Configuring the World
ASSIGNMENT-1

By Brian Greiner

Introduction

The purpose of this report is to examine a region of interest and a country outside that region in terms of several dimensions. For each dimension, the countries under study are compared to all the countries in the database (a large subset of all the countries in the world).

The dimensions to be employed are : GDP, GDP PPP, HDI, Economic globalization, trade as a percentage of GDP, FDI inward flow, and FDI outward flow.

For the purposes of this study, the region chosen is *Western Europe*, and the outside country chosen is *Canada*.

The databases used were supplied by the course instructor :

CtW 1 Size, wealth and poverty.xlsx
CTW 2 Economic Globalisation and trade.xlsx

The databases are in the Microsoft XLSX format, and each consists of several sheets. In each case, the sheet named “Data without small states” was used.

The analysis was performed using a program written in the R language. I used a programming language rather than a spreadsheet because a programming language is more powerful and flexible, and I am a strong believer in the importance and value of replicable research. In my opinion, spreadsheets are too limited and far too fragile for serious research use. The complete R program is shown in the Appendix.

Analysis by Population

The population of a country or a region is a fundamental dimension. It determines both the number of people consuming the area's resources, as well as the number of people available to acquire (eg. mining and farming) and transform those resources (eg. manufacturing).

The top half of Figure-1 graphically shows the population of the target region (shown in orange) to that of the comparison country (shown in blue). The bottom half shows the relationship of the countries in the study to all the countries in the database. Note that for the second graph, because of the large variation in populations the value displayed is the logarithm of the value.

As can be seen, the countries under study range from moderately small to moderately large.

Note that this data is collected by each country individually. That means that there will be variable accuracy, but this will not be an issue for the purposes of this report.

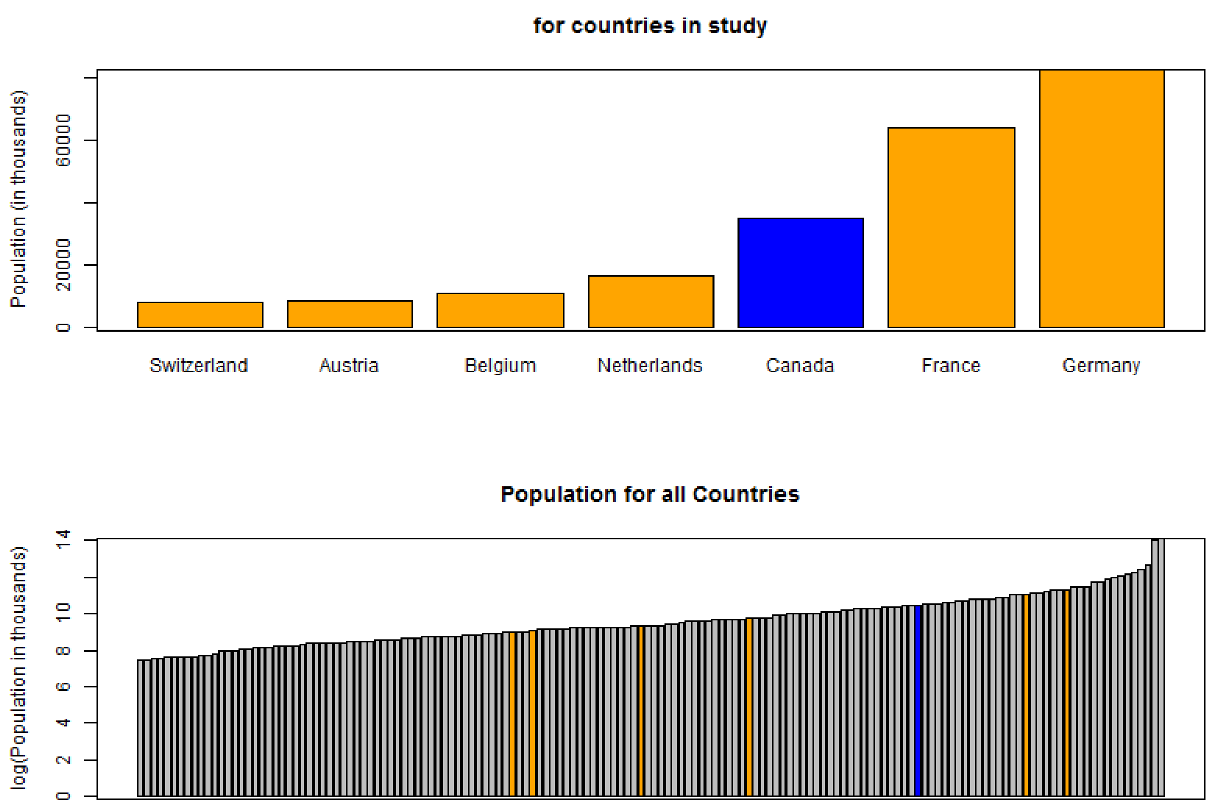


FIGURE 1 - Population 2012

Analysis by GDP

The GDP (or Gross Domestic Product) is a measure of production flowing through an economy. It is based on the total value of all goods and services produced.

As seen in Figure-2, in comparison to the rest of the countries in the database, the countries in the study are at the top end of the GDP spectrum. Note that the variance is so large that the graph displays the logarithm of the value of the GDP.

Within the region under study, there is a fairly wide gap (roughly 7:1). The outside country's GDP would be in the top third compared to the region.

There are several potential issues with the GDP. The first is how much trust can be placed in the numbers that are used to calculate it. After all, can a country accurately track each and every good and service that is produced within its boundaries? The second issue, is that it may be to a country's advantage to "tweak" this number. Another issue is can a single measure truly reflect the economic vitality of an economy?

