



RETHINKING THE LOGISTICS ROADMAP:

Tailwinds of e-commerce, outsourcing, and customer demand for robotic solutions

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When it comes to tracking our online orders as customers, we have one concern and one concern only: a delivery date and time. But what happens when we pull the curtain back to expose the multi-step, back-end process required of retail fulfillment today? The answer is more complex than you might imagine.

From production to warehouse inventory picking to the multi-step delivery and distribution process to finally land an item at your doorstep, the current Amazon-inspired retail culture is a heavy weight on fulfillment. Covid-19 only amplified that pressure.

Retailers unexpectedly faced a massive wave of online demand nearly overnight. For the companies, establishing an efficient and reliable supply chain was a requirement not only to thrive but to survive. As we come out on the other side of the pandemic, the world of retail is far from where we left it. In fact, according to McKinsey, 10 years of e-commerce adoption was compressed into three months during 2020. This shift in consumer behavior is making it mandatory for retailers to incorporate automation and AI to keep up.

For investors in disruptive technology, this transformation presents an enormous growth opportunity beyond just logistics automation, which also happens to be one of the top-performing subsectors in the ROBO index since its inception. We believe that the overhaul of the logistics industry is creating an opportunity that spans the entire scope of the technologies that are being applied to the supply chain.

In this report, we'll provide a better understanding of the current logistics environment and why the supply chain is broken. More importantly, we'll take a deep dive into how and where technology can be applied to fix it and the innovative companies paving a new, more efficient logistics roadmap.

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RE-EVALUATING THE LOGISTICS ROADMAP

When it comes to e-commerce, a supply chain is an overarching process of developing and distributing goods. Think of the retail journey as a winding road that begins from the moment you press “purchase.” As it stands, the current logistics roadmap is bumpy and fragmented at best. Each step of the supply chain is often segmented between numerous disjointed companies and processes.

THE SUPPLY CHAIN JOURNEY





BUILDING SUPPLY CHAINS THAT FUEL GROWTH: DISCUSSIONS WITH THE DECISION MAKERS

Covid-19 exposed the weaknesses across retailers' supply chain operations and inventory management. Discovering these breaks in the dam led us to wonder how retailers planned to deal with this growing demand moving forward.

We conducted research amongst top-level executives and mid-level supply chain decision-makers in six different industries. Overall, the message was clear: companies are expecting innovations in supply chains to contribute to a consumer experience that results in topline company growth.

As companies realize the need for an efficient and integrated supply chain to keep their best customers happy, introducing innovative technologies can help. Robotics and AI can provide more than just an immediate ROI and cost-savings benefits.

Implementing an effective supply chain process has traditionally been seen as a driver of scale and efficiencies. This also provides cost reduction and a higher competitive advantage, but in recent years the role of the supply chain has evolved.

70%

of industry professionals predict that their supply chain will be a key driver of improvised customer satisfaction by the end of the year.

Source: Accenture

THE NEED FOR NEXT-GENERATION SUPPLY CHAIN NETWORKS

We're hearing from these retail and logistics executives that most of their warehouse systems and inventory management are not fully integrated, leaving a lot of room for technology to take the reins. It is critical that these companies increase collaboration and integration in their supply chain networks. The need for a highly flexible supply chain is becoming a prerequisite for this era of next-generation processes.

Consumers are the driving force in this new decade with increased demand, higher expectations of product quality, and greater customization of purchased items. With these increased expectations comes additional delivery speed demand. A modernized supply chain network must be built as quickly as possible to ensure customer satisfaction. We believe that much of this will require a constant stream of innovation and technology investment to redefine supply chain operations.

In a recent conversation with a large retailer with \$20 billion in annual revenues, we were surprised to find that the company has challenges in every part of its supply chain across the customer's journey.

A leading apparel retailer provided some insight regarding the complexity of the supply chain. The executive commented that many supply chain solutions were never intended to help a company grow revenue. Today, with the deployment of technical capabilities such as AI, supply chain decisions have become more data-driven and are implemented to drive financial performance.

The head of supply chain and planning at a multinational retailer recently told us that some of the biggest costs for the company are:

Planning & Fulfillment



Customer Retention



On-time Delivery



Order Returns



When the company was looking to outsource their fulfillment capabilities, they needed a logistics partner with heavy investments in advanced automation and AI to help them grow their customer base.

OVERARCHING CHALLENGES FOR RETAILERS



FLEXIBILITY

Customer demand for high-quality products, wide product offerings, and fast delivery isn't going anywhere. This customer behavior requires high levels of sourcing and procurement expertise. Incorporating robotics and AI solutions can help companies with agile manufacturing, complex inventory management, and fulfillment capabilities.



DIGITAL EXPERIENCES

Despite the switch to online shopping, customers will continue to expect the same shopping experience whether they are shopping on their phones or at the store. Customers want a customized and connected experience with increased pickup and return options. This omnichannel experience requires digital innovation and high levels of integration in the supply chain architecture.



