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HOW TO PICK THE RIGHT TECHNOLOGY
For Your Foodservice Distribution Warehouse

IFDAonline.org/WarehouseTech

How to Pick the Right Technology for Your Foodservice Distribution Warehouse

Technology adoption was a fast-moving field before 2020, and the COVID-19 pandemic accelerated these advancements exponentially. In general terms, technology has advanced more in the last 20 years than in the last 200 years. Implementing the right software, hardware and robotics can help foodservice distributors be more efficient, improve safety and adapt to the future labor market.

IFDA published a guide on emerging technologies in 2020, but many of the items examined have already advanced by leaps and bounds. While some distributors are well on their way on their warehouse innovation journey, others are just beginning to explore how to make tech work for them. There are few one-size-fits-all solutions in the space, so customizing and mixing-and-matching solutions is the most realistic path for foodservice distributors.

It's important to note that while technology and automation can reduce the need for human labor, it's not in a place where it can replace human workers. However, warehouse jobs are changing and worker skills will evolve to include more technology operation and data handling. Thinking ahead to how you can upskill your current workforce and attract future workers with technology-related skills will serve a distributor well considering only 34% of supply chain professionals* say they're currently recruiting for skillsets to align with future needs.

Selecting the right technology requires the right vendor. Carefully selecting a partner is critical to long-term success. When it comes to technology, you want to plan for future business needs rather than today's to ensure flexibility and scalability. You also want to ensure that the partners you select are equipped to help build that roadmap and remain involved for support after implementation.

* 2023 MHI Annual Industry Report, https://www.mhi.org/publications/report

Warehouse Innovation Overview – What Is It and How Does It Work?
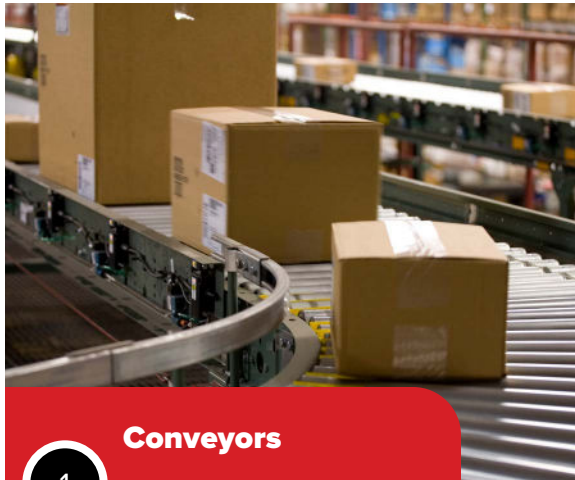
Conveyors
1

Fixed machinery that automatically moves items from point A to point B on a moving belt or rollers.

Pro: Improves speed of material handling and can reduce worker lift and strain injuries.

Con: Not flexible, limited scalability, and requires frequent maintenance. Can take up a lot of space, be loud, and moving parts can present safety hazards.

Investment: $$-$$$

ASRS = Automated Storage & Retrieval System
2

Fixed machinery featuring automated picking that delivers items to an end-point, similarly to how a vending machine functions. Works best in predictable environments with uniform picking patterns.

Pro: Fully automated, fast picking with reduced labor needs. Can improve storage density, safety and accuracy over traditional warehousing.

Con: Doesn't lend itself to business growth as it's an inflexible system and a large investment. Single point-of-failure system – if one part breaks, the whole system goes down – frequent maintenance and technical expertise needed.

Investment: $$$$

Articulated Robots
3

Robots with multiple rotary joints, often designed to mimic human arm movement. Primarily used for simple, repetitive tasks, including picking, palletizing, sorting, receiving and replenishing. Humanoid robots are the next-generation, advanced version of articulated robots, but are mostly still in development and not widely available.

Pro: Improved accuracy and safety, reduces need for human labor. Can improve worker satisfaction by performing repetitive tasks.

Con: Initial investment is high and specialized maintenance is required.

Investment: $$$-$$$$

Warehouse Innovation Overview – What Is It and How Does It Work?

Continued

4
Cobots = Collaboration Robots

Used to augment human work rather than replace it. Can take many forms, but are typically in the form of articulated robot arms, smaller than standard industrial robots and have safety features like sensors to safely work alongside humans on collaborative tasks. Cobots have similar uses to articulated robots.

