



THE **ROBOT REVOLUTION** IS RAMPING UP

Global Pandemic Likely to Accelerate Adoption

BY MICHAEL HOBAN

Ever since Kiva Systems revolutionized logistics by introducing autonomous robots into warehousing in the mid-2000s, the industry has eagerly awaited the coming of the robot revolution and the wholesale transformation it will bring. While Amazon, Walmart, and third-party logistics companies (3PLs) like DHL have increasingly incorporated robotics into their warehouse/distribution centers, the reality is that robotic systems are only in a small fraction of those facilities. Even Amazon—which purchased Kiva in 2012 and renamed it Amazon

Robotics—employs robots in just 26 of its 175 fulfillment centers worldwide.

“Generally speaking, the vast majority of space out there is un-automated or has little automation,” says William O’Donnell, managing partner at Prologis Ventures, the corporate venture group of Prologis—the largest owner and developer of industrial properties in the world, whose tenants include Amazon, DHL, and Home Depot. “If you start looking at the most prolific users of automation in the U.S., their ecommerce facilities that have automation still have hundreds of thousands of employees. The

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robots are just making those employees much more efficient and creating a better environment."

According to industry insiders, the trend towards automation and a greater degree of robot-human collaboration is about to kick into high-gear.

"While the preponderance of work is still done by humans, I expect to see that change pretty rapidly over the next couple of years," says Glenn Sanders, senior robotics analyst for Omdia/Tractica, which conducts market research on emerging technologies. "And what's happened over the last few months with the Coronavirus pandemic is just going to add fuel to the fire, because companies that have had to close or reduce operations due to the pandemic are going to say, 'I don't want this to happen again,' so they're going to 'roboticize' or automate as much as possible."

In a 2019 report¹, Sanders and Tractica forecasted that "worldwide shipments of warehousing and logistics robots would increase dramatically over the next five years from 194,000 units in 2018 to 938,000 units annually by 2022."

"But it's going to increase even more than we predicted," adds Sanders. A second report by market research and intelligence firm ABI Research² predicts that "by 2025, over four million commercial robots will be installed in over 50,000 warehouses worldwide, up from just under 4,000 robotic warehouses in 2018."

The accelerated rate of adoption of robotics into distribution centers is driven primarily by two factors: labor issues and advances in technology that make robots increasingly affordable for even small and midsize facilities. On the labor side, Sanders cites an aging population, labor shortages, rising wages for warehouse workers, and the "constant demand for faster and faster fulfillment" as demand drivers for robotics.

According to ABI, the adoption of robotics is being made possible by the increasing affordability and much faster ROI achieved by the deployment of robots—particularly Automated Guided Vehicles (AGVs) that transport inventory within the warehouse using tracks or magnetic strips; and Autonomous Mobile Robots (AMRs) that transport inventory autonomously using sophisticated sensors. These robots improve the speed and accuracy of the picking and packing processes, while the manufacturer's delivery models enable warehouses to scale operations up or down during seasonal surges and slowdowns. The lightweight, highly mobile robots can directly replace heavier mechanized automation that typically requires massive upfront investment and rigid physical infrastructure.

Kiva Systems was adopted by retailers like Staples and Walmart in the late 2000s and Amazon in 2012. In the early years, facilities had to be adapted to accommodate the automation. Some larger facilities featured Kiva's

mechanized rack storage system, which would include thousands of robotic shelves, for instance. "But one of the major focal points of robotic companies over the last four or five years is that they've realized that in order to be universally accepted, the robots had to adapt to the environment versus the inverse," says O'Donnell.

Startup companies like Fetch, 6 River Systems (acquired by Shopify last year), and Locus Robotics have developed AGVs and AMRs that can be integrated into existing facilities—even B and C warehouse product—to augment the human workforce while increasing speed and efficiency. "The new robotic systems tend to be more modular, so a company can just pop their robots in and instantly begin working," says O'Donnell. "The combination of leveraging existing infrastructure and putting these new robotic systems in is where the industry is heading."

