

Network Optimization of a D2C Supply Chain

AMERICAN
INDUSTRIAL
PARTNERS

BUSINESS PROBLEM

DistroCo is a US distributor of hygiene products. Through high service, product expertise, and excellent customer retention, DistroCo has enjoyed three decades of consistent growth and is well-positioned amongst favorable market macro-trends. However, recent inflationary pressures have caused less-than-average profitability, prompting a renewed focus on cost optimization and pricing. DistroCo's largest cost line-item behind COGS is shipping expense. Current pricing strategy absorbs shipping rather than passing it on to the consumer directly. DistroCo has opportunity to reduce expense, transit times, and service through network optimization.

DATA SOURCES

DistroCo has plentiful data, including productivity, inventory, lead times, pricing, COGS, shipping, fulfillment, order, and other invoice data. Data is collected by DistroCo's home-grown ERP system and stored in an Oracle database. It can be queried via SQL. Additional data can be gathered through employee interviews, customer call "double jacking," and in-house time studies.

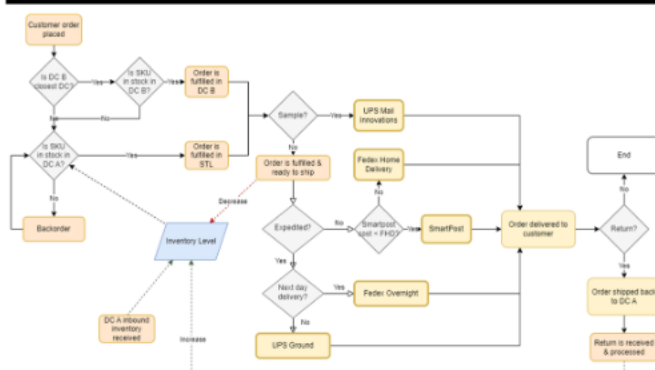
Data Types and Format

Data types include structured and time series order, invoice, and fulfillment data. Call center data includes audio and structured data.

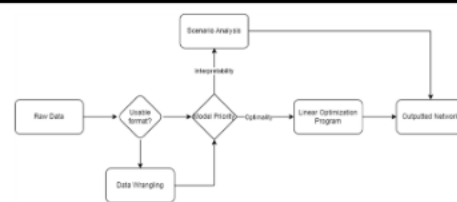
APPROACH

This approach will include (1) development of a future-state network design with shipping as the primary driver, (2) optimization of fulfillment expense including shipping, middle-mile freight, & rent, and (3) scenario analysis of future business segment growth and associated risk. Revenue drivers, such as charging for shipping, will be trialed to understand customer sensitivity to responsiveness.

Fulfillment Logic:



Model Logic:



IMPACT

This project paves the way for significant cost reduction, improved customer behavior, and better understanding of operational costs. Specifically, the impact of this project includes (1) a greater understanding of customer geographic dispersion relative to existing network layout, (2) tools for encouraging customers to consolidate their orders into fewer, more cost effective shipments, and (3) a roadmap for a lower cost of fulfillment, lowering total cost and improving net profits. The work in this project was performed in conjunction with key team stakeholders, who asked the right questions, facilitated engagement across the organization, and can champion implementation of the recommendation.

DRIVERS



The primary catalysts of the savings found in this work are (1) rising logistics prices exacerbating layout cost differences, (2) the rent/buy decision over-emphasizing the benefits of utilizing owned space, and (3) the vertical integration of DistroCo with a manufacturer consolidating its manufacturing location.

BARRIERS



Barriers to this project include (1) constraints on team time, (2) differing business priorities, and (3) uncertain pricing information, particularly as the cost to ship has and continues to change rapidly with inflation.

ENABLERS



(1) Entrepreneurial spirit. The company core team of founders have largely remained in today's leadership roles and retain the same sense of entrepreneurial spirit that grew the company over three decades. This entrepreneurial spirit is apparent in the team's openness to try new things and continuously improve. (2) Stakeholder support. The senior leadership team supported this project fully, enabling it as a priority.

ACTIONS



(1) The solution was developed in partnership with DistroCo team members. This incorporation into the planning process improved team alignment and led to a better solution. (2) The solution was presented as a range of alternatives, over which the senior leadership team could discuss tradeoffs not captured directly in the model. This improved buy-in and overall team understanding.

INNOVATION



(1) This solution shows similar results between a simple, simulation analysis and a more complex linear optimization program. The recommendation are to simplify the tool utilized to increase overall interpretability. (2) Order consolidation campaign shows meaningful reduction in fulfillment cost by simply fulfilling fewer individual boxes. Essentially, spend less by shipping less.

IMPROVEMENT



(1) Network optimization solution provides roadmap to a 5% reduction in total scoped cost with minimal impact to existing operations. (2) Order consolidation testing shows 60-70% customer acceptance rate to consolidating orders (lowering total shipping cost).

BEST PRACTICES



(1) Over-communicate the problem statement and problem-solving technique to ensure alignment. (2) Understand your data through visualization and discussion with local experts. (3) Simplify the problem and solution as much as possible. Emphasize interpretability to improve stakeholder involvement and buy-in. (4) Think outside the box.

OTHER APPLICATIONS



(1) Small data problems eligible for simulation solution rather than optimization. (2) Small to medium sized distributors attempting network optimization. (3) Scenario analysis testing.