Designing the Supply Chain for CanDi

From 3PL Dependence to an Optimized Distribution Network

Supply Chain Analytics — Final Project

$22.2M	**329K**	**110**	**3**
Annual Revenue	Bags / Week	SKUs	States Served

Our Recommendation: Open CT + MA DCs

~$1M/yr

(vs. all-direct LTL from NY at $2.7M/yr)

CT + MA DCs: $1.67M/yr total cost. Supply with FTL trunk-line to DCs. From DCs 3PL handles last-mile coordination to customers.

ME weekly leased truck from NY ($93.6K/yr). Far cheaper than a $200K DC for only 4% of volume.

We chose Periodic Review (R,S) — weekly cycle as our go to replenishment method. DCs wont have mixed boxes while ME will allow mixed boxes because lower demand.

Maine DC not justified ($200K for 9 pallets/wk)

All-direct from NY: $2.7M — too expensive

The Hidden Cost: Mixed Pallet Surcharge

The $1/box surcharge adds ~$117K/year (CT+MA). Tail & Connoisseur segments are 100% mixed — but FTL savings still dominate the economics. The FTL trunk-line savings from aggregating all volume at the DC still outweigh the $117K annual surcharge, making DC stocking the economically superior choice for these segments as well.

Left: annual surcharge by region. Right: % of boxes on mixed pallets. Mass/Mainline have low surcharge; Tail/Connoisseur are 100% mixed.

The CanDi Challenge

After 2 years using expensive 3PL distributors, CanDi must build its own supply chain deciding where to warehouses, how to ship, and what to stock where.

FTL is Point-to-Point

Full trucks go to ONE destination. Max customer = 3.4 pallets vs. 20-pallet truck.

$200K/yr Per DC

Each regional DC has a steep fixed cost. Volume must justify investment.

$1/box Surcharge

Mixed pallets at DCs incur a hidden $1/box fee — devastating for low-volume SKUs.

MA dominates with 63% of volume (~163 pallets/wk). ME is only 4% (~6 pallets/wk) — barely one-third of a truckload.

Why Direct Delivery Fails

No customer fills even 1/5 of a truck — FTL wastes 83% of capacity. Regional DCs aggregate volume → $0.02/bag FTL vs. $0.15/bag LTL. **DECISION:** CT + MA vDCs: $1.67M/yr total cost; ME LTL because of narrow delivery time frames over LT low cost.

Leased truck (multi-stop) cheaper than LTL but requires CanDi to manage strict customer delivery windows. Operationally not feasible for a small company.

Left: weekly cost by mode and state. Right: cost per bag vs. the $0.50 margin. Via Regional DC (green) is cheapest across all states.

All 8 Warehouse Configurations

Decision: *CT + MA is the clear winner at $1.67M/yr.*
Adding ME (+$227K) makes All 3 DCs more expensive. Without any DCs, ME LTL direct costs $2.69M.

Where Does the Money Go?

Left: full cost breakdown for 4 key scenarios. Right: incremental impact of each DC — MA saves $870K, CT adds $145K more, but ME costs $227K extra.

Inventory: Lean & Responsive

37 pallets
Safety Stock

60-93×
Inv. Turns/yr

$27K/yr
Holding Cost

95%
Service Level

Key assumptions:

- *25% annual holding cost rate; independent customer demands across region.*
- *Demand pooling at DCs reduces CV → proportionally less safety stock. Periodic Review (R,S) with weekly cycle aligned to customer ordering.*