Customer Suggested Ordering
Enhancing Sales and Efficiency

Problem Statement
Context: Order-taking is a core process at CC SW, where frontline employees check stores inventory and formulate orders using an Order Suggestion Tool. Orders qualify directly impact CC SW’s business and operational efficiency.

Order-taking Process Overview
1. Check sales floor needs
2. Check back-room inventory
3. Write an order
4. Order preparation
5. Delivery

Current pains
Average suggestions
• Manual calculations & adjustments
Experience-dependent
Time-consuming

Opportunities
Improve Order Suggestions:
• Can we account for trends & seasonality?
• Can we facilitate operations?
• Can we support volume growth?

Goal
Develop a Customer Suggested Ordering solution that enhances CC SW’s sales & efficiency

Scope:
4700 Home Market Stores in the Dallas-Fort Worth area (DFW)
1.4M sq ft
93M rows in sales data

Methodology
1. Sales Forecast
• Challenges:
  - Different schedules & visits frequency
  - Different SKUs sold at each visit & store
  - Different trade channels
  - Order quantities sparsity
• Forecast at the store-week-SKUs grouping level
• Best model selection (per trade-channel)
• Machine Learning models
  - Supermarket
  - Convenience Store
  - Discount Store

2. Out-of-Stocks (OOS) Prevention
• Out-of-data Stock Extraction
  - Features: Out-of-stock records, sales of the past 4 weeks, calendar
• Logistic Regression Modeling
  - Estimates probability of out-of-stock for each SKU and store given past sales and next week forecast
• Reducing risk of Out-of-stock
  - Increase suggestions when probability of out-of-stock exceeds 45%

3. Growth Potential Exploitation
• Estimate stores’ growth potential leveraging the potential model developed by a previous CC SW-MIT Case project

4. Suggestion disaggregation
• Disaggregation
  - Suggestion per week & grouping
  - Suggestion per day & SKU
• Layers adjustments
  - Promote full layers sales to facilitate warehouse operations

Results
Better forecast performance:
- Our Forecast: 0.43
- 22% Global wMAPE
- 3.3% Expected sales captured
- 230K sq ft weekly with OOS prevention (+25%)
- 110K sq ft weekly with growth potential (+11%)
- 62% Suggested volume can be delivered in full layers

Impact
By suggesting more accurate and efficient order quantities, we are...

Impacting core processes
- Enhancing stores sales & inventory control
- Facilitating warehouse operations and distribution

Improving the frontline experience
- Less pressure on frontline employees
- Dedicating more time to value-adding activities

Supporting business growth
- Optimizing product availability
- Capturing additional sales opportunities

Data
Demographics
- Gender/Race, Income, Education, Population
Stores
- 4700 Home Market Stores
Internal Sales
- 2 years of sales, with store ID, SKU ID, Date, Quantity
Weather
- Store location
Out-of-stocks
- Out-of-stock (in-store, Store ID, SKU ID, Date)
Skills
- Forecasting, Machine Learning, Competitive Analysis

Available data:

- 7 Core Channels
  - Supermarket
  - Convenience Store
  - Discount Store
  - General Merchandiser
  - Home Merchandiser
  - Mass Merchandiser

Evaluation
- Eq
- Forecast Accuracy
- Accuracy of OOS prevention model
- Accuracy of growth potential model
- Accuracy of suggestion disaggregation model

Zoom on Sales Forecast

Sample:
- Dec 2020 - May 2023
- Validation
- Test柘le 2022 Can

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Tests & Evaluation:
- Eq
- Accuracy of OOS prevention model
- Accuracy of growth potential model
- Accuracy of suggestion disaggregation model

Example:
- Week June 6, 2023
- Grouping: Cansmartnamate
- 23.7 oz Plastic Bottle
- 1. Sales forecast per store, week, & SKU geometries
- 2. OOS prevention
- 3. Growth potential exploitation
- 4. Suggestion disaggregation per store, day, & SKU