Data Analysis Portfolio: Online Retail Dataset

1. Problem Statement

The goal is to analyze the performance of the online retail business and identify actionable insights to improve revenue, customer retention, and operational efficiency. Specifically, the analysis will focus on sales trends, customer behavior, and product performance.

---

2. KPI Requirements

Below are the KPIs with their step-by-step breakdown, SQL queries, and corresponding Tableau chart requirements.

KPI 1: Total Revenue by Month

Objective: Understand monthly revenue trends to identify peak sales periods.

Steps:

1. Extract the InvoiceDate and Quantity * UnitPrice to calculate monthly revenue.
2. Group by month and year.
3. Sort the data by date.

SQL Query:

```
SELECT DATE_FORMAT (InvoiceDATE, '%Y-%M') AS Monthly_revenue,
SUM(Quantity * UnitPrice) AS Total_revenue
FROM online_retail.`online retail`
GROUP  BY DATE_FORMAT (InvoiceDATE, '%Y-%M')
ORDER BY DATE_FORMAT (InvoiceDATE, '%Y-%M')
```

Monthly_revenue	Total_revenue
2010-December	408584

Excel Visualization:

- Create a **Bar chart** to display total revenue trends by month.
- Add data labels and a trendline for better insights.

KPI 2: Top 10 Best-Selling Products

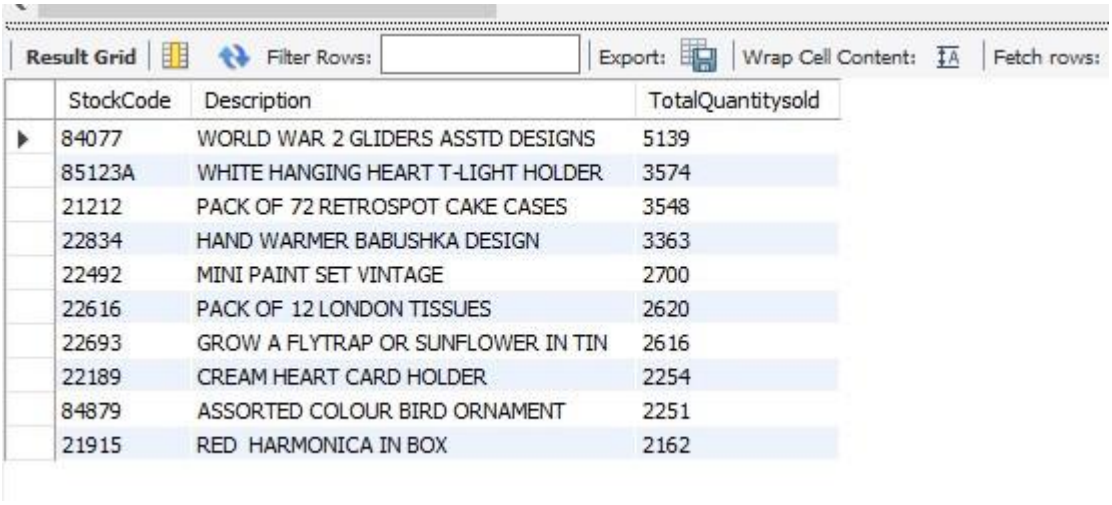
Objective: Identify the most popular products to optimize inventory.

Steps:

1. Calculate total quantity sold for each product.
2. Rank the products by quantity in descending order.
3. Select the top 10 products.

SQL Query:

```
SELECT StockCode, Description, SUM(Quantity) AS TotalQuantitysold
FROM online_retail.`online retail`
GROUP BY StockCode, Description
ORDER BY SUM(Quantity) DESC
LIMIT 10
```



StockCode	Description	TotalQuantitysold
84077	WORLD WAR 2 GLIDERS ASSTD DESIGNS	5139
85123A	WHITE HANGING HEART T-LIGHT HOLDER	3574
21212	PACK OF 72 RETROSPOT CAKE CASES	3548
22834	HAND WARMER BABUSHKA DESIGN	3363
22492	MINI PAINT SET VINTAGE	2700
22616	PACK OF 12 LONDON TISSUES	2620
22693	GROW A FLYTRAP OR SUNFLOWER IN TIN	2616
22189	CREAM HEART CARD HOLDER	2254
84879	ASSORTED COLOUR BIRD ORNAMENT	2251
21915	RED HARMONICA IN BOX	2162

Excel Visualization:

- Create a **horizontal bar chart** showing the top 10 products with their sales volumes.
- Use different colors to distinguish the bars for better visual appeal.

