THE 2022 STATE OF AUTOMATED WAREHOUSING

Food Logistics

SDC SUPPLY & DEMAND CHAIN EXECUTIVE

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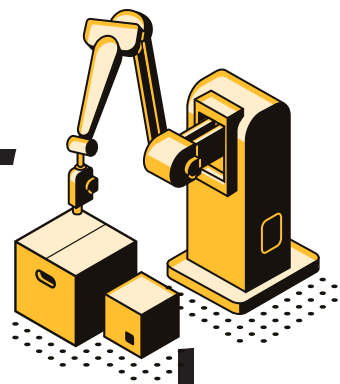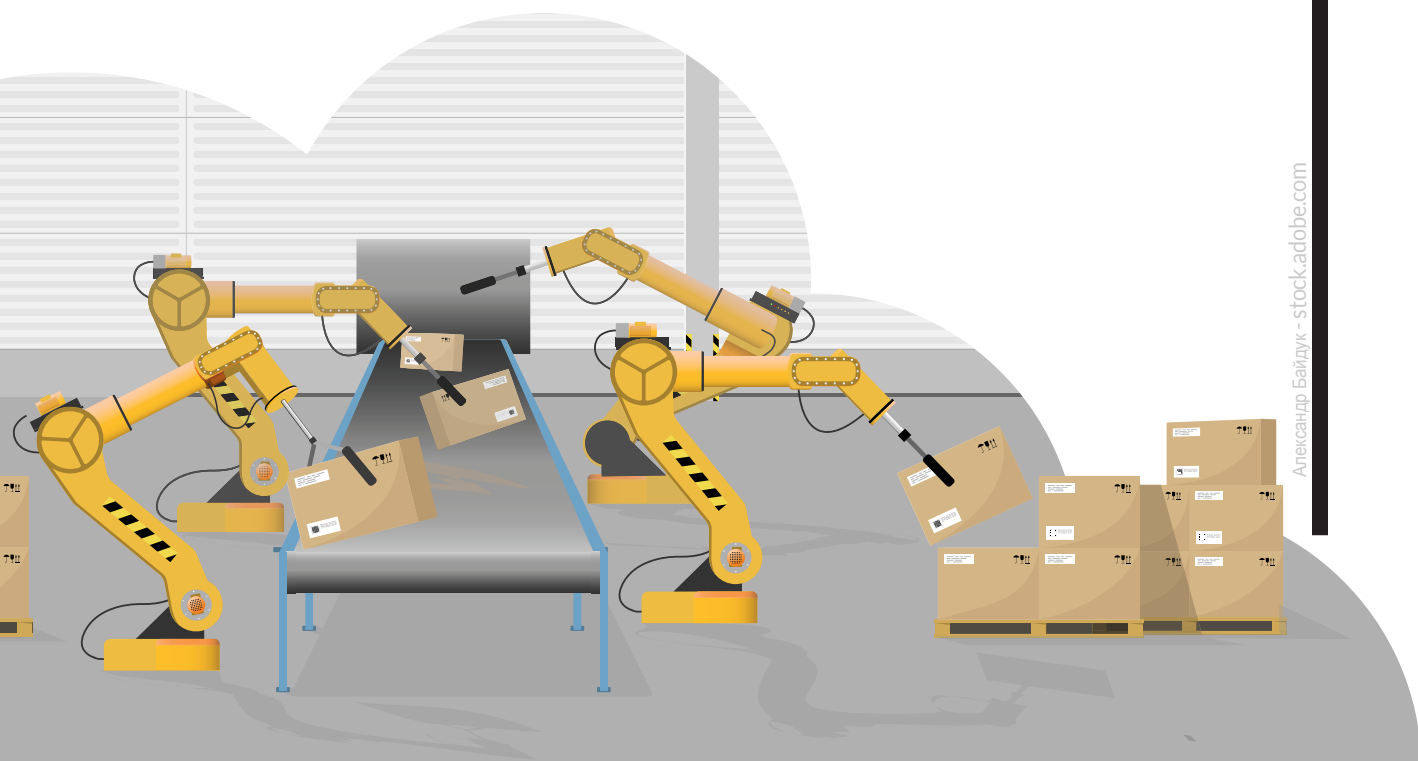
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INTRODUCTION
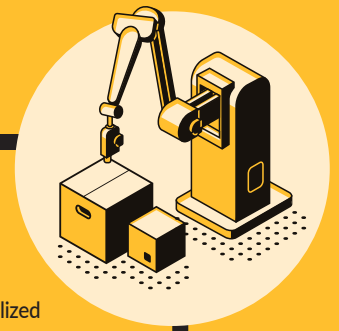
Software and technology throughout the supply chain are currently flourishing, starting two years ago, as the Coronavirus (COVID) pandemic and labor shortage reshaped and continue to reshape the warehousing and logistics industries. The trend to an automated supply chain steadily grew in the decade leading up to the pandemic and then shot upwards once the labor shortage and e-commerce boomed at the same time.

