Subject: Optimizing Production and Distribution Operations at Super Chip

To: Super Chip

From: Jonathan Wilson

Executive Summary

By replacing the proportional-capacity model with a simplified transportation LP, we cut combined shipping and production costs by ***$550,816***, lowering total expenses from $49.63 million to $49.08 million. Expanding Richmond's capacity by about **62K units** yields an additional ***$23,794 in savings***, and the current network can absorb projected demand at an ***extra $4.94 million*** operating cost warranting a pricing adjustment. Equipping Alexandria with advanced manufacturing technology promises a further ***$2.40 million reduction*** in production costs.

Purpose & Background

Super Chip is a fictitious chip manufacture based in VA. They have five manufacturing facilities Alexandria, Richmond, Norfolk, Roanoke, and Charlottesville. Super Chip makes 30 different chip products and distributes to 23 different sales regions across the US. Each facility has different production capacity levels, equipment and costs for set-up processes. There area also variations in shipping distances and shipping material requirements, different shipping costs.

Super Chip would like recommendations as to how they should carry out their production and distribution operations for the following fiscal year. Included in the recommendation, Super Chip is interested in evaluating certain strategic-level questions:

1. Currently, each facility produces each of the 30 types of chips at levels that are proportional to the facility's total portion of production capacity. However, Super Chip is a recommendation for alternative production policies to minimize their operations costs.
2. Where should Super Chip expand production capacity for a single facility by utilizing its investment capital by purchasing additional equipment?
3. Does Super Chip have sufficient capacity to handle the estimated increase in demand?
4. Which facility should receive the new manufacturing technology to reduce production costs?

Recommendations

Reco to 1: By adopting the alternative model, which forgoes the proportional production-capacity constraint in favor of a simplified, more relaxed transportation LP, we can ***reduce combined shipping and production costs by $550,816***. Total operational expenses fall from $49,634,247 in the proportional (base) case to $49,083,430 under the alternative scenario.
Reco to 2: It's recommended that we increase the production capacity for ***Richmond by ~61,899 units*** which will ***yield an additional $23,794*** in savings in addition to what we saved using the alternative model. No other facility had any benefit to adding additional capacities. This will loosen the constraint on supply for the Richmond facility.
Reco to 3: It looks like Super Chip ***will be able to handle the demand*** but will sustain and ***additional cost of $4,940,989.87*** to operations. It's recommended that an appropriate price structure be initiated in order to cover the costs.
Reco to 4: It's recommended that Super Chip place this new technology at the ***Alexandria facility*** as it will have an additional *cost savings of $2,401,007.*

*For more details on the analysis and models used see the methodology & analysis.