The evolution of robotics in warehouse distribution might be best illustrated by the story of third-party logistics provider, Quiet Logistics and Locus Robotics, which was spun off from Quiet in 2015. Founded by Bruce Welty and Mike Johnson, the Massachusetts-based startup was the first 3PL to deploy Kiva robots (in 2009), which they enhanced by incorporating warehouse management software they developed themselves. Quiet Logistics began its operations in a 10,000 square foot space, but quickly graduated to a 275,000 square foot facility in an industrial park in Devens, Mass. in 2011, investing \$10 million in Kiva's robots and infrastructure. Their roster expanded from original direct-to-consumer apparel clients Bonobos and Gilt Groupe to include Mack Weldon and Zara USA—companies attracted and retained by the speed and reduced error rate of the operation.

In 2012, Amazon purchased Kiva Systems, and announced they would eventually (2016) stop servicing the robots. Since Quiet Logistics business model was built on automation, Welty and Johnson decided the optimal business decision would be to build their own robots. Improving upon Kiva's original design, they developed smaller, lighter (120 lbs.) robots that could work side-by-side with humans in an existing facility, including on a mezzanine, and Locus Robotics was born. Shaped like a Segway scooter, the LocusBots (AMRs) were soon navigating autonomously throughout Quiet's warehouses, locating and transporting pick items while increasing accuracy and speeding up piece-picking order fulfillment.

"By the time Kiva was no longer available for parts and service, Quiet had fully developed Locus—which changed the way picking was done in a dramatic fashion. Basically it turned the picking strategy upside down," says Greg Klemmer, SIOR, executive vice president at Colliers International in Boston. Klemmer—along with partner and fellow SIOR, Tim Brodigan, SIOR—have provided tenant advisory services for Quiet Logistic since its inception, including an expansion at Devens Industrial Park to nearly 700,000 square feet. In March of 2019, Quiet was acquired by the investment arm of Related Companies—the developer of Hudson Yards in New York—and Greenfield Partners. Quiet has added four new warehouses totaling over 1.5 million square feet in Chicago, Los Angeles, St. Louis and Dallas-Fort Worth, "and we're exploring six other markets now, including Europe," says Klemmer. "They continue to grow and are using the Locus robots in all these facilities."

Since becoming a separate entity, Locus Robotics has seen its own explosive growth. In 2017, they landed a "proof-of-concept" deal with DHL

for a medical facility outside of Memphis, then a second facility, both of which proved successful. Locus later added additional global 3PLs, including France-based GEODIS and Swedish company CEVA Logistics. In March, DHL inked a deal to deploy 1,000 more Locus robots in 10 additional facilities. Mike Johnson, Locus Robotics president & COO, says that revenue quadrupled year-over-year in FY 2020.

"We think the inflection point for [the adoption of autonomous robots] came about a year or a year-and-a-half ago," says Johnson, who agrees that while labor issues have been driving demand, increased productivity and a quicker ROI are also key factors. "People want a fast return. Back in the day, if you've got a five or six year ROI, you were happy—which is what it took us with Kiva because it was such a big investment—but since we offer a RaaS (robots as a service) model, we look for less than a year for ROI for our customers," (although he concedes that it depends on the use case).

Under Locus's RaaS model, customers pay a subscription fee of approximately \$1,000 per month per robot—with a premium added for additional robots during peak seasons—for operators who choose not to pay \$30,000 or more to purchase a unit. Last year, Locus provided Boots, a UK-based Pharmacy chain, with 130 robots on short notice and were able to get them up and running in about three weeks in an existing facility—just in time for peak holiday season. One month into the COVID-19 restrictions, Boots saw volumes similar to those of holiday peak, and Locus delivered more robots to help meet the demand.

It is that flexibility that is also fueling the robot revolution, according to 30-year logistics veteran Ed Romaine of Conveyco Technologies, a systems integrator that designs and implements automated

material handling systems for distribution centers and manufacturing facilities. "For the first time in materials handling history, we have automation technology that isn't bolted down," says Romaine. "And the ability to be able to increase, decrease, and move [automated systems] of a significant magnitude in a matter of hours is unheard of."

While Romaine cautions that robots may not be the ideal solution for all companies, the ability of AMRs to adapt to older facilities is also driving the trend, as floor grades no longer have to be perfect for many of the robots. "This is giving a lot of older buildings a whole new life," he says, adding, "I've received more calls from commercial real estate brokers in the last nine months than I've had in the last 30 years." ♥

1. <https://tractica.omdia.com/research/warehousing-and-logistics-robots/>

2. <https://www.abiresearch.com/press/50000-warehouses-use-robots-2025-barriers-entry-fall-and-ai-innovation-accelerates/>

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