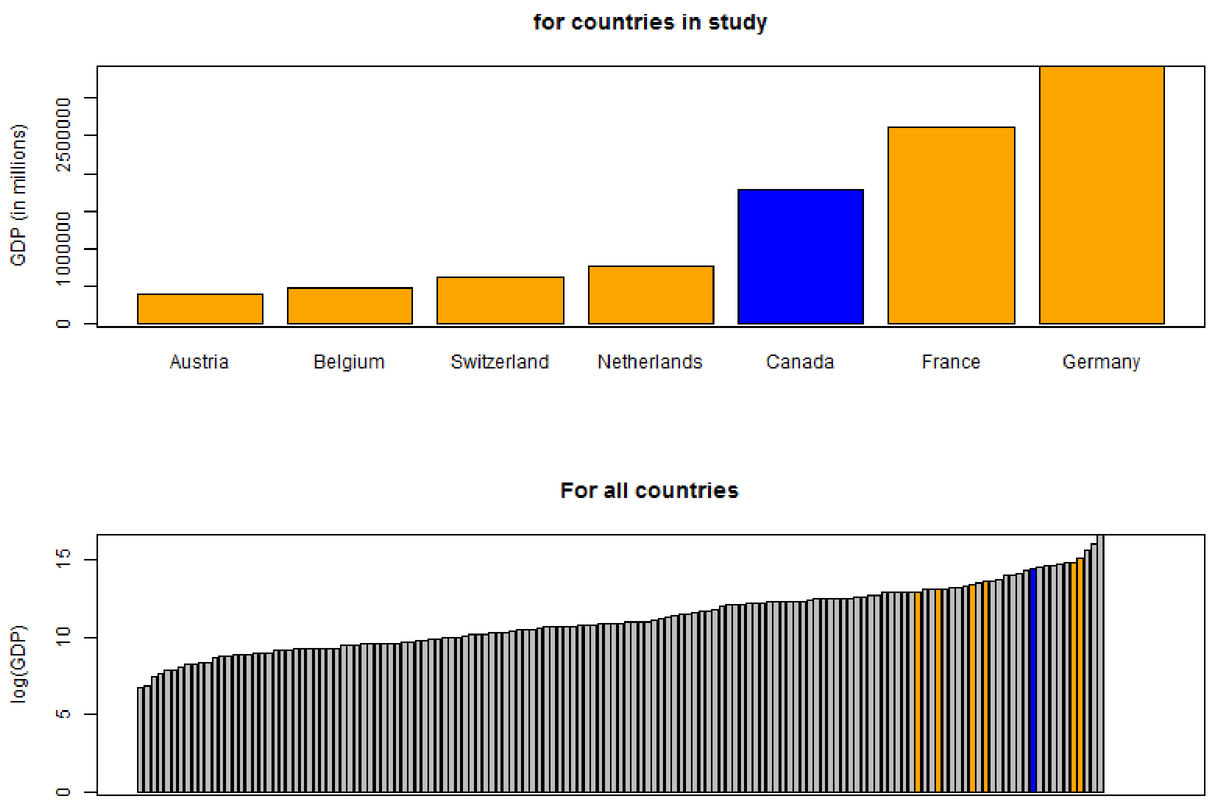


FIGURE 2 - GDP (in current dollars 2012)

Analysis by GDP PPP

The GDP PPP (purchasing power parity) attempts to adjust the GDP in terms of purchasing power in different countries. It attempts to achieve this by comparing a common ‘basket’ of consumer goods from one country (or economy) to another. The obvious shortcoming of this is how to determine an appropriate ‘basket’ of consumer goods. It can be thought of as a somewhat crude attempt to adjust the GDP, but even rough measures can be useful.

In terms of the countries in this study, it can be seen that they are all roughly equal in terms of purchasing power parity, when compared to each other. When compared to the rest of the world, they all lie at the upper end. Note that the bottom figure shows the logarithm of the value, because the range from the lower end to the upper end is so great.

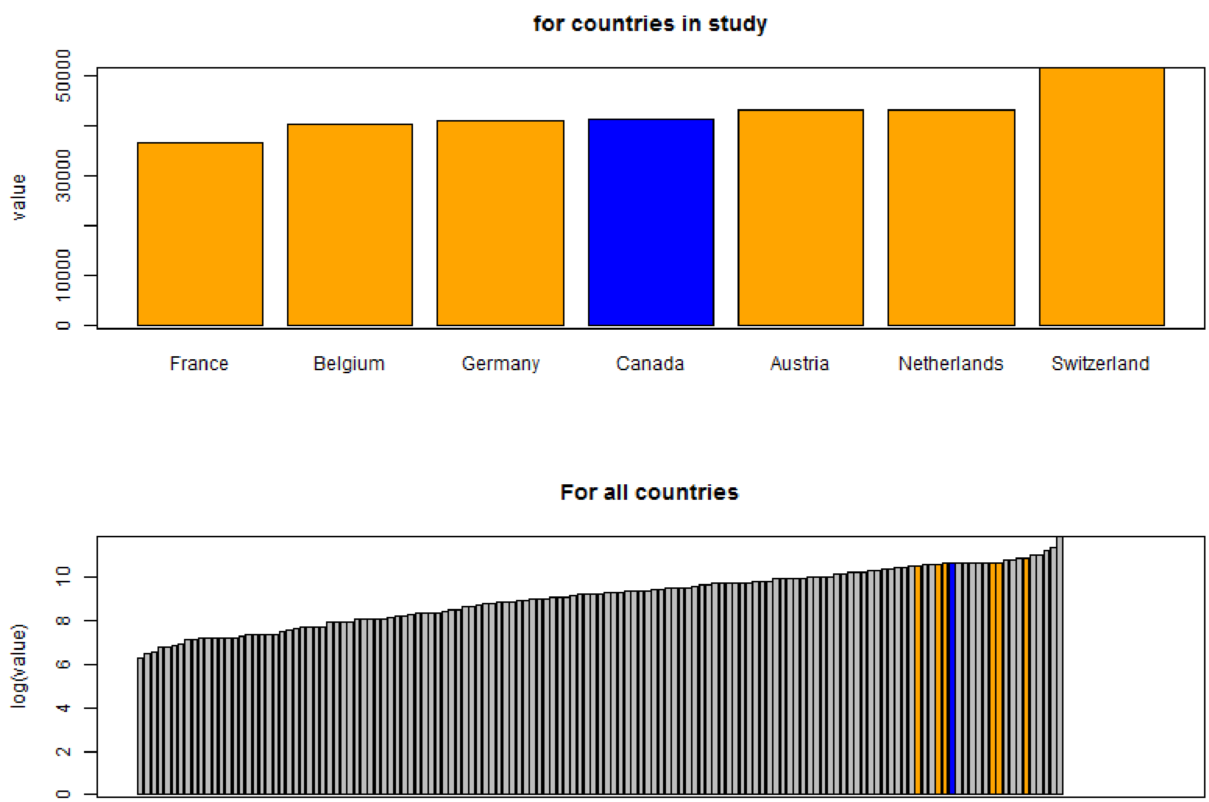


FIGURE 3 - GDP PPP (GDP Per Capita based on PPP 2011)

Analysis by HDI

The HDI (human development index) is an attempt to measure a country’s development in terms of how well it tries to develop its human potential, as opposed to its economic potential. It creates a single index based on life expectancy from birth, education, and standard of living. The limitations of this index are severe, not least of which is that the method of calculating it changed in 2010. Other problems are that the “standard of living” is measured in economic terms, and none of the components attempt to measure quality of life.

As seen in Figure-4, compared to the rest of the world the countries under study have a fairly high HDI. Note that due to the large variance, the logarithm of HDI values are plotted.

In terms of the countries in this study, it can be seen that they are all roughly equal in terms of purchasing power parity, when compared to each other. When compared to the rest of the world, they all lie at the upper end. Note that the bottom figure shows the logarithm of the value, because the range from the lower end to the upper end is so great.

