Delivering Better Fulfillment Decisions

As omnichannel retailers increasingly use stores as a major fulfillment source, many are finding that using Practical AI tools to consider more than just shipping costs can be very profitable.

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INTRODUCTION

During the past five years, leading retailers have been dramatically increasing the use of their stores as part of their omnichannel fulfillment mix. As evidence of this trend, a recent survey[1] suggests that over three-quarters of retailers are now using stores as part of their fulfillment strategy.

This is occurring because retailers have realized it can be faster and less expensive to ship from a store near the customer rather than from a distribution center. Some retailers are attempting to capture these benefits through shipping decisions based solely upon the customer's location. Others are making these determinations on an order-by-order basis, incorporating strategies to identify the lowest cost source for the specific order, including minimizing split shipments.

While these are positive strides, the next frontier in terms of improving profitability is expanding the decision process to consider not just the expected cost of shipping the item, but also the likelihood that the considered item will sell at full price at its current store location. The profit impact of this decision can be several times more significant than any shipping cost differences. This is especially true for retailers that sell goods where assortment rotates seasonally, and where some items sell out while others become subject to late-season markdowns.

Making this decision correctly takes us from a relatively simple cost optimization problem to an area where 'Practical AI' tools can play a key role in realizing full profit potential.

1 'Future of Fulfillment Vision' - Zebra Technologies - 2018, https://www.zebra.com/content/dam/zebra_new_ia/en-us/solutions-verticals/vertical-solutions/retail/vision-study/fulfillment-vision-study-report-en-us.pdf

PRACTICAL AI

"AI" has become an extremely hyped buzz-phrase, and while attention-grabbing articles about mechanical Jeopardy champions and paintings created by algorithms are entertaining to read, our experience is that successful AI applications in large corporations typically originate from finding narrow and targeted opportunities to apply data and math to improve processes with high profit leverage. Particularly well suited are those processes where large volumes of repeated decisions are being made, across time or a network of locations, and under conditions of uncertainty.

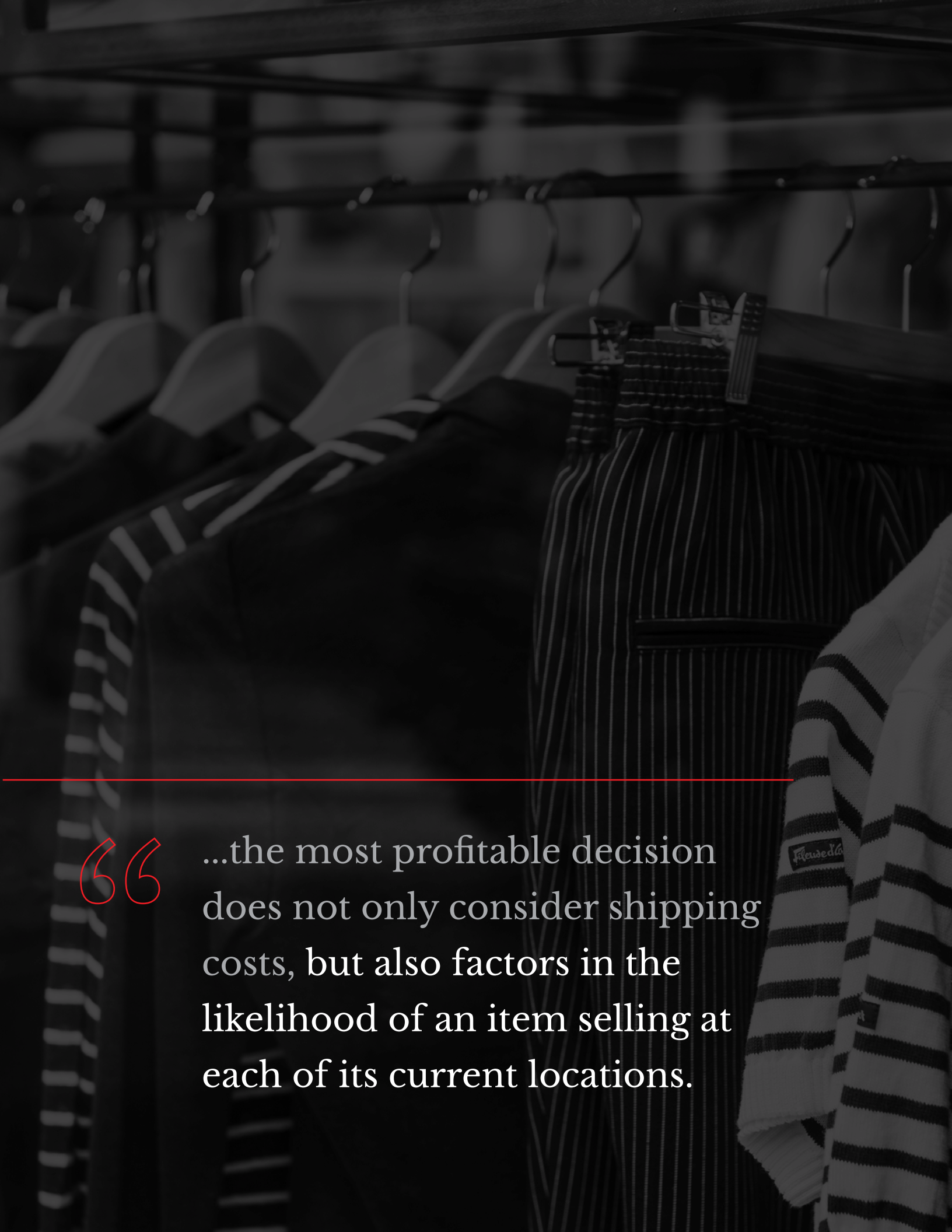
IMPROVING FULFILLMENT DECISIONS WITH PRACTICAL AI

