Data Analysis using Power BI

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Data 230: Data Visualization
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Power BI

Report on Advanced Analytics for Bike Sales Data using Power BI

1. Introduction:

As a data analyst, you're tasked with building reports and dashboards to support key business decisions using Bike sales data. Different teams in the organization have unique requirements:

- **Product Team:** They want to know which bikes are not selling as well as others.
- **Sales Team:** They are focused on forecasting sales for the upcoming year.
- **Warehouse Team:** They need an overview of how the warehousing and shipping locations are performing globally.

2. Data Set:

From the dataset, we have below listed column we can use for Data Visualization.

- Product Category
- Product Subcategory
- Product Name
- Product Description
- Product Price
- Order Total
- Shipping Method

3. Power BI Advances Features:

Power BI offers advanced analytics tools that will help create insights and visuals for each of these teams. The platform enables you to quickly generate reports and share them through dashboards, helping teams make decisions based on:

a) Analyze Feature:

Power BI provides a range of tools to help users analyze their data more effectively. One important tool is the "Analyze" feature, which allows users to explore data trends and patterns. This feature includes options to identify key influencers that impact specific outcomes, helping users understand what drives changes in their data. Additionally, the Analyze tool offers visualizations that make complex information easier to interpret. By using these capabilities, users can gain deeper insights into their data and make more informed decisions.

To access the "Analyze" feature in Power BI, right-click a data point in your visualization, select "Analyze," and choose the desired analysis type.

Please refer to Figure 1, 2, 3, 4 to understand the patterns of different columns.

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Figure 1:
Analyze Feature Customer Feedback

