Supply Chain Network Analysis for Outboard Motors at Motor Boaters U.S.A

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INTRODUCTION

Motor Boaters (MB) U.S.A is a recognized leader in power sports industry. MB U.S.A imports outboard motors into Tacoma, Washington from Japan. From the Tacoma. From the Atlanta warehouse, the motors are transported via truck to dealers and OEMs.

The main goal of this project was to analyze 2018 shipping data and a three year forecasted data to optimize the outboard motor shipment distribution by reducing the transportation costs and decreasing the distance travelled. To achieve this goal, we took into consideration the average of inventory stored, models and dimensions of units, ocean, warehouse, and transportation rates, volume growth assumptions, and transit times by mode. The scope of the project included the creation of a historical baseline, generation of a model baseline, comparison of the historical baseline to the model baseline " What-If Scenarios" and calculations.

METHOD

Analyze the data and create historical and model baseline:

- Cleansing the data into similar categories using Microsoft Excel. The data cleansing included separating the Less than Truckload (LTL) and Full Truckload (FTL) data shipments from Tacoma and Atlanta.

- Cluster the large sets of data using the enhanced K-means clustering algorithm method. K-means clustering method allowed the team to reduce all mileages from shipments to each of the fifty states to an average.

- Number of times a truck visited each state was multiplied by the clustered value in order to find the weight each state had on the nation distribution network.

- Once all data cleansing and clustering were done, three what-if scenarios were studied and analyzed.

RESULTS

Scenario 1 Vs. 2018

1.2% increase in cost
60.8% decrease in miles

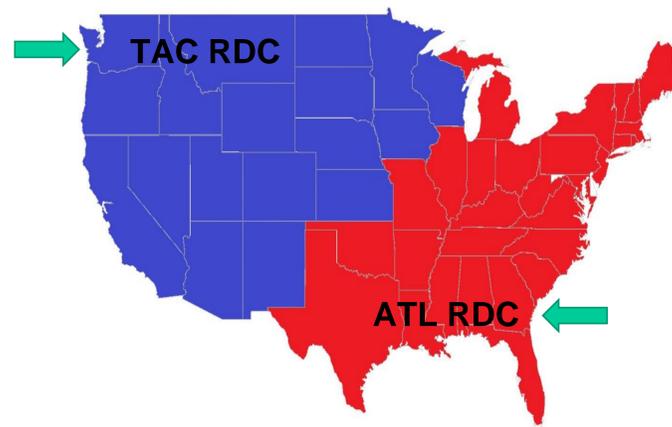**Figure 1 – Scenario 1 for LTL**

Scenario 2 Vs. 2018

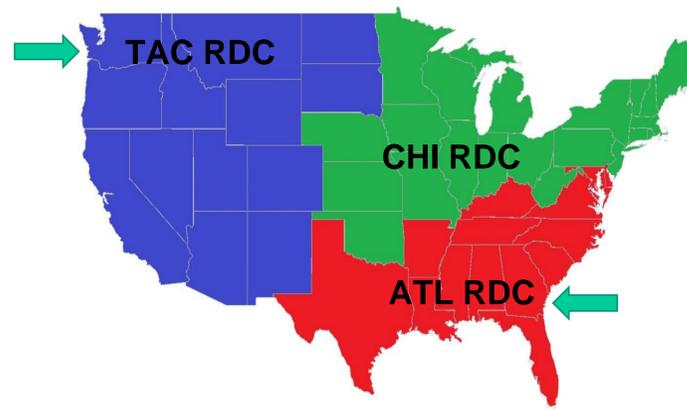**27.5% decrease in cost**
72.5% decrease in miles

Figure 2 – Scenario 2 for LTL

Scenario 3 Vs. 2018

41.4% decrease in cost
82.0% decrease in miles

Figure 3 – Scenario 3 for LTL

*FTL Results are not shown. Due to the nature of the FTL method, calculations carried out for FTL, in the same way calculations were carried out for LTL, led to inaccurate results.

"WHAT-IF" SCENARIOS

Scenarios analyzed:

1. Moving the port-of-entry from Tacoma to Savannah and using Atlanta as the RDCs .

2. Having a port-of-entry both in Tacoma and Savannah with Tacoma and Atlanta representing the RDC for the West and East, respectively.

3. Tacoma and Savanah were the port-of-entry with Tacoma, Atlanta, and Chicago representing the RDCs for the Pacific, Midwest, and Southwest, respectively.

DISCUSSION

At the end of 2018, the total cost of shipping units, by ocean, from Japan to Tacoma and then shipping units, by truck, from Tacoma to the retailers amounted to $10,819,727.35, which corresponds to the historical baseline. Comparing the three scenarios for LTL to the historical baseline, the team discovered that scenario three, which corresponds to a port-of-entry in Tacoma and Savannah and a RDC in Atlanta, Chicago and Tacoma, is the most cost effective choice. It was determined that shipping by rail the merchandize from Tacoma port-of -Entry to Chicago by rail is the most cost-effective option. The total cost for this scenario were estimated at $6,340,423 which corresponds to a 41% savings. The total mileage savings were estimated to $39,340,673 which corresponds to an astounding 82% savings.

CONCLUSION

In today competitive market, supply chain processes have been greatly influencing business trades globally. Therefore, it is necessary for the Motor Boaters U.S.A continually improve their supply chain networking while decrease the total cost of operations. An efficient and cost effective network can be achieved by having a port-of-entry in Savannah and Tacoma and a RDC in Atlanta, Chicago and Tacoma. Doing so, the company will greatly decrease the transportation cost and have a faster shipping process.