

Tata Company Micro Internship Project

Data Visualization: Empowering Business with Effective Insights

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- Expansion Strategy

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Overview

Strategic Data Analysis for Online Retail Expansion

Background and Purpose:

The online retail store is facing increasing competition and pressure to expand into new markets while optimizing its current operations. As part of this initiative, the CEO and CMO of the company have requested a detailed analysis of the store's revenue generation, customer behavior, and product demand patterns. This analysis is critical for understanding the business's strengths and identifying potential areas for growth.

The data used in this analysis represents the store's transactions for the year 2011 and includes information on invoices, customer IDs, unit prices, product quantities, and the countries where orders were placed. However, before any meaningful analysis could be conducted, the data had to be cleaned to ensure its accuracy and reliability.

Management's Focus:

The leadership team, comprising the CEO and CMO, is interested in evaluating the current business performance from both operations and marketing perspectives. They aim to

- Identify major revenue drivers and the effectiveness of current strategies.
- Assess which aspects of the business are performing well, to prioritize efforts in those areas.
- Understand the impact of various demographic factors on revenue.
- Develop an expansion strategy based on data-driven inputs various demographic factors on revenue.

Dataset For Online Retail Project

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Dataset (Link) - <https://www.kaggle.com/datasets/tunguz/online-retail>

Objective

Data-Driven Insights for Strategic Decision-Making

The primary objective of this task is to create clear, actionable visualizations that address the specific analytical needs of the CEO and CMO of the online retail store. These visualizations will guide strategic decisions regarding revenue forecasting, market expansion, and customer retention.

Key Objectives

1. Revenue Trend Analysis (2011):

- Provide the CEO with a detailed time series visualization of monthly revenue data for 2011.
- Highlight seasonal trends and significant fluctuations to assist in revenue forecasting and strategic planning for the upcoming year.

2. Top Countries by Revenue (Excluding UK):

- Create a visual for the CMO showcasing the top 10 revenue-generating countries, excluding the United Kingdom.
- Include both revenue and quantity sold metrics to offer a comprehensive view of each country's performance, enabling more precise market targeting.

3. Top 10 Customers by Revenue:

- Develop a visual that ranks the top 10 customers by revenue, starting with the highest revenue-generating customer.
- This will help the CMO focus on retaining and nurturing relationships with the most valuable customers, enhancing customer loyalty and lifetime value.

4. Regional Demand Analysis:

- Generate a comprehensive visual identifying regions with the highest demand for the company's products, excluding the United Kingdom.
- This analysis will inform the CEO's expansion strategy, focusing on regions with the greatest potential for revenue growth.

By achieving these objectives, the visualizations will provide the CEO and CMO with critical insights necessary to optimize business performance, drive revenue growth, and make informed decisions on future strategies.

Data Cleanup and Visualization in Tableau For Analysis

Data visualization is a powerful tool that allows business leaders to interpret complex data quickly and make informed decisions. However, the accuracy and reliability of these visuals depend heavily on the quality of the underlying data. Before creating any visualizations, it is essential to perform a thorough data cleanup to eliminate errors that could lead to misleading insights.

In the context of this task, data cleanup involves identifying and correcting issues such as negative quantities and erroneous unit prices. These anomalies can distort the analysis and lead to incorrect conclusions. By setting conditional checks to exclude data with quantities below 1 unit and unit prices below \$0, you ensure that only valid and meaningful data is included in the visualizations. This step is crucial for maintaining the integrity of the analysis, allowing the CEO and CMO to confidently use the visuals to guide their strategic decisions.

By meticulously cleaning the data before analysis, you lay the foundation for creating accurate and insightful visualizations that truly reflect the business performance and potential. The data cleaning process involved removing erroneous entries, such as transactions with negative quantities (returns) and unit prices below zero, which were identified as input errors. This process ensured that only valid sales data was included in the final analysis, enabling accurate insights to be drawn.

Task Questions

Question 1

The CEO of the retail store is interested to view the time series of the revenue data for the year 2011 only. He would like to view granular data by looking into revenue for each month. The CEO is interested in viewing the seasonal trends and wants to dig deeper into why these trends occur. This analysis will be helpful for the CEO to forecast for the next year.

Question 2

The CMO is interested in viewing the top 10 countries which are generating the highest revenue. Additionally, the CMO is also interested in viewing the quantity sold along with the revenue generated. The CMO does not want to have the United Kingdom in this visual.

Question 3

The CMO of the online retail store wants to view the information on the top 10 customers by revenue. He is interested in a visual that shows the greatest revenue generating customer at the start and gradually declines to the lower revenue generating customers. The CMO wants to target the higher revenue generating customers and ensure that they remain satisfied with their products.