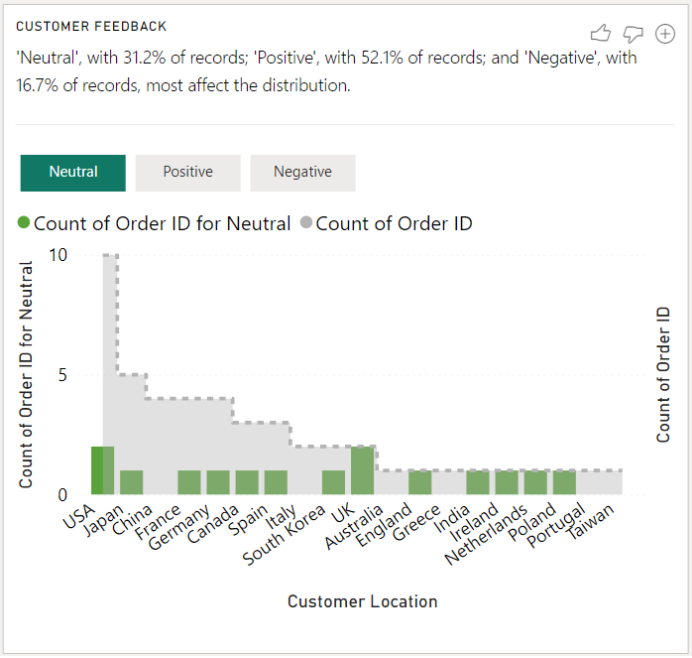


Figure 2:
Analyze Feature Product Size

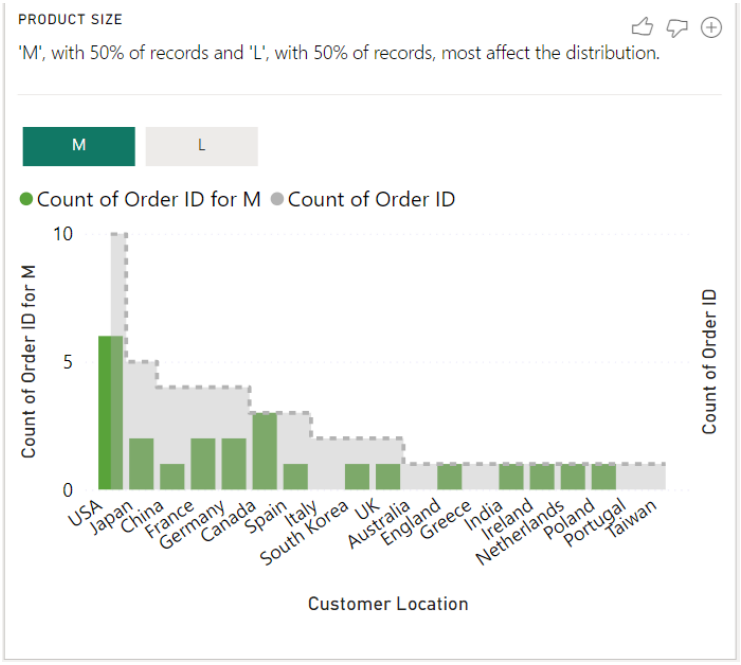


Figure 3:
Analyze Feature Product Category

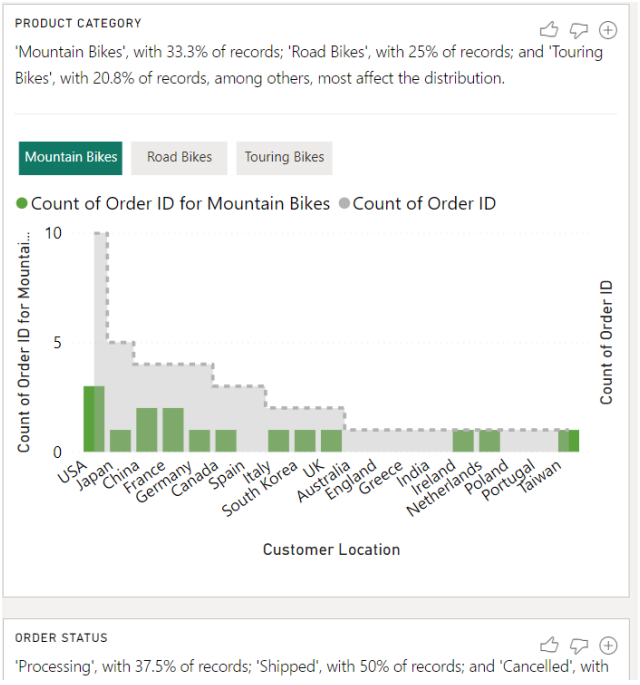
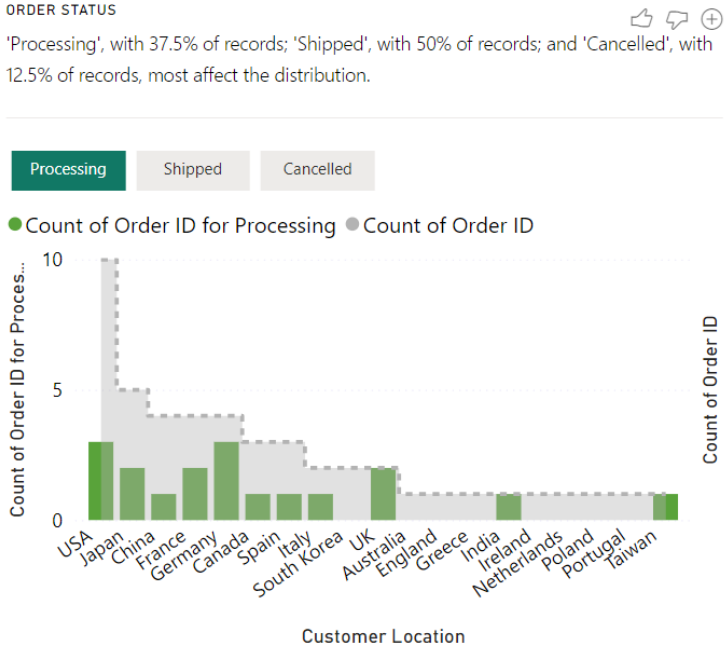


