PREEMPTIVE AND COGNITIVE SUPPLY CHAINS
WHAT RETAILERS CAN’T SAVE FOR LATER
PURPOSE-DRIVEN, RESILIENT & ADAPTABLE

with Business 4.0™

EMBRACE RISK
MASS PERSONALIZE
CLOUD
INTELLIGENT
LEVERAGE ECOSYSTEMS
CREATE EXPONENTIAL VALUE
AUTOMATED
AGILE

Business 4.0™
Retailing is a tight ropewalk between balancing delicate profit margins and adapting to ever-changing customer behaviors. Supply chain management has traditionally been considered to be a cost driver; our experience suggests the same—supply chain accounts for nearly a quarter of the retailers overall operating costs. For retailers, the focus has been on improvements in efficiency within the supply chain. However, in recent times, there has been a paradigm shift in the focus of this overarching function—from being a cost driver to becoming a key driver of customer experience.

COVID-19 has accelerated changes in customer behaviors and caused disruptions in global supply chains. Retailers are finding themselves handling several challenges all at once—from handling high volumes of online shipments to addressing limited discretionary buying; from enabling touchless shopping experience to contactless operations across the value chain; and from order cancellations of non-essential products to finding alternate supply or substitutes for essentials. While the pandemic has created several such zeitgeist moments for retail, it has also exposed several chinks in the retailers’ supply chains.

Introduction

94% of retailers have admitted they don’t have full visibility into their supply chains¹

55% of ecommerce brands still use pen-and-paper manual processes to manage logistics²

28% of retailers have admitted their supply chains are unable to keep up with demand³

33% of retailers lack omnichannel fulfillment capabilities⁴
As we move forward into the post-COVID world, we need to be aware that a black swan event can strike anytime. Businesses that are agile, and can sense and respond to disruptions in real-time will be able to serve their customers and communities even when stressed and stretched by unforeseen events.

The ability to sense the volatility in the market and customer behaviors, and respond in a timely manner will define the agility of a supply chain. However, the shorter cycle times that distinguish agile supply chains are the exact antithesis to the traditional focus on cost savings through bulk processing. While bulk processing works well in a stable environment, in a volatile environment, it can result in cost escalation due to obsolescence and wastage, and revenue loss due to misaligned supply and demand patterns.

The capabilities required to enable sense and respond across retail supply chain processes, ranging from demand forecasting to last mile delivery, is now becoming a foundational capability to survive in the current business environment.

The holy grail of supply chain management has been to marshal disparate functions and partners to work towards a single organizational goal of customer experience while balancing costs. This calls for a multi-dimensional approach through focused partner, process, and capability interventions, augmented with next generation technologies such as AI/ML and IoT. Table 1 provides a representative summary of expected capabilities across key process areas.
Table 1: Sense and Respond Capabilities for Agility and Resiliency in Retail Supply Chain Functions

<table>
<thead>
<tr>
<th>SCM Process Area</th>
<th>New Imperatives</th>
<th>Enablers</th>
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</thead>
<tbody>
<tr>
<td>Demand Forecasting</td>
<td>• Accelerated alignment of forecasts with changes in demand patterns and evolving customer behaviors</td>
<td>• AI/ML driven algorithm rack and self-learning capabilities</td>
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<tr>
<td></td>
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<td>• Real-time POS demand signals</td>
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<td></td>
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<td>• IoT driven sensing</td>
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<td>Sourcing</td>
<td>• Improved time to market and shorter cycle times</td>
<td>• Virtual remote buying and hyper-collaboration</td>
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<td></td>
<td>• Early detection of risks and disruptions for preemptive actions</td>
<td>• AI/ML driven cognitive sourcing and integrated sourcing operations</td>
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<tr>
<td></td>
<td></td>
<td>• Sourcing knowledge platforms for risk analytics and alternate sourcing</td>
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<td></td>
<td></td>
<td>• Bi-directional visibility</td>
</tr>
<tr>
<td>Replenishment and Allocation</td>
<td>• Value chain aligned replenishment plans</td>
<td>• Optimization plan driven by value chain constraints</td>
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<tr>
<td></td>
<td>• Ultra-frequent replenishments to points of consumption</td>
<td>• Automated and periodic replenishment parameter tuning</td>
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<td>• Intra-day replenishment planning with real-time allocations</td>
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<tr>
<td>Omnichannel Order Management</td>
<td>• Fulfillment at scale and speed of thought</td>
<td>• Dynamic customer propositions</td>
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<td></td>
<td>• Intelligent fulfillment source decisions</td>
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<td></td>
<td>• Preemptive and intelligent returns management</td>
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<td>DC Operations</td>
<td>• Flexible capacity and scalable throughput to address volatility</td>
<td>• Dynamic workforce planning and man-machine harmonization</td>
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<tr>
<td></td>
<td></td>
<td>• Hyper-automation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Operations visibility</td>
</tr>
<tr>
<td>Logistics</td>
<td>• Shortened batch sizes and frequent supply</td>
<td>• Predictive capacity planning</td>
</tr>
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<td></td>
<td>• High-speed, high-volume online orders</td>
<td>• On-demand partners</td>
</tr>
<tr>
<td></td>
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<td>• Track and trace</td>
</tr>
<tr>
<td>Store Operations</td>
<td>• Maximized leverage of store footprint to meet ever growing online demand</td>
<td>• Intelligent workforce planning and collaboration</td>
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<td></td>
<td></td>
<td>• In-store fulfillment operations automation, micro-fulfillment</td>
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Agile, Preemptive, and Cognitive Supply Chains: How to Get There

The key dimensions for cognitive and agile supply chains:

**Value Chain Focus**: Most retailers use traditional transactional systems that are vertically integrated from planning to execution with a definite set of inputs and outputs. These systems have limited abilities to synchronize data in real-time, both internally and with external partners. This makes them inadequate for solving complex trade-offs that cut horizontally across the value chain. To cite an example, determining the optimal handling units for delivering products with a short shelf life requires trade-offs between distribution, stockout, and wastage costs. It requires the collaboration of several internal and external stakeholders across functions such as replenishment planning, ordering, distribution operations, and store space planning.

