP(COUNTD([New Customers]), -1))
/ LOOKUP(COUNTD([New Customers]), -1)

Drag the date field (e.g., **OrderDate**) to the Columns shelf.
Drag the calculated field for **customer growth** rate to the Rows shelf.

Inventory Management

Inventory management involves overseeing the flow of goods from manufacturers to warehouses and ultimately to customers. It includes tasks like tracking inventory levels, ordering and restocking products, optimizing storage space, and minimizing carrying costs. Effective inventory management ensures that a company has the right amount of stock at the right time to meet customer demand while avoiding stockouts or excess inventory.

TABLEAU

Inventory Turnover Rate Over Time

CF **Cost of Goods Sold (COGS)**
[Quantity] * [Unit Price] * (1 - [Discount])

CF **Average Order Value**
WINDOW_AVG(SUM([Units In Stock]))

CF **Inventory Turnover Rate**
SUM([COGS]) / [Average Inventory]

Drag the "Order Date" field to the Columns shelf.
Drag the calculated field for Inventory Turnover Rate (calculated as Cost of Goods Sold divided by Average Inventory) to the Rows shelf.

Stock Levels by Product Category

Drag the "CategoryName" field from your data source to the Rows shelf.
Drag the "Units In Stock" field to the Columns shelf. Tableau should automatically aggregate this as a sum.

Inventory Turnover Rate by Product Category

CF **Cost of Goods Sold**
[Quantity] * [Unit Price] * (1 - [Discount])

CF **Average Inventory**
AVG([Units In Stock])

CF **Inventory Turnover Rate**
SUM([Cost of Goods Sold]) / [Average Inventory]

Drag the "CategoryName" field to the Columns shelf.
Drag the calculated field for Inventory Turnover Rate to the Rows shelf.

Inventory Level Distribution

Create Bins for Inventory Levels:
Right-click on the "Units In Stock" field in the Data pane.
Select "Create" and then "Bins..."

In the "Edit Bins" dialog, specify the bin size and range for the inventory levels. For example, you can set the bin size to 10 or adjust it based on your data distribution.
Click OK to create the bins.

Create the Chart:
Drag the newly created "Units In Stock (bin)" field to the Columns shelf.
Drag the "Number of Records" field (which represents the count of inventory items) to the Rows shelf.

Pricing Strategy

Pricing strategy refers to the approach a business takes to set the prices of its products or services. It involves analyzing factors such as production costs, competition, customer demand, and market trends to determine the optimal price point that maximizes profitability and market share. Common pricing strategies include cost-plus pricing, where a markup is added to production costs, value-based pricing, which considers the perceived value of the product to customers, and competitive pricing, where prices are set based on what competitors are charging. The chosen pricing strategy plays a significant role in shaping consumer perceptions, influencing purchasing decisions, and ultimately impacting the success of a business.

TABLEAU

Profit Margin Analysis

This chart provides a visual representation of the components contributing to profit margins.

Drag your dimension representing the components (e.g., Revenue, **COGS**, Operating Expenses, Taxes, Net Profit) to the **Columns** shelf.
Drag your measure representing the value of each component **(Profit Margin**) to the **Rows** shelf.
Create a waterfall chart:
Drag the dimension representing the components to the Rows shelf again, placing it next to the existing one.
Change the chart type of the second dimension to a Gantt Bar (or Stacked Bar) chart.
Adjust the **size** of bars as needed to create the desired appearance.
Add reference lines:
Right-click on the axis of the second dimension (the Gantt Bar chart) and select "Add Reference Line" > "Value".
In the "Reference Line" dialog, select "Per Cell" under "Scope".

Cost Analysis

This chart displays the cost breakdown for each product or service

Drag the dimension representing the cost components (e.g., **Production Costs**, Marketing Expenses, Distribution Costs, Overhead Expenses) to the **Columns** shelf.
Drag the measure representing the value of each **cost** component to the **Rows** shelf.
Choose the appropriate chart type:
Depending on your preference and the nature of your data, you can choose from various chart types to visualize cost analysis. Common options include:
Stacked Bar Chart: Use this chart type to show the total cost with each component stacked on top of each other.

Revenue Analysis

This chart illustrates the revenue generated at different price points

Drag the dimension representing the category you want to analyze revenue by (e.g., Product, **Region**, Time) to the **Columns** shelf.
Drag the measure representing **revenue** to the **Rows** shelf.

Price Elasticity Analysis

This chart shows the relationship between changes in price and changes in demand quantity. It helps identify the optimal price point for maximizing revenue or profit.

Drag the measure representing **price** to the **Columns** shelf.
Drag the measure representing **demand quantity** (объем спроса / (**כמות דרישה** Units In Stock to the **Rows** shelf.

Cost Reduction Opportunities

Cost Reduction Opportunity Identifys areas where costs can be reduced without compromising quality.
Provide examples such as optimizing logistics or renegotiating supplier contracts.

TABLEAU

Product Sales by Category

This chart visualizes the sales performance of different product categories and can help identify which product categories contribute the most to overall sales and where potential opportunities or challenges lie within the product offerings

Drag the dimension representing the product category (e.g., **CategoryName** from the Products table) to the **Columns** shelf.

Drag the measure representing sales (e.g., Sales) to the **Rows** shelf. If there's no explicit sales measure, you can use a measure such as **Revenue** or Quantity Sold.

Supplier Contracts

This chart will show the breakdown of costs associated with supplier contracts, helping us identify opportunities for renegotiation.

Drag the dimension representing the supplier (e.g., **SupplierName**) to the Columns shelf.
Drag the measure representing the total cost of goods sold (**COGS**) for each supplier's products

Employee Performance

Assess sales performance by employee.
Identify top-performing employees and areas for improvement.
These charts will provide insights into sales performance by employee, helping identify top performers and areas for improvement.
They can assist in making informed decisions related to sales team management, training, and incentive programs.

TABLEAU

Sales Performance by Employee

Drag the "**EmployeeID**" field from the Employees table and the measure representing sales (e.g., "**Sales**") to the Rows shelf.
Change the aggregation of the sales measure to "**SUM**" to show the total sales amount by each employee. **Sort** the bars in descending order based on total sales amount to identify top-performing employees.

Employee performance

CF **Employee performance**
IF SUM([Quantity]) >= WINDOW_MAX(SUM([Quantity])) THEN "Top-performing“
ELSE "Low-performing“
END

Drag the "**OrderDate**" field to the Columns shelf and choose the appropriate level of date granularity (e.g., month).
Drag the calculated field Employee performance representing employee performance (e.g., "**Performance Category**") to the Rows shelf to create two separate lines for top-performing and low-performing employees.