



When the Omnichannel Supply Chain Goes Phygital: From the Hype to the How

“Promises to keep promises” aptly describes how digital technologies are enticing retailers with promises of better efficiencies and agility in their supply chains to live up to their customer promise.

The expectations of omnichannel customers—speed and flexibility, transparency, authenticity, and ethical standards—is challenging the supply chain to emerge as a key customer

experience and sales driver. To realize this, it is imperative for the ‘physical’ omnichannel retail supply chain to evolve into a ‘phygital’ front runner, with digital becoming the new normal in supply chain operations.

While new digital interventions such as IoT, machine learning, blockchain, warehouse automation, and automated guided vehicles (AGVs) look promising, retailers are still

unable to ascertain the modus operandi to adopt them and realize significant benefits.

This article presents intriguing questions that surfaced while walking the corridors of global retailers and discusses the evolution required to derive the best from these technologies to build digital prowess in the retail supply chain.

IoT: From Connected Devices to 'Talking' Strawberries

IoT offers immense possibilities in the retail supply chain. The retail fleet is being connected through vehicle telematics enabling real-time driver communication, vehicle health management, driver behavior analytics, and weather and traffic-based alert management. Retailers are also embracing IoT to provide the assurance of freshness by monitoring and tracking the 'farm to fork' journey through various sensor devices. Imagine strawberries or a bunch of kale providing information on the journey vitals (including the temperature conditions, humidity, shocks) right from the farm to the moment the customer picks them from the store shelf! The prospect of 'talking' strawberries offering the promise of freshness is quite exciting.

IoT can play a major role in expediting the supply chain, boosting the attempt to shift focus from 'shelf life' to 'home life' for fresh food. To maximize the shelf life of fresh food, retailers typically adopt an 'inside out' approach, i.e., retailers explore ways to retain its freshness from the time the product lands on the shelf till the 'sell by date.' By reducing wasted time in the supply chain, IoT allows retailers to adopt an 'outside in' approach by maximizing the home life, i.e., the time between the purchase date of the product by the customer and the 'use by date,' empowering retailers to be more customer centric.

While tracking provenance is key for great customer experience, global retailers are, however, intrigued about the 'how' of IoT. For example:

- **Identifying the right solution and the parameters for each product type.** Determining the right IoT solution based on the

A general rule of thumb for the brewing industry is that beer stored at 100°F for one week tastes as old as beer stored at 70°F for two months, or as old as beer stored at 40°F for one year!¹

business needs from the plethora of sensors, devices, and technologies poses a big challenge. Again, identifying the parameters for each product type is challenging because the parameters vary from product to product. For example, the parameters that need to be controlled to maintain the freshness of strawberries are not the same for maintaining the freshness of meat or beer (refer Figure 1).

- **Planning the reverse logistics for sensor devices.** After the strawberry is picked at the store, how does the sensor device get back to the farm? A strong business case would be to build an ecosystem like the 'pick anywhere, drop anywhere' rent-a-car model. One option is to use disposable sensors but how cost effective will it be?
- **Ensuring authenticity of sensor data.** If IoT-enabled sensor data is tampered with, it could result in faulty decision making. Complementing IoT with blockchain can help address the authenticity of sensor data.



Figure 1: Fresh foods vs meat: Different parameters for maintaining freshness

- **Moving to the 'Intelligence of Things.'** To move from merely monitoring parameters to wisely controlling parameters, machine learning needs to be integrated with IoT. For example, rather than sending alerts when the temperature of perishable items exceeds permissible limits, the IoT device must automatically reduce the temperature to the optimal level.

AGVs: Fulfillment at the Speed of Thought

While retailers are experimenting with flying drones, AGVs, hyper loops and autonomous vehicles, Amazon steps up its game by filing patents for underwater depots, aerial warehouses, and parcel labels with parachutes.

As this fairy tale panorama unfolds, it opens up discussions on the road ahead for the omnichannel supply chain.

- **Scalable infrastructure for autonomous vehicles (AVs).** Legal approvals for using drones is just one of the hurdles. While

safety is an important aspect, there is a need to build scalable infrastructure for drone take offs and landings, smart roads for AGVs similar to dedicated cycling lanes in Europe, and docking stations for charging drones enroute and within facilities for continuous wireless connectivity.

- **Evolution of 3 PL business models.** As drone-enabled fulfillment becomes more pervasive, third party business models will evolve to provide drones/AGVs/autonomous driven vehicles as a service. Similar to Uber Pool, there will be drone pooling for consolidating deliveries and optimizing fulfillment costs.
- **Insurance services.** Insurance services need to be extended to cover the risks in deliveries managed by drones and AGVs as these would have different risk factor considerations.
- **Traffic management and routing.** The delivery fleet of drones and AGVs would necessitate the evolution of dedicated Google Maps and Air Traffic Controls (ATCs) while these vehicles are enroute to their destination. Traffic Management Solution (TMS) packages need to be revamped to include scheduling, load balancing, route optimization, and mode selection. It also needs to drive system integration across master data creation and the SKU onboarding process to qualify the suitability of the SKU for relevant delivery modes like drones.
- **Last mile visibility.** Providing an immersive last mile experience to enable customers to locate and connect with the fulfillment vehicle in real time (like in the case of Uber) will be key to drive customer experience and loyalty.