Question 4

The CEO is looking to gain insights on the demand for their products. He wants to look at all countries and see which regions have the greatest demand for their products. Once the CEO gets an idea of the regions that have high demand, he will initiate an expansion strategy which will allow the company to target these areas and generate more business from these regions. He wants to view the entire data on a single view without the need to scroll or hover over the data points to identify the demand. There is no need to show data for the United Kingdom as the CEO is more interested in viewing the countries that have expansion opportunities.

Key Areas of Analysis

1. Operational Performance:

- Evaluate monthly and seasonal revenue trends to identify peak periods and potential areas for operational optimization.
- Analyze the performance of top countries and regions, focusing on both revenue generation and market potential.
- Identify the top customers by revenue and assess their buying behaviors, frequency, and overall contribution to the business.

2. Marketing Effectiveness:

- Examine the impact of marketing campaigns and strategies on revenue generation.
- Assess customer segmentation and demographics to understand which groups are driving sales and which may need targeted marketing efforts.
- Analyze geographic data to identify high-potential markets that could benefit from increased marketing focus.

3. Expansion Strategy:

- Provide insights on which regions, customer segments, and product categories show the most promise for expansion.
- Recommend strategies for enhancing market penetration in underperforming regions or segments.
- Suggest metrics and KPIs that will help monitor the success of the expansion efforts and allow for agile adjustments.

Data Analysis

(To answer the task question on the based on data and chart observations)

TASK 1 (Monthly revenue of 2011)

The CEO of the retail store is interested to view the time series of the revenue data for the year 2011 only. He would like to view granular data by looking into revenue for each month. The CEO is interested in viewing the seasonal trends and wants to dig deeper into why these trends occur. This analysis will be helpful for the CEO to forecast for the next year.

Solution : Time Series Analysis of Revenue Data for 2011

Summary: The chart illustrates the monthly revenue for the retail store during the year 2011. The data shows significant seasonal trends with notable fluctuations in revenue across different months.

Key Observations:

- **Decline:** The year started with a moderate revenue of around 691,365 units in January, followed by a decline to 523,632 units in February.
- **Steady Increase:** There was a steady increase in revenue from March (717,639 units) to June (761,740 units)
- **Mid-Year Stability:** July and August showed relatively stable revenue figures, with slight decreases to 719,221 units and 759,138 units respectively.
- **Sharp Increase in Autumn:** A significant increase in revenue occurred from September (1,058,590 units) to October, peaking at 1,509,496 units in October.
- **End-of-Year Drop:** The revenue saw a sharp decline in November to 1,154,979 units, followed by a further decrease in December to 638,793 units.

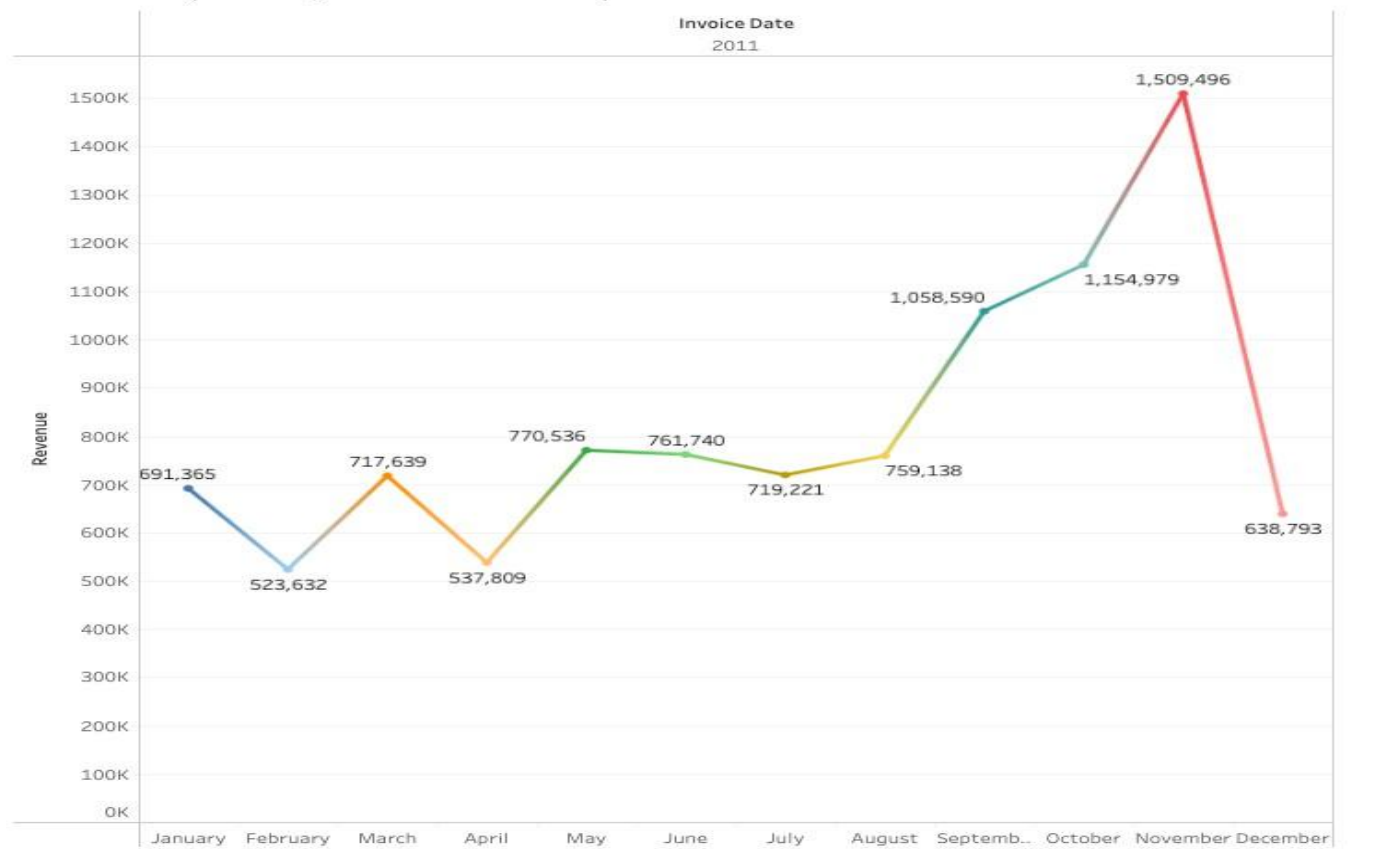
Insights:

- **Seasonal Trends:** The sharp increase in revenue during September and October may be attributed to seasonal factors such as holiday preparations or promotional events.
- **Forecasting:** These trends can help in forecasting future revenues by identifying peak months and preparing strategies to optimize sales during high-revenue periods.
- **Strategic Planning:** Understanding the reasons behind the mid-year stability and the sharp autumn increase can inform strategic decisions, such as inventory management, marketing campaigns, and staffing.

By digging deeper into the underlying causes of these trends, the CEO can better plan for the upcoming year, leveraging high-revenue periods and addressing low-revenue months with targeted strategies.

Tableau Chart:

Solution 1 (Monthly revenue for 2011)



Solution 1(Link)-

https://public.tableau.com/app/profile/sumit.baviskar/viz/TataProject1_17044404080020/Solution1

Recommendation:

The analysis shows significant fluctuations in monthly revenue for 2011, with the highest spike in November. This indicates potential seasonal trends, likely linked to major shopping events such as Black Friday or holiday sales. To capitalize on these trends, the company should:

- Focus on promotional campaigns and inventory management leading up to peak months (such as November) to maximize revenue potential.
- Investigate the lower revenue months (such as January and December) to identify opportunities for sales improvement, such as targeted marketing or special discounts during traditionally slower periods.
- Plan operational resources around expected revenue peaks to ensure seamless customer service and order fulfillment during high-demand months.

TASK 2 (Top 10 countries by revenue)

The CMO is interested in viewing the top 10 countries which are generating the highest revenue. Additionally, the CMO is also interested in viewing the quantity sold along with the revenue generated. The CMO does not want to have the United Kingdom in this visual.

Solution : Top 10 Countries by Revenue (Excluding the United Kingdom)

Summary:

The bar chart displays the top 10 countries that generated the highest revenue for the retail store. It also includes the quantity of items sold in each country, providing a comprehensive view of both revenue and sales volume.

1. Netherlands:

- **Revenue:** 286,421 units
- **Quantity:** 20,284 items

2. EIRE (Ireland):

- **Revenue:** 288,544 units
- **Quantity:** 147,272 items

3. Germany:

- **Revenue:** 221,705 units
- **Quantity:** 27,405 items

4. France:

- **Revenue:** 209,065 units
- **Quantity:** 112,043 items

5. Australia:

- **Revenue:** 138,417 units
- **Quantity:** 62,943 items

6. Switzerland:

- **Revenue:** 133,989 units
- **Quantity:** 28,643 items

7. Spain:

- **Revenue:** 106,238 units
- **Quantity:** 27,918 items

8. Belgium:

- **Revenue:** 94,693 units
- **Quantity:** 41,546 items

G. Sweden:

- **Revenue:** 85,009 units
- **Quantity:** 39,378 items

10. Japan:

- **Revenue:** 92,050 units
- **Quantity:** 13,248 items

Key Observations:

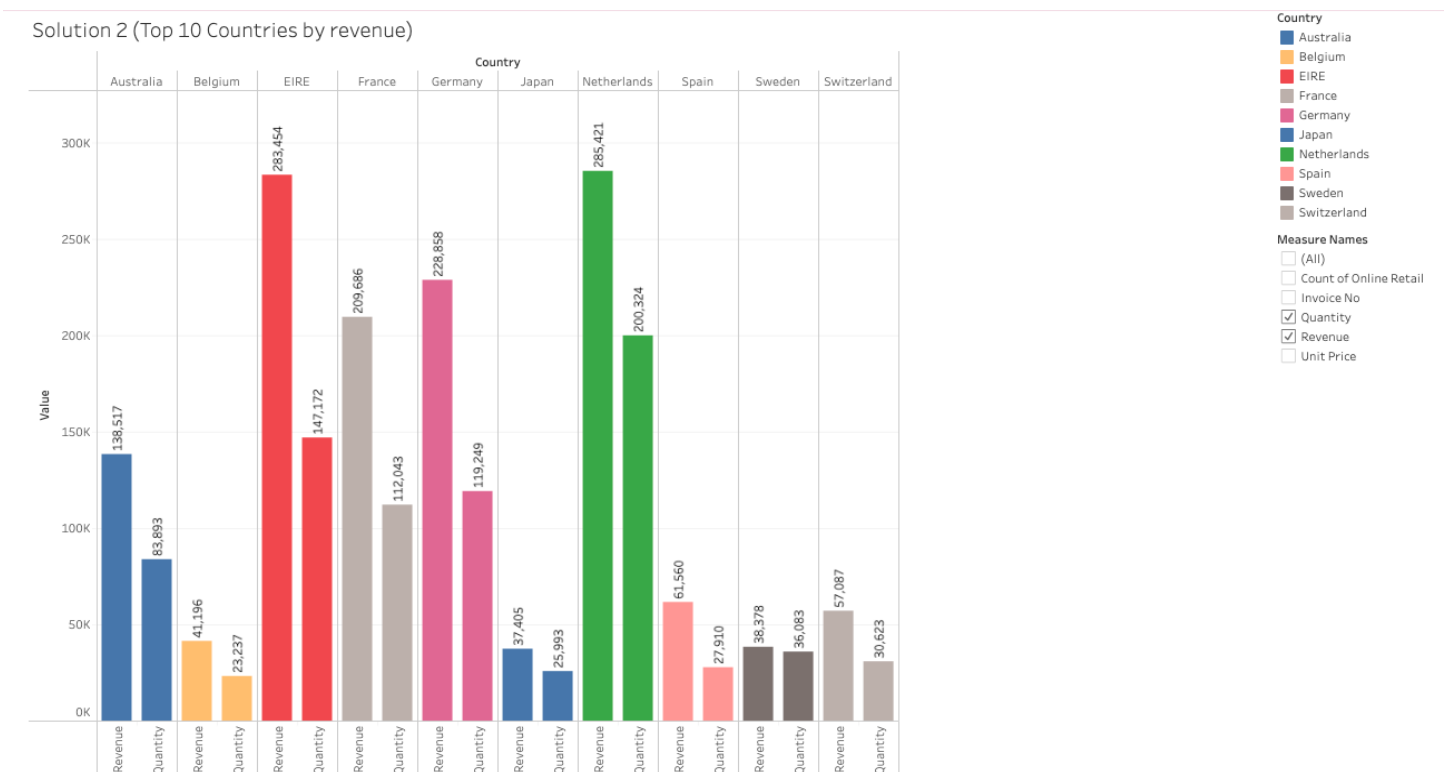
- The Netherlands is the top revenue-generating country, followed by Germany and France. Countries like Belgium and EIRE show lower revenue but high sales quantities.
- Japan shows a notable gap between sales quantity and revenue, indicating either lower pricing or higher competition in the region.

Insights:

- **High Revenue and Quantity:** EIRE and Netherlands stand out with the highest revenue and significant quantities sold, indicating strong markets.
- **Revenue vs. Quantity:** Some countries like Germany and France have a high revenue but relatively lower quantities sold, suggesting higher unit prices or premium product sales.
- **Market Potential:** Countries with high quantities but lower revenues, such as Belgium and Sweden, might offer potential for pricing strategy adjustments to increase revenue.

By focusing on these key markets and understanding the dynamics of revenue and quantity sold, the CMO can develop targeted marketing and sales strategies to maximize revenue growth while addressing market-specific needs.

Tableau Chart:



Solution 2 (Link)-

<https://public.tableau.com/app/profile/sumit.baviskar/viz/TataProjects2/Solution2>

Recommendation:

The top 10 countries by revenue provide valuable insights for market expansion. With the highest revenue generated from countries like the Netherlands, Germany, and France, the company should:

- Prioritize marketing and sales efforts in these high-revenue markets to strengthen the brand presence and increase market share.
- Investigate why certain countries, such as Japan or Belgium, have lower revenue despite substantial sales volume, and adjust pricing strategies or customer engagement approaches accordingly.
- Continue focusing on product availability and tailored marketing campaigns in these regions to sustain growth and enhance brand loyalty.