Decoupling intelligence from transactional systems may be a step towards realizing exponential value. Creating a control layer that can predict and preempt value chain challenges can help retailers make proactive recommendations and take autonomous next best actions.

**Fluid Network Design**: A rigid network design that orchestrates the product flow in a static and often vertical manner deters the smooth flow of products in volatile times—for example, when stores experience constraints on inventory levels, space, or operations due to demand fluctuations.

While Amazon’s futuristic aerial warehouse design is an extreme form of flexibility to address some of these challenges, retailers can realize dynamic capacities with their existing static facility footprint by leveraging intelligent capabilities for product
placement and movement. For example, scientific and continuous review of product placement across warehouse facilities can give insights on the appropriate range that must be stocked and cross-docked based on the demand patterns and delivery lead times.

Similarly, extreme agility and responsiveness in replenishment planning can be realized by dynamically determining replenishment schedules, and ordering units and flow paths, inclusive of horizontal movements.

**Touchless Dependable Supply Chain:** The overall cycle time of value chain processes is dependent on the efficiency of various functions involved in the planning and orchestration of the supply chain. Cognitive operations and intelligent process automation can play a vital role in bringing agility through low-touch operations especially in planning and administrative activities. For example, virtual collaboration platforms and computer vision-driven decision-making capabilities can compress times required for product cost decisions and supplier selection for fashion retailers.

Physical demand fulfillment is another area that is constantly challenged due to variability in demand volume. Capacity can be flexed during peak demand periods by hyper automating fulfillment facilities—completely lights out greenfield facilities or co-inhabited by man and autonomous mobile robots.

**Last-mile Phygital Enablement:** Last-mile performance is characterized by the efficiency of physical fulfillment operations. Addressing surge in online order volume or providing a dynamic fulfillment proposition to customers requires the ability to scale up operational capacities either through on-demand partners or through node automation, drones, robots, and autonomous vehicles. Digital enablement can be driven by a platform or a set of services which can recommend optimal decisions based on the state and context. For example, selecting a full service crowd partner for store pickup or a third-party logistics provider to fulfill last-mile requirements from a central fulfillment center.

**Flexible and Auto-corrective Systems:** Supply chain processes are inherently controlled by disparate systems (predominantly packaged solutions, with varying levels of maturity and technology sophistication). These systems are controlled by static business parameters and rules that seldom change even in the face of altered business contexts.

Bringing dynamicty to critical parameters and rules through automated tuning of a multitude of hidden parameters and rules leveraging ML is the way forward. For example, ML techniques will not only help align product replenishment frequency and store delivery schedules with demand volumes but also concurrently balance warehouse capacity constraints and optimize truck utilization.
Re-imagining Ecosystems: While investing in facility or transportation capacity might bring self-sufficiency, it is a prohibitive proposition considering the time-to-market and overall costs. A collaborative retail network can provide opportunities for scalable capital-light alternatives where capacity can be acquired on demand.

Sense-and-Respond Capabilities: The ability to react to the changes in demand pattern is primarily dependent on the temporal nature of demand patterns as well as the cycle time required to respond. For instance, consider the impact of local weather changes on the demand patterns for food products. Some of the leading food retailers in smaller geographies have achieved a higher level of responsiveness through real-time demand sensing from point of sale (POS) and intra-day refresh of store replenishment allocations based on the POS transaction trend. While this is achievable in smaller geographies, it may not be possible in cases when replenishment lead time is nearly a day or more.

On the other extreme, some fashion retailers have a very long design-to-rack cycle time due to various reasons such as labor-intensive sourcing decisions and global spread of sourcing partners. Responding to changes in fashion trend is nearly impossible in such situations. Here, merely sensing demand changes will not help in creating agility in supply chain; it requires capabilities such as intelligent process automation to address human induced delays as well as make predictive and preemptive decisions based on a plethora of data points such as social, weather, sensor data, macro environment, and competition. This will give fashion retailers an extended window to prepare and respond.
Conclusion

Unprecedented disruptions are pressing the need for real-time decision making. However, most supply chains can’t see the disruptions coming because information is still locked in silos. Today, supply chains is as much about information flow as it is about product flows. The chief supply chain officer’s radar must extend beyond the enterprise and focus on the big picture. The entire retail value chain and partner ecosystems need to be evaluated for the ability to predict and preempt disruptions due to changes in the macro environment or stakeholder expectations. They should also fix existing gaps in their systems and processes in their pursuit of delivering on the customer promise. An algorithmic approach that harnesses the abilities of new technologies can accelerate business agility and unlock exponential value through proactive insights and cognitive autonomous actions across the value chain. Creating a sense-and-respond, resilient, and agile supply chain can no longer be a vision. It is table stakes to remain relevant.

About the Author

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Padmakumar has over 20 years of experience working with global retailers in transforming their supply chains through game changing initiatives, innovative solutions, and business focused benefits delivery. Currently, his focus is on reimagining supply chains from being a cost-driver to driving customer experiences by leveraging TCS Algo Retail™ and next generation technologies.

References

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