

Demystifying the World Economic Forum (WEF) via Visualizations

Tyler Reed



Fig. 1. WEF logo from Wikipedia (see url in footnote)

Abstract—The following article attempts to uncover the obscure World Economic Forum via visualizations of key aspects of the organization: current corporate membership, country representation compared to the U.N., and history of agendas from inception.

Index Terms—Global Governance, Elite Organizations, Big Business, Western Democracy.

1 INTRODUCTION

Understanding of the membership structure, agendas of the World Economic Forum (WEF) and their impact on Western society's democratic ideals is obscure among the general population. In 2020, WEF had 627 self-selected, non-elected, member corporations. Over 3,000 invitation-only participants attended the flagship annual Davos Meeting in Switzerland, including 410 public figures. Since WWII, the United Nations (U.N.) has served as the foremost international body for geopolitical and economic issues for many countries, primarily those with Western democratic ideals. WEF members could pose serious concerns to members' democratic nations when many such nations already have economic representation through the democratic process within the United Nations (U.N.).

The main cause of concern is the makeup of the members of WEF compared to those of the United Nations. World citizens, especially Westerners, may be interested in knowing who WEF is by the current makeup of corporate members by national representation. Providing a visualization of the current makeup of WEF could inform citizens of those types of corporate entities that join WEF and those that do not, including industry sector. Then citizens will be able to further their investigation of WEF, any members of interest, and the scope of impact WEF has in their individual lives. The tasks at hand will attempt to provide means whereby world citizens can be informed of the current membership structure and overview of annual meeting agendas since WEF inception in 1971 via visualizations. The following includes an outline of three specific tasks to be completed via visualizations, relevant literature review, data sources and references.

2 TASKS

1. International Representation of Member Entities

- In this task, viewers will be able to see the current counts of WEF member corporations by country.

2. Comparing the Membership of the U.N. to WEF

- Next, viewers will be able to compare current WEF membership by nationality against the current membership of

the world's foremost international governance body, the United Nations.

3. WEF Agendas

- Lastly, viewers will see a display of annual WEF Davos Meeting agendas since its inception in 1971. The diagram will aid viewers in conceptualizing a general impression of all past WEF agenda themes which may be relevant to contemporary issues.

3 LITERATURE REVIEW

A substantial corpus exists regarding tasks one and two, comparing counts or proportions and geographic data. The goal is to implement established concepts of effective proportion estimation studied by J. Hollands et al. [4] and pre-attentive processing when comparing boundaries studied by R. Amar et al. [1]. For the third task, studies by F. Heimerl et al. [3] and J. Sinclair et al. [5] are built upon regarding tasks for open-ended comprehension of large, scalar, text data and general impression formulation of such data.

The work by J. Hollands et al. [4] models how the brain interprets proportions when they are less than one and greater than one. It predicts small proportions are "underproduced" or interpreted as less than actual values and the opposite when proportions are greater than one. They correlate this with the use of pie charts vs bar charts, affirming that pie charts are interpreted incorrectly more often because of having to estimate proportions directly instead of a simpler value like the length of a bar compared to other bars in a bar chart.

In the studies J. Sinclair et al. [5] about tag clouds, they conclude that large amounts of text data can be more effectively analyzed when the task is more open-ended for the user. Other forms of visualizations of text scalars seem more appropriate for well-defined tasks that don't involve exploration. Heimerl et al. work attempts to find optimal visualizations for text analytics in natural language processing. Ultimately, they conclude the word cloud to be most effective at providing an overall impression of the data set over other visuals like frequency tables. The work of S. Baseman et al. supports word clouds as a tool to view the most influential data while close to all the data as the center of the graphic displays the largest words according to frequency.

• WEF logo:
https://en.wikipedia.org/wiki/World_Economic_Forum

4 DATA SOURCES AND COLLECTION

Most of the data was not pre-packaged or processed, though publicly available.