Figure 4:
Analyze Order Status



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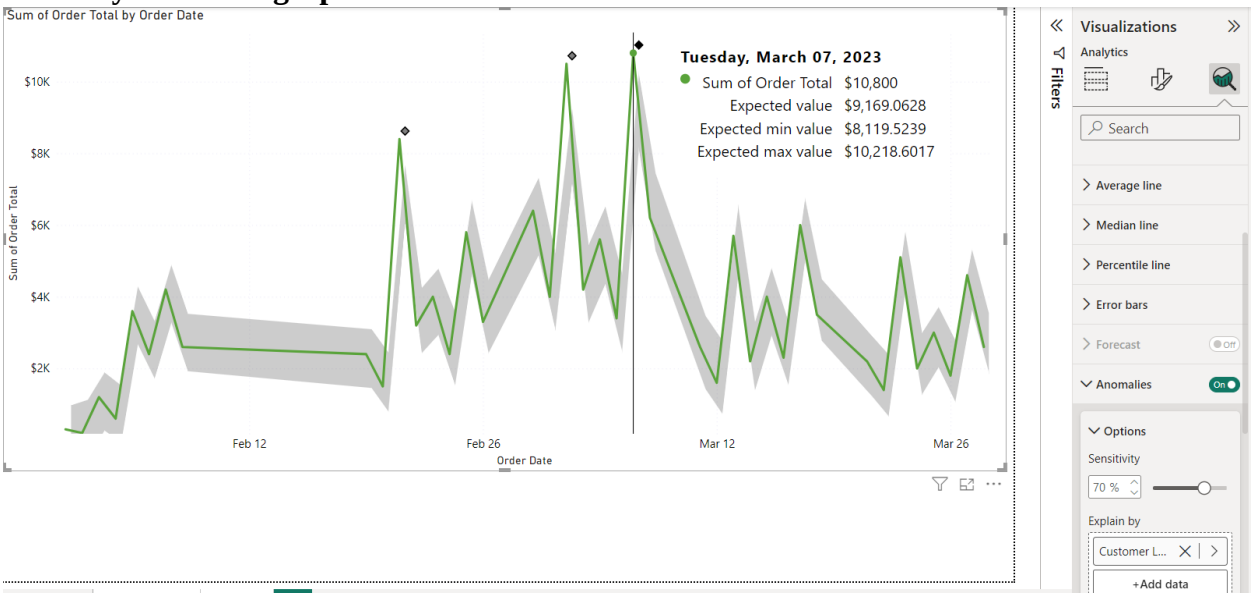
b) Anomaly detection:

Anomaly Detection in Power BI helps users identify unusual or unexpected data points in time-series data, highlighting trends that deviate from the norm. It is especially useful for spotting outliers in data patterns that might need further investigation.

Create a line chart with your time-series data. Then, go to the "Analytics" section in the Visualizations pane and enable the "Find anomalies" option. Adjust the detection sensitivity and settings as needed. Power BI will then automatically highlight anomalies on the chart, and you can click on them to get more details like in Figure 5.

Figure 5:
Anomaly Detection graph



c) Key Influencers

The Key Influencers visual not only helps users identify which factors impact outcomes but also provides a visual representation of how strongly each factor contributes to the results. This can be useful in various scenarios, such as understanding what drives customer behavior, sales trends, or product performance. By breaking down complex data relationships into clear insights, it enables more informed decision-making.

Navigate to the Visualizations pane and select the Key Influencers icon to add to your report. Once added, choose the metric you want to analyze, like customer ratings or profit margins. Then, drag relevant fields into the "Analyze" and "Explain By" sections to specify which variables Power BI should assess.

Additionally, you can interact with the visual by filtering the data or drilling down into specific influencers. Power BI dynamically updates the insights based on any changes, ensuring that users always have the most relevant and updated information for their analysis. This makes the Key Influencers visual a powerful tool for uncovering hidden patterns and gaining actionable insights from your data. Please refer Figure 6.