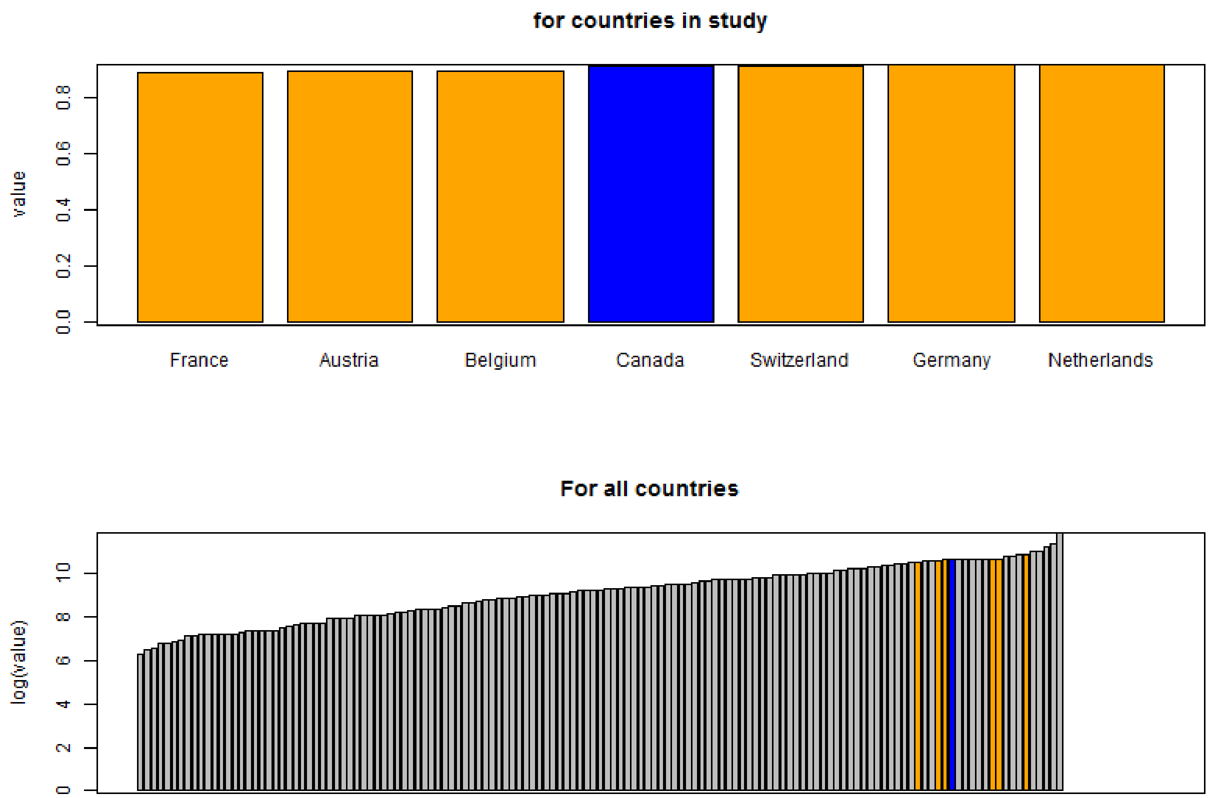


FIGURE 4 - Human Development Index (HDI) value 2012

Analysis by Economic Globalization

The economic globalization index (KOF) attempts to create a single index that measures how open a country is to the free flow of goods and ideas. It is based on three dimension : economic, political, and social. The economic dimension considers restrictions to free trade. The political dimension considers the number of embassies, trade commissions, and international organizations. The social dimension considers how free the flow of information is, in terms of telephone calls, newspapers, and so forth. These dimensions are quite obviously subject to a lot of interpretation, so the final index must be taken only as a rough measure of international activity.

As seen in Figure-5, the countries under study have a medium to high degree of economic globalization compared to the rest of the world. Canada is at the reasonably high end of the scale.

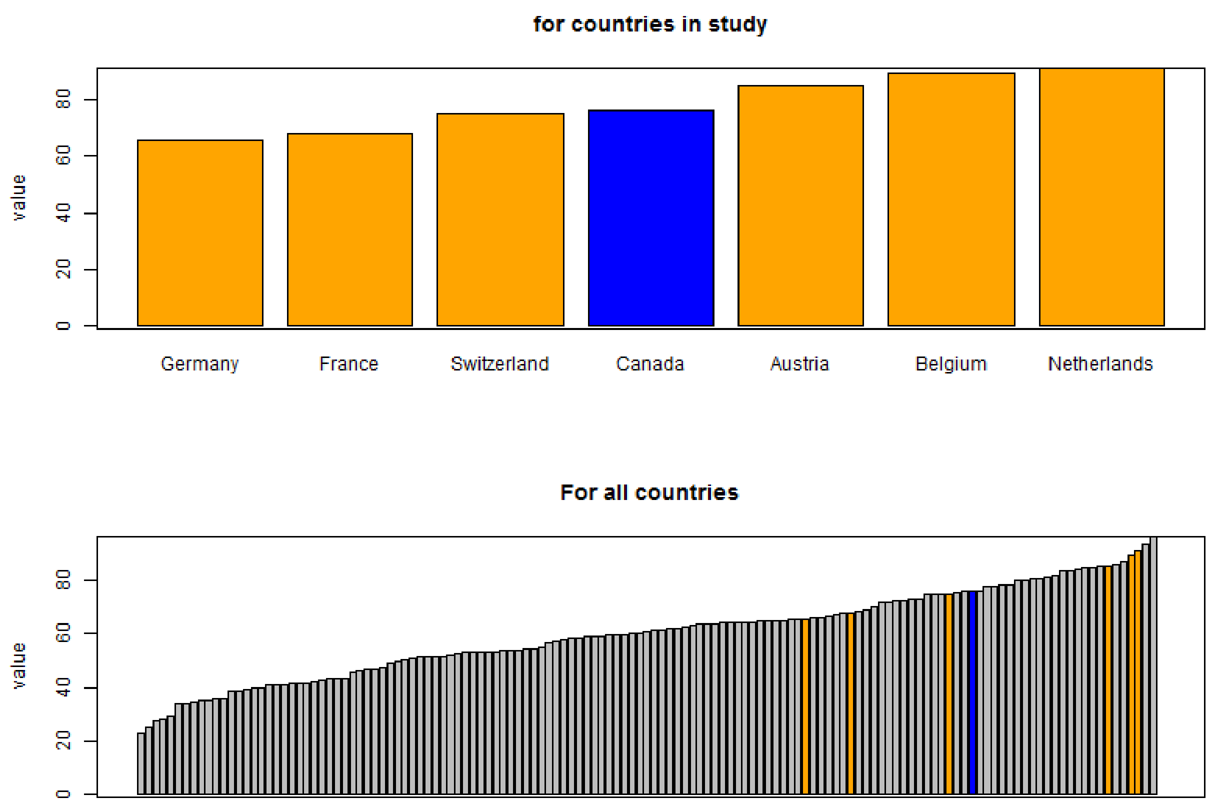


FIGURE 5 - Economic globalization index (KOF) 2011

Analysis by Trade

Looking at trade as a percentage of GDP measures how much of a country's overall economic activity depends on foreign trade. This also means that it suffers from two sources of inaccuracy. The first are the inaccuracies inherent in the calculation of the GDP, and the second are the inaccuracies in tracking the amount of trade.

In terms of the subject region, there is a roughly 3x variation in the amount of trade. The subject country, Canada, is towards the bottom when compared to the subject region. Compared worldwide, there is a very large variation, with France and Canada towards the lower half, and Belgium and Netherlands very near the top.

It is also interesting to compare this dimension to the economic globalization dimension. In both dimensions the top 3 countries in the subject region have the same rankings.