The driver shortage has been a significant issue in the supply chain, but since the pandemic prompted the Great Resignation, the warehousing sector is now just as affected. That, in addition to changing consumer needs and an immediate e-commerce jump, warehouses look to automation to bridge the gaps in operations, improve efficiency and accuracy, and ease the burden of manual labor on human employees.

According to a market study from LogisticsIQ, warehouse automation will hit beyond $30 billion in market value within four years, growing at a 14% rate.

Right now, picking and packing is a new focus for the automated warehouse sector, prompting an increase in innovation from technology developers. Previously, warehouses focused on bulk orders, but e-commerce pushes the focus more on individualized item picking, which requires greater ability from robotics. Greater sophistication in artificial intelligence and machine vision made way for new automation that allows more accurate and individualized picking in the warehouse, in addition to new forms of grippers.

Another circumstance that appeared at the start of the pandemic was the introduction of food and grocery to e-commerce, throwing warehouses another curveball somewhat alleviated by automation.

Due to the increase of smaller size orders for both the food and dry storage sector, companies now look for more smaller warehouses in strategic locations to deliver more orders at a faster rate. Many facilities were even converted from retail locations to localized distribution centers instead. Sometimes these locations are also temporary. All of this pushes the need for adaptability and less bulk in on-the-floor technology.

"Labor cost and shortage have been the biggest driver due to a huge demand from e-commerce in the last decade," says Avi Gupta, principal analyst for LogisticsIQ. "Things have accelerated further with additional demand due to the pandemic and we can witness e-grocery fulfillment as the latest trend at present. Picking and Packaging are the new focus for the warehouse automation as it is the least automated and time-consuming function."

All of these factors led to the top technologies seen in warehouse automation today.

