

Working for Scale



When it comes to warehouse scalability, you need to balance automation and flexibility
By Kate Vitasek

Automation considerations	
ATTRIBUTE	WHAT TO CONSIDER
Volume	<ul style="list-style-type: none"> Forecasted volume and one-, two-, and five-year plans Peak demand impact on picking, storage, and sortation Storage requirements Cross-docking requirements
Product mix	<ul style="list-style-type: none"> Changes in product velocity Impact of sales and marketing programs on picking and order flow
Seasonality	<ul style="list-style-type: none"> Seasonal lows and highs and the effect on material flow
Distribution	<ul style="list-style-type: none"> Distribution types (bulk, consolidation, single order) Cross-docking requirements
Product size	<ul style="list-style-type: none"> Effect on sorters, conveyors, storage racking Effect on pick locations Ease with which material handling equipment can be modified
Customer requirements	<ul style="list-style-type: none"> Routing guide changes and impact on order size and shipping requirements Data and information needs
Labor	<ul style="list-style-type: none"> Local labor availability and costs Ability to staff to meet peak demand

It is a long-held belief among warehousing professionals that highly automated distribution centers are more challenging to modify in response to changes in volume, merchandise mix, order profiles, and other factors than are less-automated centers. “Automation has an inverse relationship to flexibility,” says Ken Ackerman, president of The Ackerman Co., a Columbus, OH-based warehousing consultancy.

Modern distribution centers do a lot more than DCs of the past; they are more supply chain centers than fulfillment centers. In addition to storing and shipping product, they must manage a broad array of information flows and activities such as cross-docking and value-added services. Automation, of course, facilitates many of these functions and services. But when implementing automation solutions, you also need to keep scalability and flexibility in mind.

UNDERSTANDING AUTOMATION Automation is commonly defined as the conversion of a workplace to one that replaces or minimizes human labor with mechanical or electronic machines or processes. In the DC, automation is focused on the storage and movement of product and the flow of information relating to these processes. Success is measured by the reduction of costs or by improvements to customer service levels. Typical justification factors include labor reduction, increased order/inventory accuracy, improved inventory turns, improved warehouse utilization, improved information flow, and increased system throughput.

There are a dizzying number of examples of DC automation that support merchant

Examples of DC automation

PRODUCT MOVEMENT/STORAGE

- Conveyors and overhead cranes
- Fluid load and unload conveyors
- Automated guided vehicles (AGVs)
- Sortation and diverter systems
- Automated storage and retrieval (AS/AR) systems
- Carousels
- Layer-forming palletizers

FULFILLMENT/PACKING

- Smart carts
- Pick-to-light/put-to-light
- Robotics
- Voice recognition (VR) technology
- A-frames (automated dispensing systems)
- Auto and semiauto tapers
- Auto label print and apply
- Put-to-zone/put-to-store systems

INFORMATION GATHERING/INTERFACE

- Precubing
- Inline scales and sizing (cube capture)
- Inline label readers
- Radio-frequency (RF) terminals, scanners, and cameras
- Barcodes
- RFID

INFORMATION MANAGEMENT

- Enterprise resource planning (ERP) applications
- Warehouse management systems (WMS)
- Transportation management systems (TMS)
- Labor management systems (LMS)
- Warehouse control systems (WCS)

and product lines. Each presents its own challenges to how existing automation will support these new products or volumes,” says Jeremy Davidson, an account executive for West Reading, PA-based distribution consultancy and systems integrator Fortna.

Product mix, order volume, and product size are all subject to change. Labor in some parts of the country may be difficult to come by during peak seasons. Customer order patterns may change, requiring relocation of DCs closer to the customer base. These are just a few of the things that you must consider when looking into DC automation.

WHAT DO YOU NEED TO CONSIDER? Many factors must go into any decision to automate. Foremost should be how to balance current needs with future needs.

Start by understanding your company’s core business and growth strategy. “Companies grow organically, where products and volumes change over time, and inorganically, through acquisitions of companies

and product lines. Each presents its own challenges to how existing automation will support these new products or volumes,” says Jeremy Davidson, an account executive for West Reading, PA-based distribution consultancy and systems integrator Fortna.

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Multichannel merchants face some additional, unique challenges, as do third-party logistics providers (3PLs). A merchant with a well-defined mix of products that is projected to be stable and uniform over time could probably implement automation solutions that can substantially reduce costs with little risk that its DC will outgrow these solutions. But a multichannel merchant often has to support multiple distribution types, such as bulk shipments to wholesalers or other distribution centers, consolidated shipments to stores, and order fulfillment and shipping to end customers. To meet these varying customer requirements, such companies often design “warehouses within the warehouse”; this sort of configuration makes planning for automation particularly difficult.

On the other hand, a 3PL must try to predict what types of customers it will have in the future and, as such, what types of product these customers will require it to manage. For a 3PL, then, developing a highly automated warehouse would unnecessarily restrict its ability to respond to various customer needs.

FLEXIBLE AUTOMATION, AUTOMATED FLEXIBILITY One of the more common automation projects in a DC is implementation of outbound carton sortation systems. These systems have a high payback by streamlining the pick and ship-to manifest process.

Pick-to-light systems are the second most common automation project. These systems reduce pick labor, can support high volumes, and work with many product types. And as Eric Lamphier, director of product management for Atlanta-based supply chain solutions provider Manhattan Associates, points out, “Today’s pick-to-light systems are more movable and adjustable than those of the past, and the ability of these new products to interface with popular WMS [warehouse management system] programs are excellent. These systems have become much more flexible to changing product mixes.”

Voice recognition systems “are arguably the most important technological breakthrough in warehouse operations of the past two decades—since barcode scanning,” says Ackerman. “These systems have a quick payback [12-18 months] and are delivering concrete and impressive results for many companies.” Like pick-to-light systems, voice technology is a flexible sort of automation; because the interface with the warehouse worker is software driven, you can quickly modify pick rules and logic.

Information is at the heart of today’s DCs, and WMS software provides real-time visibility into inventories and product locations. This in turn allows companies to apply

and update business rules and logic to aid order management, drive sorters, optimize storage, and allow for effective cross-docking. “Technology providers understand that DCs are under pressure to reduce costs, to do more with less, and to react quickly to changing demands of their customers,” says Lamphier. “As a result they are developing far more modular and flexible products than those of the past.”

Modularity can in fact help companies arrive at an effective balance of efficiency and flexibility. “We have found hybrid solutions are often the most effective for a company,” says Fortna’s Davidson. “Voice, pick-to-light, and pick-to-cart implemented together may each bring benefits to a company’s picking solution, for example.” The same is true of solutions that integrate material handling products such as sorters, diverters, conveyors, automated storage and retrieval [AS/AR] systems, automated guide vehicles [AGVs], and a host of other tools.

“Automation needs to be viewed as a system of activities that must each fit together with downstream customers,” Davidson continues. “This lean view of distribution through continuous processing offers the next major advancement in DC workflow balancing and flexibility.” ■

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