Pro: Improves accuracy and safety. Reduces labor needs. Increases worker satisfaction by alleviating repetitive tasks.

Con: Initial investment can be high and worker training is crucial.

Investment: $$$-$$$$
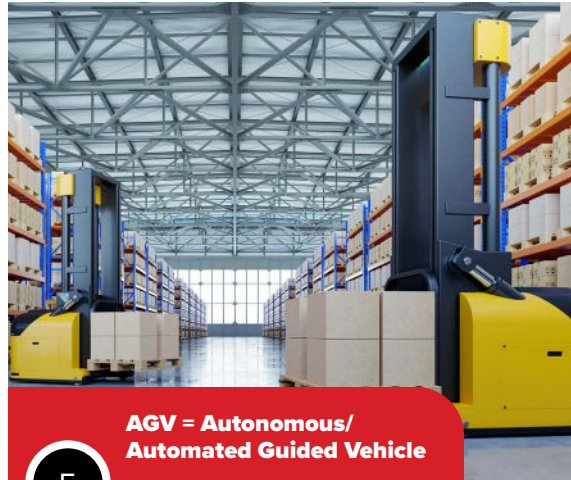
5
AGV = Autonomous/ Automated Guided Vehicle

Vehicle that moves materials or people along predetermined routes guided by physical aids, like lasers, cameras, wires or magnets. Comes in many forms, including with or without human interaction, and safety features like collision avoidance. Best used for repetitive tasks of moving things from point A to point B.

Pro: Can greatly reduce human travel time in the warehouse, increasing efficiency and productivity. Works well for retrofitting traditional warehouses without major structural changes.

Con: Requires some physical modification of the warehouse to set the predetermined routes.

Investment: $$-$$$

6
AMR = Autonomous Mobile Robot

Self-operated robots designed to move materials guided by sensors, lasers, or radar, similarly to how a robotic vacuum cleaner operates. Can detect and avoid obstacles, and move freely around the warehouse floor. Typically used for zone picking and replenishing to create collaborative workflows with human workers.

Pro: Flexible and scalable as no physical warehouse modification is necessary and you can start with only a few units. Works well for retrofitting traditional ware-houses.

Con: Specialized knowledge for programming and maintenance is required.

Investment: $$-$$$

Warehouse Innovation Overview – What Is It and How Does It Work?
Continued

UAV = Unmanned Aerial Vehicle
7

(commonly known as drones)

Small, flying vehicle that is programmed and operated remotely. Best used in warehouses for inventory management, security, visual inspections, and yard management. Drones are equipped with cameras and sensors to read their environment and send data to a central location to be analyzed and made actionable.

Pro: Drones can help monitor larger areas to detect safety risks, anomalies, and movement, in addition to scan labels quickly.

Con: While artificial intelligence is improving drone performance, they typically need a consistent environment when doing inventory; all labels need to face the same way, for example.

Investment: $$

Wearable Technology
8

Hardware physically worn by workers. Common types include barcode scanners, such as gloves, rings and headsets; smart glasses that display directions, safety alerts, inventory, etc.; activity trackers that produce data and/or alerts (typically haptics, audio, and or email/SMS) based on physical reactions, posture and movement; and exoskeletons that provide power and support to workers' legs and back for heavy lifting. Most wearables are intended to improve worker safety, as well as boost efficiency.

Pro: Easily scalable for pilot programs or use only in specific areas of a warehouse. Data collection is automatic, and can often be affordably integrated with existing systems.

Con: Workers can be hesitant about having their movements tracked, and some wearables may be uncomfortable.

Investment: $$-$$$$

AR & VR = Augmented and Virtual Reality
9

A virtually created environment experienced through a device, such as glasses, tablets or headsets. AR shows the existing surroundings and adds elements to it, while VR creates an environment different than existing surroundings. Can be used for worker training, guiding workers to correct slots for picking or replenishing, and inventory management.

Pro: A safe way to let workers experience a decision-making situation without the risk of injury or damage. Can quickly guide workers to locations, identify misplaced items, and potential hazards.

