The opportunity of Ethiopia Economic

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I. Data Story Summary

Nowadays, Ethiopia has the most GDP growth in Africa [1]. They drive away poverty within the country by developing a country for rapid economic growth [2], that other Africa countries can learn from Ethiopia to drive away poverty like Ethiopia. However, to make the country grow rapidly Just by setting national policy according to the vision of the country's leaders and running the country under the guidelines of the government is not enough, there must be fundamental factors in the country to support it. This data story will answer Ethiopia's fundamental factors, the other factor that can affect Ethiopia's economy and what factors other Africa countries can learn from its through the questions “Why Ethiopia stay one of the fastest economies grow up in the world?”.

The important fundamental factors that can answer the data story question is Ethiopia demographic and location. This nation has the youthful potential of people and they have a great location because Africa is the continent between Europe and Asia that good effect on the supply chain. Many countries in Africa have demographics and locations that resemble Ethiopia, but they have a problem in political stability the data story will show how the change of political stability in Ethiopia and some other Africa countries through military data.

II. Dataset Summary

All my data set is from the World Bank Open Data [3]. All data set provided the data of 233 countries from 1960 to 2019 but data in some countries of this data set did not record. Each data set will describe in the topic below:

A. Population by age every 5 years of male and female

This data set provides the population by age every 5 years of the total population in each country and separate between male and female. To prepare this data set is needed to take Ethiopia data apart from the data set to use in visualisation.

B. Fertility rate

This data set gives the fertility rate of infant birth per woman in each country. To prepare this data set is needed to take Ethiopia and some countries' data apart from the data set to use in visualisation.

C. Gross Domestic Product Growth (GDP Growth)

This data set provides GDP Growth show in annual percent unit in each country. To prepare this data set is needed to take Ethiopia data apart from the data set to use in visualisation.

D. Gross Domestic Product (GDP)

This data set gives GDP show in current US dollar unit in each country. To prepare this data set is needed to take Ethiopia data apart from the data set to use in visualisation.

E. Foreign direct investment (net inflows)

This data set gives foreign direct investment (net inflows) show in percent of GDP unit in each country. To prepare this data set is needed to take Ethiopia data apart from the data set to use in visualisation.

F. Armed forces personnel

This data set provides armed forces personnel show in percent of the total labor force unit in each country. To prepare this data set is needed to take Ethiopia and some countries' data apart from the data set to use in visualisation.

G. Military expenditure

This data set gives military expenditure show in percent of GDP unit in each country. To prepare this data set is needed to take Ethiopia data apart from the data set to use in visualisation.

After getting all the necessary data set of Ethiopia and some other countries, I will link all datasets together by using the Ethiopia column that will have it in every data set.

III. Visualisations

From visualisation in HTML file is use the size of visualisation that not too large to most of computer monitor screen and insert next page button because audiences can focus on visualisation and do not need to scroll down the HTML page.