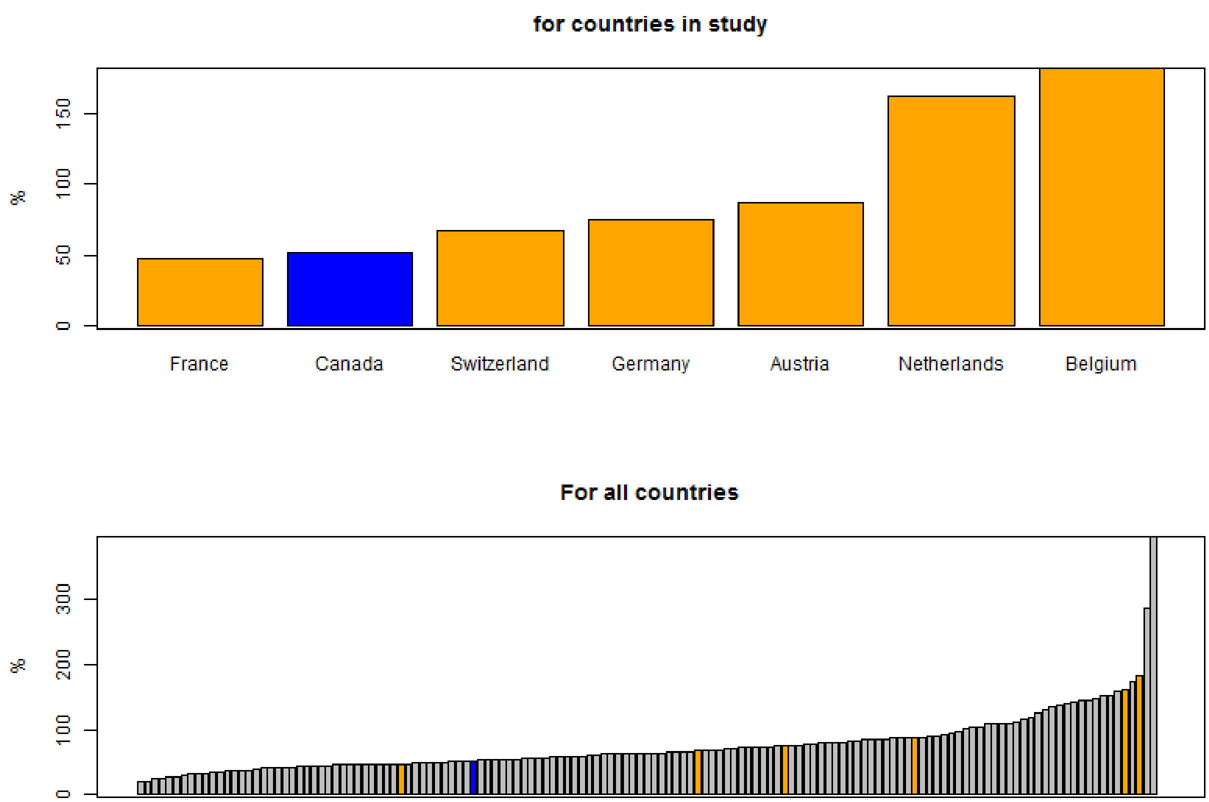


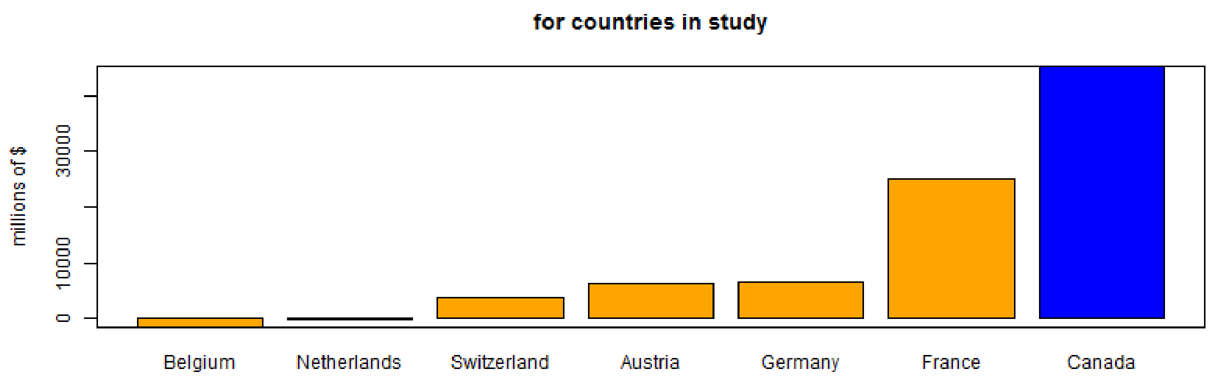
FIGURE 6 - Trade as % GDP 2012

Analysis by FDI inward flow

FDI (foreign direct investment) measures investment in one country that is controlled by another country. Inward flow measures investment into the economy of the subject country. The data used to calculate this are based on all reported transactions, and this is the central weakness of this dimension. That is, not all transactions are necessarily reported.

In terms of the subject region, there is a very large range within it, including Belgium with a negative value. Canada has a much larger FDI inward flow than any of the countries in the subject region.

In worldwide terms, the subject countries range quite widely. Several of them are at the upper end, some in the middle, and some at the bottom. Canada and France are up at the upper end, worldwide.



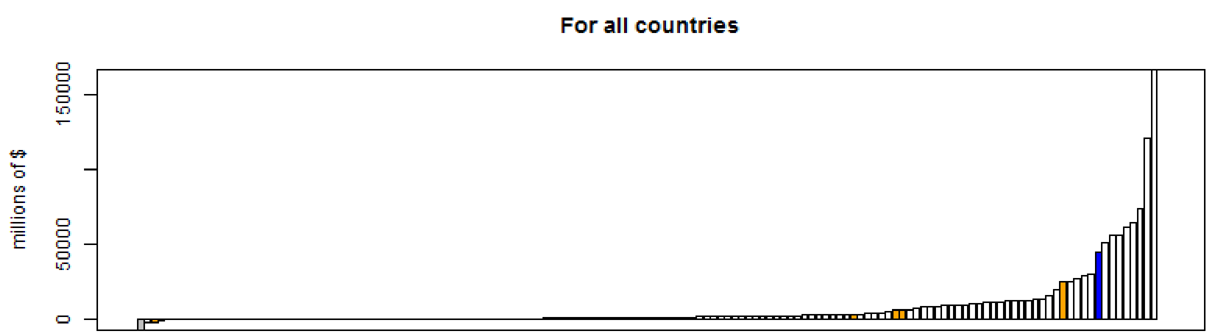


FIGURE 7 - FDI Flow Inward in millions of dollars (UNCTAD) 2012

Analysis by FDI outward flow

FDI (foreign direct investment) measures investment in one country that is controlled by another country. Outward flow measures investment from the subject country into an economy of another country. The data used to calculate this are based on all reported transactions, and this is the central weakness of this dimension. That is, not all transactions are necessarily reported.

In terms of the subject region, there is a very large range within it, including Netherlands with a negative value. Canada has a much larger FDI outward flow than any of the countries in the subject region except Germany.

In worldwide terms, the subject countries range quite widely. Many of them are at the upper end, some in the middle, and some at the bottom. Canada, Germany, Switzerland, and France are up at the upper end, worldwide.