14% Growth
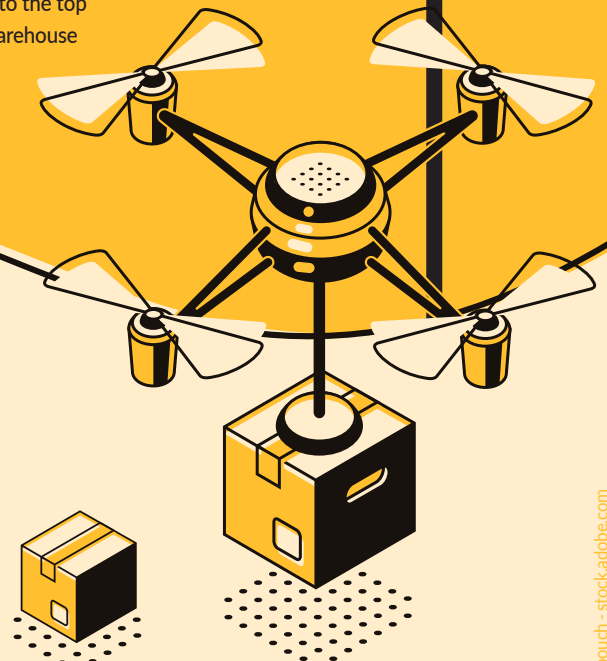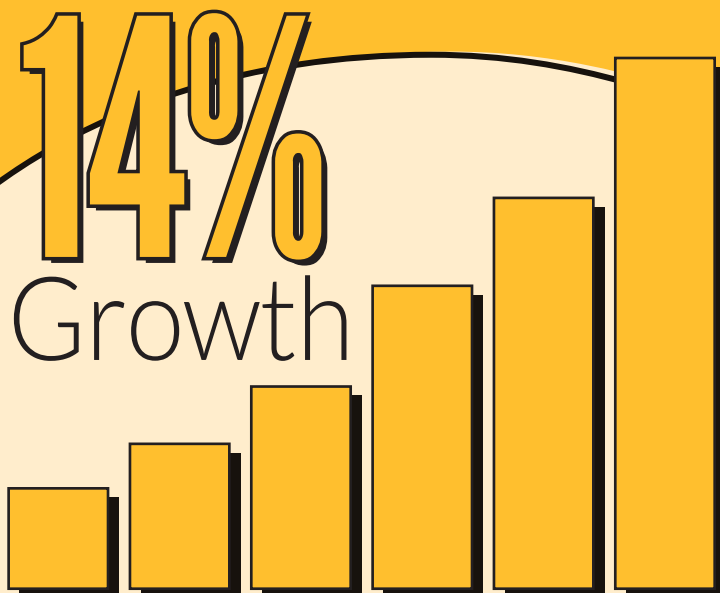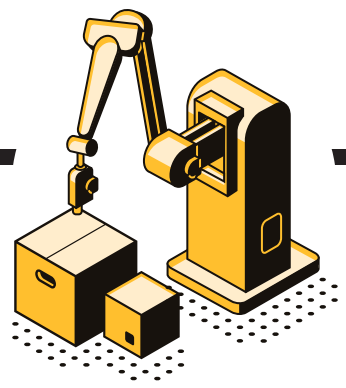
KEEP IN MIND

For both technology providers and warehouse managers, it is vital to keep in mind the lack of flexibility related to automation technology. Fixed automation systems have specific throughput capacity, different from the ability to hire extra staff during busy seasons. Managers need to keep this in mind when starting the initial investment.

However, mobile robots may offer greater range and flexible scalability.

"Fixed automation, such as conveyors and AS/RS, tend not to be as flexible and therefore have to build either to handle the maximum throughput during the year (i.e., holiday season) and remain under-utilized throughout the rest of the year, or built to handle the average capacity throughout the year and add additional labor during the holiday period to bridge the capacity gap," says Rueben Scriven, senior analyst at Interact Analysis. "Mobile robots, on the other hand, tend to be more flexible and can be scaled up or down throughput the year by adding more or less robots. The downside is that mobile robotics are less proven and service networks tend to be less developed than traditional fixed automation integrators."

Implementing automation technology may also take much more time than introducing a new software or other technologies throughout the supply chain. Warehouse managers must plan for this at the beginning of negotiations during automation investment.

> However, **MOBILE ROBOTS** may offer greater range and **FLEXIBLE SCALABILITY.**

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THE FUTURE

Warehouse automation will continue to grow and is already an integral part of supply chain operations. The technology will become more sophisticated, allowing for greater range of tasks and expand throughout different sectors of the supply chain.

As the number of providers, developers and innovators in the supply chain technology sector grow, warehouses will likely be equipped with numerous automation solutions from different vendors. The future in warehouse automation lies within these technologies coexisting and working together through a warehouse execution system (WES), according to Deloitte.

Additionally, Deloitte reports that private 5G networks will grow to enable the Internet of Things (IoT) in the warehouse. Other future trends include interoperability of robotic solutions using sensors, digital twins for variable planning, integrated control towers to handle operations, real-time performance monitoring and issue detection, and improvements to vision technology and AI.

> The **FUTURE IN WAREHOUSE AUTOMATION** lies within these **TECHNOLOGIES COEXISTING** and working together.

