17:610:554:90 – Information Visualization and Presentation

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Visualization 1 – Create Motion Charts using Tableau

(Revision)

Introduction

For the first visualization assignment, I chose to visualize the percentage of 25-64 year-olds, in different countries, who have attained tertiary education over several years, along with the percentage of the elderly in those countries. Tertiary education includes any education after secondary education; this can include undergraduate education or postgraduate education, and can culminate in the attainment of certificates, diplomas, or academic degrees. The population of the elderly includes anyone 65 years old or older. The objective was to answer the question, *Who is receiving a college education, and how does that information relate to the population of the elderly?*

The Data

The data set for this motion chart includes the following (as well as any applicable units):

- Country
- Year
- Elderly (% of Population)
- Percentage of men who have attained tertiary education (% 25-64 year-olds)
- Percentage of women who have attained tertiary education (% 25-64 year-olds)
- Population of the country (million persons)
- Continent of the country in question

For the countries, twenty-five were selected from the Organization for Economic Co-operation and Development (OECD) based off of the availability of their data. The countries are as follows:

1. Australia
2. Belgium
3. Canada

4. Czech Republic
5. Denmark
6. France
7. Germany
8. Greece
9. Hungary
10. Ireland
11. Italy
12. Japan
13. Korea
14. Mexico
15. Netherlands
16. Poland
17. Portugal
18. Spain
19. Sweden
20. Switzerland
21. Turkey
22. Great Britain
23. United States of America
24. Estonia
25. Latvia

For the years, focus was placed on 2001 through 2012 inclusive - twelve years in total - in order to limit the scope to just the 21st century. Moreover, the twenty-five countries above each had data for these twelve years. The percentage of the population who are elderly was included to see if there are any trends among the number of older people in relation to tertiary education. The percentage of tertiary education was selected due to its importance as an enabler for people to attain better-paying jobs, satisfy a need for self-actualization, acquire social status, move to more developed countries where demand for highly-skilled workers is high, and promote economic growth. The distinction between men and women was chosen in order to see any differences between the two groups. Population values were included to see if there were any patterns over time. Continent was included to see the distribution of countries included in the visualization.

