Placing yourself into perspective

Tinka Valentijn

There is all this buzz about sustainable development. We have to take action now, else most of the population will live under water. The economy is becoming more unstable. Though advancements, many people are still living in poverty. All this information we often get through the news, news which often gives only a very limited image and is hard to relate to.

Motivation

Many of us are living in our own little bubble, without knowing what the real situation is in other countries. We have prejudices and stereotypes, but are either not aware of them or it is hard to discover how true they are.
My aim was to make a visualization which makes people more conscious of the situation around the world and their position in it.
From experience I believe that people are better at imaging someone else's situation when they themselves are part of the story. This visualization uses this by placing the user's situation relative to the rest of the world.

Measure

One thing I wished people would be more aware of is the status of sustainable development around the world, so I chose this as my topic. As measure for sustainable development, I make use of the Sustainable Development Goals (SDGs). This are 17 goals developed by the United Nations (UN) in 2015 and are supposed to be reached by 2030. The goals cover all 3 aspects of sustainability: social, economical and environmental.
I am making use of the SDGs because they are the most general and measurable guidelines on sustainable development to date. What I observed, is that most people have heard of the SDGs but don't really know what they entail. Hence, this visualization will also create more awareness about the SDGs.

The main target groups are the general public and policy makers. The goal for the general public is to get a feeling for their position in the world, and for the policy makers to get a better idea how they are doing compared to others.
I made a concept map (Eppler, M. J., 2006) to get an idea how this visualization fits in the overall picture, see Figure 1. From this map we can see that by this visualization we can make the general public and policy makers more aware of the SDGs, which should result in more and/or better sustainable development. The ultimate goal of that development is to create an utopia.

Data

Another advantage of using the SDGs, is that there is data available. The data I am using is the so called SDG Index, which gives a score to every goal for every country on

a scale from 0 to 100 (given sufficient data is available). This index is developed by the Sustainable Development Solutions Network (SDSN) and the Bertelsmann Stiftung, and is based on several sources of publicly available data. The data used for this visualization can be found here.

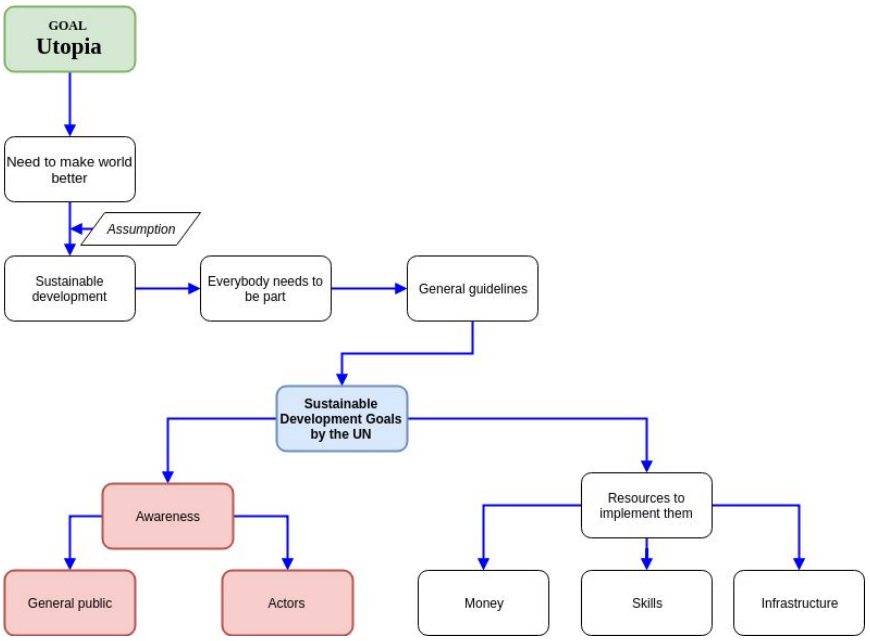

Figure 1: Concept map of the role of this visualization in the bigger picture. This visualization influences the red blocks, so it mainly creates awareness. The awareness of the SDGs influences in turn other blocks, which ultimately leads to an Utopia.

Space

Space is definitely important for the context and goal of my visualization. I use data per country and I want to compare those countries. At the same time I want to enable the user to get a good image of the whole world and the relations between countries.

Representing space

The go to way when using space is a map, but during this course I discovered there are many possibilities to represent space. For example, I could just use connections between countries based on some characteristic, or represent it by size instead of the real country shape.

At the end I chose to go with the old school map. The reason for this is that I want to make it very clear how differences are across the world. And I think the map is still the most powerful tool for this. It can show differences within and between regions.

But I do think there are other possibilities, I experimented for example a bit with a tree map which could also be very interesting but didn't have all the characteristics I wanted now.

Map projection

An important aspect to think about when using a world map, is the projection. Projection from 3D to 2D always gives some distortion and this is often forgotten. In my case it would be most important to preserve area while still being easily readable. There

are some really cool visualizations to show the characteristics of different projections[1]. The so called Eckert IV projection could be a good option for my visualization (Jenny et al. ,2017).

