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Aim: **Experiment Design for Creating Visualizations using D3.js on a Forest Dataset**

☐ **Dataset Link:**
https://www.kaggle.com/datasets/iamsouravbanerjee/women-empowerment-index?resource=download

☐ **Dataset Description:**

This dataset provides insights into women's empowerment and gender parity across various countries and regions, using key indicators like the Women's Empowerment Index (WEI) and the Global Gender Parity Index (GGPI). It categorizes countries by empowerment and gender parity levels, human development groups, and Sustainable Development Goal (SDG) regions, allowing for comparisons across geographic and developmental dimensions. The dataset is valuable for analyzing global and regional trends in empowerment and parity, supporting data-driven strategies to promote gender equality and empower women worldwide.
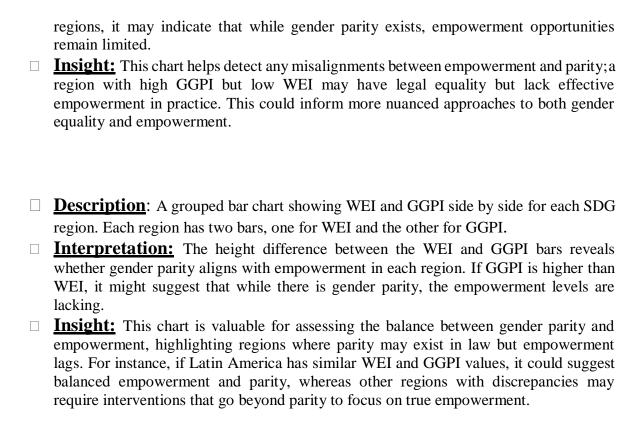
☐ **Dashboard:**

1. **WEI Distribution:**

☐ **Description:** This choropleth map uses color gradients to display the Women's Empowerment Index (WEI) values for countries around the world in 2022. Darker shades indicate higher WEI scores, which represent higher levels of empowerment for women.

- **Interpretation:** This map visually highlights geographical disparities in women's empowerment. Regions with darker shading may represent areas with strong empowerment policies, economic independence for women, or access to educational and healthcare resources. In contrast, lighter-shaded regions could indicate areas where empowerment is lower, potentially due to social, economic, or political barriers.
- **Insight:** A viewer can quickly spot regions where women's empowerment is particularly high or low, potentially guiding policymakers or NGOs to focus on regions with lower WEI scores.

- **Description**: This stacked bar chart categorizes WEI into different groups (e.g., "High," "Low," "Lower-middle," "Upper-middle") and displays the distribution of countries within each group.
- **Interpretation:** The colors within each stacked bar represent subsets of countries with varying levels of WEI, helping to visualize how many countries fall into each empowerment level. For example, if a large segment is colored red under the "Low" category, it might mean a considerable number of countries score low on the empowerment scale.
- **Insight:** This chart can reveal the most common empowerment levels globally, potentially indicating that more efforts are needed to elevate countries from lower empowerment levels to higher ones.

- **Description**: A box plot of the Global Gender Parity Index (GGPI) values, grouped by gender parity categories (likely high, medium, low). The plot includes median lines, quartiles, and outliers.
- **Interpretation:** This chart provides insights into the spread of GGPI values across various parity levels. A high median in one group may suggest better gender parity than in other groups. The interquartile range (box width) shows the variability of GGPI within each group, with a narrower range suggesting more consistency.
- **Insight:** This plot allows for comparison of gender parity within and across groups, highlighting disparities within groups or any notable outliers. A larger spread in one group could indicate diverse policies or economic conditions impacting gender parity.

- **Description**: This pie chart breaks down the WEI distribution into four categories: Very High, High, Medium, and Low, with each category represented as a slice.
- **Interpretation:** The size of each slice corresponds to the proportion of countries within each WEI level. For instance, if "High" occupies the largest portion, it suggests that a substantial number of countries score well on the empowerment scale, though not in the "Very High" range.
- **Insight:** The pie chart gives a quick overview of how WEI scores are distributed globally, with immediate visibility of the relative proportions of high versus low empowerment regions.

