

## LSC Student Case Competition: Case Description

In this case study, you are asked to analyze the network design and distribution decisions of a company introducing its product in a new metropolitan area. Particularly, Company ABC has recently decided to enter the market in city XYZ to sell its product, which is a daily used non-perishable product.

ABC wants to decide on its distribution network for the product in city XYZ. Prior to entering any market, ABC prepares a market analysis to estimate the demand for its product. The following steps are executed to complete the market analysis for city XYZ:

- City XYZ has been divided into 30 representative districts
- A sample size representative of each district's population has been determined
- In each district, a number of households, equal to the sample size, has been surveyed

In the survey, ABC prepared questions to estimate the current demand for similar products and the demand for its product. Therefore, one of the main questions in the survey was whether similar products are consumed by the household and, if so, what is the daily usage level. The other important question in the survey was whether the person consuming similar products would switch to ABC's product. As a result of these surveys, ABC has gathered the following data for each district:

- Daily usage of similar products in each district
- Percentage of households, who are using similar products, who answered 'definitely yes', 'yes', and 'maybe' to the question whether they would use ABC's product instead of their current brand

The results of the survey are given in the case data (Market Survey Results tab). After market analysis, ABC estimates the demand in each district. You need to do this analysis based on a search in marketing literature and the interpretation on "Definitely Yes", "Yes", and "Maybe".

In other cities, where the product is being sold, the distribution processes are operated as follows:

- The product is delivered to the customers from retailer stores. The retailer stores are standardized, i.e., they have the same capacities and same operating costs. To remain profitable, an open retailer store should at least have a pre-specified number of daily sales. For operating a store, there are two parts of cost in each week, fixed weekly operating cost that is the same for any district (e.g., labor cost) and additional weekly cost that is different among districts (e.g., rental). The total operating costs of having of a store in a district is the sum of the two if there is a store in the district.
- Retailer stores are located around the centers of the defined districts. ABC determines at which districts retailer stores should be opened.
- Retailers are responsible for a set of districts and they deliver to the customers at their assigned districts. ABC determines the districts assigned to open retailer stores.

- Retailers use minivans to deliver the product to the customers. One minivan is sufficient to deliver 100 units to the customers within a day.
- The product is manufactured in production facilities located around the city. ABC determines where the production facilities are located. The cost of operating a production facility is similar to operating a retail store.
- Retailers are supplied from production facilities located around the city. ABC determines which open retailer stores are supplied from which production facilities.

To supply the customers in city XYZ, ABC is considering locating production facilities around city XYZ. There are 5 alternative sites to locate production facilities. These alternative sites are in sub-urban areas around city XYZ. The specifications of a possible production facility in each alternative site and the distances between any alternative site and any district are given in the case data (Alternative Production Sites tab).

The production facilities can deliver the product to the retailers on a daily basis. Given the locations of the production facilities and the retailer stores, ABC determines how often each retailer will receive delivery from the production facility supplying it. That is, ABC determines the inventory replenishment decisions among the retailer stores and the production facilities. Estimated daily inventory holding cost per unit of product at the retailer stores is 1% of the unit production cost (inventory holding cost at the production facilities is considered negligible). The shipments between the retailer stores and production facilities are delivered with trucks owned by ABC. ABC has single type of truck such that one truck can carry 750 units and costs \$3 per mile traveled on average while the minivan costs \$1 per mile traveled on average.

To establish its supply network and distribution plans in city XYZ, ABC needs to determine locations of production facilities, locations of retailer stores, the production facilities each retailer store will be supplied, the delivery frequencies between production facilities and retailer stores, and the districts each retailer store will cover.

In this case study, you are asked to help ABC to establish its supply network and distribution plans to market its product in city XYZ. The data ABC has is given in the Case Data file.