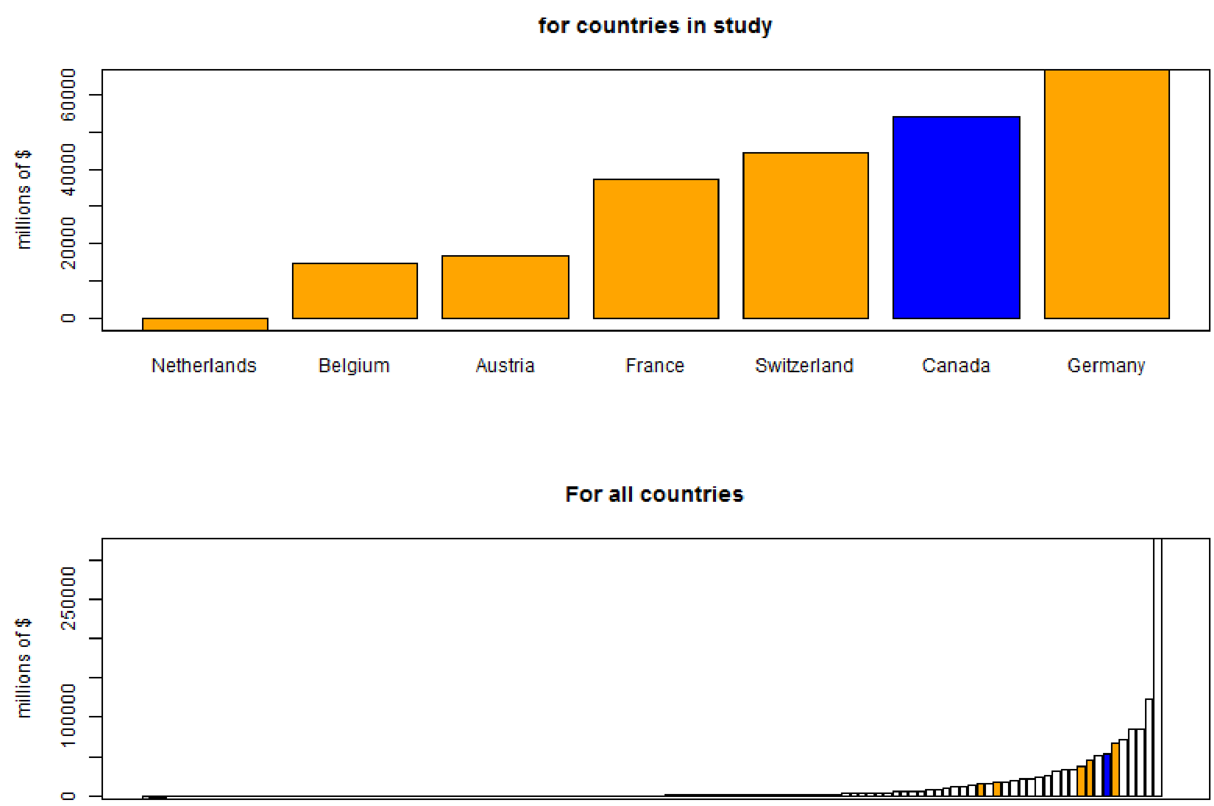


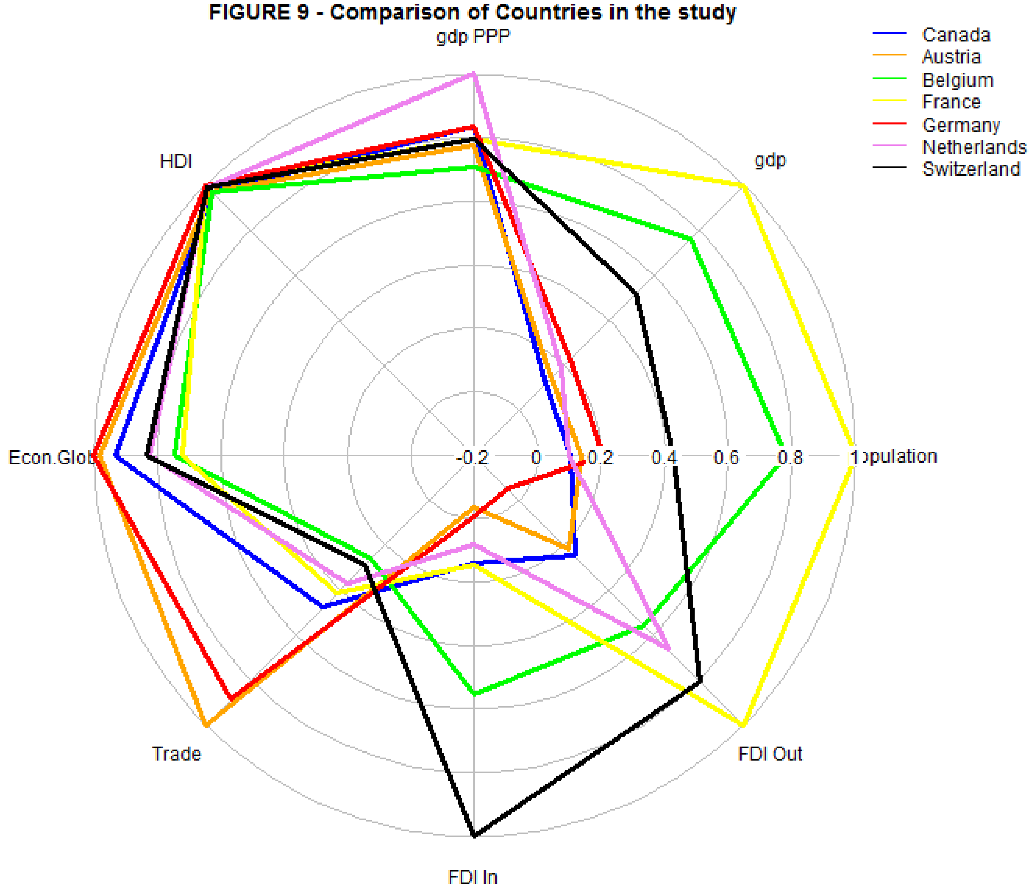
FIGURE 8 - FDI Flow Outward in millions of dollars (UNCTAD) 2012

Comparison of the Countries Under Study

To compare all countries in the study in terms of all the different dimensions, it was decided to employ the so-called ‘spiderweb’ plot. This is a circular plot, with equidistant lines corresponding to the different dimensions. The result is a polygon which can be used to represent each country in terms of the various dimensions. The data for each dimension is normalized so that the data for the different countries can be compared on the same graph.