TOP TECHNOLOGIES IN WAREHOUSE AUTOMATION:
INFOGRAPHIC DIRECTORY
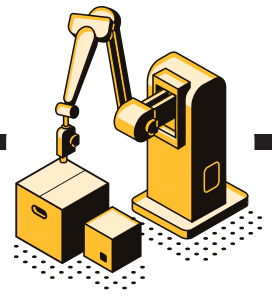
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SORTERS

Automated sorters identify items and direct them to correct pathways on conveyor systems.

How: Automated aspects of conveyor belts and systems will pop up, lift or push the items to where each individualized product needs to be.

Why: Increases speed in the sortation process exponentially for faster packing times and greater accuracy.

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ROBOT UNIT PICKING

Instead of human workers picking items for shipping within a warehouse, autonomous robots may be equipped to do so.

How: Through autonomous technology, robotics can complete the entire picking process similar to a human.

Why: Optimizes operations and allows for less human workers over less hours and is especially helpful for those with a waning workforce.

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AUTOMATED STORAGE AND RETRIEVAL SYSTEMS (ASRS)

Store goods in a compact manner that still allows for easy retrieval and often assemble goods into a compact cube for better configuration.

How: Uses automated racks and robotics to optimize warehouse space, compacting storage usually into a cube-like shape.
Why: Maximizes and optimizes space in warehouses to help companies keep up with the growth of e-commerce with products still easily reachable for retrieval.


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WAREHOUSE MANAGEMENT SYSTEMS (WMS)

Software that allow managers to control and manage their warehouses.

How: Uses software to get a view of the entire warehouse operation. While this is somewhat of a legacy technology, new adaptations and innovations introduce automation and data into these systems for greater sophistication and planning.

Why: Visibility into operations is crucial for optimization and communication with partners. The added use of data and algorithms in WMS helps create resiliency and bridge gaps in the supply chain while also optimizing operations.
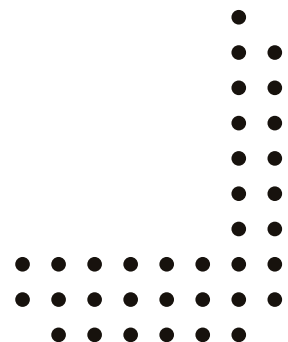
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AUTOMATED GUIDED VEHICLES:

Driverless warehouse vehicles that travel through a specifically marked pathway within the warehouse to complete various tasks. These can also be known as Automated Guided Robots (AGRs).

How: Equipped with automation, machine vision, sensors and artificial intelligence, AGVs operate themselves through warehouses to transport goods from A to B. Technology providers work with warehouse managers to install software along with the AGVs and create specific pathways for them to follow.

Why: Helps reduce the distance human workers must travel throughout the warehouse, saving physical energy for employees while also saving time for operations.
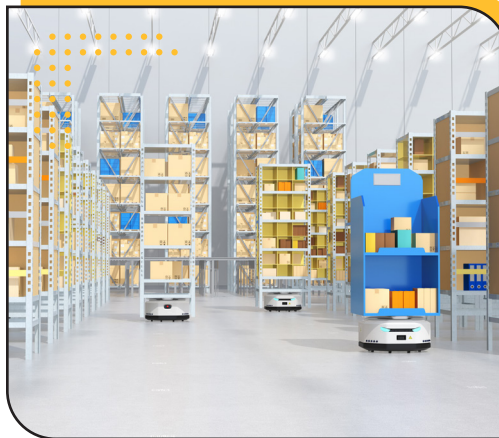
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GOODS-TO-PERSON AND PERSON-TO-GOODS AUTOMATED MOBILE ROBOTS (AMRS)

Works with human employees to transport items throughout the warehouse.

How: Similar to AGVs, AMRs can transport individual items to human works to save time and energy, where the human employee can handle the final process.
Why: Reduces unnecessary trips, time and walking from human workers to save energy and speed up the picking and packing process.

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VOICE OR LIGHT PICKING

Wearables in the warehouse that direct employees with exact directions through either visual or voice guidance.