Con: Not always accurate in complex environments. Data collection and storage can be a point of vulnerability for breaches.

Investment: $-$$$$

Warehouse Innovation Overview – What Is It and How Does It Work?

Continued

10 AI & ML = Artificial Intelligence and Machine Learning

A computer program that mimics human thinking patterns learned from data input and repetition. Can come already-integrated with programs or equipment, or retrofitted into existing systems and equipment. AI programs need training with specific data and their performance should be monitored, similar to training and evaluating human workers. This technology can be used in many ways, including inventory, order management, monitoring equipment and security.

Pro: Unlike traditional software and applications, AI programs will augment humans without requiring continuous directives. Can be used to analyze, evaluate and make pre-set decisions to free up humans for more complex decision-making.

Con: While AI is advancing quickly, it can make errors even with accurate data input. AI is only as good as its training, and may not react as expected if it encounters a situation it hasn't learned.

**Investment:** $-$$$

11 WMS = Warehouse Management System

Software application to manage warehouse operations, including inventory, orders and optimization. Can be integrated with WES (Warehouse Execution System) WCS (Warehouse Control System), and TMS (Transportation Management System) and other applications for increased automation and analytics.

Pro: Automating data collection and analysis helps to quickly find areas of improvement to increase efficiency and productivity. It helps manage, collect and display KPIs consistently and accurately to better plan for labor and inventory needs.

Con: Implementation is a complex process that has to be approached with growth and flexibility in mind, or the system can become an inflexible legacy one quickly.

Investment: $-$$$
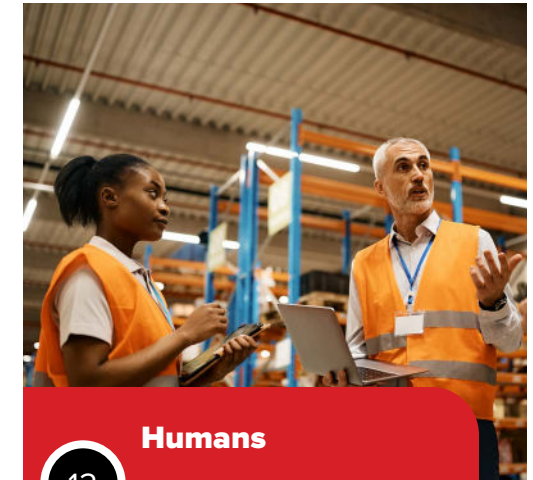
12 Humans

There is no technology today that operates completely without human interaction, so it's important to remember that innovation starts with us. Keeping an open mind to what's possible is key to leverage any type of technology in your business. Many innovative products, programs and processes can appear complicated, but with the right attitude, knowledge and people, they can greatly improve operations and show ROI in short order.

One Small Step for Man, One Giant Leap for Warehouse Innovation

Taking the first step on a long journey can be a daunting task, and knowledge is crucial to choosing the right path. Understanding each option available and how it can be of use serves as the base for building a successful warehouse innovation strategy.

It's tempting to design technology plans to address an immediate challenge, but focusing too much on the near-term will leave you with a legacy system very soon. Designing automation and robotics implementation for your business 5-10 years into the future will serve you better. Implementation takes time and you want to avoid working with hardware and systems that will soon be outdated. Build systems for scalability and flexibility to allow room to evolve, and choose core software that can be built upon and integrated with other systems, as opposed to one that only works with specific applications and hardware. Bundling products and services can make sense, but keep in mind that technology that's sold as a set may not allow for easy integration of different systems going forward.

Combining different technologies is often necessary for success, but integrating multiple sources is complex and requires multiple aspects to work in harmony with each other. Training staff on new processes and requirements is one of those aspects. Robotics and automation are not likely to replace humans in the workforce, but it will require those humans to learn new skillsets and tasks. For example, an order selector today physically picks cases, but that role may evolve to control automated systems and robots instead – the human is still needed, just doing something different. The best business case for robotics is to replace humans for simple, repetitive tasks to enhance productivity, safety and worker satisfaction.