KPI 3: Revenue Contribution by Country

Objective: Analyze which countries contribute the most to revenue.

Steps:

1. Aggregate revenue (Quantity * UnitPrice) for each country.
2. Calculate the percentage contribution of each country.

SQL Query:

```
SELECT
  Country,
  SUM(Quantity * UnitPrice) AS Revenue,
  ROUND((SUM(Quantity * UnitPrice) / (SELECT SUM(Quantity * UnitPrice) FROM OnlineRetail))
* 100, 2) AS PercentageContribution
FROM
  OnlineRetail
GROUP BY
  Country
ORDER BY
  Revenue DESC;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Country	Revenue	PercentCont
United Kingdom	358535	87.75
Germany	10415	2.55
France	6741	1.65
EIRE	5976	1.46
Netherlands	5918	1.45
Japan	5553	1.36
Norway	2228	0.55
Portugal	1864	0.46
Sweden	1728	0.42
Spain	1346	0.33
Lithuania	1294	0.32
Cyprus	1087	0.27
Denmark	1034	0.25

Result 19

Tableau Visualization:

- Create a **horizontal bar chart** to display the percentage revenue contribution by each country.
- Use annotations to highlight the top three countries.

KPI 4: Customer Retention Rate

Objective: Measure the percentage of repeat customers over time.

Steps:

1. Identify first purchase dates for each customer.
2. Calculate the number of customers with repeat purchases.
3. Divide repeat customers by total customers to calculate retention rate.

SQL Query:

```
WITH FirstPurchase AS(
SELECT CustomerID, MIN(InvoiceDate) AS FirstPurchaseDate
FROM online_retail.`online retail`
GROUP BY CustomerID
),
RepeatCustomers AS(
SELECT fp.CustomerID
FROM online_retail.`online retail` r
INNER JOIN FirstPurchase fp
ON r.CustomerID = fp.CustomerID
WHERE r.InvoiceDate > fp.FirstPurchaseDate
)
SELECT
(SELECT COUNT(DISTINCT CustomerID) FROM RepeatCustomers)/
(SELECT COUNT(DISTINCT CustomerID) FROM online_retail.`online retail`) * 100 AS RetentionRate;
```

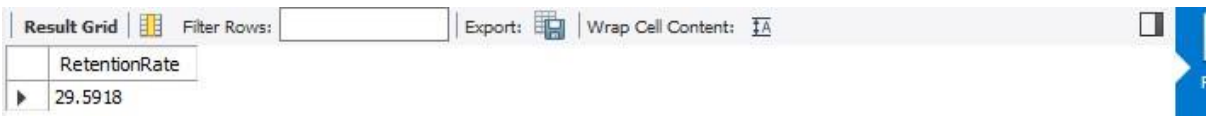


Tableau Visualization:

- Use a **text table** to compare the total number of customers with repeat customers across time periods.
- Add percentages as data labels for clear communication.

KPI 5: Average Order Value (AOV)

Objective: Track the average revenue per order to assess profitability.

Steps:

1. Calculate total revenue and the number of invoices.
2. Divide total revenue by the number of unique invoices.

SQL Query:

```
SELECT ROUND(SUM(Quantity * UnitPrice)/ COUNT(DISTINCT InvoiceNo), 2) AS
AverageOrderValue

FROM online_retail.`online retail`
```

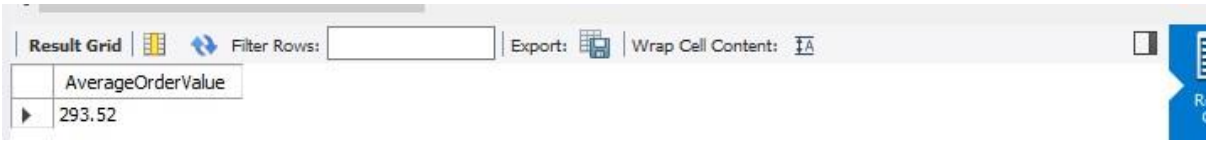


Tableau Visualization:

- Create a **text table chart** showing monthly trends in AOV.
- Add a reference line for the average AOV across the entire dataset.

---

3. **By addressing the outlined challenges and analyzing the available data, this project aims to deliver actionable insights that enhance operational efficiency, improve customer retention, or optimize revenue]. The results will enable data-driven decision-making and provide a foundation for continuous improvement in business performance, customer satisfaction, or resource allocation. Ultimately, this analysis seeks to support strategic objectives and foster sustainable growth**

Reference

UCI Machine Learning Repository (Link for Dataset)