A. Ethiopia Gross Domestic Product (GDP) & GDP Growth Visualisation 1

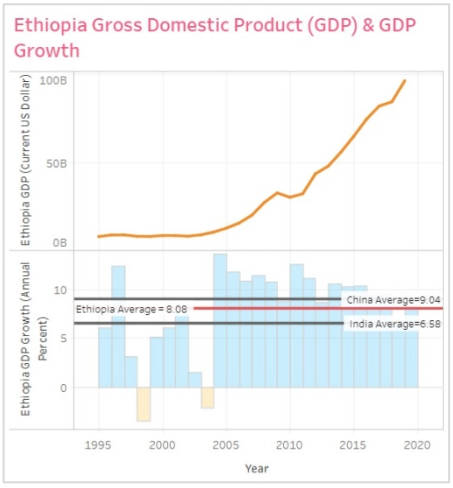

Figure 1: Ethiopia Gross Domestic Product (GDP) & GDP

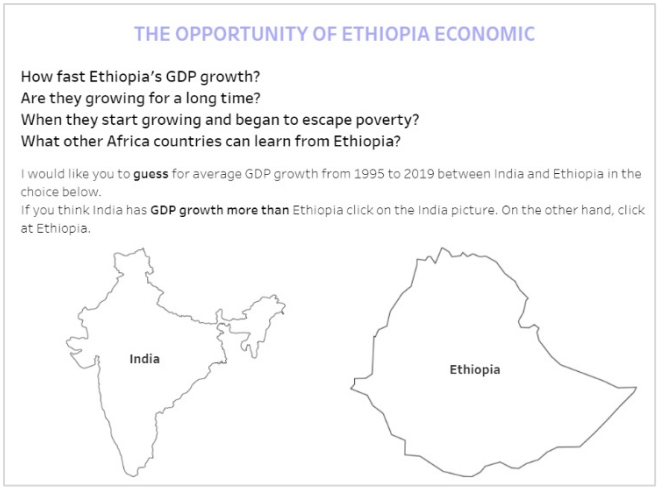

Figure 2: Make-a-guess and rhetorical question pattern of visualisation 1

1) Description

This visualisation is separated into two plots as shown in Fig. 1. These two plots use the same x-axis that is the year from 1995 to 2019. The upper plot show GDP by using a line graph and its y-axis is the current US dollar. The lower plot presents GDP growth by using a bar chart. The blue bar is positive GDP growth in that year and the orange bar is negative GDP growth in that year. Moreover, the lower plot will illustrate the Average GDP growth from 1995 to 2019 of Ethiopia, China and India.

2) Justification

The upper plot line graph will make audiences see the obvious increasing trend of GDP. The difference of color in positive GDP growth and negative GDP growth in the lower plot want audiences to observe most of Ethiopia's GDP growth is positive and higher than its average. The red color of Ethiopia GDP growth average will spot it from other countries that are grey color.

3) Narrative Design Patterns

Narrative design patterns of this visualisation are use compare, make-a-guess and rhetorical question pattern [4] as illustrate in Fig 2. This visualisation has many narrative design patterns to try to make a first impression on audiences. A rhetorical question can make audiences think about the visualisation and make engagement. Audiences will feel more interaction by make-a-guess that use a rhetorical question, answer the question and compare Ethiopia's GDP growth average to China and India to see the nearness of all these GDP growth averages.

4) Strengths and Weaknesses

The strengths of this visualisation are the use of narrative design patterns is prominently and varied. visualisations try to bring Ethiopia more noticeable and be conspicuous than in other countries. Its weakness is some descriptions did not show in the plot such as the number of GDP growth in each bar in the lower plot.

5) Improvements

Try to find a way to add some description into visualisation. It will be making the audiences discover more insight from this data. This visualisation can add more other countries GDP growth average especially Africa countries to see more the difference of Ethiopia to other countries.

B. Ethiopia Population Ages in 2019 Visualisation 2

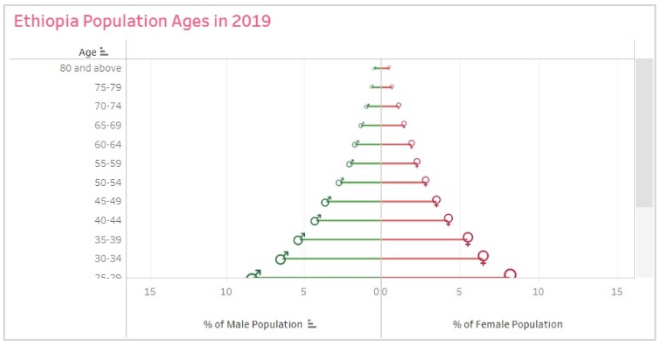

Figure 3: Ethiopia Population Ages in 2019

Figure 4: Rhetorical question pattern of visualisation 2 and 3

1) Description

This chart shows the population ages of every 5 years from 0 to above 80 years for male and female in 2019 by use bar chart as present in Fig. 3. The left plot is the male plot and the right plot is the female plot. The x-axis is the percent of the male and female population and the y-axis is illustrating 0 to above 80 years by every 5 years. Moreover, this visualisation use color to separate the gender by the male is green and female is red.

2) Justification

The visualisation design percent of the total population be x-axis and 0 to above 80 years by every 5 years be y-axis to make audiences visual this plot as a mountain that the top of the mountain has small diameter than the bottom like the population ages have young people less density than old people.

3) Narrative Design Patterns

This visualisation begins with a rhetorical question pattern [4] to make audiences argumentation and more engagement its stories in the visualisation as shown in Fig. 4. Moreover, concretise pattern [4] has been added to the

visualisation by showing the symbol of gender behind the plot and its size depending on the percent of the population.