Blockchain: The Promise of Integrity

There is a growing rallying call by omnichannel customers for transparency. They want assurance that the wine or organic produce they are buying is authentic and produced using sustainable and ethical practices. An assurance of provenance with visibility across the value chain through blockchain helps retailers give customers a near frictionless transparency and thus make informed choices. For successfully implementing blockchain, retailers would need to consider and address few key aspects:

- **Physical authenticity:** Unlike the financial industry where both the authentication and product are digital, in the retail world, due consideration needs to be given to the physical form of the product, i.e. 'physical' authenticity along with 'digital' authenticity. Physical authentication can be enabled by investing in complementary technologies like tamper detectable packaging or invisible barcodes

- **Blockchain where it matters:** While it would be good to demonstrate authenticity for multiple products, blockchain should be selectively adopted for SKUs which indicate a good ROI, financial viability, and more importantly demand authentication for a delightful customer experience.
- **Extent of integration:** Blockchain opens doors for a collaborative/ consensus-based mechanism. In this multi stakeholder consensus-based distributed ecosystem, stakeholder buy-in will determine the extent of blockchain integration in the supply chain network. This entails a paradigm shift in the entire operational culture and retailers will need to enhance their supplier collaboration to a large extent.
- **Scalability:** The enablement of private consortiums with competing stakeholders on the same network makes scalability a key consideration. For example, when two competing retailers are part of the same consortium, how the CPG vendor strikes a balance

between 'what to share and what not to' while still providing an adequate view into authenticity and provenance will be a key determinant of blockchain success.

Hubotic Warehouses: A Harmonious Co-Existence

As robots settle in as the new citizens of warehouses, a lot needs to be done to facilitate smooth interactions and a harmonious co-existence of humans, robots, and machines in retail facilities.

- **Integration with existing human-machine estate:** Introduction of robots in a warehouse would need to complement the existing automation efforts.
- **Evolution of 3 PL business models for staffing augmentation.** As robots in warehouses become more pervasive, third party service providers analogous to staffing agencies will emerge and provide robots as a service, enabling capex avoidance. What would be the learning curve for this new workforce onboarded to serve only during the Holiday season?
- **Labor standards and breach of confidentiality.** The labor standards will need to be revisited to include robots. What about confidentiality issues arising from poaching of trained robots by competitors?
- **Logical distribution of tasks:** How to schedule work between humans and their new buddies and identifying the most optimized approach (% of tasks allocated to each, repetitive transactions by robots, non-repetitive by humans or based on parameters like accuracy and throughput)? More importantly, humans would need to learn how to lead teams of robots.
- **Impact on other SCM processes:** Robotic process automation beyond DC operations will reshape other SCM processes including replenishment, order management, vendor collaboration, transport management, and other human intensive operations in the supply chain.

Conclusion

Undoubtedly, the adoption of digital technologies in retail supply chains is challenging due to diverse factors such as the complexity of supply chain networks, multiple handoffs across numerous external stakeholders and the physical nature of products. There is also the underlying challenge of integrating these digital levers into the physical world of boxes, cartons, pallets, totes, and eaches in the omnichannel retail supply chain ecosystem.

The 'phygital' perspective of omnichannel supply chain is imperative to drive the omnichannel promise of customer freedom, convenience, and service with assured immersive experience. Retailers will need to charter the adoption approach and a benefit realization methodology to realize the true potential of 'phygital.'

¹"How Beer Storage Temperature Affects Your Brew" by Krista Graver; Published May 2017, Accessed September 2017; <https://www.storeitcold.com/beer-storage-temperature-affects-brew/>

“

While an ultimate 'lights out' warehouse is in the pipeline, we need to first successfully build a perfectly harmonious 'hubotic' warehouse. Retailers will need to charter the adoption approach and a benefit realization methodology to realize the true potential of 'phygital.'

”

About the Author

Dheeraj Shah

Dheeraj Shah, Head - Retail Supply Chain Practice, has over 19 years of experience in the retail industry. He has been instrumental in driving multi-million dollar business benefits for global customers through consulting, business operations, and digital transformation initiatives across the retail supply chain including omnichannel supply chain network strategy design and enablement, intelligent warehousing, dark store operations, and optimization across vendor operations.

He has led several supply chain digital reimagination engagements leveraging technologies like IoT, blockchain, big data, robotics, and machine learning.