Homework 12T

This is a group assignment. All group members must make a substantive contribution to the work submitted in order to receive credit for this assignment.

Clifton Running Shoes (CRS) specializes in high-end trail running shoes. As mud runs and trail races have increased in popularity in the United States, CRS has experienced dramatic growth over the last five years. CRS has two production plants located in Trenton, New Jersey and Stockton, California. Both plants make all models of CRS shoes, and production is split between the two plants. CRS currently has distribution centers (DCs) in Denver, Colorado and Pittsburgh, Pennsylvania. Karen Fisher, the director of logistics has decided it is time to take a hard look at the CRS supply chain and has gathered the following data:

- Forecasted annual demand for 505 customer zones (in pounds),
- Inbound freight cost in ($/pound) from each of its two plants to each of 15 candidate DC locations,
- Handling charges ($/pound) at each candidate DC location,
- Outbound freight cost ($/pound) from each candidate DC location to each customer zone, and
- Transit time (days) from each candidate DC location to each customer zone.

Karen would like to have a fresh analysis of the potential DC locations, but the plant locations should be considered fixed. More specifically, does CRS have the right number of DCs and are they in the best locations? In addition to understanding the logistics costs, Karen would also like to know the level of customer service as measured by the percentage of shipments from DCs to customer zones that can be delivered in at most two days. The available data for the analysis is provided in the Excel workbook *CRS_data.xlsx*. You should submit two documents detailing your work and analysis:

- One page executive summary (MS Word .docx file) and
- Jupyter Notebook containing your code with supporting tables and graphs.

At a minimum, your work should answer the following questions:

1. What is the cost and level of customer service for the current CRS distribution network?
2. What are the cost and the customer service level for the optimal distribution network designs with 1, 2, 3, . . . , and 10 distribution centers?
3. Which distribution network design and DC locations do you recommend and why?