



# **ASCM CASE COMPETITION**

In collaboration with

**Deloitte.**

**Navigating pandemic supply challenges**

Team ID: 2230672

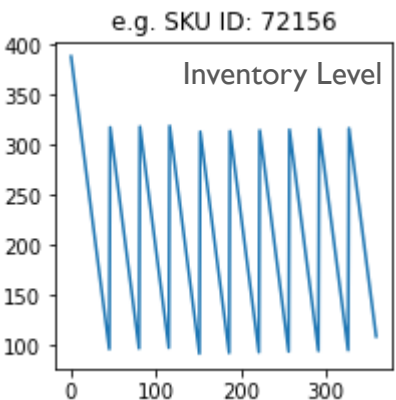
# Executive Summary

## 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<sub>APU</sub>**      **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 =  $Initial\ Inventory - Standard\ Price * Yearly\ Demand$
- Yearly Demand =  $APU(1 + trend_{APU}) * 12$
- Initial Inventory =  $On - hand\ Stock$
- Safety Stock =  $Z_{\alpha}\sqrt{(\mu_L\sigma_D^2 + \mu_D^2\sigma_L^2)}$

$$\mu_D = \text{Daily Demand}$$

$$\mu_L = \text{Lead Time} * S - OTD$$

$$\sigma_D = COV_D * \mu_D$$

$$Z_{\alpha} = 1.645$$

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

Defined KPI

Obsolete Inventory

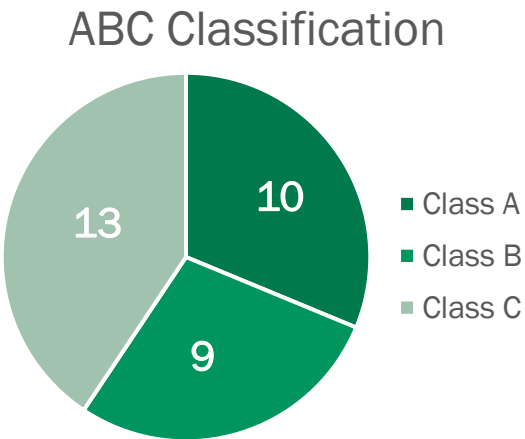
Safety Stock

117.36 %

#obsolete SKUs

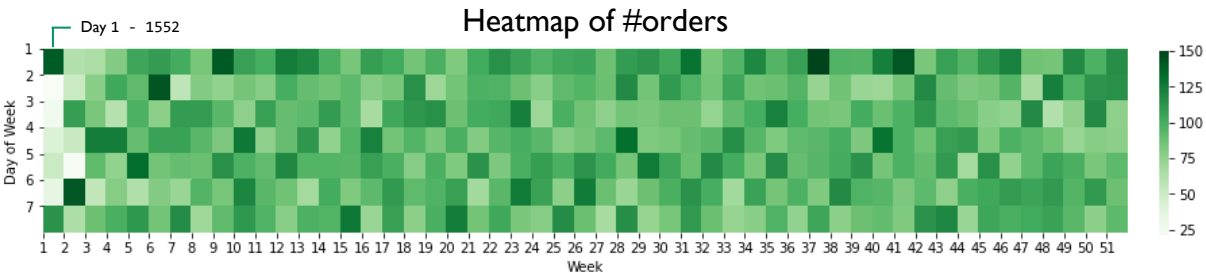
32

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



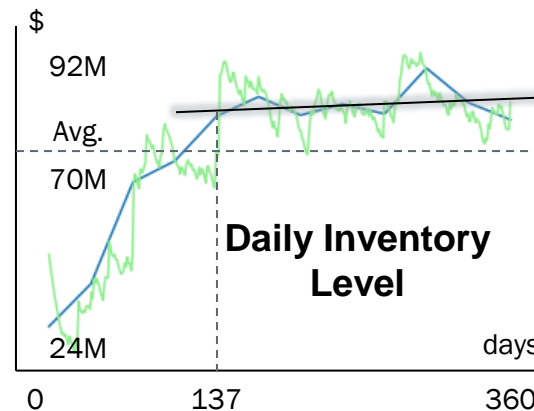