Task 3 (Top 10 customers by revenue)

The CMO of the online retail store wants to view the information on the top 10 customers by revenue. He is interested in a visual that shows the greatest revenue generating customer at the start and gradually declines to the lower revenue generating customers. The CMO wants to target the higher revenue generating customers and ensure that they remain satisfied with their products.

Solution: (Top 10 customers by revenue)

Summary: As per the bar chart that visualizes the top 10 customers by revenue for an online retail store. The chart is sorted in descending order, with the highest revenue-generating customer on the left and the lowest on the right. Here is a summary of the information:

- **Customer ID 14646** : \$279,489
- **Customer ID 18102** : \$256,438
- **Customer ID 17450** : \$187,482
- **Customer ID 14G11** : \$132,573
- **Customer ID 12415** : \$123,725
- **Customer ID 14156** : \$113,384
- **Customer ID 17511** : \$88,125
- **Customer ID 16684** : \$65,892
- **Customer ID 136G4** : \$62,653
- **Customer ID 15311** : \$59,419

The CMO can use this visual to identify the top revenue-generating customers and focus on strategies to ensure their satisfaction and retention. The chart clearly shows the revenue contribution of each customer, making it easier to prioritize efforts.

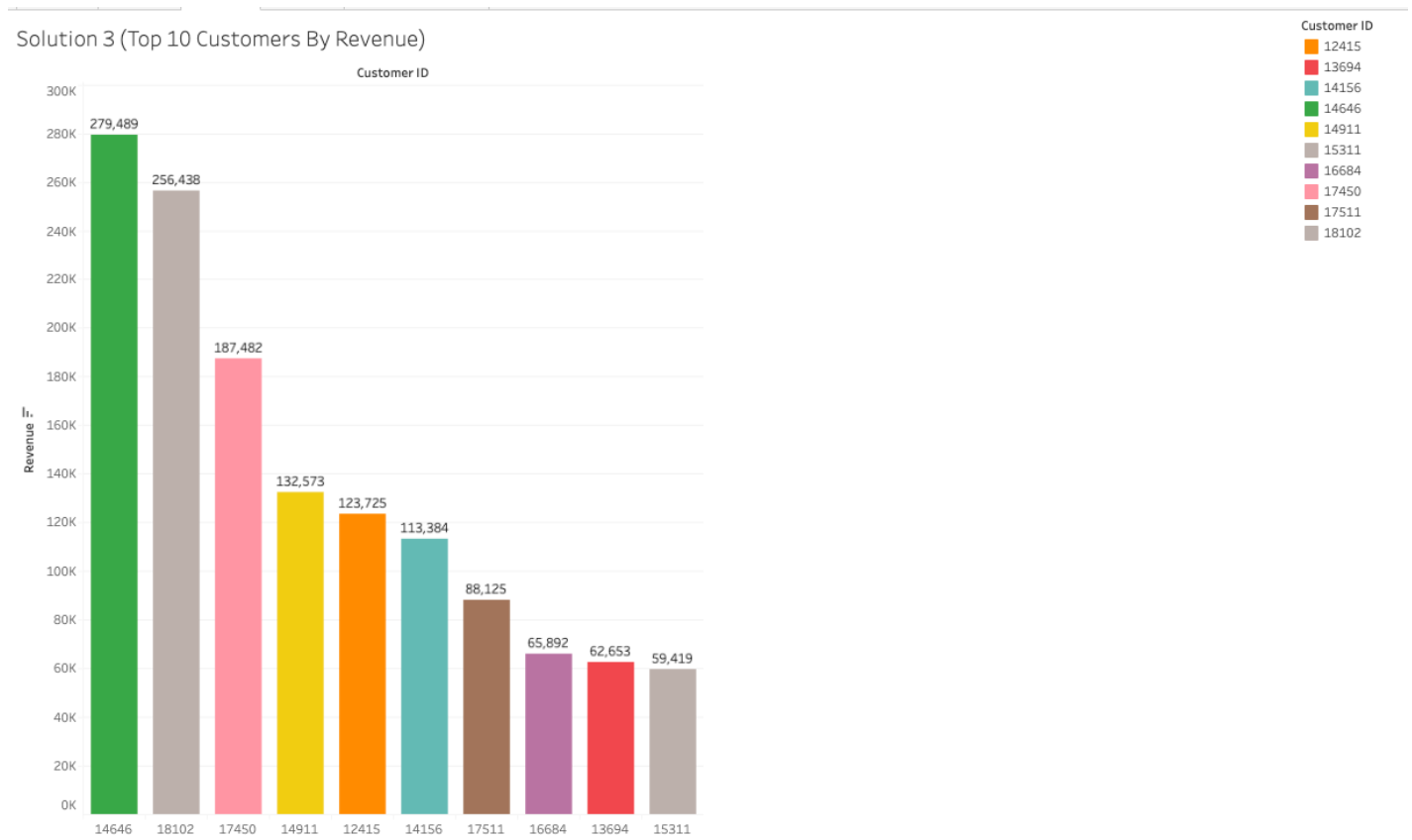
Key Observation:

- Customer 14646 generates the highest revenue, followed by 18102 and 17450. There is a significant drop-off after the top 3 customers.
- The revenue gap between the highest and lowest customers in the top 10 is substantial, with Customer 14646 generating more than \$270k, while Customer 15311 generates just under \$60k.