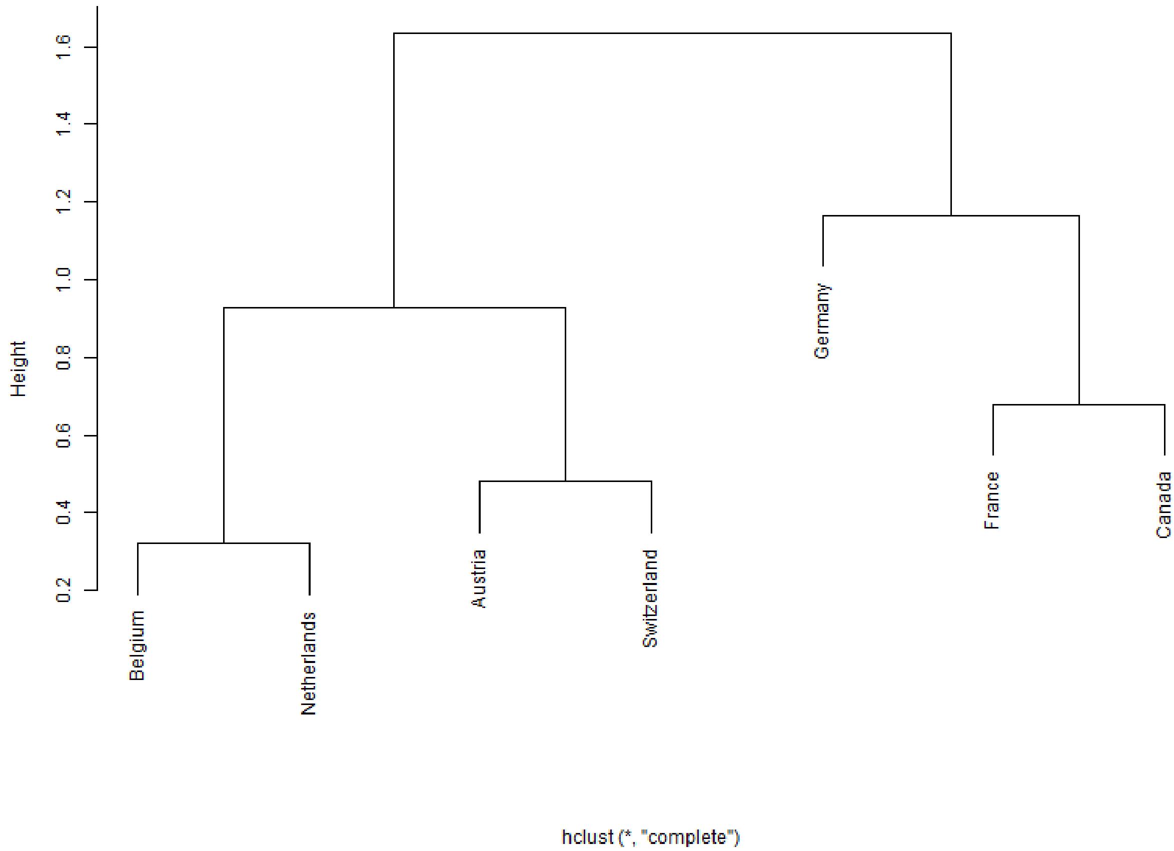
To see which countries are the most similar, one can study the graph and try to determine which polygons look the most similar.

FIGURE 9 - Comparison of Countries in the study



A numeric way to determine similarity between the countries is to use a clustering technique. With a dendogram type of analysis, one calculates the distance between each country (in terms of the various dimensions) and then determines which are closest to each other. Figure-10 shows the results of such an analysis.

FIGURE 10 - Cluster Dendogram Analysis



As can be seen, the countries within the region can be divided into two clusters :

Germany, France
Belgium, Netherlands, Austria, Switzerland

The outside country, Canada, is most similar to Germany and France.

This sort of analysis was done for all the countries in the database, but the result was a graph that was too complicated to be of much use. More sophisticated clustering techniques would be required to properly characterize such a large number of countries.

Conclusions

The subject region (Western Europe) and the comparison country (Canada) have been compared in terms of several different dimensions between each other and the rest of the world. When compared against each other, it appears that Western Europe can be divided into two major regions. The first region is composed of Germany and France, and the second region composed of everyone else. The second region can then be broken down into two sub-regions, Belgium and Netherlands, and Austria and Switzerland. Canada is most similar to Germany and France, at least given the current dimensions.