4) Strengths and Weaknesses

This visualisation has strength in clarity by a use bar chart, it symbols of gender and color of the gender. However, sometimes it may make audiences confuse because the y-axis is the sum of the population every 5 years not every age.

5) Improvements

This visualisation can improve by finding a new data source that can show population age for every year and the visualisation could change from bar chart to area chart. Because audiences can feel from the young age population more than old age population from the area chart clearer than the bar chart.

C. Fertility Rate Visualisation 3

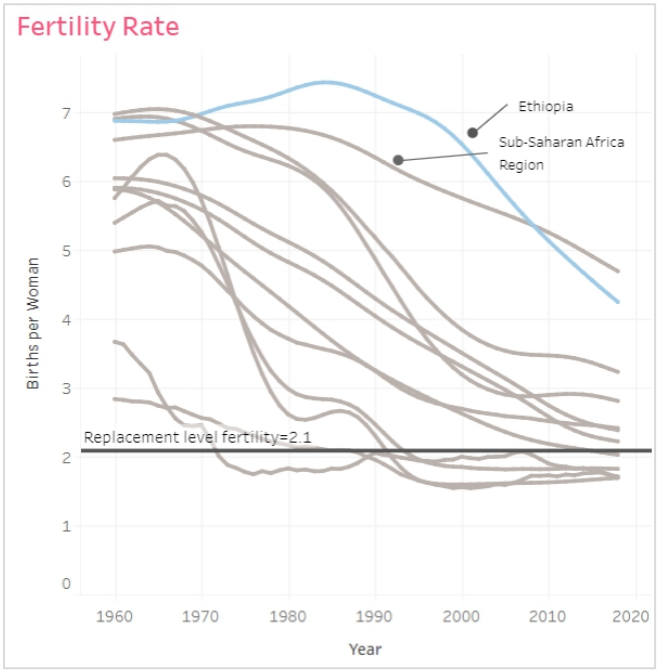

Figure 5: Fertility Rate

1) Description

This chart illustrates the line chart fertility rate of Ethiopia, China, India and the other region in the world from 1960 to 2018 as present in Fig. 5. The y-axis show birth per woman and the x-axis show year from 1960 to 2018. The Ethiopia line color is blue and the other is brown. Moreover, this visualisation has a black horizontal line to present the replacement level fertility.

2) Justification

From the visualisation it uses blue color in Ethiopia line to make Ethiopia superior to other countries that use the brown line. The replacement level fertility uses black color which contrasts with other color lines in this visualisation.

3) Narrative Design Patterns

This visualisation uses rhetorical question [4] as in Fig. 4 to engage the audiences and compare Ethiopia to China, India and other regions to highlight differences of Ethiopia fertility rate to other areas in the world.

4) Strengths and Weaknesses

The blue color of Ethiopia's fertility rate different from other countries and areas in the world. However, this visualisation shows too many lines in the visualisation that make it confuses and it is show label only in Ethiopia and Sub-Saharan Africa region, it did not show label in every line in this visualisation that may make audiences miss some information of this visualisation.

5) Improvements

To improve this visualisation, it can add a label to every line and increase the size of this visualisation to make audiences gain more information. This visualisation could add the prediction of fertility rate from 10 to 20 years in every line to show the trend of Ethiopia's fertility rate and other areas in the future.

