ok but need something to differentiate from Brunel example.

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CS 524: Introduction to Optimization Fall 2025
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Optimising Shipping Costs - Project Spec

1. What is the issue being addressed?

Two plants share a common logistics network that includes ports, carriers, warehouses, shops, and products. Both plants manufacture the same type of product, but their production methods differ, resulting in varying production costs. However, because the market is competitive, both plants must sell their products at the same price. Since one plant uses a cheaper production method, it carries a higher risk of defects. Additionally, each warehouse connected to a shop must contain at least 140% of the quantity of good (non-defective) products available in that shop. Also, the earlier plants introduce their product to the market, the more customers have the opportunity to see it, and it is more likely to be purchased by them. If a plant uses a carrier that has faster delivery, it can get its products to the market soon, which in turn comes with a cost. Each warehouse also has a storage cost, but the warehouse does not accept any defective products for storage because of safety regulations. The main objective is to determine the optimal logistics path for each plant that **maximizes overall profit**. I'll try to include variables such as climate and other holidays that might affect the cost of transporting the goods by the ports and carriers in my model.

2. Where does the data come from, and how will it be obtained?

I will first try to build a simple network based on my idea, and after debugging my model, I'll use it on this dataset[1] that I got from Brunel University's website. Also, if possible, I'll try to synthesise a dataset such that it will be synonymous with me opening a business in my hometown.

3. What is the optimization problem underlying this project?

Maximise the profit of both plants. Also, get an idea of how many shops each plant should distribute to so that they can maximise profit.

4. What are the deliverables?

First, I will try to build a model for each plant that will find the path it should take to maximise the profit. Second, I'll try to build a single model that can find the optimal path for both plants. Third, I built a visualisation of the optimal path compared to the other paths using visualization tools such as Matplotlib or Geopandas. Lastly, I will include climate into the equation that might affect the rates at ports and carriers.

5. Other points for me to consider when evaluating.

I need to make sure that the optimisation turns out to be realistic. Also, I need to keep an eye on the constraints that I'm enforcing so that it is feasible.

1. [Link to dataset](#)

How does this differ from Brunel example problem? Maybe good to add "stochastic" issue that good delivered is defective with small probability. Then solve the stochastic program.