**Final Technical Report**

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* **Abstract**

Due to the globalization nowadays, international trading becomes very important to every country. Therefore, in this project, I decided to choose the top 20 countries by overall merchandise trade in 2016 and selected the data from 2010 to 2016 to do the analyses. The top 20 countries are USA, China, Germany, Japan, Netherlands, France, UK, South Korea, Italy, Canada, Mexico, Belgium, Singapore, India, Spain, Switzerland, Russia, Thailand, Poland, and Australia.

By using Google API, Tableau, and Datawrapper, I created various charts to illustrate the merchandise trade activities, and furthermore, used those charts to analyze and predict the future trending of the merchandise trade and single out the country’s main import and export merchandise goods.

* **Objectives**

In my project, I would like to use different visualization technique to clearly show the top 20 countries’ relationships between merchandise trade and GDP, every merchandise topics’ imports and exports including agricultural raw materials, food, fuel, manufactures, and ores and metal. By using a variety of charts, I want to indicate the merchandise trade in every topic’s changing from 2010 to 2016. Moreover, I also want to compare the top 20 countries’ proportions of merchandise trade and predict the future trending in both of the overall top 20 countries’ merchandise trade and each country’s merchandise trade activity.

* **Functional requirements**

Data cleaning process, I calculated the Merchandise trade from the percentage of GDP into current US$ and replaced the missing data by using the mean values. Next, I separated each country’s merchandise import and export in order to draw the pie plots to clearly reveal the proportion of every merchandise trade topic in different countries.

* **System architecture and description**

First of all, I found all the data from the World Bank and done the cleaning and calculating process via Excel. Second, I uploaded and imported the data to the google drive and chart developing platforms, including Datawrapper and Tableau to draw the plots. Finally, after finishing drawing plots, I will create a web page to combine and show all the plots so that it would be easier to do the analyses and prediction.

* **Development platforms**

I decided to create the charts via Datawrapper, Tableau, and Google API.

* **Proposed visualizations**

In Datawrapper, [Top 20 countries in merchandise trade from 2010 to 2016](https://www.datawrapper.de/_/7MlH3/), [Top 20 Countries' Merchandise Export](https://www.datawrapper.de/_/3JoC1/) and [Import](https://www.datawrapper.de/_/RhxtG/), [Agricultural & Raw Materials Import](https://www.datawrapper.de/_/FsrXQ/) and [Export](https://www.datawrapper.de/_/boAGI/), [Food Import](https://www.datawrapper.de/_/AdJU8/) and [Export](https://www.datawrapper.de/_/p8Dg7/), [Manufacture Import](https://www.datawrapper.de/_/OJVPX/) and [Export](https://www.datawrapper.de/_/NJ1Mw/), [Fuel Import](https://www.datawrapper.de/_/0pI3T/) and [Export](https://www.datawrapper.de/_/uZLg7/), [Ores & Metals Import](https://www.datawrapper.de/_/K1Oca/) and [Export](https://www.datawrapper.de/_/dffmF/).

In Tableau, [Top 20 Countries’ Export Growth and Import Growth 2011~2016](https://public.tableau.com/profile/phoebe.wu7036#!/vizhome/ExportGrowthvsImportGrowth20112016/Dashboard1?publish=yes). Next, I decided to create the line charts for the growth rate of each import and export topic.

By Google API, I plan to draw pie charts to show every country’s percentage of each export and import group.

* **Experimental analyses and conclusions**

In my project analyses so far, first, four countries, Netherlands, Belgium, Singapore, and Thailand’s merchandise trade are higher than their GDP especially Singapore which is almost three times more than the GDP. Second, most of the top 20 countries’ merchandise trade growth rates are declining especially Russia and India. From the data, I think that the main reason for Russia’s decrease in merchandise exports is the amount of the fuel export, and the reason for India’s decrease in merchandise imports is also the amount of the fuel import. Third, most of the 20 countries’ main imports and exports are manufacturing except Russia and Australia. Russia and Australia’s main exports are “Fuel” and “Ores & Metals” respectively. Therefore, at this step, we can see that every country has different main merchandise goods and the trending in merchandise trade which are related to their region, economic development, and the global environment. Next step, I plan to do more analyses in each merchandise topic and also each country I selected.