APPENDIX

```
##
## Configuring the World -- Assignment-1
##
## Program written by Brian Greiner
## September 18, 2014
##

##
## set the working directory
setwd("C:/Coursera/Configuring The World/Assignment-1")


##
## load the required libraries
library(xlsx)
library(plotrix)
library(tm)
library(FactoMineR)
library(gplots)


##
## read the databases
## use only the "data without small states" sheet, which is sheet-2
##
dataSet1 <- read.xlsx("..\\data\\CtW 1 Size, wealth and poverty.xlsx",2)
dataSet2 <- read.xlsx("..\\data\\CTW 2 Economic Globalisation and trade.xlsx", 2)


##
## extract the data specific to our region and country of interest
##
region = "Western Europe"
outsideCountry = "Canada"

dataSet1Region <- subset(dataSet1,Region==region ,stringsAsFactors=FALSE)
dataSet1Country <- subset(dataSet1, Country.==outsideCountry ,stringsAsFactors=FALSE)

dataSet2Region <- subset(dataSet2,Region==region ,stringsAsFactors=FALSE)
dataSet2Country <- subset(dataSet2, Country.==outsideCountry ,stringsAsFactors=FALSE)

countryNames <- c(as.character(dataSet2Region$Country.), as.character(dataSet2Country$Country.))


##
## analyse in terms of population
##
#dataSet1Country$Population.
#dataSet1Region$Population.
##
png(filename="figure-1.png", width=800, height=600)
par(mfrow=c(2,1))
popData <- data.frame(c(dataSet1Region$Population.,dataSet1Country$Population.), countryNames)
colnames(popData) <- c("population", "country")
popDataU <- popData
popData <- popData[order(popData$population),]
barColours <- c("orange", "orange", "orange", "orange", "orange", "orange", "orange")
barColours[popData$country==outsideCountry] <- "blue"
barplot(popData$population,
        names.arg = popData$country,
        col=barColours,
        main = "for countries in study",
        xlab = "",
        ylab = "Population (in thousands)")
box()
```

```
# look at all the countries in the database
dataSet1World <- dataSet1[order(dataSet1$Population.),]
barColours <- character(length(dataSet1World$Population.))
barColours[1:length(barColours)] <- "gray"
for(i in 1:length(countryNames))
{barColours[dataSet1World$Country.==countryNames[i]] <- "orange"}
barColours[dataSet1World$Country.==outsideCountry] <- "blue"

barplot(log(dataSet1World$Population.),
        #barplot(dataSet1World$Population.,
        col=barColours,
        main = "Population for all Countries",
        xlab = "FIGURE 1 - Population 2012",
        ylab = "log(Population in thousands)")
box()
par(mfrow=c(1,1))
dev.off()


##
## analyse in terms of GDP
##
##
png(filename="figure-2.png", width=800, height=600)
par(mfrow=c(2,1))
gdpData <-
data.frame(c(as.numeric(as.character(dataSet1Region$GDP.in.current.Dollars.2012..in.millions..)),

as.numeric(as.character(dataSet1Country$GDP.in.current.Dollars.2012..in.millions..))),
                      countryNames)
colnames(gdpData) <- c("gdp", "country")
gdpDataU <- gdpData
gdpData <- gdpData[order(gdpData$gdp),]
barColours <- c("orange", "orange", "orange", "orange", "orange", "orange", "orange")
barColours[gdpData$country==outsideCountry] <- "blue"
barplot(gdpData$gdp,
        names.arg = gdpData$country,
        col=barColours,
        main = "for countries in study",
        xlab = "",
        ylab = "GDP (in millions)")
box()

# look at all the countries in the database
gdpDataWorld <-
data.frame(as.numeric(as.character(dataSet1$GDP.in.current.Dollars.2012..in.millions..)),
                           dataSet1$Country.)
colnames(gdpDataWorld) <- c("gdp", "country")
gdpDataWorld <- gdpDataWorld[order(gdpDataWorld$gdp),]

#gdpDataWorld <- dataSet1[order(dataSet1$GDP.in.current.Dollars.2012..in.millions..),]

#gdpDataWorld <- gdpDataWorld[order(gdpDataWorld$GDP.in.current.Dollars.2012..in.millions..)]
barColours <- character(length(gdpDataWorld$gdp))
barColours[1:length(barColours)] <- "gray"
for(i in 1:length(countryNames))
{barColours[gdpDataWorld$country==countryNames[i]] <- "orange"}
barColours[gdpDataWorld$country==outsideCountry] <- "blue"

barplot(log(gdpDataWorld$gdp),
        col=barColours,
        main = "For all countries",
        xlab = "FIGURE 2 - GDP (in current dollars 2012)",
        ylab = "log(GDP)")
box()
par(mfrow=c(1,1))
dev.off()


##
## analyse in terms of GDP PPP
```

```
##
##
png(filename="figure-3.png", width=800, height=600)
par(mfrow=c(2,1))
gdpPPPData <-
data.frame(c(as.numeric(as.character(dataSet1Region$GDP.Per.Capita.based.on.PPP..2011)),

as.numeric(as.character(dataSet1Country$GDP.Per.Capita.based.on.PPP..2011))),
                         countryNames)
colnames(gdpPPPData) <- c("gdp", "country")
gdpPPPDataU <- gdpPPPData
gdpPPPData <- gdpPPPData[order(gdpPPPData$gdp),]
barColours <- c("orange", "orange", "orange", "orange", "orange", "orange", "orange")
barColours[gdpPPPData$country==outsideCountry] <- "blue"
barplot(gdpPPPData$gdp,
        names.arg = gdpPPPData$country,
        col=barColours,
        main = "for countries in study",
        xlab = "",
        ylab = "value")
box()

# look at all the countries in the database
gdpPPPDataWorld <-
data.frame(as.numeric(as.character(dataSet1$GDP.Per.Capita.based.on.PPP..2011)),
                              dataSet1$Country.)
colnames(gdpPPPDataWorld) <- c("gdp", "country")
gdpPPPDataWorld <- gdpPPPDataWorld[order(gdpPPPDataWorld$gdp),]
barColours <- character(length(gdpPPPDataWorld$gdp))
barColours[1:length(barColours)] <- "gray"
for(i in 1:length(countryNames))
{barColours[gdpPPPDataWorld$country==countryNames[i]] <- "orange"}
barColours[gdpPPPDataWorld$country==outsideCountry] <- "blue"

barplot(log(gdpPPPDataWorld$gdp),
        col=barColours,
        main = "For all countries",
        xlab = "FIGURE 3 - GDP PPP (GDP Per Capita based on PPP 2011)",
        ylab = "log(value)")
box()
par(mfrow=c(1,1))
dev.off()


##
## analyse in terms of HDI
##
##
png(filename="figure-4.png", width=800, height=600)
par(mfrow=c(2,1))
hdiData <-
data.frame(c(as.numeric(as.character(dataSet1Region$Human.Development.Index..HDI..value.2012)),

as.numeric(as.character(dataSet1Country$Human.Development.Index..HDI..value.2012))),
                      countryNames)
colnames(hdiData) <- c("hdi", "country")
hdiDataU <- hdiData
hdiData <- hdiData[order(hdiData$hdi),]
barColours <- c("orange", "orange", "orange", "orange", "orange", "orange", "orange")
barColours[hdiData$country==outsideCountry] <- "blue"
barplot(hdiData$hdi,
        names.arg = hdiData$country,
        col=barColours,
        main = "for countries in study",
        xlab = "",
        ylab = "value")
box()

# look at all the countries in the database
hdiDataWorld <- data.frame(as.numeric(as.character(dataSet1$GDP.Per.Capita.based.on.PPP..2011)),
                           dataSet1$Country.)
```

```
colnames(hdiDataWorld) <- c("hdi", "country")
hdiDataWorld <- hdiDataWorld[order(hdiDataWorld$hdi),]
barColours <- character(length(hdiDataWorld$hdi))
barColours[1:length(barColours)] <- "gray"
for(i in 1:length(countryNames))
{barColours[hdiDataWorld$country==countryNames[i]] <- "orange"}
barColours[hdiDataWorld$country==outsideCountry] <- "blue"

barplot(log(hdiDataWorld$hdi),
        col=barColours,
        main = "For all countries",
        xlab = "FIGURE 4 - Human Development Index (HDI) value 2012",
        ylab = "log(value)")
box()
par(mfrow=c(1,1))
dev.off()


##
## analyse in terms of Economic globalization
##
##
png(filename="figure-5.png", width=800, height=600)
par(mfrow=c(2,1))
eglobData <-
data.frame(c(as.numeric(as.character(dataSet2Region$Economic.Globalization.index..KOF..2011)),

as.numeric(as.character(dataSet2Country$Economic.Globalization.index..KOF..2011))),
                        countryNames)
colnames(eglobData) <- c("EconomicGlobalization", "country")
eglobDataU <- eglobData
