D605 Task 1: Business Case Analysis Scenario 1

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A.

The business need in the ABC Logistics scenario is to maximize profits while ensuring customer satisfaction. Since the goal is to maximize profits, an optimization approach would be appropriate.

A1.

To maximize profits, the business approach will be to optimize the truck delivery routes. Since we have the fleet information, delivery points, distance matrix, and competitor information, optimizing the truck delivery routes to reduce cost would help maximize the company’s profits. This will save money on fuel, maintain customer satisfaction, and help reduce CO2 emissions, as wanted by ABC Logistics.

A2.

The linearity in the optimization problem can be seen in the truck routes as well as the total cost for the company. These can be modeled by linear equations.

A3.

From the models listed in the course material, I believe that this optimization problem could satisfy a few of the classifications. Part of the resource allocation could be construed to be a **linear programming problem.** The course also details that for **combinatorial optimization problems**, vehicle routing problems are a given example. That does appear to align with the problems that the company is facing. However, this also goes in hand with **network optimization problems**, which can be characterized by finding the shortest path. Since we are focused on optimizing the truck routes, the shortest paths for them to take would be optimal. Thus, I believe this optimization problem has a few types to it.

B.

The main optimization objective is to maximize profits while maintaining customer satisfaction. The secondary objective is to reduce CO2 emissions to also reduce their carbon footprint. Decision variables are variables that “can be adjusted or controlled to achieve the optimal solution.” (WGU Course Materials). In this scenario, the decision variables would then be the number of trucks, the capacity of each truck, the type of truck, and each truck’s route. Two constraints in the scenario are the time window for delivery, which impacts customer satisfaction as well as capacity, as there is a maximum weight that each truck can hold.

B1.

The end point considerations of this scenario are that profits should increase, customer satisfaction should at least not go down, and that the company should reduce carbon emissions.

C.

Although I mentioned in Part A3 that there are a few potential fits for the type of optimization problem, I believe that the **network optimization problem** is the overall best fit for this scenario. Since we are so focused on improving the fleet efficiency, we want the shortest route on each trip. This in turn should maintain customer satisfaction, as well as help reduce carbon emissions since each truck route would be shorter.

D.

WGU (n.d.) *Lesson 1.1: What Are Optimization Models?* Retrieved March 31st, 2024 From D605: Optimization Course Materials

WGU (n.d.) *Lesson 2: Optimization Considerations* Retrieved March 31st, 2024 From D605: Optimization Course Materials