However, the most commonly used projection is the Mercator projection. This one heavily distorts scale and hence is not very suited for my visualization. The problem is that this is the most popularized projection, e.g. used by Google Maps, even though critics have stated that it is not always a good choice ("Map projection", n.d.). This was also the only projection available in the software I used (Tableau) and hence my final visualization has a Mercator projection, but when time would have allowed it would have been better in a more space preserving projection.

Time

Time is relevant in my topic. The Sustainable Development Goals should be reached by 2030, so it is important there is progress over time. It is also interesting to see how the past development has been to see the change and possibly try to make predictions for the future. The context of time is also interesting, i.e. certain events at certain times might have influence on the status of the SDGs in each country.
Since the SDGs are relatively new (2015), there are not really scores on these goals from the past. There is data on related topics, such as poverty, but not on the goals itself. They do try to do some future predictions, for every goal in every country they have an indicator stating whether the status is increasing, neutral or decreasing, and whether they are on the right track for reaching the goal or not. This indicator is used in the dashboards developed by the Sustainable Development Solutions Network[2].
However, the problem with this topic of sustainable development is that there is so much information that can be displayed. My visualisation already has quite a lot the user has to process and I think introducing the dimension of time will become too much. Moreover, it adds less strongly to the goal of placing the user in its context than the dimension of space.
Hence, I decided to not use time as a dimension in this visualization, but there are definitely interesting possibilities for visualization of this topic with time. For example, one idea I had is to show the progress of countries over time for a certain goal and compare this again between countries.

The actual visualization

Final structure

So what is my final idea? It is to create a map with all the countries. The user can then choose a country and a goal. Based on this selection, the score of the chosen goal (goal y) for each country, relative to the score of the selected country (country x) is shown, i.e. score_goaly_country - score_goaly_countryx. I would say when dividing the

[1] For example https://bl.ocks.org/syntagmatic/ba569633d51ebec6ec6e
[2] See https://dashboards.sdgindex.org for the dashboards

visualization space in quarters, this visualization would go to exploratory read data (Kirk, 2013).

Software

I had never made a proper visualization before so it was rather hard figuring out which tools exist that have all the possibilities I need and are not too hard to learn. The main problem was that I want to use the relative value, which has to be calculated dynamically based on user input. This was not possible with many softwares.
At the end I went with Tableau because it didn't require learning a new language and seemed to have a wide range of possibilities. At the end I spent way too many hours struggling with this software, but finally most things I wanted were possible.

Displaying the values

Another question is how to show differences across space. It can be done for example by adjusting the size of each country relative to its score, or by coloring the country based on the score. I chose to go for the coloring because in this case I thought the sizing would put too much emphasis on the outliers.
The next question, is what color scale to use. I wanted to use a diverging color scheme with a middle point of 0, since I am using relative values. In the first instance, I was using a continuous color scheme from green to red. The main reasoning being that it is easily interpretable. After reading a bit more about it[3], I found out it was maybe better to divide the results in a fixed number of categories. I chose 7 as this fixed number. I still think, red to green is the most intuitive color scale to show negative and positive values. The problem is that this scale is not colorblind friendly. I asked feedback from peers about this, and based on that I decided to still go for it because all the other scales just lost their interpretability. Another tricky point was which color to use for countries that have about the same score as the selected country. The internet advised yellow, but this resulted in people perceiving those countries as having a lower score instead of the same as the selected country. Finally, I settled for grey. For missing data, I went for black but if the software would allow, I think it would be better to make them pop-out less by using some pattern.

Storytelling

By asking feedback from others, I realized that the goal of my visualization was clear for myself but not for others. There was too much information and possibility to tune without understanding why. One thing was for example, the lack of information on the goals. I just used Goal 1, Goal 2, etc. whereas I discovered most people had never heard of the goals. I decided to add a sentence what the goal is about and show the symbol when the goal is selected.
Secondly, it was not clear what kind of country the user should select. I thought the most simple one would be to select the country where you are a local, so I decided to add a screen with that as starting question before going to the real visualization, see

[3] Mainly from http://colorbrewer2.org

Figure 2. This idea could be elaborated by for example randomly generating questions by which the user could select a country, e.g. “What is the country you last visited?”.

The final result

I am quite satisfied with my final visualization looking at the scope of the course. I applied several concepts that we learned, got new insights throughout the course, and learnt to work with a visualization software. I do think the visualization brings across a clear message, though a lot of improvement is still possible, see the next section.
The visualization has been published here, so here you can interact with the visualization. The online version can be very slow, in case you have Tableau you can also download the workbook.
Below are a few screenshots of the start page and the actual visualization.