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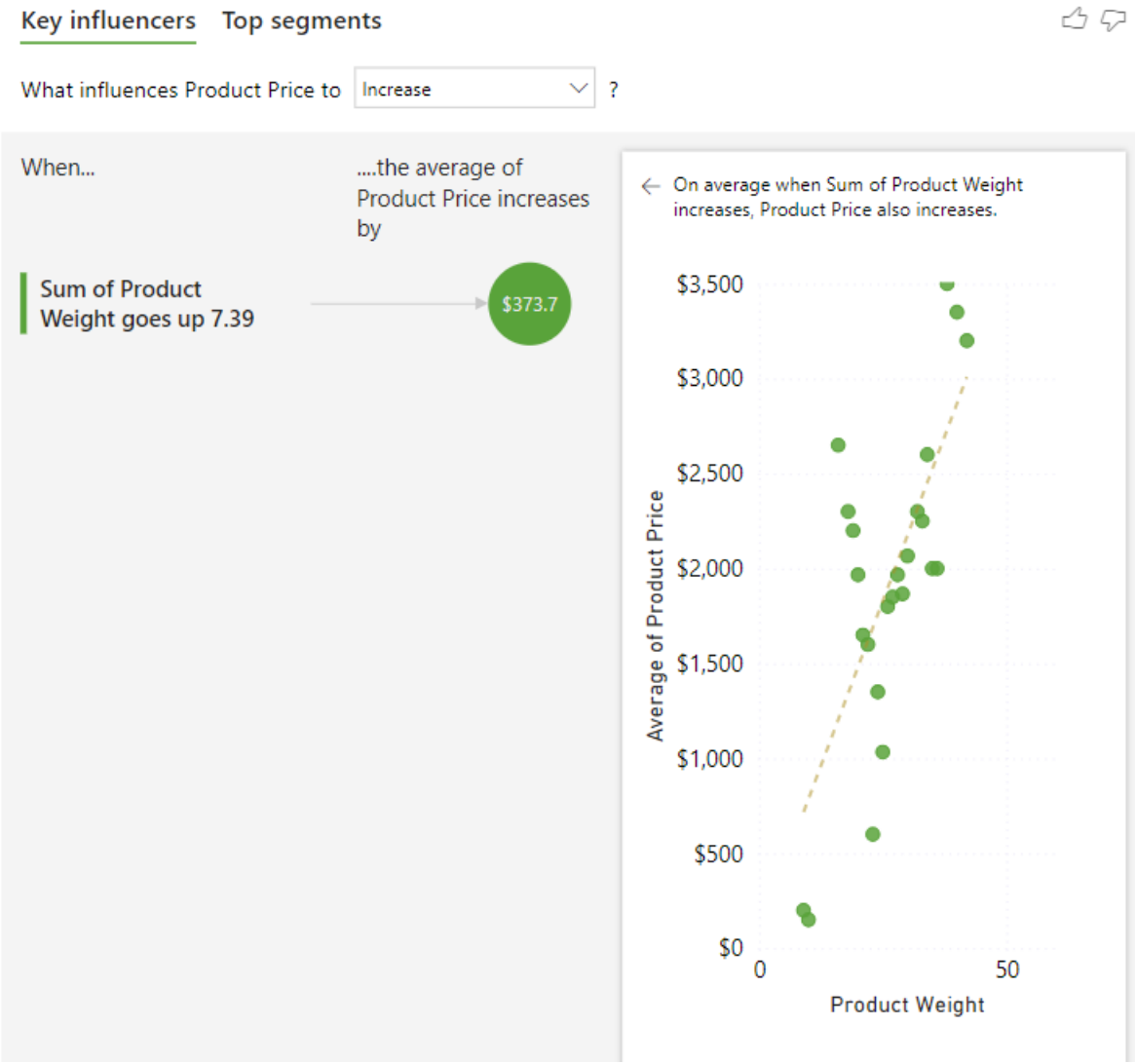
Figure 6:
Key Influencers



d) Q & A

You've created a report for the Finance team, and now the team members have questions about various other views or insights that they are interested in. Power BI has a built-in Q&A visual that allows users to ask their own questions and get answers, so you don't have to address each individual question. The Q&A visual is an effective tool because it allows users to quickly get answers about the data independently, which saves time for everyone involved. The Q&A visual is unique in that it does not require knowledge of Power BI to use the visual; users can ask their question and they, too, can create insightful visuals as shown in Figure 7.