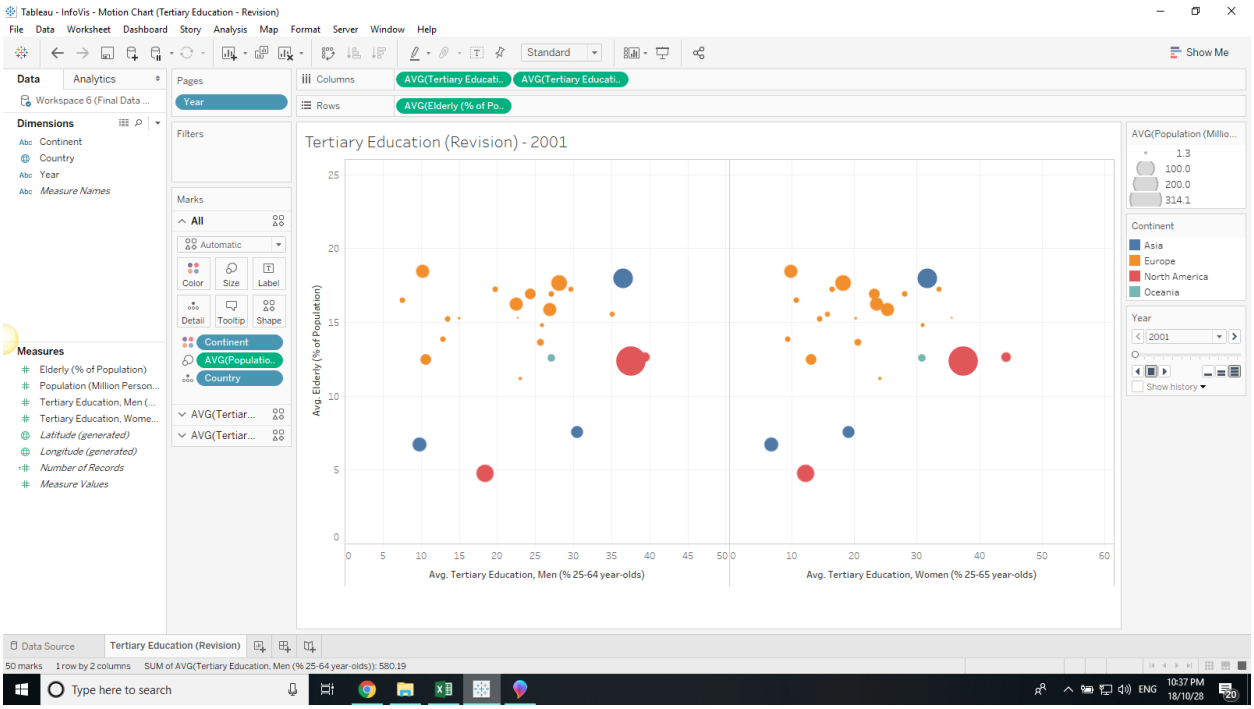
Data Acquisition and Processing

The data sets were downloaded from the OECD website as separate .csv files. The data contained in each .csv file were then copied into separate sheets within one Excel spreadsheet file dedicated to data wrangling. From there, the data was consolidated into a new sheet in the same Excel file before undergoing an iterative process to generate a final data set that includes the twelve years of data for the twenty-six countries. Each step of the process was performed on a new sheet within the Excel file in order to keep track of the steps taken when processing the data.

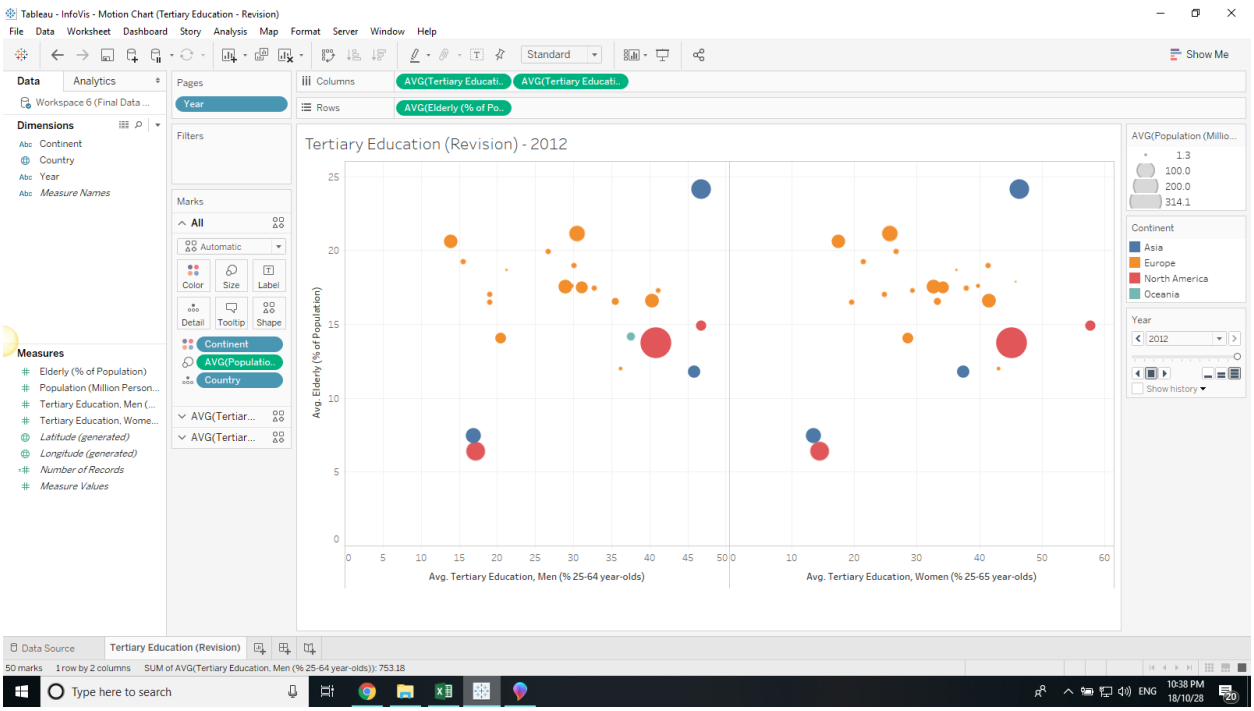
The .csv files for population and percentage of population who are elderly only included data from 2001 to 2014 inclusive, while the .csv files for tertiary education and GDP included data from 2001 to 2017 inclusive. Not all countries had data for each of the years covered by the .csv files, and countries with large amounts of data missing were excluded the final data set. Extrapolation was avoided since estimated values could be grossly incorrect, thus affecting the analysis of the motion chart. Some countries had breaks in the time series associated with population and percentage of population who are elderly. This was because the methods for measuring this statistic had changed; however, care was taken by statisticians to maintain the integrity of the time series.

