



ASCM CASE COMPETITION

In collaboration with

Deloitte.

Navigating pandemic supply challenges

Team ID: 2230672

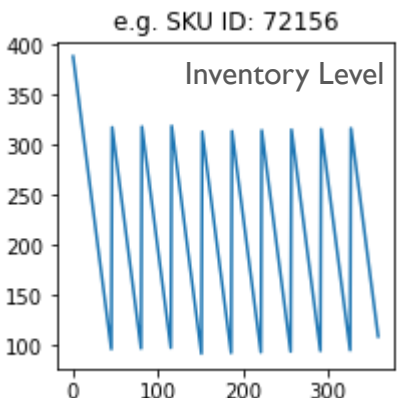
Executive Summary

Inventory Management

- Objectives
- Calculate Obsolete Inventory
 - Find Change in Inventory Position

Model Considered:
Deterministic Demand

- Unknown Parameters:
1. Economic Order Quantity
 2. Order Aggregation



Constant APU after considering trend_{APU} **Initial On order Inventory = 0**
Reason: Model considered is Deterministic Demand. Reason: No explicit data mentioned in Exhibit 2
This is based on the forecasting methods followed in supply chains of fragile goods.

Assumptions

Initial and Final Back order Inventories = 0
Reason: No data in Exhibit 2 regarding
1. Initial Back order Inventory
2. Final Lead Time after considering S-OTD thus leading to no specific way to simulate arrival delay in model

Obsolete Inventory

Formulae used for derivation :

- Obsolete Inventory of an SKU = $Standard\ Price * (Initial\ Inventory - Yearly\ Demand)$
 - Yearly Demand = $APU(1 + trend_{APU}) * 12$
 - Initial Inventory = $\frac{On-Hand\ Stock}{Standard\ Price}$
 - Safety Stock = $Z_{\alpha}\sqrt{(\mu_L\sigma_D^2 + \mu_D^2\sigma_L^2)}$
- $\mu_D = Daily\ Demand$
 $\mu_L = Lead\ Time * S - OTD$
 $\sigma_D = COV_D * \mu_D$
 $Z_{\alpha} = 1.645$

Both Demand and Delivery Lead Time are assumed to be normally distributed

Defined KPI

Obsolete Inventory

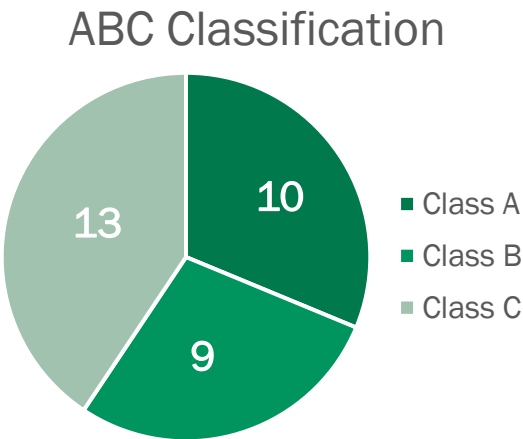
Safety Stock

117.36 %

#obsolete SKUs

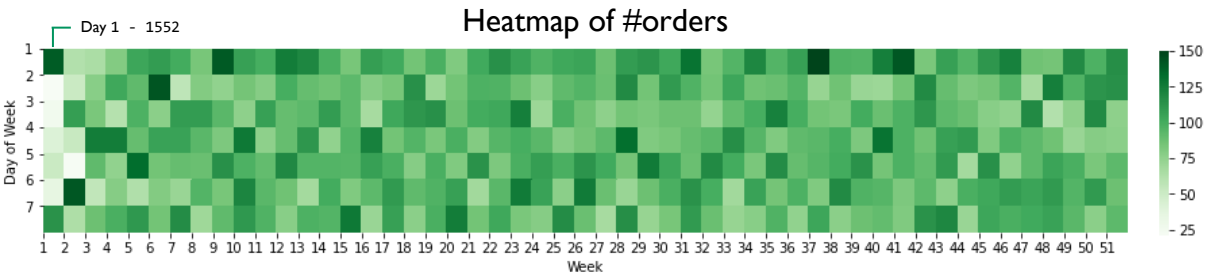
32

Class	Condition
A	10 > KPI
B	100 > KPI ≥ 10
C	KPI ≥ 100



Unaccounted parameters for Cost Reduction

On average 94 SKUs are placed on order for replenishment daily



- Order Aggregation** because of lacking data in terms of Coordinated Transportation for delivering multiple SKUs
 - For SKUs sourced from single supplier :
 - Constraint for Lot Sizes to maintain Full Truck Load
 - Managing Joint Economic Lot Sizes for profitability
 - For aggregating order arrivals from multiple suppliers :
 - Information systems to organize dispatches based on lead times
- Economic Order Quantity** due to absence of data on
 - Holding Cost
 - Ordering Fixed Cost
 - Supplier Discounting Schedule

