DISTRIBUTION STRATEGY GROUP

Warehouse and Supply Chain Technology

The Role of Warehouse Automation in Driving Efficiencies and Productivity

By Pat Hanrahan

Distributors that lack the tools to optimize and manage a complex order fulfillment operation will struggle to control labor costs.

For that reason, warehouse automation is proving to be a compelling investment for distributors seeking to reduce labor costs and improve throughput efficiencies.

In this report, we'll look at the role that ERP and WMS play in distribution operations — and we'll explore how Warehouse Execution Systems (WES) can support those functions.

The Role of Warehouse Execution Systems

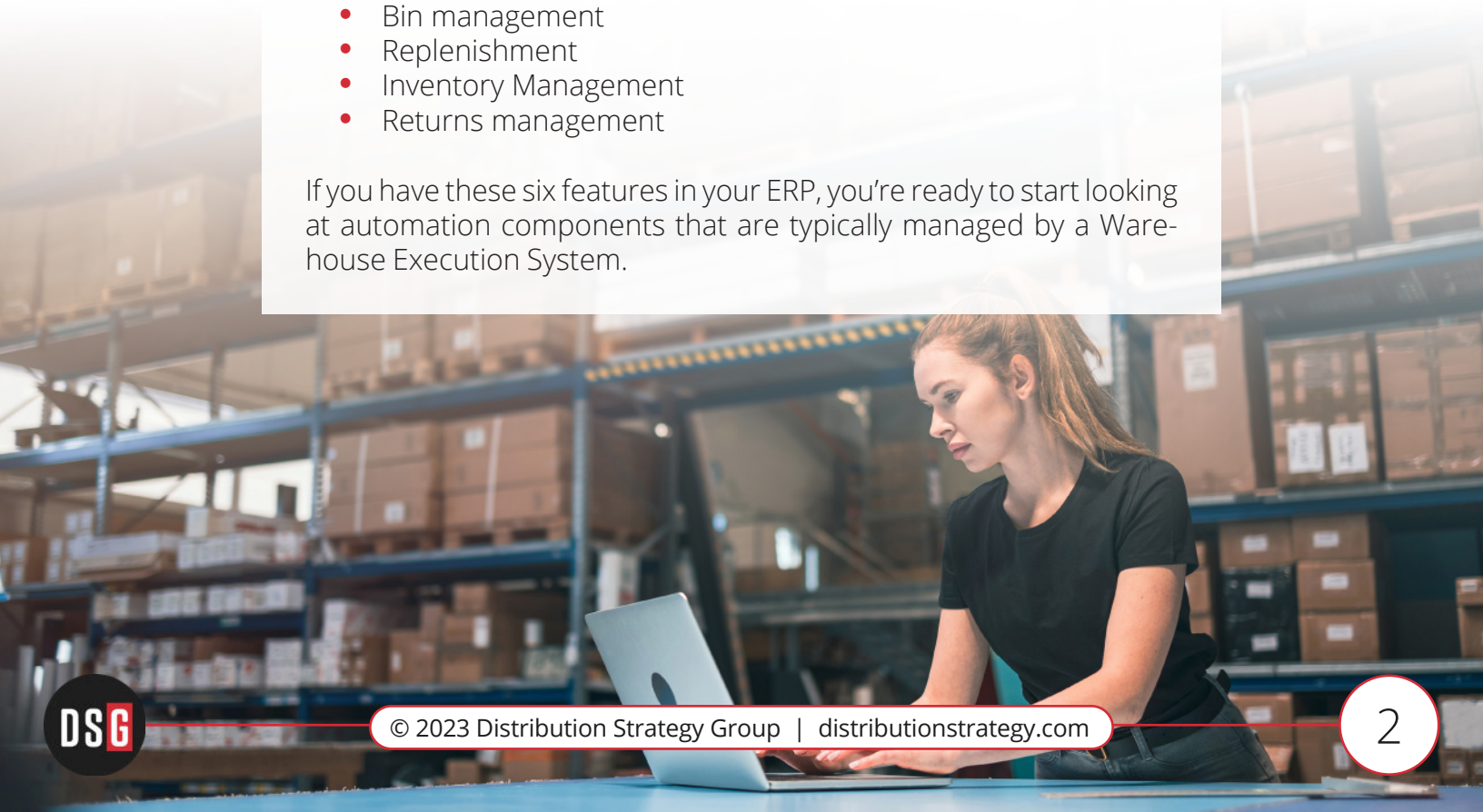
Warehouse Execution Systems exist to connect automation to the ERP platform. It's essentially a complementary technology, a "helper" that makes your ERP more powerful.