How: Wearables can either use automated voice or visual directions, like a GPS system in a vehicle, to point human workers in the direction of the item they need to pick.

Why: Saves time in the picking process, directing employees right to where the needed item is without them having to search.

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PALLETIZERS AND DE-PALLETIZERS

Another form of automation that stacks cases onto palettes as well as removes them from palettes when necessary.

How: Robotic arms or machinery located between incoming product bins and pallets, where they organize the items on the pallet in a compact and organized manner.

Why: Optimizes space on the pallet and within the warehouse for greater storage opportunity while also driving palletizing speed and eliminating a tedious task for employees.
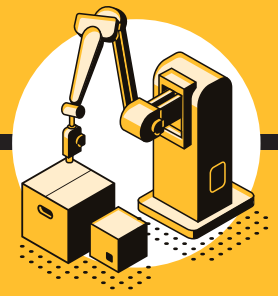
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PIECE PICKING ROBOT

Can pick and pack packages to ship out directly to consumers for e-commerce.

How: Through robotic arms, programming and artificial intelligence, all times for a package can be sorted and packed into a parcel.

Why: Some warehouses struggle with the extreme volume and growing nature of e-commerce, these robotic systems optimize and speed up the process.

AUTOMATED PACKAGING

Robotics through artificial intelligence, like the picking robots, can also finish the packaging itself for e-commerce parcels to go right to the consumers doorstep.

How: Automated robots can finish the entire packaging system for parcels, completely packing up boxes to send out to consumers, including closing and taping up the boxes.

Why: Optimizes the packaging process to quickly and efficiently send out e-commerce packages through to the end.
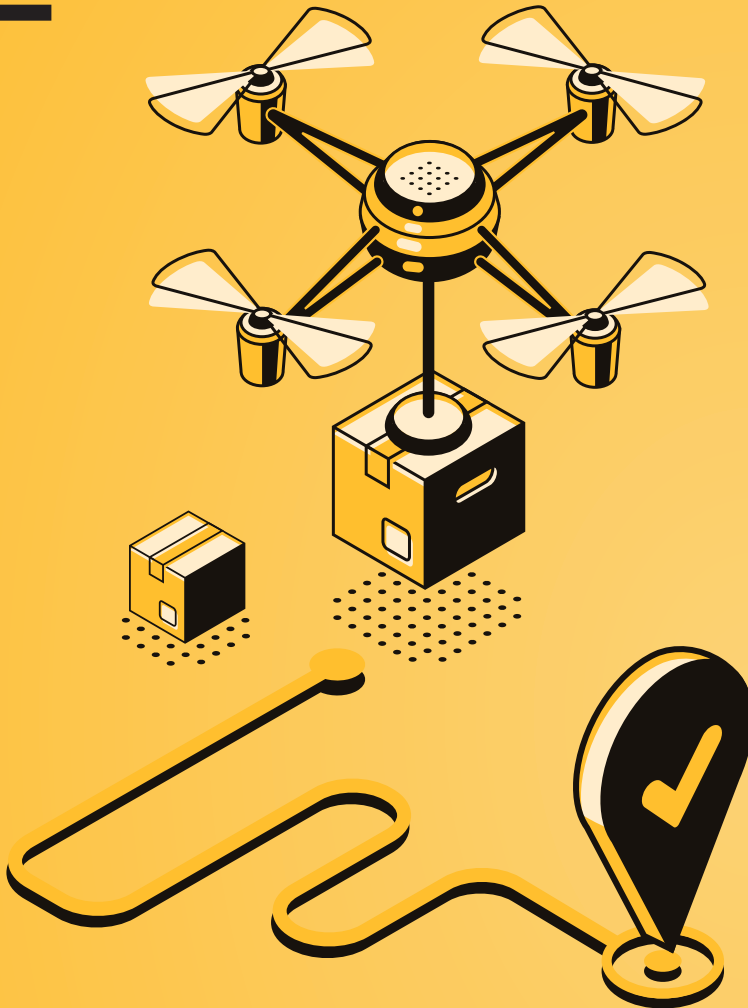
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