LEVERAGING E-COMMERCE SITES TO ABSORB RETAIL STORES’ EXCESS INVENTORY

By: Hyuk Jin Cho and Ketan Lahoti
Adviser: Dr. Bruce C Arntzen
Sponsor: CSV Health
LEVERAGING E-COMMERCE SITES TO ABSORB RETAIL STORES’ EXCESS INVENTORY

By: Hyuk Jin Cho and Ketan Lahoti
Advisor: Dr. Bruce C Arntzen
Sponsor: CSV Health
Carries over 3,000 SKUs

9,600 Stores across US

No. 1 Retail Pharmacy business in the US
I DON'T FEEL GOOD...I’M GONNA PICK UP THE PRESCRIPTION DRUG THAT THE DOCTOR WROTE FOR ME FROM THE STORE.
WELCOME TO CVS!
WE HAVE ALL THE DRUGS YOU NEED.
HOW MAY I HELP YOU?
COME TO CVS AGAIN!
BUT...

FORECAST ACCURACY

CLIMATE CHANGES

PROMOTION
EXCESS INVENTORY
BACK IN 2015...

TOO MUCH EXCESS INVENTORY !!!
REDUCED EXCESS INVENTORY
REDUCED EXCESS INVENTORY...BUT THE COST INVOLVED WAS HIGH...
OBJECTIVE

AUTOMATED PROCESS
For each SKU at each store (non-controlled drugs):

1. Calculate Average Weekly Sales (outbound)
   \[
   \text{Average Outbound} = \frac{\text{Sum of sales for a SKU in a store across 52 weeks}}{52}
   \]

2. Calculate Weeks of Supply (WOS)
   \[
   \text{Weeks of Supply} = \frac{\text{Inventory on hand at Week 52}}{\text{Average Outbound}}
   \]

3. Compare with the standard weeks of supply
   \[
   \text{Excess Inventory (weeks)} = \text{Current WOS} - \text{Target inventory levels}
   \]

4. Convert back to units for excess weeks of supply
   \[
   \text{Excess Inventory (units)} = \text{Excess Inventory (weeks)} \times \text{Average Outbound}
   \]

5. Multiply excess units with Average Wholesale Price (AWP)
   \[
   \text{Excess inventory value} = \text{Excess inventory units} \times \text{AWP}
   \]

6. Sum all excess inventory value across the system
1. Calculate Average Weekly Sales (outbound)
2. Calculate Weeks of Supply (WOS)
3. Compare with the standard weeks of supply
4. Convert back to units for excess weeks of supply
5. Multiply excess units with Average Wholesale Price (AWP)
6. Sum all excess inventory value across the system
## RESULT

<table>
<thead>
<tr>
<th>Top X SKUs</th>
<th>Total Savings ($M)</th>
<th>% Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>84.33</td>
<td>8.11%</td>
</tr>
<tr>
<td>5</td>
<td>208.22</td>
<td>20.03%</td>
</tr>
<tr>
<td>10</td>
<td>300.46</td>
<td>28.91%</td>
</tr>
<tr>
<td>20</td>
<td>426.16</td>
<td>41.00%</td>
</tr>
<tr>
<td>30</td>
<td>516.83</td>
<td>49.72%</td>
</tr>
<tr>
<td>40</td>
<td>588.49</td>
<td>56.62%</td>
</tr>
<tr>
<td>50</td>
<td>647.61</td>
<td>62.31%</td>
</tr>
<tr>
<td>60</td>
<td>697.71</td>
<td>67.13%</td>
</tr>
<tr>
<td>70</td>
<td>740.93</td>
<td>71.28%</td>
</tr>
<tr>
<td>80</td>
<td>778.67</td>
<td>74.92%</td>
</tr>
<tr>
<td>90</td>
<td>811.84</td>
<td>78.11%</td>
</tr>
<tr>
<td>100</td>
<td>841.08</td>
<td>80.92%</td>
</tr>
</tbody>
</table>

Proportion of total potential inventory reduction by # of SKUs sent by each store to the mail centers

![Graph showing proportion of total potential inventory reduction](image)
Traditional
FUTURE RESEARCH

Traditional

Leveraging E-commerce

Lateral Transshipment
Q&A