4.1 Task 1

For Task 1, the corporation name had to be scraped from <https://www.weforum.org/partners> and then each name had to be used in another to scraping algorithm to scrape each corporation headquarters' country. In the final dataset used for Task 1 there were two variables. First, a categorical country column consisting of the country name. Second, the count of the number of corporations in WEF within a country. The dataset dimensions were 77x2 with a total of 77 countries in the world having corporations in WEF.

4.2 Task 2

Three sources of data were needed for Task 2. The first source was downloaded from data.un.org in csv format. The two csv files downloaded included one column, country, with country name values, but one file only had country names that were members of the U.N., whereas the other file included all world countries.

The second source came from Microsoft Word. Within Word exists a feature to create automatic world choropleth maps. A key aspect of the automatic map creation is the Excel spreadsheet containing the map attributes data, though longitude and latitude data for countries is embedded. This Excel sheet contained the second source of country data with country names in one column and color encodings for each country in the second column.

The third data source came from the final dataset of Task 1; however, only the country column with the list of country names with WEF representation was used. After formatting each dataset from the three sources to match the world choropleth map country name format in Word and providing an encoding column, the three datasets were merged to create a final dataset which was 249x2. Country and encoding were the two final columns with a categorical country name and numerical color encoding value, respectively. The choice of numerical color encoding value was made by selecting the color from the color wheel in Word, which would populate the associated numerical value, e.g., 25 being dark blue.

4.3 Task 3

Task 3 data was also scraped, but from https://en.wikipedia.org/wiki/World_Economic_Forum. Specifically, the table with listed historical Davos Meeting agendas was collected. To prepare the data for a word cloud diagram, the scraped data had to be cleaned and stop words removed. The final dataset included one column of categorical data called *word* with each individual word from the aggregation of historical Davos Meeting agenda titles as values. Its dimensions were 133x1.

5 DESIGN

In this section a breakdown of design details for each visualization will follow for each of the three tasks.

5.1 Task 1

A bar chart is chosen to display counts due to its ease in showing many dimensions and quick comparison of lengths. A pie chart was not chosen because there are too many data points to see counts clearly. Cleveland's rules suggest angles are not as well ascertained by the brain as position is, which is why the positioning and lengths of the bar chart are preferred to pie charts. Hollands [4] supports this Cleveland rule by pointing out the increased bias in proportions estimation in pie charts vs bar charts and other diagrams.

Each bar in the bar chart is encoded to a country containing at least one corporation that is a member of WEF. Counts of the number of WEF member corporations from a country are encoded to the length of the bar chart. The position of the countries and their bars is encoded to the descending order of the number of WEF member corporations in a country, the United States having the most at 238.

5.2 Task 2

A choropleth map was chosen for a few reasons. The task is to compare geographical data, countries, that are represented by the U.N., WEF, or both, which cannot be easily performed with other diagrams. Comparing country representation by Venn diagram could have been a possibility but was not chosen due to likely size issues with over 200 data points. Instead, Gestalt's isomorphism principle is invoked through the use of a choropleth map. The data in map form with three color encodings is easier to display to compare geographically without having to label each data point. Motivation for the choropleth map with 3 accent color encodings comes from R. Amar et al. [1] research on pre-attentive processing while performing simple tasks like group and boundary comparisons.

Dark blue and orange colors were chosen because they bind well together and contrast enough for good comparison. Also, they are colorblind friendly. Gray is encoded for a country not within the WEF or U.N. because of the general neutral or irrelevant sentiment the brain associates with the color. In this visual, a simple choropleth map with a white background of the world will be displayed. Each *Country* name will be mapped to its *longitude* and *latitude* coordinates. A country with representation in the U.N. and the WEF will be encoded with a dark orange, countries in the U.N. but not WEF will be encoded with a dark blue color. Countries neither in the U.N. nor WEF will be light gray. To overcome the indiscernible encoding of the smallest countries represented in the WEF, a line will be drawn from the country to its name.