Insights:

- A small group of high-value customers is driving a significant portion of the store's revenue, emphasizing the importance of retention and loyalty strategies targeted toward these key individuals.
- Tailored offerings, such as VIP programs, personalized experiences, and exclusive discounts, could help further solidify relationships with top customers and encourage more repeat purchases.
- Focusing on nurturing relationships with lower-revenue customers in the top 10 could also help increase overall revenue and balance reliance on a few key contributors.

Tableau Chart:



Solution 3(Link):

<https://public.tableau.com/app/profile/sumit.baviskar/viz/TataProject3/Solution3>

Recommendation:

The top 10 customers by revenue reveal which individuals or businesses are contributing the most value. To further nurture these relationships and increase customer lifetime value, the company should:

- Implement a loyalty or rewards program targeting these top customers to incentivize repeat purchases and promote long-term retention.
- Develop personalized marketing and engagement strategies for these high-value customers, such as exclusive offers, personalized product recommendations, or priority customer service.
- Monitor purchasing behaviors of these customers to identify any patterns that could inform future product offerings or promotional strategies.

Task 4 (Map distribution by count of customer per country)

The CEO is looking to gain insights on the demand for their products. He wants to look at all countries and see which regions have the greatest demand for their products. Once the CEO gets an idea of the regions that have high demand, he will initiate an expansion strategy which will allow the company to target these areas and generate more business from these regions. He wants to view the entire data on a single view without the need to scroll or hover over the data points to identify the demand. There is no need to show data for the United Kingdom as the CEO is more interested in viewing the countries that have expansion opportunities.

Solution: (Map distribution by count of customer per country)

Summary:

As seen in map chart we can observe that a world map highlighting the demand for products in various countries, excluding the United Kingdom. The map uses color coding and numerical values to represent the demand in different regions. Here is a summary of the regions with the greatest demand:

Australia: 83,653

United States: 2,763

Germany: 16,787

France: 4,719

Netherlands: 5,224

Canada: 1,034

Brazil: 356

Spain: 1,197

Sweden: 1,066

Belgium: 1,032

These regions show significant demand for the company's products and present potential opportunities for expansion. The CEO can use this visual to identify high-demand areas and develop targeted expansion strategies to generate more business from these regions. The map provides a clear, single-view representation of the data, making it easy to identify key markets without the need to scroll or hover over data points.

Key Observation:

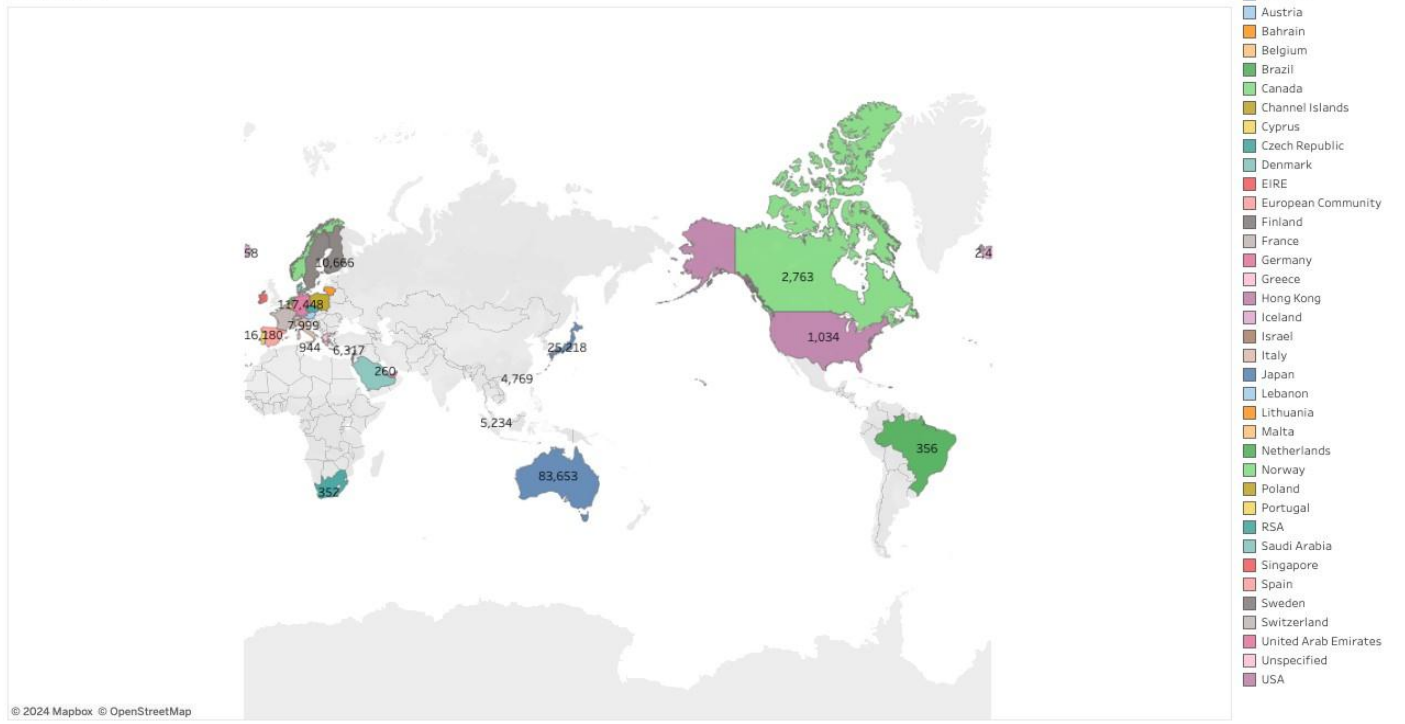
- The highest demand for products comes from countries like the Netherlands, Germany, and France, with substantial revenue across Western Europe.
- The demand in regions like Japan, Australia, and the United States is comparatively lower but still present.