D. Ethiopia Foreign Direct Investment (net inflows) Visualisation 4

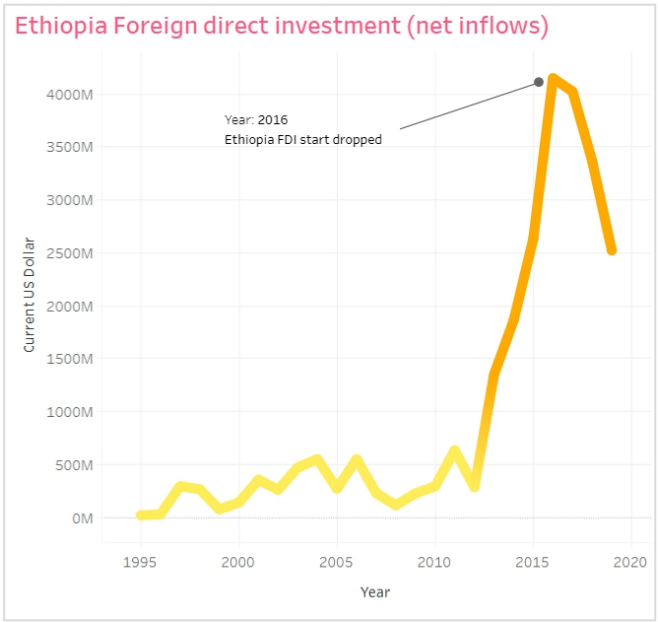

Figure 6: Ethiopia Foreign Direct Investment (net inflows)

Figure 7: Rhetorical question pattern of visualisation 4, 5 and 6

1) Description

This visualisation shows the line chart of Ethiopia's foreign direct investment (net inflows). Its x-axis is the year from 1995 to 2019 and the y-axis is the current US dollar as illustrate in Fig. 6. This line chart is orange color and in uptrend period be the darkest orange.

2) Justification

This chart uses a line graph to show the trend of data and uses color tone to notice audiences an uptrend and downtrend. The uptrend is the darkest and the downtrend is the lightest. Moreover, this chart insert label of FDI start dropped to show event for the story in the chart.

3) Narrative Design Patterns

The rhetorical question pattern [4] has been used in this visualisation to engage audiences that the FDI of Ethiopia is an uptrend in the last 10 years as illustrated in Fig. 7.

4) Strengths and Weaknesses

It is good to use the line graph and use color to separate the uptrend of it. However, color makes some audiences confuse why some parts of the line graph need to be darker colors.

5) Improvements

Generate some more event label to make interest and engagement from audiences to this visualisation. Add sub bar graph to show the percent of foreign direct investment growth in each year to make the audiences see how much it change in each year.

E. Ethiopia & Central African Republic & DR Congo Armed Forces Personnel Visualisation 5

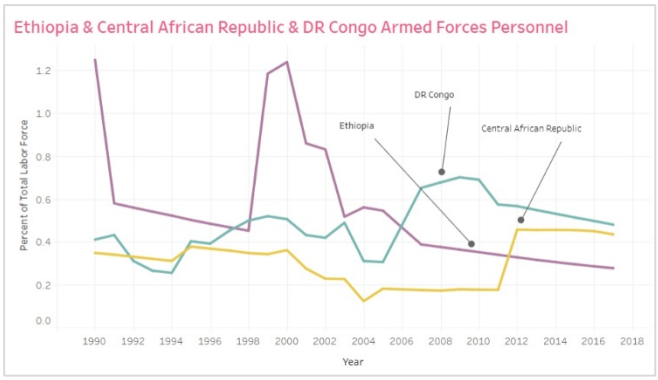

Figure 8: Ethiopia & Central African Republic & DR Congo Armed Forces Personnel

1) Description

This visualisation presents a line chart of Ethiopia, Central Africa Republic and DR Congo Armed Forces Personnel. Its x-axis is the year from 1990 to 2017 and the y-axis is the percent of the total labor force as shown in Fig. 8. This visualisation has three line trends for each country and these use a different color.

2) Justification

The color of all line trend in this visualisation is different to make audiences not confuse other line trends in the same visualisation. The country name labels will be added to the line trend to get audiences to obtain more information.

3) Narrative Design Patterns

This visualisation uses a rhetorical question pattern to engage the audiences [4] that on the same page with Visualisation 4 as shown in Fig. 7. Moreover, repetition pattern has been used in this visualisation to show the same phenomenon in Central African Republic same with DR Congo but different in Ethiopia to give information that Ethiopia armed forces personnel has significant decrease and make audiences feel Ethiopia is outstanding.

4) Strengths and Weaknesses

From this visualisation use of different color in the line graph, it makes audiences see the difference of each country in the graph and when it in repetition pattern. However, this visualisation mainly talks about Ethiopia if we highlight color to only the Ethiopia line it might be better.

5) Improvements

Add more countries from many regions in the world to compare their armed forces personnel with Ethiopia armed forces personnel to make audiences gain more information from other countries.