WMS Capabilities within an ERP

The top six features that the WMS functionality within your ERP should be providing include:

- Receiving
- Put-away
- Bin management
- Replenishment
- Inventory Management
- Returns management

If you have these six features in your ERP, you're ready to start looking at automation components that are typically managed by a Warehouse Execution System.



WMS Myths

Myth 1: Sometimes we visit distributors who have a strong ERP, and they think they need a Tier 1 Warehouse Management System. That's a myth. We can complement the existing warehouse management functions of the ERP by adding the right blend of automation.

Myth 2: We also see distributors that think that the ERP by itself is sufficient for the requirements of omnichannel fulfillment, such as when you're trying to deliver ecommerce — possibly managing processes for Fulfilled by Amazon or Fulfilled by Walmart, and handling mixed-shipment customers that are taking both pallet-level orders, LTL pallet-level orders, and parcel orders.

These are areas where distributors should start investigating how to manage those processes more efficiently.

Signs You're Ready for a WES

Here are some signs you're ready to consider a Warehouse Execution System.

1. Your picking can't keep pace with order volume.
2. You're missing shipment deadlines.
3. You've got bottlenecks in picking, packing or shipping
4. You're pursuing a warehouse automation initiative.
5. You've got excessive overtime and reliance on temporary workers.
6. Your parking lot is full.

You may have daily fluctuations or seasonal fluctuations — and instead of trying to rely on overtime or bringing in a temporary workforce, the question should be:

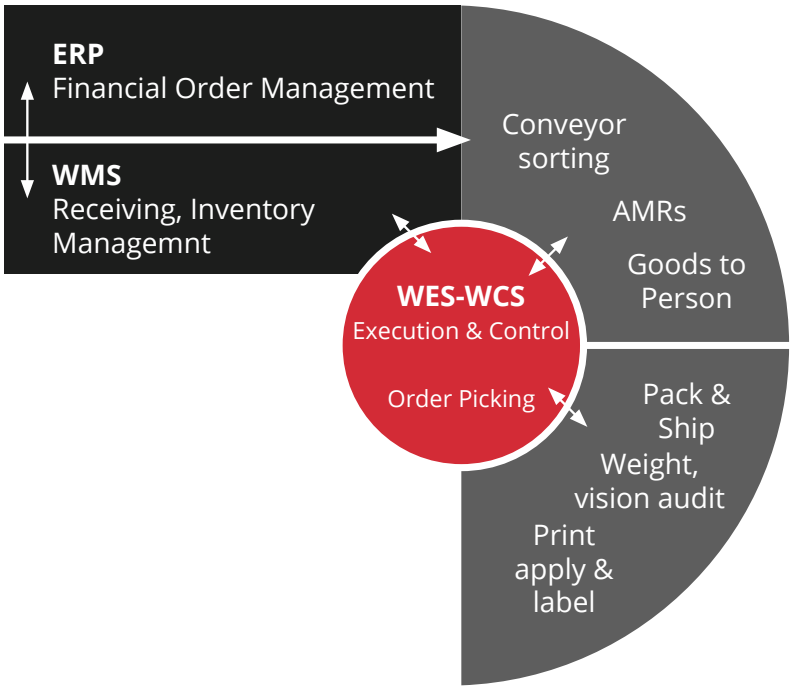
"Can we increase the productivity of the existing workers through better processes and technologies, eliminating those bottlenecks?"

The WES acts as "warehouse glue" to connect the latest generation of receiving, pick, pack and ship automation technologies.

A Warehouse Execution System drives standardized work processes throughout the warehouse, reducing a distributor's reliance on tribal knowledge. WES can also help reduce the dependency on manual labor, and streamline and increase order throughput.