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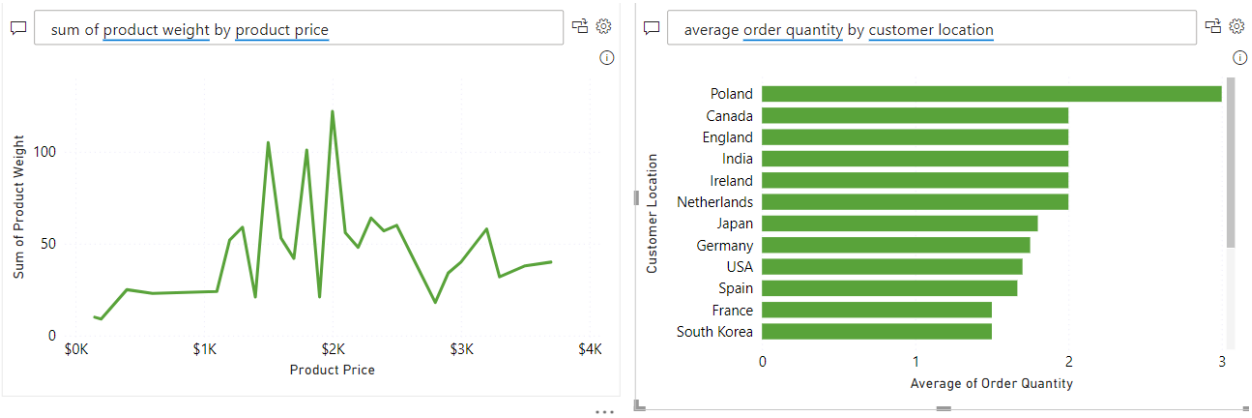
Figure 7:
Q and A



e) Time Series analysis

Time series analysis in Power BI helps you track how data changes over time using visuals like line charts, scatter charts, or custom visuals from Microsoft AppSource. These visuals make it easier to spot trends, see if any events disrupted the data, and analyze changes in things like sales or stock movement. You can also use the Play Axis custom visual to show time trends dynamically, but some organizations may restrict the use of custom visuals, so it's important to check if they're allowed.

For example, if the Sales team wants to study the region and total product price , you can use scatter chart display the product price data for the region. By adding animation with the Play Axis feature, the team can see how sales change over time, helping them understand patterns and make better decisions. In Figure 8, 9, 10, 11 by playing the graph we can get product price for single region at a time.