Potential 32 obsolete SKUs result to a Total Obsolete Inventory of \$ 50,140.797

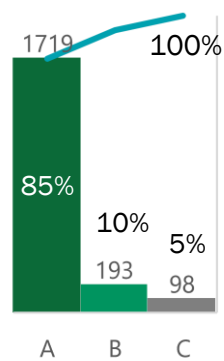
Working Capital Impact

Observed SCM Metrics

Gross Inventory Ordered	= \$ 921,037,718.242	97.696%
Total Stockout Loss	= \$ 50,272,666.496	Average
Overall Demand	= \$ 848,623,825.109	Service Level
Max. acquired Overall Service Level = $100 \left(1 - \frac{\text{Stockout Loss}}{\text{Demand}}\right) = 94.076 \%$		

\$46,008,199.786	\$80,738,869.44	\$118,422,092.919
Initial Inventory	Final Inventory	Final On order Inventory

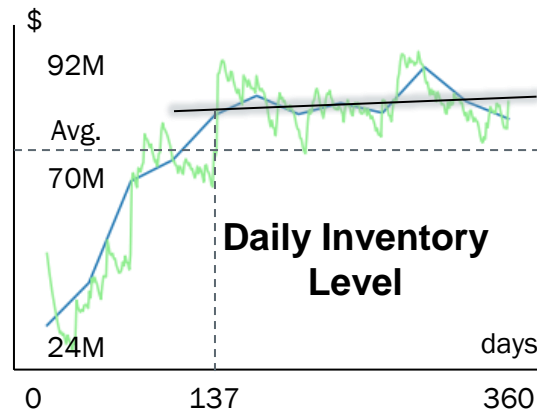
Pareto Chart



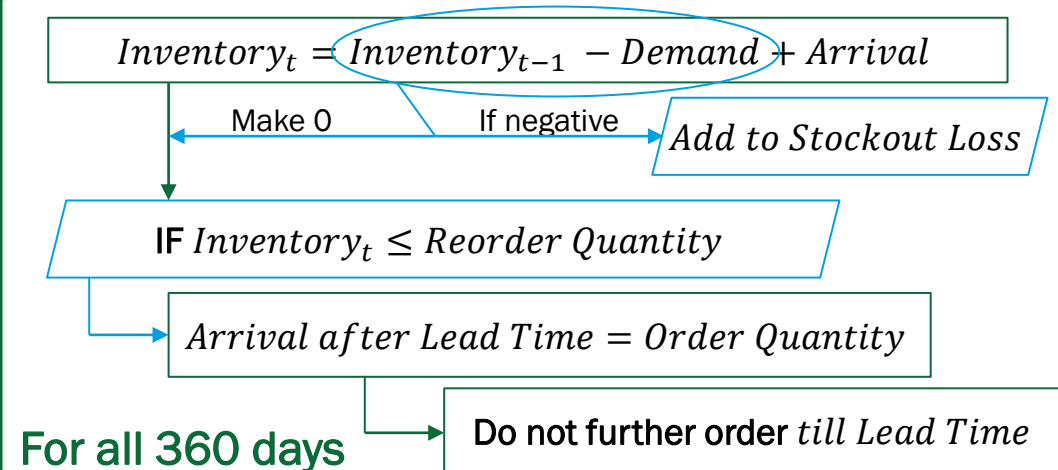
ABC Classification

Class	Condition
A	SL > 95 %
B	95 % > SL ≥ 90 %
C	90 % > SL

* SL – Service Level



Inventory Management Schema for SKUs



Formulae used for calculation :

- Change in Inventory Position = $\text{Final Inventory} - \text{Initial Inventory} + \text{Final On order Inventory}$
- Final On order Inventory = $\text{Gross Inventory Ordered} - (\text{Overall Demand} - \text{Initial Inventory})$
- Reorder Quantity = $\text{Expected Lead Time Demand} + \text{Safety Stock}$
- Order Quantity = $\text{Lead Time Demand} + \text{Safety Stock}$
- Daily Demand = $\frac{APU}{30} (1 + \text{trend}_{APU})$

Value of Assets under Inventory shall increase by \$ 153,152,762.573

Conclusion

Inventory Management

\$ 50,140.797

Total Obsolete Inventory
From 32 obsolete SKUs

\$ 153,152,762.573

Working Capital Impact
Increase of Assets under Inventory

→ Recommendations

- For SL Class C (service level < 90%),
average Lead Time = 78 days
 - To increase overall SL, source these 98 SKUs from local suppliers
- To create positive Working Capital Impact, increase Inventory Turnover Ratio