F. Ethiopia Military Expenditure Visualisation 6

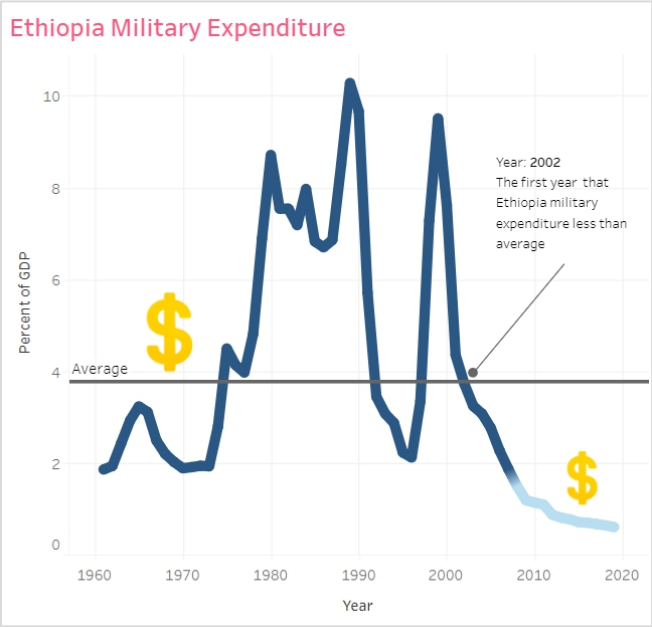

Figure 9: Ethiopia Military Expenditure

1) Description

This visualisation shows the line chart of Ethiopia's military expenditure. Its x-axis is the year from 1961 to 2019 and the y-axis is the percent of GDP as present in Fig. 9. This line chart is blue color and in downtrend period will the lightest blue and show the average line of Ethiopia military expenditure from 1961 to 2019.

2) Justification

Similar to Visualisation 4 this chart uses a line graph to show the trend of data and uses color tone to notice audiences an uptrend and downtrend. The uptrend is the darkest and the downtrend is the lightest. Moreover, this chart inserts a label of the first year that Ethiopia military expenditure less than average to show event for the story in the chart.

3) Narrative Design Patterns

For this visualisation show concretise pattern [4] by using the size of a dollar sign to represent the amount of money that the Ethiopian government spends on military expenditure. Dollars sign easier to observe and grasp on it. Moreover, this visualisation uses a rhetorical question pattern to engage the audiences [4] that on the same page with Visualisation 4 as shown in Fig. 7.

4) Strengths and Weaknesses

It is a good plot that generates graph audiences can observe Ethiopia's military expenditure is decrease and decrease than average from around 20 years ago. However, the concretise pattern that shows the dollar sign can confuse some audiences they might be thing why it needs to insert this symbol.

5) Improvements

Change line graph to the show the only size of the dollar sign in each year to make audiences more engage by concretise pattern.

IV. Conclusion

The story trying to deliver a message to my audiences that Ethiopia is not a poor country like it was 20 years ago. In this story mention why Ethiopia is one of the fastest growing economies in the world through demographic, location and political stability factor of country and what other Africa countries could learn for Ethiopia. It uses strengths and weaknesses point of the chart and narrative pattern that learned for the Data Visualisation class to design the visualisation to attempt to find the best visualisation for audiences. Data Visualisation class allows me to learn a lot of new knowledge. From the start, I was very interested in data visualisation. However, I do not know much about data visualisation. Now, I have learned new principles about how to present data to audiences more efficiently. Lastly, I want to thank all the lecturers for their efforts to provide the best knowledge and experience in their class. Even we live in difficult times like this chaotic COVID-19 situation.

References

[1] [Online]. Available: https://www.brookings.edu/wp-content/uploads/2020/01/ForesightAfrica2020_20200110.pdf [Accessed November, 18 2020].

[2] [Online]. Available: https://www.focus-economics.com/blog/the-poorest-countries-in-the-world [Accessed November, 18 2020].

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[4] B. Bach, M. Stefaner, J. Boy, S. Drucker, L. Bartram, J. Wood, P. Ciuccarelli, Y. Engehardt, U. Köppen, and B Tversky. “Narrative design patterns for data-driven storytelling.” In Data-Driven Storytelling, N. H. Riche, C. Hurter, N. Diakopoulos, and S. Carpendale, Eds. CRC Press, USA, 2018, ch. 5, pp. 107–134.