Figure 8:
Australia

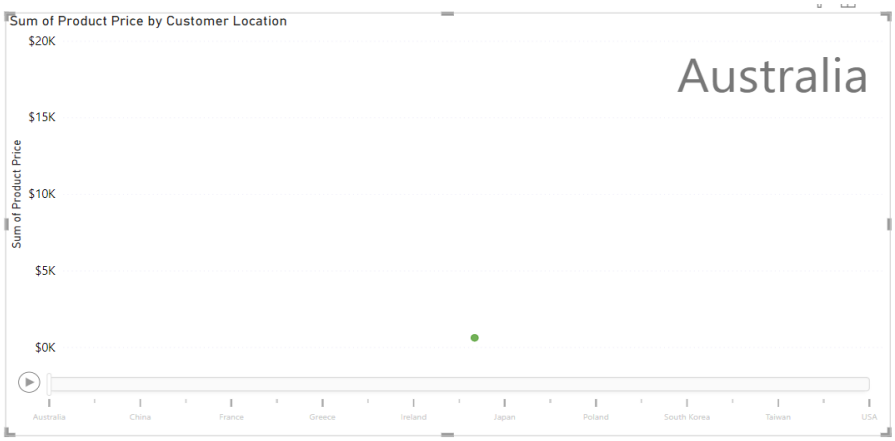


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Figure 9:
China

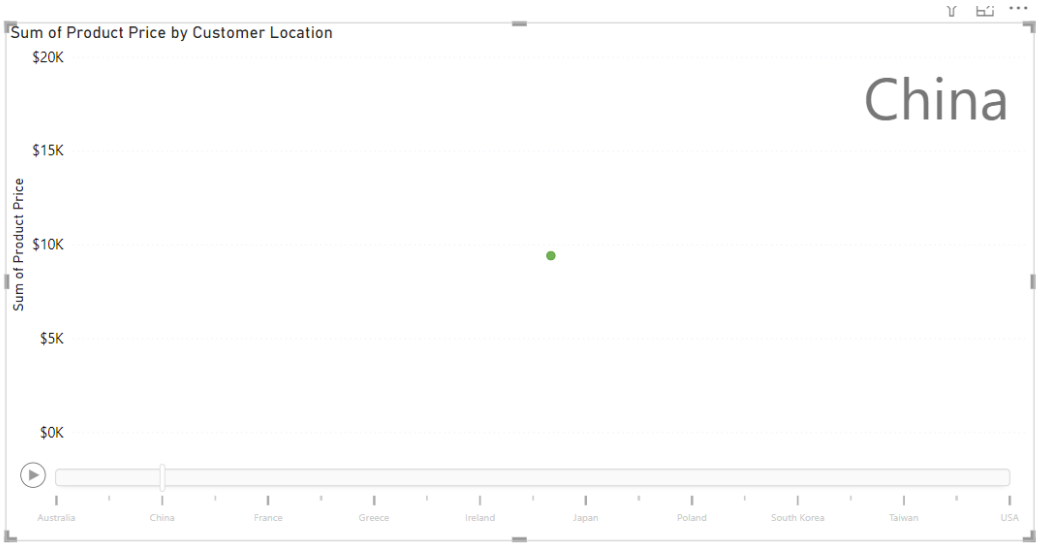

Figure 10:
UK

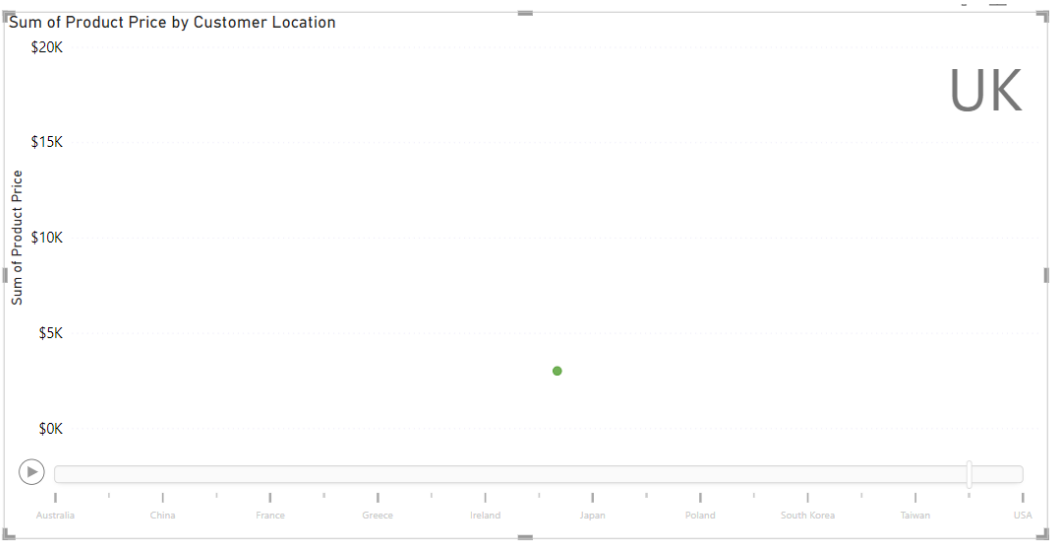

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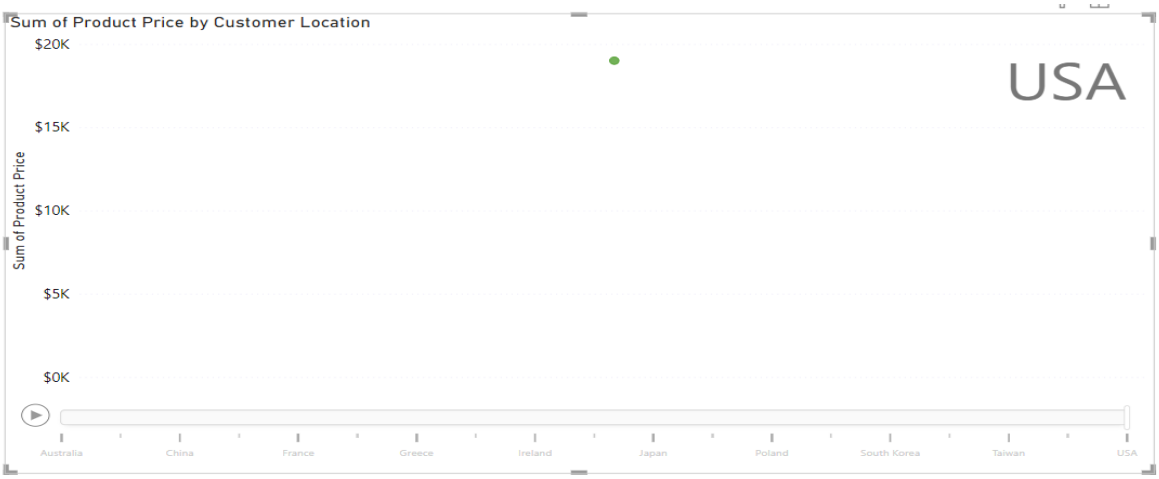
Figure 11:
USA

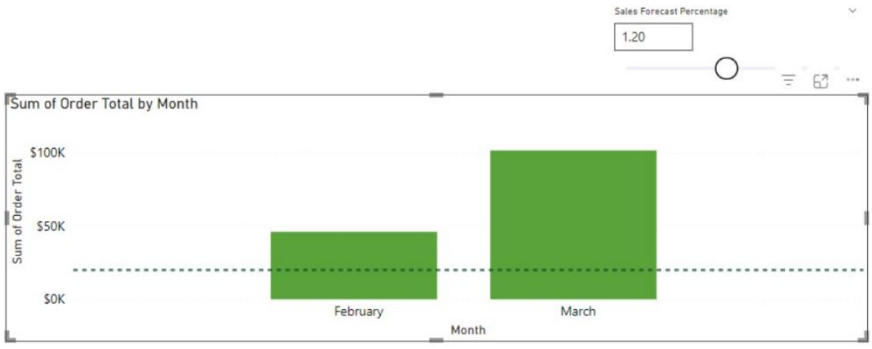


f) What if:

The "What-If" parameters in Power BI allow users to explore different scenarios by adjusting variables to see how changes impact outcomes. This feature is useful for testing different business strategies, such as altering pricing, costs, or sales forecasts, and understanding their effects on key metrics. It provides a flexible way to simulate potential changes and make more informed decisions based on data.

To use the "What-If" parameter in Power BI, start by going to the Modeling tab and selecting "New Parameter." Define the range of values and increments you want to test. Once created, the parameter can be added to visuals, allowing users to adjust it and instantly see the impact on the data. This helps in making quick comparisons between different scenarios, helping teams to plan for a variety of outcomes.

Figure 12:
What if



4. Conclusion:

In conclusion, Power BI provides a wide range of powerful tools, such as time series analysis and What-If parameters, to help users gain insights from their data and make informed decisions. These features enable businesses to analyze trends, test scenarios, and visualize outcomes, driving better strategic planning and performance.

Reference

Microsoft. (n.d.). *Introduction to performing analytics in Power BI*. Microsoft Learn. https://learn.microsoft.com/en-us/training/modules/perform-analytics-power-bi/1-introduction