ACCESS TO DATA & REAL-TIME STOCK VISIBILITY

Currently, the supply chain lacks real-time visibility that can help to support transparency and accuracy. Advanced analytics including AI can help provide insightful data to drive better business decisions.

This problem is highlighted only when a customer calls looking for a lost package or requesting a different item instead. One of the largest e-commerce providers in the world told us that they lacked real-time data on warehouse inventory and shipment statuses at both the depot and once it has been loaded into the truck for delivery.

With over 10 million SKUs to track and over half of their goods coming from China, the company faced many stock issues, especially in 2020. The executive believes that over 20% of their items were out of stock with absolutely no transparency and visibility on when the inventory would be replenished. Prior to the pandemic, it was not much better. Despite access to diverse data, it was often so unreliable and inaccurate that the company stopped relying on it. The low quality of their data blew her away.



WORKER SAFETY & PRODUCTIVITY

An executive at one of the largest global supply chain logistics companies shared with us that worker's compensation is often one of the largest costs for the company. Keeping their workers safe is integral to the company because the workers must operate large equipment and forklifts to move pallets around the freight depots. This multi-billion-dollar company even has a venture arm to invest in innovative companies that can keep their warehouse workers safe while improving productivity and utilization. The company has hired several key leaders to improve the human-to-machine experience to ensure that workers are taken care of.

DELIVERY DEMAND: THE COMPLEXITY OF TRANSPORTATION

For most retailers, the delivery process, rather than fulfillment and labor costs, is the biggest economic feat.

One online retailer with \$20 billion in sales shared that their greatest inefficiencies did not lie in product fulfillment but in the transportation of goods. Just one pallet of goods on a journey from China to the US incurs ocean freight cost, warehouse costs from one depot to another, and, finally, last mile delivery. This does not even include manufacturing and material sourcing costs.

Complexity arises when a unique customer order is created for shipment. The order identifier is linked with a transporter management system, but often the transporter system is not linked to the warehouse or yard management system. This means that the supply chain team must track down the trailers that need to be loaded or unloaded.

Some hardware technology companies can help solve this problem. Some supply chain technologies allow for speedy scanning and tracking. However, beyond immediate order tracking, retailers increasingly need software solutions powered by AI that can quickly identify, unify, and extract all relevant data. Though we are in the early stages of these AI applications, various companies are leading the transformation of this important side of the supply chain journey.

TECHNOLOGIES HELPING IN THE TRANSPORTATION OF GOODS



Self-driving trucks use sensors such as cameras, lidar, and radar to drive from freight depots to warehouses. These long-haul trucks generally follow fixed routes and can operate mostly on highways that are easier to navigate than urban streets. These AI-powered trucks have learned through massive amounts of training data and simulation and will best address the shortage of truck drivers facing the industry today.



According to CapGemini, the last mile of a product's delivery accounts for over 50% of the total shipping cost. Some autonomous delivery robots like Starship have been rolled out in select cities, but we are still in the early phase in solving the problem. The costs and inefficiencies of the last mile have only been exacerbated by the massive acceleration of e-commerce since COVID, which has dramatically raised the number of packages to be delivered each day to unique sets of addresses. Whenever possible, grouping the package delivery is not just better for the environment but also the most cost-effective way for many of the parties involved.

REVERSE LOGISTICS: THE COMPLICATED PROCESS OF RETURNING PRODUCTS

Returns are the new norm. This requires retailers to ask themselves: when a customer wants to return something, how do they do that? Many retailers are being beaten down trying to make this process as simple and cost effective as possible.

According to Shopify, approximately 20-30% of online sales are returned. Complicating things further, most shoppers prefer to return items in person, according to Forrester Research.

Retailers are increasing warehouse space, hiring third-party logistics providers, and creating departments to manage the return of goods. Despite high upfront costs, the long-term rewards can be enormous for retailers that embrace technology solutions for the product return process.



END-TO-END FULFILLMENT VS. 3PL

We are seeing an increased trend in retailers outsourcing the entire return process to a third-party fulfillment provider or to a returns management service (RMS) provider. The global third-party logistics provider (3PL) market has been forecast to top \$1.3 trillion USD by 2024. It is emerging as one of the industries seeing rising growth for their services.

3PL refers to the outsourcing of the e-commerce logistics processes to a third-party provider that manages inventory management, warehousing, and fulfillment. We are seeing trends of multiple 3PL partners being used by a retailer or manufacturer to diversify or have global distribution footprints.

[Most Fortune 500 companies](#) are using 3PL services as the exponential growth of e-commerce is testing everyone's supply chain. Companies like Shopify ([THNQ member](#)) has recently launched end-to-end fulfillment capability to provide warehousing, retail distribution, and returns for customers, competing with its innovative solutions in a market that is currently dominated by the big guys like DHL and FedEx.

INVESTABLE TECHNOLOGY COMPANIES TRANSFORMING THE SUPPLY CHAIN

Manhattan Associates (ROBO member) is the leader in warehouse management systems. Manhattan's cloud-enabled solution helps integrate data from multiple inventory management systems to boost warehouse productivity and improve utilization. Manhattan uses machine learning and big data analytics to integrate and manage warehouse automation technologies so they can work together seamlessly.

