1.

2. Yes I can choose a best value for $k$ according to my plot. Using the elbow method I was able to determine that 9 was my optimal $k$ value because at the elbow point of the plot, I am not making any more substantial lower of the cost while using a large amount of time for this little improvement. Furthermore at this point I could be beginning to overfit the data as I increase $K$ so that each centroid has fewer points which it must balance between.

3. **Lists of Countries by Centroid:**

Vincent and the Grenadines', 'Sao Tome and Principe', 'Seychelles', 'Slovakia', 'Solomon Islands', 'Suriname', 'Trinidad and Tobago', 'Turkey', 'Venezuela (Bolivarian Republic of)]


4: ['Austria', 'Belgium', 'Canada', 'Denmark', 'Finland', 'France', 'Germany', 'Iceland', 'Liechtenstein', 'Luxembourg', 'Netherlands', 'New Zealand', 'Norway', 'Sweden', 'Switzerland', 'United Kingdom of Great Britain and Northern Ireland', 'United States of America'],

5: ['Democratic People's Republic of Korea', 'Eritrea', 'Iraq', 'Lebanon', 'Libya', 'Oman', 'Republic of Korea', 'Syrian Arab Republic', 'Yemen', 'Palestine (State of)'],


8: ['Morocco']

The difference from the average for all centroids. Positive means they care more than average, negative means they care less than the average.

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These clusters are reasonably well balanced with all of the clusters except for cluster 8 having roughly the same number of countries. Furthermore the countries in these clusters are definitely related. 2 examples of this are clusters 2 and 4. In cluster 2 nearly half of the countries were formerly part of the USSR. In cluster 4 every single country can be considered ideologically as part of "the west" and every country with the exceptions of the US, Canada, and New Zealand are European countries. Next I returned the distances from each part of the cluster centers to the mean. Negative values denote that an issue is less important while positive values denote that an issue is more important. Because cluster 8 only had 1 country, it had more extreme differences from the mean. Apart from that it is pretty easy to see which clusters are developing or are in difficult climates (island countries are generally more worried about transport and roads because of big storms and such as shown by cluster 1 which has many island countries).

4. I am going to be looking at the Centroid of Iceland, a country which has political stability and extensive government services but poor infrastructure on account of the harsh climate and a economy that was affected more than most countries by the 2008 recession. Furthermore Iceland is an island country in a very cold climate.

Iceland is in centroid 4 with the following countries: 'Austria', 'Belgium', 'Canada', 'Denmark', 'Finland', 'France', 'Germany', 'Iceland', 'Liechtenstein', 'Luxembourg', 'Netherlands', 'New Zealand', 'Norway', 'Sweden', 'Switzerland', 'United Kingdom of Great Britain and Northern Ireland', 'United States of America'. These countries are nearly all wealthy western European countries with the exceptions of the United States, Canada, and New Zealand. The main concerns of this group is action on climate change, protecting forests oceans and rivers, and freedom from discrimination and persecution. These issues, especially the first 2, seem very fitting for Europe and North America at this time as such economically and politically stable nations are not worried about utilities and commodities and are more worried about the consequences of energy consumption and urbanization. There aren’t any surprises in this region as the all countries in this group are wealthy democracies with a very very high concentration placed in Europe (only 3 exceptions).