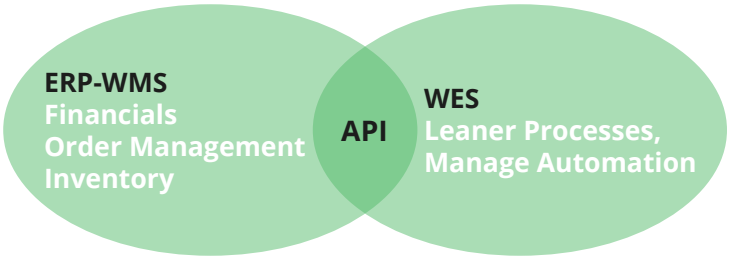
How WES Works

Let's look at WES architecture at a high level. The ERP's WMS functionality sits above the Warehouse Execution System, which uses a standard API to connect. The order details are sent to the Warehouse Execution System, which is managing a mix of automation required within the facility. It also offers other functions, such as real-time inventory visibility.



If a large group of orders gets dropped to the WES, and some of those orders don't have the forward inventory available, the WES can send alerts and messages to supplement the WMS capabilities of the ERP, to show that replenishment moves will be required to execute those orders.

Real-time control and the integration of intelligent automation are at the core of what a Warehouse Execution System brings to the ERP.



Orchestration

The orchestration layer of a WES is where order release and advanced cartonization come in. That includes the ability to create waves of both parcel-level and LTL orders through inventory awareness and order prioritization.

This ensures that a high-priority order (such as a same-day order) gets out the door within the required time limits. It's all about taking touches out. Other tactics include:

- **Zone-based picking** consolidates picks that may be happening in parallel across multiple zones.
- **Travel path optimizations and "like visit" batch pick logic** drive 300%-400% efficiency gains as compared to visiting the same location multiple times.

Order Release with Cartonization

Most Tier 1 Warehouse Execution Systems use multiple algorithms to select the optimal shipping container for an order.

- Item Dimensions
- Item Weights
- Is it compressible?
- Can it be nested?
- Is it glass?
- Does it have specialty handling?
- Is it fragile?
- Is there a bottled product?
- Is there a product that might have hazmat rules associated with it?

Here's another important question: If you're experiencing growth, or you have a strategy to grow your ecommerce business, are there products that you ship that can go in a poly bag? The advanced cartonization logic within a Warehouse Execution System systematically assigns these orders to a polybag significantly lowering parcel shipping costs.

Distributors' goals should be to drive to 93% utilization of a carton. Advanced cartonization logic can drive material usage down and reduce shipping costs.

An example might be a customer using poly bags and shipping 200 orders a day. If the cartonization looks at the products that could ship and drives another 50-100 orders a day through the poly bag shipment method, you're saving dollars per shipment. That adds up.

Inventory Awareness

Inventory awareness is another valuable capability of a WES. This complements the inventory management functions of the ERP, rather than replaces them. It looks at large order drops and forward inventory locations, releasing orders that have available inventory and alerting the operations through email, text messages and web notifications when replenishment is needed. This functionality drives awareness to the right person in the operation.

Automation Technologies

Let's talk about the automation that a WES supports.

Receiving and Cross Dock

An extendable conveyor and sortation system can be used for container or truck unloading. Containers may have mixed SKUs. Capture the weight and cube of each of the items, so you have that information within your warehouse.

And then, as it goes through that auditing process, we can bring it into a sortation system that sorts similar SKUs to pallets for more efficient put-away and/or directing products that are cross-dockable to the right location. This accelerates the performance of the ERP by bolting on automation in receiving.

Picking Suite

The Warehouse Execution System should have a suite that includes:

Pick to light: This works best when you have a small quantity of fast-moving SKUs.