Insights:

- Western Europe remains the strongest market for the company, presenting a clear opportunity for continued investment in logistics, marketing, and distribution networks to further penetrate these regions.
- The relatively lower demand in countries like the US, Australia, and Japan suggests untapped potential for growth. Targeted marketing campaigns or region-specific product lines could stimulate demand in these areas.
- This analysis provides a clear path for regional expansion, prioritizing the regions with the highest demand while exploring strategies to boost demand in lower-performing region

Tableau Chart:

Solution 4



Solution 4 (Link):

<https://public.tableau.com/app/profile/sumit.baviskar/viz/Solutin4/Solution4>

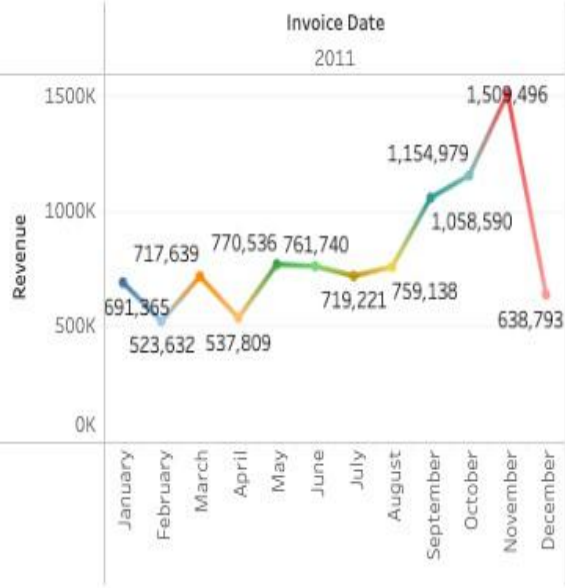
Recommendation:

The regional demand map highlights areas with the highest product demand, offering guidance for expansion strategies. Based on this analysis, the company should:

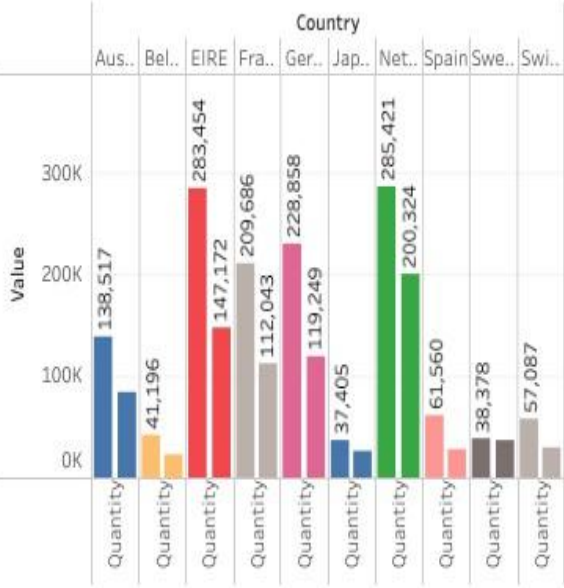
- Prioritize expansion into regions like the Netherlands, France, and Germany, where product demand is highest, and consider opening new distribution centers or partnerships to reduce shipping times and improve customer satisfaction.
- Explore marketing and sales opportunities in regions with moderate demand to boost sales through targeted campaigns and localized promotions.
- Continue monitoring demand in underperforming regions to determine if adjustments in product offerings, pricing, or marketing efforts could increase demand.