5.3 Task 3

A word cloud is chosen as the visual because of the cohesive, themed nature of the data set and its ability to provide an effective overall impression [3]. A frequency table or bar chart could have been another option, but to facilitate an open-ended conceptualization of the entirety of the data set, [5], a word cloud is implemented. Again, Cleveland's rule that the brain distinguishes position best, is prioritized in the selection of the word cloud to allow for words with low frequency to still be close in proximity to the center of the graphic [2]. Gestalt's proximity principle supports the word cloud approach because it would be difficult to quickly associate, for example, the 100th word in a table to the 2nd. The word cloud does not have this limitation.

Encoding of the word cloud consists of font size and position to frequency. Larger font sizes and proximity to center indicate higher frequency of word counts. Color is not encoded to an attribute of the variable, but is blue to match the tones of the other visuals.

6 IMPLEMENTATION & INSIGHTS

Following is a detailed explanation of the creation of the visualization for each task as designed in the previous section. The visualization and its description will follow each subsection.

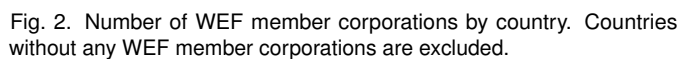
6.1 Bar Chart

The bar chart below was created using Tableau. It provides the counts of WEF member corporations headquartered in each associated country by row. It is in descending order with the country having the most WEF member corporations at the top.

The visualization has enabled seamless performance of the task where even the countries with few counts are just as visible as the largest, which would not be possible with something like a pie or doughnut chart. Cleveland's rule that position is the most easily determined by the human brain is at work here. The descending order of the bars immediately draws the eye to the top position, being the USA followed by UK, China, and Japan. The Gestalt principles of proximity and closure are also at play. Each bar's proximity to another conveys similarity, which is similarity in counts. Closure helps maintain a succinct message of the entire diagram being one unit though there are no explicit borders or lines enclosing the chart.

A few interesting insights can be drawn from the visual. First, it is important to note the rank order of the countries and why it's laid out the way it is. You could compare these rankings to external data like the latest GDP rankings by country. The rankings here are not

Counts of Corporations in WEF by Country



The choropleth map below was created using both Microsoft Word and Powerpoint. Word has an automatic choropleth world map creation feature including an excel worksheet for the data where all countries are given in one column, the color encoding of each country in another, and their longitudes and latitudes, which were embedded and immutable. All that was needed was a brief edit of the excel data file associated with the map. This was done by copying the final dataset, which was prepared to match the specifications of Word's Excel worksheet, to the Word data sheet. Powerpoint was used to add the lines to country labels that were difficult to view because of geographic size.

comparing current membership of the U.N. to WEF by country. Gestalt's isomorphism principle allows for quick comprehension of the map at large being a world map with delineated country borders without having to label each country. A Venn diagram simply could not convey all 249 data points in such a succinct manner. Although Cleveland's rules state the human brain understands color the least, the dark blue and orange contrast well enough to immediately distinguish categories. Gestalt's law of similarity may even suggest, implicitly, a revealed correlation of geographic location to category. Perceiving patterns like this aligns well with the motivation to understand the makeup of the WEF as compared to the U.N.

Countries in WEF & U.N.

Legend

- In WEF & U.N.
- Only in U.N.
- Neither WEF, U.N.

* Labeled countries are in WEF & U.N.

6.3 Word Cloud

The word cloud provides an impression of key words or themes from annual Davos Meeting agendas, which seems sufficient for the task at hand. In general, displaying any kind of text data is difficult to do when the task at hand is open-ended and the viewer is forced to make a highly subjective interpretation of it. It ties the frequency of a word to an overarching theme that may be interpreted by the viewer, however, the word cloud does lack any kind of context, i.e., trends in themes, the relationship of some words to others. Cleveland's rule of position is key in conveying frequent words or themes as they are in the center of the cloud, but not too distant from other, possibly relevant words which Gestalt's law of proximity suggests may be similar. If anything, the word cloud is a starting point to further investigation.

The largest words are global, world, leadership, shaping, new, and globalization. This isn't surprising, however, when words like redefining and transforming, and responsibility are close in proximity to the larger, it may provoke a desire to understand how such a global forum could be influencing the world at large or a citizen's own head-of-state.

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