Critics

There are many things I think could be improved in this visualization. One of them is that there should be more storytelling. I still think the map now doesn’t give enough inside, unless you really dig into the details. One interesting idea would be that you could select a second country and somehow see their differences and similarities. Or give a more detailed view of the selected country, by showing a ranking of each goal for that country.
Secondly, there are many improvements possible in the design. Due to limited time and knowledge, it is not as aesthetically pleasing as it could be. An example would be to highlight the selected country on the map. Other little things could also be rethought such as the color scale, and the information displayed in the tooltip.
All in all, a nice visualization that gave me new insights in the SDGs, while also being work in progress before it becoming a real good visualization.

Figure 2: the start screen of the visualization.
The idea is to provoke people to choose a country they are familiar with.
Later, the country can be changed.

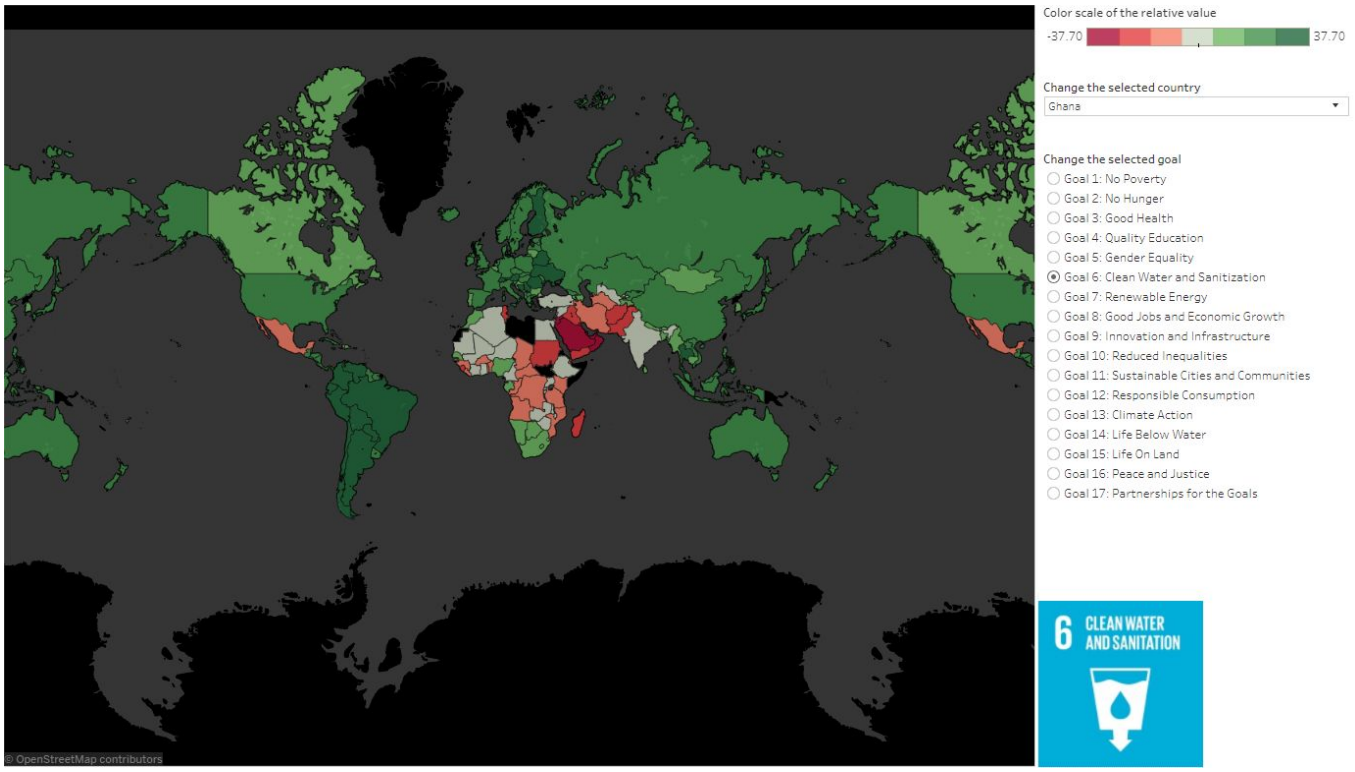

Figure 3: the final visualization.
In this example Ghana is the selected country, and clean water & sanitization the selected goal.
The relative values are indicated by the colors, and are elaborated when hovering over.

References

Jenny, B., Šavrič, B., Arnold, N. D., Marston, B. E., & Preppernau, C. A. (2017). A guide to selecting map projections for world and hemisphere maps. In *Choosing a Map Projection*(pp. 213-228). Springer, Cham.

Map Projection. (n.d.). In *Wikipedia*. Retrieved November 13, 2018, from https://en.wikipedia.org/wiki/Map_projection#Which_projection_is_best?

Eppler, M. J. (2006). A comparison between concept maps, mind maps, conceptual diagrams, and visual metaphors as complementary tools for knowledge construction and sharing. *Information visualization*, *5*(3), 202-210.

Kirk, A. (2013). Andy kirk NYC Data Visualization Meetup. Retrieved December 29, 2018, from https://www.slideshare.net/visualisingdata/andy-kirk-nyc-data-visualization-meetup