Teradyne (ROBO member) is an undisputed leader in industrial automation. With over \$3 billion in revenues and over 5k employees worldwide, Teradyne is a top provider of collaborative robotic solutions for the manufacturing sector with its Universal Robots. Teradyne's subsidiaries MiR and AutoGuide offer a broad range of automation solutions for the inventory management industry.

Zebra Technologies (ROBO member) has been at the forefront of supply chain innovation with its RFID scanners through its investments in computer vision technologies. Zebra works with leading retailers and logistics providers around the world to drive and improve flexibility within their supply chain process.



Source: Zebra Technologies



Source: PTC

PTC (ROBO member) has been investing heavily in its digital architecture for the manufacturing sector to enable collaboration and innovation to improve agility in the supply chain ecosystem. With double-digit revenue growth for the past several years, PTC is a provider of smart manufacturing software solutions.

XPO Logistics, a leader in supply chain solutions, has over 1,500 distribution locations in 32 countries. Its 2015 acquisition of Ux Logistics has improved last-mile delivery capabilities by offering a broader network of truck brokerage, expedited transportation, and freight forwarding services. XPO has recently announced that it will spin off the logistics business called GXO Logistics later this year to capitalize on the industry's tailwinds.

[TuSimple](#) is a tractor-trailer company with 18 contracted customers known for their fully autonomous technology, and we should see continued progress toward commercial deployment throughout the country by 2024. TuSimple has partnered with UPS, and they are conducting test operations in cities throughout Texas and Arizona. TuSimple states that its technology can reduce the costs of shipping goods via tractor-trailer by 30% and uses 10% less fuel than a human-driven truck.

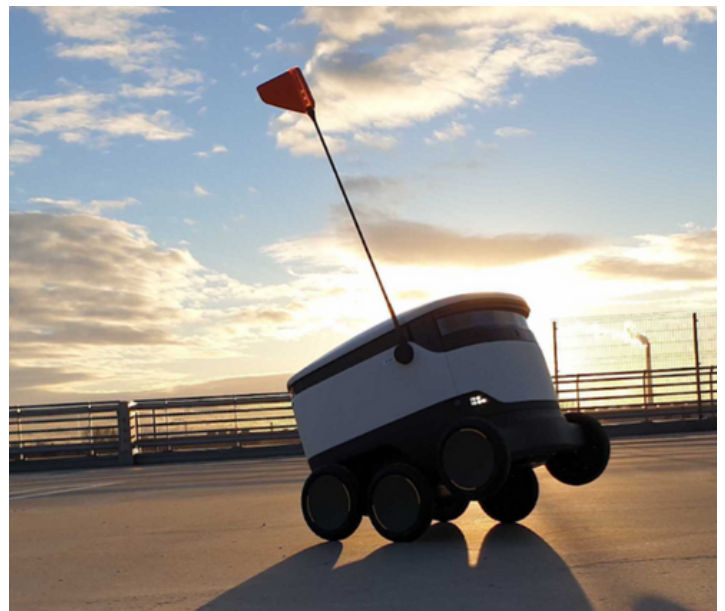
PRIVATE COMPANIES DEVELOPING AUTONOMOUS TECHNOLOGIES FOR THE SUPPLY CHAIN

[Verity AG](#) (private) is the global leader in autonomous indoor drones for the warehouse. Verity was co-founded by ROBO Global strategic advisor [Raffaello D'Andrea](#) who also co-founded Kiva Systems, selling the company to Amazon in 2012. Customers such as IKEA and DSV are using this AI-powered drone technology to automate inventory checks to get critical insights into inventory management.

[Starship](#) (private) delivery robots that move around on sidewalks have completed over 1 million robotic deliveries and traveled over 1.5 million unmanned miles to paying customers. Founded in 2014 by Skype co-founders, Starship is revolutionizing food and package deliveries.



Source: Verity AG



Source: Starship

[Nuro](#) (private) is another autonomous delivery robotic company that completes deliveries with its R2 robots. These AI-powered robots are fully autonomous and have delivered goods for Domino's, Walmart, and Kroger.

INVESTING IN THE SMART SUPPLY CHAIN OF THE FUTURE

It's no secret that the race is on by retailers, manufacturers, and logistics fulfillment companies to adjust to the ever-changing needs of consumers, and we expect that these trends will continue to transform the industry in the coming years. With the rise of 5G adoption, consumer demand for omnichannel, artificial intelligence, and increased demand for e-commerce/home delivery, shoppers are driving the technological innovations.

Retailers will continue to reimagine their stores for years to come through the power of robotics, automation, and AI along with the business impact of e-commerce. Though we are very early in identifying the leaders of this technological supply chain shift, at ROBO Global, we believe that investors should be searching for broad-based exposure to the innovation occurring in the space.

ROBO Global Robotics and Automation (ROBO) is one way to capture the growth of the robotic revolution and capitalize on the growth of logistics automation and digital capabilities as spending around supply chain integration is poised to grow over the next years.