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Future Retail Investments Shaped by Today's Supply Chain Challenges

Retail supply chains have garnered more media attention and public awareness over the past 24 months than at any time in recent history. Prior to the pandemic, few outside the industry could articulate precisely what a supply chain entailed. At the onset of the pandemic, supply chains were hailed in the media for their heroic role in helping mitigate the fallout associated with unprecedented product demand shifts as panic buying ensued.

Despite the early positive media attention, however, supply chains were already crumbling under the multi-faceted challenges presented by the pandemic. Retailers had touted investments in supply chain agility for the past decade, but once their inventory reserves dried up, supply chains proved to be anything but nimble and agile. It became evident that retailers had designed their supply chains to address predictable and specific challenges but had not adequately invested and undergone the end-to-end structural transformation necessary to become truly agile.

Leading into the 2021 holiday season, supply chains continue to garner attention, but this time due to bottlenecks across the global supply chain threatening supply on shelves. For many retailers, Santa may not be coming in time.

Supply chain constraints, from raw material supply to manufacturing (e.g., Vietnam factory closures), ocean / port capacity to over-the-road (OTR) trucking capacity, down to store and warehouse labor for replenishment, threaten the ability of retailers to keep the shelves stocked and capitalize on what is their best-selling season. Physical asset constraints contribute to the challenges (such as shortage of chassis for OTR transportation or a reduction in commercial air flights which typically courier 45% of air cargo volume). However, labor availability is the most critical challenge facing today's supply chains. For example, the American Trucking Association estimates the driver shortage at 80,000¹. Several factors driving labor constraints include (but are not limited to): exit of labor from the workforce, shifts away from retail into other industries, lack

1. <https://www.trucking.org/news-insights/ata-chief-economist-pegs-driver-shortage-historic-high>

of compliance with COVID vaccination requirements, union rules and government regulations, etc.

Given these challenges, most retailers are in store for a rocky holiday in procuring seasonal merchandise in a timely manner. The resulting challenges may include lost sales due to out of stockouts, late deliveries (and unsatisfied customers) and unplanned markdowns. Some large retailers will be able to partially offset these challenges (through investments in air freight, chartering ocean vessels, etc.), but most cannot afford the incremental expense.

As retailers evaluate these events once the holiday season is concluded, many will transition into updating (and maybe completely re-writing) their five-year strategic plans. Successful retailers will conduct a thorough root cause analysis of their 2021 supply chain challenges, likely landing at a few key realizations:

1. Significant spikes in demand are a way of life. The over-reliance on human capital and significant underinvestment in automation create hurdles in managing demand spikes; these issues are not likely to go away.
2. The physical transportation network has experienced little change in decades. While technology has disrupted and transformed other sectors, the transportation industry has been mostly left behind. Amazon saw this coming, as evident in the large investments to build their land and air fleets (as well as their more grandiose visions of drone delivery).
3. Reverse logistics is a margin killer (and environmentally wasteful). This is true for both product returns and the return of containers to Asian ports. In the latter case, US port backlogs have resulted in container ships returning to Asia empty as they do not want to wait for additional delays associated with loading empty containers — expect the bottleneck in the supply chain to move to China when this problem fully manifests.

In the short term, retailers will devote their attention to resolving the immediate issues of replenishing store shelves quickly, managing inventory associated with late deliveries (especially true for seasonal products arriving after the season), and balancing the desire for higher inventory holdings with the cost and implications to financials (money is cheap - lost sales are not!).

2. <https://www.flexport.com/blog/port-automation-oakland-rotterdam/>

AUTOMATING PORT OPERATIONS

The US port infrastructure is heavily outdated compared to other countries — even what might be considered under- developed markets. In nearly all US ports, the operation of gantry cranes, transport vehicles, and stacking cranes is controlled by members of the International Longshore and Warehouse Union (ILWU). In comparison, the Port of Rotterdam is fully automated, with the operation of all assets being conducted by remote (office) workers. This automation drives significant advantage compared to US ports, as evident in a comparison of the Oakland and Rotterdam ports:

- Rotterdam is 80% more efficient at loading/unloading than Oakland
- If Oakland implemented similar automation, studies estimate a 40-50% reduction in labor could support current port volumes

Being said, we don't anticipate near-term shifts in the US towards port automation. The ILWU has been fervent in their opposition to automation, and already are gearing up to continue their fight against automation in the 2022 ILWU contract negotiations.