Observations and Analysis

Below is the motion chart for 2001:



And below is the motion chart for 2012:



At first glance it appears that there is a general trend where the dots for both charts shift upward and to the right, though not necessarily by the same amount. The shift to the right would indicate that the percentage of both men and women between 25 and 64 years old has increased over the time period for much of the countries observed. An exception to this trend would be Mexico - the dots for both men and women start to move to the right, but then jump to the left before continuing rightward again. The percentage of men ends up lower by 2012 than where it was in 2001; by contrast, the percentage of women ends up slightly ahead of its 2001 value. Moreover, the shift upward would indicate that the percentage of the population who are elderly has increased over the same time period.

With respect to the percentage of elderly individuals, the increase could indicate an improvement of lifestyles as a function of higher education which in turn can prolong life for people. Another possible explanation for the increase in percentage of elderly individuals is that there are fewer children being born, thus skewing the percentage of elderly upward. Perhaps, the increase could be a combination of the two, or perhaps there could be completely different reason, such as an influx of elderly people into certain countries due to high quality of care for the elderly in those countries. Further study would be needed for clarity on the matter.

Another way to look at the motion chart is to consider how a rising percentage of elderly people might affect people's pursuit for higher education. Perhaps the personal accounts of the elderly encourage the younger generations to pursue higher education for a better lifestyle. Or perhaps the rising number of elderly can enable relatively younger individuals to pursue higher education by handling some logistical matters for the students, such as a housing, transportation, or childcare. Again, further study would be needed for clarity on the matter.

In terms of global distribution of these twenty-five countries, many of them are part of Europe. Three are part of North America - Canada, United States, and Mexico. Turkey was designated an Asian country because 95% of the country is located on the Asian continent; therefore, a total of three countries are part of Asia (Japan and Korea being

the other two). Only one country, Australia, is part of Oceania. There may be other countries that exhibit similar trends as these twenty-five - or maybe even completely different trends - but due to a lack of available data, those countries could not be included in this analysis.

Conclusion

It appears from the motion chart that an increasing percentage of both men and women in different countries are attaining tertiary education. Moreover, the percentage of elderly among the populations of each country observed has increased as well within the same time period. As time progresses, and as data-collection processes improve, perhaps more countries can be analyzed to determine how much of their population is receiving tertiary education. Additionally, any interactions between the growing number of people people with tertiary education and the growing population of the elderly can also be studied. These insights can then be shared, and perhaps an action plan can be generated to help countries maximize access to tertiary education for their own populations, thus improving the quality of life the people in those those countries, including the elderly.

References

1. Tertiary education. (n.d.). In *Wikipedia*. Retrieved October 14, 2018, from https://en.wikipedia.org/wiki/Tertiary_education
2. OECD. (n.d.). Elderly Population. Retrieved October 28, 2018, from https://data.oecd.org/pop/elderly-population.htm
3. OECD. (n.d.). About the OECD. Retrieved October 14, 2018, from https://www.oecd.org/about/
4. OECD. (n.d.). Elderly population, Total, % of population, 2001-2014 [Data set]. Retrieved October 28, 2018, from https://data.oecd.org/pop/elderly-population.htm

5. OECD. (n.d.). Adult education level, Tertiary, men, % of 25-64 year-olds, OECD, 2001 – 2017 [Data set]. Retrieved October 13, 2014, from https://data.oecd.org/eduatt/adult-education-level.htm
6. OECD. (n.d.). Adult education level, Tertiary, women, % of 25-64 year-olds, OECD, 2001 – 2017 [Data set]. Retrieved October 13, 2014, from https://data.oecd.org/eduatt/adult-education-level.htm
7. OECD. (n.d.). Population, Total, Million persons, OECD, 2001 – 2014 [Data set]. Retrieved October 13, 2018, from https://data.oecd.org/pop/population.htm
8. George Herald - CA Saga. (2016, April 9). WHY IS TERTIARY EDUCATION SO IMPORTANT? Retrieved October 14, 2018, from https://www.georgeherald.com/news/News/General/161048/Why-is-tertiary-education-so-important
9. OECD. (n.d.). Glossary of Statistical Terms - Time Series Breaks. Retrieved October 14, 2018, from https://stats.oecd.org/glossary/detail.asp?ID=6156
10. Kiprop, J. (2017, April 25). Is Turkey In Europe Or Asia? Retrieved October 13, 2018, from https://www.worldatlas.com/articles/is-turkey-in-europe-or-asia.html