

What We Did: A route optimization tool to develop optimal transportation routes from DC to stores

The Impact We Made: Reduced 30% of transportation costs and number of miles traveled

Summary - Route optimization tool to reduce transportation costs

A leading convenience retailer was leveraging 3rd party logistics providers to run their transportation network. The client was interested in identifying opportunities to optimize the transportation routes from DC to stores in order to reduce transportation costs. Mu Sigma worked with the client to develop a solution that proposed new routes that resulted in a 30% reduction in transportation costs. This solution incorporated capabilities to plan loads better and come up with the right set of stops on each route to lower the number of miles traveled and optimally utilize trailers of right size in the fleet.

About The Client - A leading retailer

The client is a leading convenience retailer in the US with over 8000 stores. It works through 4PLs to manage the distribution of inventory from the DCs to franchisee stores.

The Challenge - High distribution costs

The client observed that the distribution costs in one of their largest markets were higher than the national average. This implied that there was room for improvement. Since the management of the transportation network was completely outsourced, the client needed a robust solution that could be adopted by the 4PL vendors, with ease and scale.

The Approach - Route optimization

A three-step approach was adopted to solve the problem collaboratively with the client:

- Acquired all available data from 4PL, and extrapolated wherever data was missing, to develop a baseline model. One of the smaller problems that had to be solved was to derive the gross weight and cube conversion factors for each of the SKUs being sold. This information was not available in the client. The Mu Sigma team had to devise an agile approach to look at historical shipment data to derive the conversion factors which were then validated by the client and

logistics provider. This model measured current performance in terms of total miles, total cost, empty miles, average wait time at store, delivery frequency to store, etc.

- Developed a genetic algorithm augmented by heuristics to develop optimal routes while respecting operational constraints related to stores, drivers, fleet and CDC operations
- During the course of the project, the client was conducting commercial negotiations with the logistics provider managing the Florida network. The results from the network analysis were presented to the logistics provider to get them on board to implement the recommendations. A few additional refinements had to be made to the model based on the feedback of the logistics provider
- Analyzed multiple scenarios related to fleet mix, number of stores in each route, stop times, etc. These scenarios were socialized with the client and 4PL, and refined based on their feedback
- Since the initial results for Florida pilot were very encouraging, the genetic algorithm was coded into an application which allowed a client logistics user to assess the effectiveness of routes of any of the 25 National DCs and then determine more optimal alternatives. Multiple steps relating to data collection were automated to achieve the goal of being able to perform route audits for any DC within 3 weeks

The Outcome - Optimized process of route allocation

- The new routing solution helped reduce the distribution costs for the pilot DC by reducing the total number of miles by 28% and the total number of trucks by 12% on a monthly basis
- The client now has a tool to conduct route audits which enables the process to be completed for any new DC within 3 weeks
- Following the successful outcome of the pilot, the solution is being replicated across all the DCs

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