5. WEI by Country

- ☐ **Description:** This pie chart appears to break down WEI scores for individual countries, with each slice representing one country and its respective WEI score.
- ☐ **Interpretation:** Since each country has its own slice, the chart may help visualize specific countries with outlier scores (either very high or very low). Each score is displayed alongside the country name, facilitating identification of leaders and laggards in women's empowerment.
- ☐ **Insight:** This could provide policymakers and stakeholders with insights into specific countries' empowerment statuses, offering opportunities for international collaboration or targeted initiatives in underperforming areas.

- ☐ **Description**: A bar chart comparing WEI scores across various SDG regions such as Australia & New Zealand, Sub-Saharan Africa, and others.
- ☐ **Interpretation:** The length of each bar represents the average WEI for each SDG region, making it easy to compare empowerment levels between regions. For example, if Europe and Northern America have the highest bar, they likely exhibit higher women's empowerment than Sub-Saharan Africa, which might have a shorter bar.
- ☐ **Insight:** This chart highlights regional disparities in women's empowerment and could help prioritize areas with lower scores for focused empowerment programs, potentially in alignment with SDG goals.

- ☐ **Description**: A bubble chart categorizes countries by human development levels (Very High, High, Medium, and Low), with each bubble representing a group and possibly indicating the number of countries or an aggregated WEI score for each group.
- ☐ **Interpretation:** Larger bubbles could indicate a higher concentration of countries within that human development group or higher average WEI values. This chart helps show if there's a correlation between human development and women's empowerment.
- ☐ **Insight:** If higher human development levels align with larger WEI scores, this would support the hypothesis that economic and social development positively correlate with women's empowerment, suggesting that policies targeting economic development may also uplift women's empowerment.

- ☐ **Description**: This line chart compares WEI and GGPI values across regions, with separate lines for each index.
- ☐ **Interpretation:** The chart visualizes the relationship between women's empowerment and gender parity across regions, showing if the two metrics correlate or diverge in specific regions. For instance, if WEI is consistently lower than GGPI across

regions, it may indicate that while gender parity exists, empowerment opportunities remain limited.

☐ **Insight:** This chart helps detect any misalignments between empowerment and parity; a region with high GGPI but low WEI may have legal equality but lack effective empowerment in practice. This could inform more nuanced approaches to both gender equality and empowerment.

☐ **Description**: A grouped bar chart showing WEI and GGPI side by side for each SDG region. Each region has two bars, one for WEI and the other for GGPI.

☐ **Interpretation:** The height difference between the WEI and GGPI bars reveals whether gender parity aligns with empowerment in each region. If GGPI is higher than WEI, it might suggest that while there is gender parity, the empowerment levels are lacking.

☐ **Insight:** This chart is valuable for assessing the balance between gender parity and empowerment, highlighting regions where parity may exist in law but empowerment lags. For instance, if Latin America has similar WEI and GGPI values, it could suggest balanced empowerment and parity, whereas other regions with discrepancies may require interventions that go beyond parity to focus on true empowerment.

☐ **Conclusion**:

The dataset and accompanying visualizations provide a comprehensive view of women's empowerment and gender parity across the globe. The **WEI Distribution Map** and **pie charts** offer an overview of empowerment levels and the distribution of countries by WEI categories, highlighting stark regional disparities. The **bar charts** comparing WEI across Sustainable Development Goal (SDG) regions and human development groups reveal that higher human development is often associated with higher empowerment levels, underscoring the need for development-focused strategies in regions with lower scores.

The **stacked bar chart** and **box plot** of GGPI indicate diversity in gender parity across different empowerment and gender parity groups, suggesting that while some regions may achieve gender parity, empowerment levels vary significantly. The **line graph** comparing WEI and GGPI across regions shows that gender parity does not always equate to empowerment, with some areas achieving parity but lacking true empowerment opportunities for women. The **grouped bar chart** allows for a side-by-side comparison of WEI and GGPI across regions, identifying areas where parity might exist in law but not in practice.

In conclusion, the dataset and visualizations provide essential insights into the current state of women's empowerment and gender equality, showing that while some progress has been made, significant gaps remain. These findings can help guide targeted initiatives in regions and countries where empowerment and parity are low, promoting a more equitable future globally.