**Choosing the Toolset for Data Visualization: Tableau vs. PowerBI**

For this project, I chose **Tableau** over **PowerBI** for a few key reasons. First and foremost, my **familiarity with Tableau** played a significant role in this decision. Over the years, I have become accustomed to Tableau's user interface, functionalities, and its ability to create compelling, interactive visualizations. Since the project's scope involved mapping and generating part-to-whole graphs, I knew that Tableau’s capabilities in this area would allow me to quickly create visualizations that were both effective and aesthetically pleasing.

Additionally, there were **hardware constraints** that made Tableau a better choice at the time. I was working on a **Chromebook**, and while PowerBI is a powerful tool, I encountered issues with running it on my Chromebook. PowerBI Desktop is a Windows-only application, and even with PowerBI's web-based offering (PowerBI.com), it was not fully compatible with my device at that time. Tableau, however, provides both a **cloud-based version** and a **desktop application**, which worked seamlessly on my system, making it a more feasible option for completing the project.

**Process of Generating Visualizations**

To generate my visualizations, I followed a simple yet effective process. The first step was to set up the map visualization. In Tableau, I simply dragged the **country, state, and city** fields into the "Rows" shelf and then assigned the **category for color coding** to the "Color" shelf. This method allowed me to map the geographical data to their respective locations while color-coding them according to their category, creating a clear, visual representation of the data. Tableau automatically recognized the geographic fields, which made the mapping process easy and efficient.

Once the map visualization was set up, I duplicated it for the **part-to-whole analysis**. This duplication was essential because it allowed me to apply the same filters, such as region or specific states, across the visualizations without manually adjusting each map. For the part-to-whole graphs, I used the **stacked bar chart** because it provided a clear representation of how different categories contributed to the total value, allowing viewers to see both individual and cumulative comparisons. By applying the same filters to both visualizations, I ensured that both the map and the part-to-whole chart displayed consistent, synchronized data.

**Choice of Part-to-Whole Graphs**

I chose to generate **stacked bar graphs** for part-to-whole analysis due to my familiarity with this type of visualization. Stacked bar graphs allow for a clear visual comparison of multiple categories within a single bar, making them ideal for displaying the contribution of individual elements to a whole. For instance, if I were visualizing the number of EV charging stations by region, a stacked bar chart could show the total number of stations, broken down by type (Level 1, Level 2, DC fast), making it easy to see not just the total, but how each category contributes to the overall picture.

Additionally, stacked bar graphs are versatile. They can be used to show comparisons across multiple groups or categories, both individually and collectively. This made it a suitable option for visualizing the data in this project, where I had to show the breakdown of EV charging stations across different geographical regions and types of chargers.

**Challenges and Problems Encountered**

While working on this project, I encountered a few challenges, particularly when it came to **cleaning and preparing the data**. One significant issue was the presence of **null values** in the dataset, which had to be addressed to ensure that the visualizations were meaningful. These null values could skew the results, making it difficult to derive accurate insights. Fortunately, Tableau made it easy to filter out or replace these null values before generating the visualizations, ensuring that only the **relevant data** was included. Removing these null values allowed the final visualizations to be more accurate and cleaner, which was crucial for interpreting the data.

Another challenge I faced was related to the **part-to-whole visualization**, where the categories being analyzed could not belong to two different groups at the same time. This was a particular problem when trying to visualize multiple categories in a single chart. For example, if I tried to show both the number of Level 1 and Level 2 charging stations in a single chart, there was a risk of categorizing a station as belonging to both groups. This could distort the visual representation of the data. To solve this, I used **stacked bar charts**, which, despite not being a perfect fit for part-to-whole analysis, provided a suitable workaround. Stacked bar graphs allow for each category to be represented within a single bar, thereby visually communicating how different categories contribute to the total while avoiding the issue of overlap.

**Conclusion**

In conclusion, choosing Tableau over PowerBI was the best decision for this project, given my familiarity with Tableau and the hardware limitations of my Chromebook. The process of creating the visualizations was relatively straightforward, thanks to Tableau’s user-friendly interface and its ability to handle geographic and categorical data seamlessly. The stacked bar chart was the optimal choice for part-to-whole analysis due to its ability to display both individual comparisons and the total contributions of each category. While there were some challenges, such as cleaning the data and handling null values, Tableau provided the necessary tools to overcome these obstacles. Overall, Tableau proved to be an effective and reliable tool for completing this project.