eglobData <- eglobData[order(eglobData$EconomicGlobalization),]
barColours <- c("orange", "orange", "orange", "orange", "orange", "orange", "orange")
barColours[eglobData$country==outsideCountry] <- "blue"
barplot(eglobData$EconomicGlobalization,
        names.arg = eglobData$country,
        col=barColours,
        main = "for countries in study",
        xlab = "",
        ylab = "value")
box()

# look at all the countries in the database
eglobDataWorld <-
data.frame(as.numeric(as.character(dataSet2$Economic.Globalization.index..KOF..2011)),
                             dataSet2$Country.)
colnames(eglobDataWorld) <- c("EconomicGlobalization", "country")
eglobDataWorld <- eglobDataWorld[order(eglobDataWorld$EconomicGlobalization),]
barColours <- character(length(eglobDataWorld$EconomicGlobalization))
barColours[1:length(barColours)] <- "gray"
for(i in 1:length(countryNames))
{barColours[eglobDataWorld$country==countryNames[i]] <- "orange"}
barColours[eglobDataWorld$country==outsideCountry] <- "blue"

x <-which(is.na(eglobDataWorld$EconomicGlobalization))
barplot(eglobDataWorld$EconomicGlobalization[1:x[1]],
        col=barColours,
        main = "For all countries",
        xlab = "FIGURE 5 - Economic globalization index (KOF) 2011",
        ylab = "value")
box()
par(mfrow=c(1,1))
dev.off()


##
## analyse in terms of Trade as a % of GDP
##
##
png(filename="figure-6.png", width=800, height=600)
par(mfrow=c(2,1))
```

```
tradeData <- data.frame(c(as.numeric(as.character(dataSet2Region$Trade.as...GDP.2012)),
                          as.numeric(as.character(dataSet2Country$Trade.as...GDP.2012))),
                        countryNames)
colnames(tradeData) <- c("trade", "country")
tradeDataU <- tradeData
tradeData <- tradeData[order(tradeData$trade),]
barColours <- c("orange", "orange", "orange", "orange", "orange", "orange", "orange")
barColours[tradeData$country==outsideCountry] <- "blue"
barplot(tradeData$trade,
        names.arg = tradeData$country,
        col=barColours,
        main = "for countries in study",
        xlab = "",
        ylab = "%")
box()

# look at all the countries in the database
tradeDataWorld <- data.frame(as.numeric(as.character(dataSet2$Trade.as...GDP.2012)),
                             dataSet2$Country.)
colnames(tradeDataWorld) <- c("trade", "country")
tradeDataWorld <- tradeDataWorld[order(tradeDataWorld$trade),]
barColours <- character(length(tradeDataWorld$trade))
barColours[1:length(barColours)] <- "gray"
for(i in 1:length(countryNames))
{barColours[tradeDataWorld$country==countryNames[i]] <- "orange"}
barColours[tradeDataWorld$country==outsideCountry] <- "blue"

x <-which(is.na(tradeDataWorld$trade))
barplot(tradeDataWorld$trade[1:x[1]],
        col=barColours,
        main = "For all countries",
        xlab = "FIGURE 6 - Trade as % GDP 2012",
        ylab = "%")
box()
par(mfrow=c(1,1))
dev.off()


##
## analyse in terms of FDI Inward flow
##
##
png(filename="figure-7.png", width=800, height=600)
par(mfrow=c(2,1))
inwardData <-
data.frame(c(as.numeric(as.character(dataSet2Region$FDI.Flow.Inward.in.millions.of.dollars..UNCTA
D..2012)),

as.numeric(as.character(dataSet2Country$FDI.Flow.Inward.in.millions.of.dollars..UNCTAD..2012))),
                        countryNames)
colnames(inwardData) <- c("inwardFlow", "country")
inwardDataU <- inwardData
inwardData <- inwardData[order(inwardData$inwardFlow),]
barColours <- c("orange", "orange", "orange", "orange", "orange", "orange", "orange")
barColours[inwardData$country==outsideCountry] <- "blue"
barplot(inwardData$inwardFlow,
        names.arg = inwardData$country,
        col=barColours,
        main = "for countries in study",
        xlab = "",
        ylab = "millions of $")
box()

# look at all the countries in the database
inwardDataWorld <-
data.frame(as.numeric(as.character(dataSet2$FDI.Flow.Inward.in.millions.of.dollars..UNCTAD..2012)
),
                              dataSet2$Country.)
colnames(inwardDataWorld) <- c("inwardFlow", "country")
inwardDataWorld <- inwardDataWorld[order(inwardDataWorld$inwardFlow),]
barColours <- character(length(inwardDataWorld$trinwardFlowade))
```

```
barColours[1:length(barColours)] <- "gray"
for(i in 1:length(countryNames))
{barColours[inwardDataWorld$country==countryNames[i]] <- "orange"}
barColours[inwardDataWorld$country==outsideCountry] <- "blue"

x <-which(is.na(inwardDataWorld$inwardFlow))
barplot(inwardDataWorld$inwardFlow[1:x[1]],
        col=barColours,
        main = "For all countries",
        xlab = "FIGURE 7 - FDI Flow Inward in millions of dollars (UNCTAD) 2012",
        ylab = "millions of $")
box()
par(mfrow=c(1,1))
dev.off()


##
## analyse in terms of FDI Outward flow
##
##
png(filename="figure-8.png", width=800, height=600)
par(mfrow=c(2,1))
outwardData <-
data.frame(c(as.numeric(as.character(dataSet2Region$FDI.Flow.outward.in.millions.of.dollars..UNCT
AD..2012)),

as.numeric(as.character(dataSet2Country$FDI.Flow.outward.in.millions.of.dollars..UNCTAD..2012))),
                          countryNames)
colnames(outwardData) <- c("outwardFlow", "country")
outwardDataU <- outwardData
outwardData <- outwardData[order(outwardData$outwardFlow),]
barColours <- c("orange", "orange", "orange", "orange", "orange", "orange", "orange")
barColours[outwardData$country==outsideCountry] <- "blue"
barplot(outwardData$outwardFlow,
        names.arg = outwardData$country,
        col=barColours,
        main = "for countries in study",
        xlab = "",
        ylab = "millions of $")
box()

# look at all the countries in the database
outwardDataWorld <-
data.frame(as.numeric(as.character(dataSet2$FDI.Flow.outward.in.millions.of.dollars..UNCTAD..2012
)),
                               dataSet2$Country.)
colnames(outwardDataWorld) <- c("outwardFlow", "country")
outwardDataWorld <- outwardDataWorld[order(outwardDataWorld$outwardFlow),]
barColours <- character(length(outwardDataWorld$trinwardFlowade))
barColours[1:length(barColours)] <- "gray"
for(i in 1:length(countryNames))
{barColours[outwardDataWorld$country==countryNames[i]] <- "orange"}
barColours[outwardDataWorld$country==outsideCountry] <- "blue"

x <-which(is.na(outwardDataWorld$outwardFlow))
barplot(outwardDataWorld$outwardFlow[1:x[1]],
        col=barColours,
        main = "For all countries",
        xlab = "FIGURE 8 - FDI Flow Outward in millions of dollars (UNCTAD) 2012",
        ylab = "millions of $")
box()
par(mfrow=c(1,1))
dev.off()


##
## summarize everything in a spiderweb plot
##
# first, normalize all the specific items to the maximum value for that item
png(filename="figure-9.png", width=800, height=600)
maxPop <- max(popData$population)
```

```
maxGdp <- max(gdpData$gdp)
maxGdpPPP <- max(gdpPPPData$gdp)
maxHDI <- max(hdiData$hdi)
maxEconGlob <- max(eglobData$EconomicGlobalization)
maxTrade <- max(tradeData$trade)
maxFdiIn <- max(inwardData$inwardFlow)
maxFdiOut <- max(outwardData$outwardFlow)

items.names <- c("population", "gdp", "gdp PPP", "HDI", "Econ.Glob.", "Trade", "FDI In", "FDI
Out")

spiderColour <- c("blue", "orange", "green", "yellow", "red", "violet", "black")
spiderCountry <-
c(outsideCountry,countryNames[1],countryNames[2],countryNames[3],countryNames[4],countryNames[5],
countryNames[6])

radial.plot(spd,
            labels=items.names,
            rp.type="p",
            radial.lim=c(-0.2,1),
            line.col=spiderColour,
            lwd=3,
            main = "FIGURE 9 - Comparison of Countries in the study")
legend(1.2, 1.4,spiderCountry, lty=1, col=spiderColour, bty='n', cex=1)
dev.off()


##
## look at "closeness" by using denogram
##
png(filename="figure-10.png", width=800, height=600)
plot(hclust(dist(spd, method = "euclidean")),
     main = "FIGURE 10 - Cluster Dendogram Analysis",
     xlab = "")
dev.off()



## >>>>>  end of code  <<<<<
```