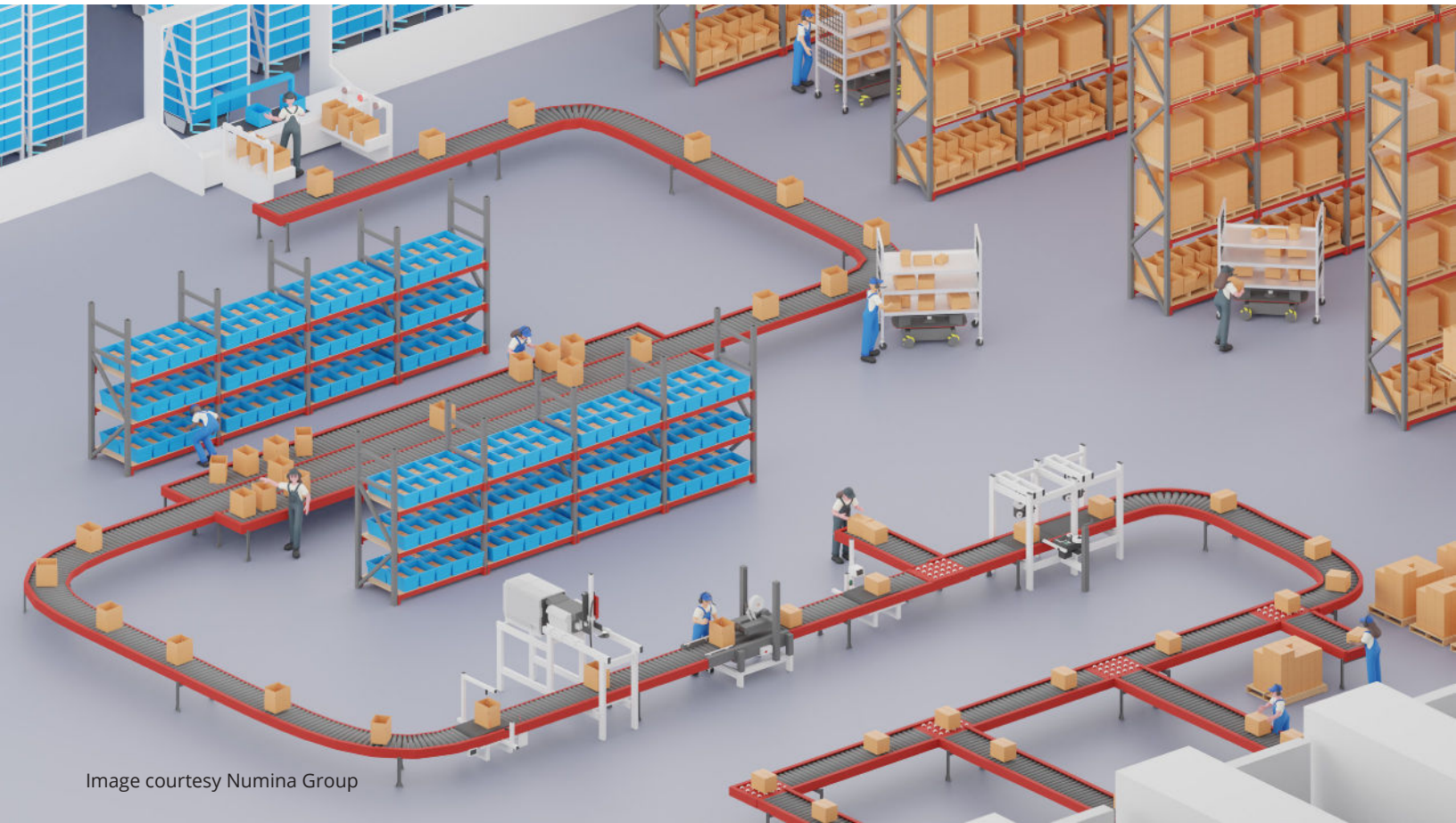
Pick by voice: Voice is all about keeping the operators working—hands-free, eyes focused on the work task. And when you do that, you achieve a gain in productivity.

AMR-Enabled Batch Order Picking: With a manual push cart, you're typically batch picking 12 or more orders. An autonomous mobile robot can move more weight, allowing for larger batches of orders.

Goods-to-person (GTP): Many distributors are exploring this technology, which combines automated storage and retrieval with accurate picking. The system delivers goods to the user. AMR-based GTP increases performance, flexibility and efficiency, as well as makes it easy to adapt to swings in demand due to seasonality and other factors. AMR-based solutions have advanced a lot since the early generation of solutions like Kiva, where autonomous mobile robots pick up shelves and bring them to picking stations. Today's AMRs are faster and safer with LIDAR guidance systems.

Order Consolidation Put Wall: Essentially an order fulfillment sortation system using to-put light displays. Items are zone-picked across a warehouse using picking automation systems like autonomous mobile robots or batch picking carts. Complete batches are brought to the order consolidation put wall where they are sorted to the specific order using put to light displays. Back side of the put wall can be used for packing.

A Warehouse Execution System can orchestrate and manage multiple technologies across the distribution center.



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Packing and Shipping

After optimizing picking, many operations see a bottleneck in pack and ship. A WES unifies the entire pick, pack and ship operation by integrating pack and ship automation solutions, providing a complete end-to-end solution.