Improving the profitability of fulfillment decisions is a perfect example of a 'Practical AI' application, with the critical insight being that the most profitable decision does not only consider shipping costs, but also factors in the likelihood of an item selling at each of its current locations.

Here is a hypothetical example. A customer in Alexandria, Virginia buys a $50 blouse online, near the end of the spring season. The blouse delivers a 50% margin to the retailer at full price.

The cost to ship the blouse from the Fulfillment Center is $6.00. But there are two stores in the customer's expanded trade area that can deliver less expensively: delivery from the store in Tyson's Corner, Virginia would only cost $3.00, and delivery from the store in Philadelphia would cost $5.00.

Based upon these inputs, a cost minimizing system would recommend that the blouse be shipped to the customer from the Tyson's Corner location.



> ...the most profitable decision does not only consider shipping costs, but also factors in the likelihood of an item selling at each of its current locations.

However, AI can deployed to answer a key question: will the blouse have to be discounted at each store, as the season concludes, to clear inventory and make way for the fall line?

The AI system might find that the blouse in question is highly likely to sell out at Tyson's Corner, but it is predicted to need to be discounted by 30% to sell in Philadelphia as the spring season concludes.

In this example, shipping the blouse from Philadelphia becomes the superior alternative. While it costs $2.00 more than shipping from Tyson's Corner, the blouse will drive $15.00 more margin when sold at full price from the Philadelphia store's inventory than it will when discounted at season's end. This margin gain is not relevant if the blouse is shipped from Tyson's Corner because the blouse is expected to sell out at that location at full price regardless.

TABLE 1

Incremental margin alternatives for the blouse in Philadelphia store

	Price	Markdown	Shipping Cost	Product Cost	Net Margin
Sell now online, with higher shipping cost	$50	*n/a*	- $2	- $25	$23
Sell later in store after markdown	$50	- $15	*n/a*	- $25	$10

This simple illustration becomes more complex as orders are received with multiple items that can be shipped from multiple locations, and costs for split shipments are factored in. It can also be extended to consider the expected margin from the inventory at the Fulfillment Center itself.

Enhancing the decision-making process to capture this opportunity is possible with an AI system that can:

- Make a granular, real-time demand prediction for each item to sell at full price or different markdown levels – by SKU by store
- Calculate product and shipping costs, and use historical sales data to inform the economic trade-off of holding inventory too high or too low versus actual demand at each location
- Make a 'best bet' decision about from which store (or Fulfillment Center) to ship the item to optimize expected profit
- Automatically incorporate feedback to improve knowledge and performance over time

TURNING THEORY INTO PRACTICE

Incorporating predictions about the likely sales price of an item by location into decisions about where to fulfill customer orders represents a profitable opportunity for AI because it targets a specific, repeated decision process with a clear vision for how to create value. We have seen that success is considerably more likely when implementation follows a few simple rules:

Act quickly

Our belief is that successful AI investments should create incremental free cash flow within 12 months. Targeting the specific decision of 'where to ship this item from' offers a manageable focus and ensures that data can be assembled, models developed and pilots run in 6-8 months. It is also generally straightforward to establish baselines and success measures.

Minimize change to existing processes

AI tools that add new considerations to the fulfillment decision can be deployed alongside existing supply chain systems and can output the final optimized decision in a way that requires almost no change to existing processes.

Keep the technology lightweight

Getting rapid impact is best achieved with lightweight cloud-based prediction technology, sitting outside of legacy systems, and with the simplest possible integration to existing data stores and operational systems.

SUMMARY

Improving decision-making related to inventory fulfillment by including sku- and store-level demand prediction is a real and targeted opportunity for 'Practical AI.' We have observed that senior executives following the guidelines above have consistently been able to introduce AI tools profitability within short timelines. We at Foundry.ai are pleased to be leading the development of software addressing the 'smart fulfillment' opportunity, and are happy to engage in dialogue about the opportunity, our work, and possibilities for teaming.

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