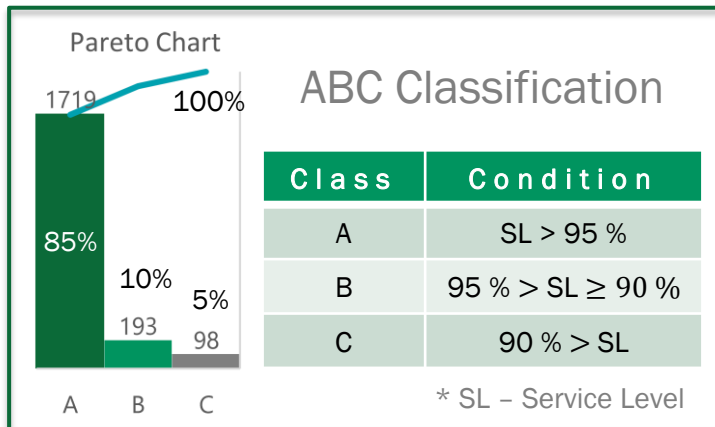
- Order Aggregation** because of lacking data in terms of Coordinated Transportation for delivering multiple SKUs
  - For SKUs sourced from single supplier :
    - Constraint for Lot Sizes to maintain Full Truck Load
    - Managing Joint Economic Lot Sizes for profitability
  - For aggregating order 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

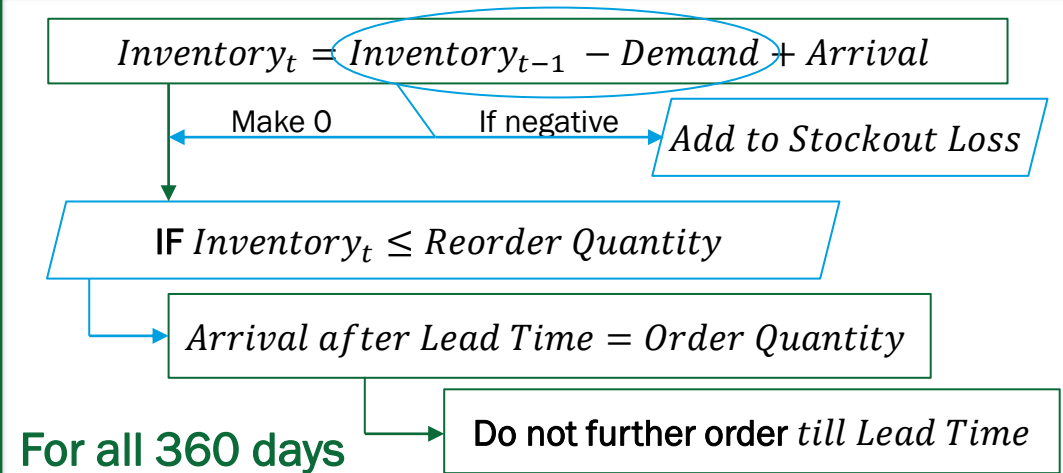
# Working Capital Impact

## Observed SCM Metrics

<b>Gross Inventory Ordered</b>	= \$ 921,037,718.242	<b>97.696%</b>
<b>Total Stockout Loss</b>	= \$ 50,272,666.496	<b>Average</b>
<b>Overall Demand</b>	= \$ 848,623,825.109	<b>Service Level</b>
<b>Max. acquirable Overall Service Level</b> = $100 \left(1 - \frac{\text{Stockout Loss}}{\text{Demand}}\right) = 94.076 \%$		
<b>\$46,008,199.786</b>	<b>\$80,738,869.44</b>	<b>\$118,422,092.919</b>
<b>Initial Inventory</b>	<b>Final Inventory</b>	<b>Final On order Inventory</b>



## 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