As retailers move beyond short-term planning, there are a host of a disruptive technologies we expect retailers to evaluate as part of their five-year strategic plans (with some retailers even considering a 10-year strategic plan as the options for greenfield development over a longer time horizon are less limited²). Key examples include:

- Investment in Distribution Center (DC) optimization. As retailers look to address issues related to reducing the human factor in scaling distribution to support large spikes in demand (such as executing holiday), DC automation presents an attractive option. Technologies and automation (such as Goods-to-Person, automated picking, workforce automation and execution planning) that retailers struggled to justify investing in 3-5 years ago are now critical drivers of success. Such investments will reduce the need to add labor as demand spikes occur, and will simplify the workflow by reducing training demands, mitigating challenges associated with a multi-lingual workforce and reducing the risk of errors in DC operations.

- Increased investments in transportation networks. The fragility of the just-in-time supply chain was exposed as transportation networks struggled to maintain pace this fall. Solutions may entail reducing the number of partnerships with logistics providers to increase leverage with a few strategic alliances (and improve service levels), investing in private and/or dedicated fleets, as well as sizeable investments to arrive at semi-autonomous (or self-driving) fleets.
- Reoptimizing physical value chains. The supply chain challenges of 2021 highlighted gaps in the existing value chain, forcing retailers to evaluate their value chain to address questions such as:
 - Should production be moved closer to the end-customer (nearshoring)?
 - What products should be made in-house versus procured from third parties?
 - How can we route product to avoid congested ports?
 - How can we position DCs to better align with labor availability (and avoid the industrial corridors with high warehouse penetration and limited labor availability)?
 - How can we incorporate value-based engineering into our packaging design to allow for product to be shipped with minimal interaction (other than adding a shipping label)?
 - How can we accelerate leverage of store networks for distribution (e.g., ship from store) and place more inventory in stores (rather than DCs)?
- Enhanced AI and machine learning. With the wealth of data retailers have on customer behaviors and purchasing patterns, continued integration with AI and machine learning platforms will enable predictive (and prescriptive) analytics to more effectively place inventory to align with demand.
- Automating store replenishment functions. From robots identifying stockouts and developing automated stocking lists to machines that improve the efficiency of stocking the shelves retailers will continue to push for capabilities that reduce labor requirements in store.

- Collectively partnering with government to address labor and regulatory challenges. Cross-retail industry groups will likely look to pressure and work with Congress to address strategic issues impacting the labor market. Retailers should seek to address border crossing regulations (which have placed significant strain on global logistics employees who were stuck in countries during COVID-related border closures), incentivize immigrants to relocate to markets where labor availability is low, support paid childcare and create meaningful jobs that return labor to the workplace. The biggest factor here is creating a better and more stable career path for younger workers in these sectors.

The actions of retailers to mitigate the challenges faced in 2021 will have impacts beyond the retail sector – some positive and some negative. Industrial manufacturers of automation and robotics will thrive, as will providers of supply chain technology and systems. The same is true for manufacturers of transportation assets, such as trucks, chassis, containers and container ships, as they race to increase capacity. Tesla, realizing the trend years ago, entered the competition with their new Tesla Semi truck (although the release has been delayed 2+ years).

Broad scale adoption of automation, however, will enable businesses to scale more effectively to meet large demand spikes, eliminating the need to onboard large amounts of labor for peak demand. This will have resounding impacts on the temporary labor market as the retail industry hires less surge labor. Lastly, there are potential implications to green initiatives which may increase costs or reduce efficiency as companies look to divert capital for supply chain investments and maximize efficiency and capacity.

The big questions that will determine the extent of this retail transformation are:

1. Will retailers have the commitment to de-risk their supply chain, even if it means taking higher costs in the short-to-medium term and/or diverting capital from other key projects?
2. Was the pandemic a big enough event for retailers to generate the commitment for sustainable change or will they revert to previous, practices as happened after other black swan events?

3. What does this mean for smaller businesses that do not have the capital to invest in these initiatives?
4. How will the public react to retailers' efforts to automate processes (e.g., pressure on Walmart to stop use of replenishment robots in their stores during the pandemic)

As is often the case, complacency will be the end of some retailers. To quote Navy Admiral McRaven, “those who can lead in an environment of constant stress, chaos, failure, and hardship³”, will succeed. The road to transformation will not be an easy path but will reward those retailers with the commitment and tenacity to get it done.

3. <https://news.utexas.edu/2014/05/16/mcraven-urges-graduates-to-find-courage-to-change-the-world/>

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