Pick complete cartons are inducted onto a Pakt system to seal, manifest inline, automatically print and apply, and sort to parcel carrier or LTL pallet build.

Common packing and shipping software modules and technologies that a WES integrates:

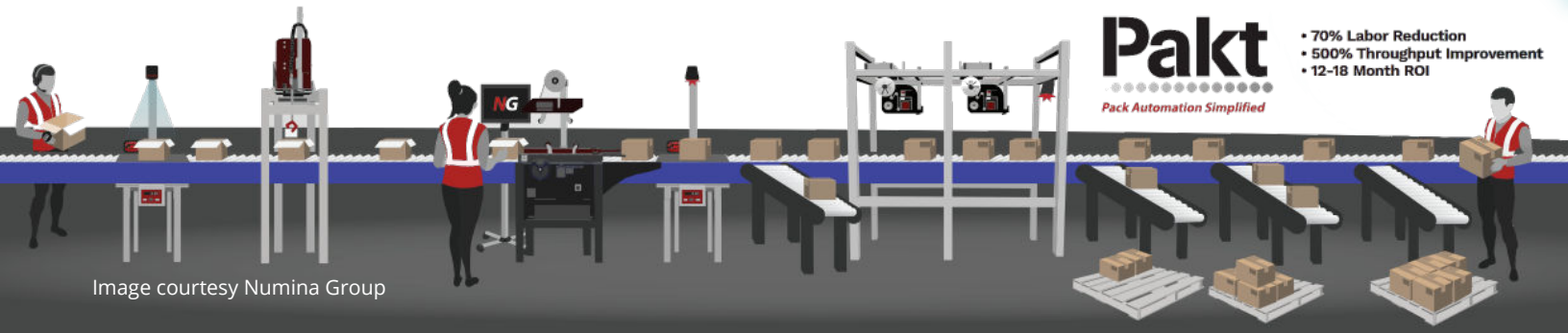
Scan-Weight-and-Vision Audit: This combines automatic scanning of a barcode ID/LPN (license plate number), with a scale for weight capture that can be used for Quality Control or manifesting purposes. Cartons that do not match the expected weight are kicked off for secondary inspection. Additionally, a camera can capture an image of internal carton contents married to the barcode ID/LPN to streamline quality assurance and customer service.

PFI Print-Fold-Insertion: A PFI system is an automatic document inserter that will print, fold and insert documents such as packing sheets, marketing materials, product-specific instructions and compliance documentation. A PFI prints, folds and automatically inserts these documents into a carton.

Taper and Void Fill Insert: This is a high-speed solution to insert, void, fill and seal cartons. It dramatically reduces the touches required to complete the packing process.

SLAM: After the carton transports through the taper, the carton continues down the line for dimension capture to complete the manifesting operation, and print and apply shipping labels, packing slips or retail compliance labels.

Sortation Systems: These automatically sort cartons based on shipping carrier or shipping method; exceptions and quality control will deliver to the jackpot lane for secondary handling or exception processing.



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Think Holistically

Warehouse Execution Systems connect software with warehouse automation components, including:

- Order release optimization
- Cartonization
- Order picking suite
- Voice Directed Picking
- Pick to light
- AMR Robotic Picking
- GTP Automation
- ASRS and mini loads
- Robotics
- Put Wall and Sorter Order Consolidation
- Conveyor Controls and High-Speed Sortation
- Print-Fold-Insert
- Scan-Weight-Dimensioning
- Print and Apply Labeling
- Sorter Control & Management
- Labor Tracking and Reporting

Unfortunately, many distributors have only invested in islands of automation. Try to avoid that. If you buy a WES for one purpose, you can accelerate one area of the warehouse — but you wind up creating bottlenecks somewhere else downstream or upstream of that process.

If you think holistically, automation can unite your entire operation – improving accuracy, productivity, customer experience and profitability across the board.

About the Author

Pat Hanrahan has 15+ years of warehouse automation experience at Numina Group. As vice president of business development, Pat works closely with companies to improve their order fulfillment operations. He also helps clients assess their current operation and identify opportunities for improvement, and Pat collaborates with their team to implement end-to-end warehouse automation solutions. Numina Group specializes in defining, designing, and implementing warehouse automation solutions that eliminate manual labor and increase efficiency, accuracy, and profitability throughout fulfillment operations.

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