Dashboard

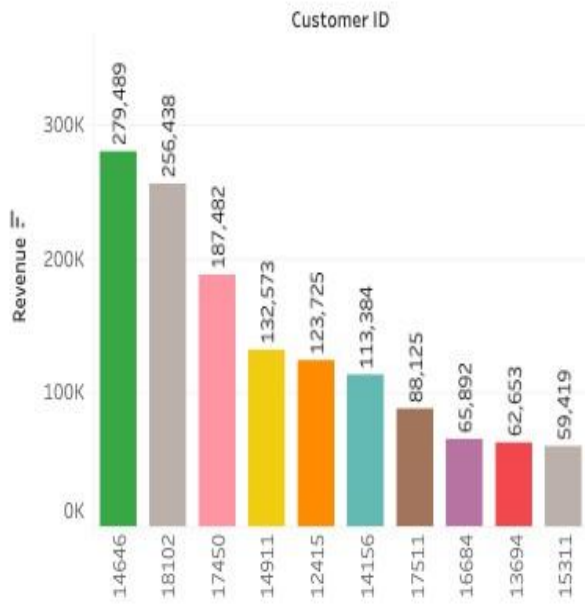
Solution 1 (Monthly revenue for 2011)



Solution 2 (Top 10 Countries by revenue)



Solution 3 (Top 10 Customers By Revenue)



Solution 4



Month of Invoice Date

- January
- February
- March
- April
- May
- June
- July
- August
- September

Customer ID

- 12415
- 13694
- 14156
- 14646
- 14911
- 15311
- 16684
- 17450
- 17511

Measure Names

- ☐ (All)
- ☐ Count of Online Retail
- ☐ Invoice No
- ☒ Quantity
- ☒ Revenue
- ☐ Unit Price

Country

- Australia
- Belgium
- EIRE
- France
- Germany
- Japan
- Netherlands
- Spain
- Sweden

Overall Recommendations

1. Operational Performance:

- **Seasonal Inventory s Staffing Adjustments:** Implement a dynamic inventory management system that adjusts based on identified peak and off-peak monthly trends. Similarly, create flexible staffing plans that increase workforce during high demand and scale down during slower months, ensuring cost-efficiency.
- **Supply Chain Optimization:** Focus on high-demand regions outside the UK for improved supply chain performance. Establish efficient logistics and prioritize these areas for quicker restocking, minimizing stockouts and improving customer satisfaction.
- **Error Mitigation:** Implement robust data validation to avoid errors like negative quantities or inaccurate prices. This will provide a reliable basis for making informed operational decisions, reducing costly errors.

2. Marketing Effectiveness:

- **Targeted Campaigns Based on Top Countries:** Direct marketing efforts toward high-performing countries (excluding the UK), tailoring content to match local customer preferences and purchasing behavior. Maximize the budget on countries with high revenue potential to drive significant growth.
- **Customer Loyalty Programs:** Leverage data from top 10 customers to craft highly personalized loyalty programs. Offer exclusive benefits like discounts, early access, or VIP treatment to reinforce loyalty and boost repeat sales.
- **Cross-Selling s Upselling:** Analyze purchase data to identify cross-selling and upselling opportunities, providing targeted recommendations based on customer purchase patterns. This will increase average order value and strengthen customer relationships.

3. Expansion Strategy:

- **Focus on High-Demand Regions:** Use data-driven insights to target expansion in countries with high product demand. Open new distribution centers and launch tailored marketing campaigns in these locations to capture market share quickly.
- **Product Localization:** Adapt product offerings and marketing messages to align with local cultural preferences. Localization will help boost engagement and sales by creating stronger connections with regional customers.
- **Market Penetration Strategy:** In regions with lower-than-expected performance, implement aggressive pricing, local promotions, and partnerships with influencers to boost brand visibility, increase market share, and improve sales performance.

By implementing these strategies, the online retail store can improve its operational efficiency, enhance marketing targeting, and successfully expand into high-demand markets, driving sustained growth and business success.

Project Dashboard Link

Project Dashboard (Link)

https://public.tableau.com/app/profile/sumit.baviskar/viz/Tata_ProjectSubmission/Solution1

Solution 1 (Link)

https://public.tableau.com/app/profile/sumit.baviskar/viz/TataProject1_17044404080020/Solution1

Solution 2 (Link)

<https://public.tableau.com/app/profile/sumit.baviskar/viz/TataProjects2/Solution2>

Solution 3 (Link)

<https://public.tableau.com/app/profile/sumit.baviskar/viz/TataProject3/Solution3>

Solution 4(Link)

<https://public.tableau.com/app/profile/sumit.baviskar/viz/Solutin4/Solution4>