Pharmaceutical supply chain analytics & supply planning

1. Problem description

Pharmaceuticals for testing and treating HIV are shipped to many African countries regularly and in large quantities as part of health care projects launched by World Health Organisation, United Nations and other institutions. Thereby, two man groups of pharmaceuticals can be distinguished: HIV tests and HIV treatment drugs. Both groups of pharmaceuticals comprise a bunch of different products offered by many different suppliers.

The data set "data_orders.xlsx" contains shipment data of HIV pharmaceuticals to 8 African countries over a time span of about 10 years. Each order is described by the destination (country), mode of transportation, INCOTERMS, pharmaceutical information, supplier as well as shipment size, volume, and value. Additionally, for some shipments transportation cost are given. A description of the data set can be found here [https://www.kaggle.com/divyeshardeshana/](https://www.kaggle.com/divyeshardeshana/supply-chain-shipment-pricing-data)[supply-chain-shipment-pricing-data](https://www.kaggle.com/divyeshardeshana/supply-chain-shipment-pricing-data).

2. Task

Based on the data, analyze the supply relations with respect to mode of transportation, INCOTERMs, delivery reliability (earliness/lateness), suppliers as well as transport cost. Derive rough estimates of the transportation costs for each relation. Additionally, analyze the demand distribution for both groups of pharmaceuticals in each country. Based on the results of the aforementioned analyses, derive and solve a model to supply the African countries most cost-efficiently with the required pharmaceuticals by selecting proper lot sizes, suppliers and transport modes.