Country Risk Case Study[1]

The objective in this case is to cluster countries according to their risk for foreign investment. The following data has been collected for 122 countries:

- GDP growth rate (IMF)
- Corruption index (Transparency international)
- Peace index (Institute for Economics and Peace)
- Legal Risk Index (Property Rights Association)

The data and the analysis covered in Chapter 2 of Hull's book is in the following files:

countryriskdata.csv
countryriskdata_scaled.xlsx
countryrisk_kmeans_results.ipynb

We will refer to this as the Chapter 2 data.

You are required to:

(a) Carry out k-means clustering for k=3 with all four features (corruption index, peace index, legal risk index, and GDP growth rate) using the Chapter 2 data. Compare the countries that are in the high risk cluster with those that are in the high risk cluster when only three features are used (see Table 2.6).

(b) The Chapter 2 data is from the years 2016 and 2017. Data for the year 2019 is in the file Country Risk 2019 Data.xlsx. Use this data to calculate three clusters from the four features. Comment on how the clusters differ from those obtained with the Chapter 2 data.

(c) Use hierarchical clustering to determine three clusters from the peace index, legal risk index, and GDP growth rate using the Chapter 2 data. . Compare the countries that are in the high-risk cluster with those that are in the high-risk cluster when the k-means algorithm is used (see Table 2.6). A Python package, ***hierarchy***, for hierarchical clustering can be imported from sklearn.cluster. Try different measures of closeness (referred to as "linkage" in the package).

You should submit your Python notebook (*ipynb) and a short report (two pages or less) summarizing your findings.

[1] This case study and accompanying files were produced by FinHub, the Financial Innovation Lab at the Joseph L. Rotman School of Management, University of Toronto.