Supply Chain optimisation

Objective function:

To find the optimal locations of manufacturing facilities to meet your customers' demand and reduce production costs.

Supply chain optimization makes the best use of data analytics to find an optimal.

In this case, we will present a simple methodology using Linear Programming for Supply Chain Optimization considering

- Fixed production costs of your facilities ($/Month)
- Variable production costs per unit produced ($/Unit)
- Shipping costs ($)
- Customer's demand (Units)

Problem Statement

To design the Supply Chain Network for the next 5 years considering various costs and the forecasts of future demand.

Supply Chain Network

- 2 types of manufacturing facilities: low capacity and high capacity sites.
- Shipping costs ($/container)
- Customer's demand (Units/year)
- 5 markets in Brazil, USA, India, Japan, Germany.

Manufacturing Facility Fixed Costs

- Capital Expenditure for the equipment (Machines, Storage)
- Utilities (Electricity, Water)
- Factory management, administrative staff
- Space Rental

These costs depend on the country and the type of plant.

Production Variable Costs

- Production lines operators
- Raw materials

Shipping Variable Costs

- Cost per container ($/Container)
- Assumption: 1 container can contain 1000 units.

Result

- Brazil is producing for the local market only

  Facilities: 1 low capacity plant

  ('Brazil','Brazil') = 145,000 **(Units/Month)**
- The USA started to produce for the local market and Japan

  Facilities: 1 high capacity plant

  ('USA','Japan') = 200,000 **(Units/Month)**

  ('USA','USA') = 1,300,000 **(Units/Month)**
- India closed its low capacity factory

  Facilities: 1 high capacity plant

  ('India','Germany') = 90,000 **(Units/Month)**

  ('India','India') = 160,000 **(Units/Month)**

  ('India','USA') = 1,500,000 **(Units/Month)**
- Japan starts to produce for its local market

  Facilities: 1 high capacity plant

  ('Japan','Japan') = 1,500,000 **(Units/Month)**

  Because of their limited production capacity, Japan and the USA rely on the Indian plant.

Final Costs

Total Costs = **92,981,000 ($/Mont**