While using different technologies is the best way to build custom solutions, using disparate software systems is a big drain on productivity and leveraging data. Using multiple data streams from different systems – an apples to oranges scenario – will make you miss important information and trends, and make dashboards difficult to maintain and understand. Look for software and systems that normalize your data into a single stream of comparable information, preferably in real time. Also keep in mind that applications work best if they're customized to your operation rather than adjusting your operation to fit a turnkey application.

For those just beginning to explore technology solutions, a good starting point is single-task automation, such as trying a few automatic forklifts or AGV tuggers. This technology can be augmented and integrated with additional technology solutions, as well as built on for future expansion. It can also be a stopgap for long delivery times on more advanced technology products and services.

Something else to consider is that some robotics providers offer their products and services on a rental basis, similarly to how software products are cloud-based subscriptions rather than programs installed on computers (also known as SaaS, or Software as a Service). Using this option makes it easy to run a pilot program and scale up and down, even temporarily during busy times of year, as well as eliminates hardware maintenance costs.

Integrating any kind of technology and automation in a warehouse is a complex process that requires careful planning, testing, and implementation. By taking a systematic approach and involving key internal stakeholders, you can successfully create systems and processes that improve efficiency, accuracy, safety and productivity.

ADVANCED AND PREDICTIVE DATA ANALYTICS

There's a lot of data produced by technology use that can be harnessed to maximize operations. The best use of data coming through any application is real-time data that can easily be pulled into a dashboard to provide a snapshot of what's happening now as opposed to what happened hours or days ago, and to predict what is likely to happen next.

Key Steps to Consider When Exploring New Warehouse Innovation

1 Evaluate your current processes

Analyze your warehouse operations to identify areas where automation can be most beneficial.

2 Research automation solutions

Research what different types of automation solutions are available and determine which ones are most suitable for your warehouse based on your specific needs and budget.

3 Create a plan

Develop a detailed plan, including timelines, budgets, and performance metrics. Make sure to involve key internal stakeholders and departments in the planning process.

4 Test and pilot

Before fully integrating automation, it's important to test and pilot different solutions to determine their effectiveness and identify any potential pitfalls.

5 Train employees

Train employees on how to use and interact with the new automation equipment and processes, and allow time for adjustment. It's also a good idea to explain why the technology is being integrated and how it will improve their work tasks and responsibilities.

6 Monitor and evaluate

Monitor the performance of your automation solution regularly and evaluate its impact on your warehouse operations, including workers. Use data and analytics to track metrics such as productivity, efficiency, safety and accuracy to determine if it's meeting your goals.
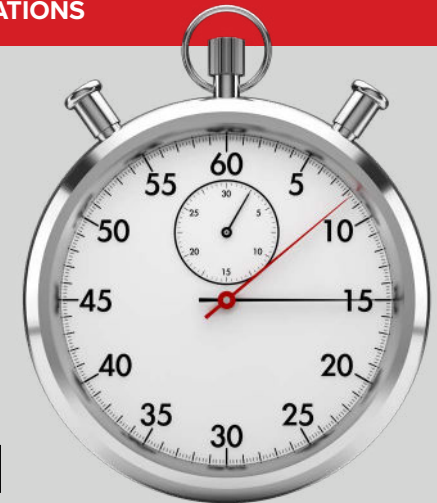
SIMULATIONS AND DIGITAL TWINS

Technology such as AI and virtual environments are ideal for testing technology and automation implementation and running test scenarios before committing to it in reality, as they can digitally recreate your exact warehouse and processes. Many consulting companies offer this service to help distributors decide what options would work best for them.
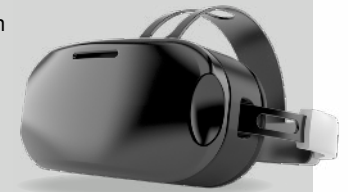
THE TOGGLE TAX = TIME WASTED SWITCHING BETWEEN COMPUTER APPLICATIONS

It takes an average 2 seconds for a person to switch and reorient from one computer program to another, for example from Excel to an ERP application. This is done up to 1,200 times every workday. That's equal to 4 hours per week, or 5 work-weeks per year, adding up to 9% of annual worktime.* Automating software and application data can eliminate a lot of that wasted time.

9%

* Harvard Business Review https://hbr.org/2022/08/how-much-time-and-energy-do-we-waste-toggling-between-applictions