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# Designing an Automated, Omni-Channel Fulfillment Center: Key Considerations for Multi-Channel Retailers

## INTRODUCTION

U.S. e-commerce retail sales in 2013 were estimated to have exceeded $262 billion, marking an increase of 16.4 percent year-over-year.[1]  That makes online fulfillment the fastest growing segment in retail, with the National Retail Federation (NRF) reporting anticipated "non-store and online growth of 11.4 percent and the bricks-and-mortar segment growing at 3.5 percent … [and] losing market share."[2]  Some forecasts predict e-commerce growth to exceed $440 billion by 2017.[3]

That explosive growth is compounded by the high expectations of shoppers:

*Today's consumers want it all. They want to shop for what they want, where they want, when they want—and then have all of their purchases delivered seamlessly on a consistent timeline (whether the timeline is next day or even same day delivery.)[4]*

Customers also expect a seamless shopping experience that minimizes, or eliminates, the distinctions between online and in-store shopping. They want to order something online from a retailer's e-commerce website, but be able to return it to a brick-and-mortar store location to avoid shipping charges (or, they want a free return shipping label). They want an out-of-stock item in a retail store to arrive on their doorstep the next morning, shipped from a different store location or warehouse located in another region.

But meeting those types of demands poses a definite challenge to retailers' existing supply chains. That's because traditionally, retailers have used three separate distribution facilities to meet the needs of three different sales channels: one each for brick-and-mortar retail store replenishment, wholesale bulk shipments to other resellers, and small parcel e-commerce fulfillment to individual customers. "The advantage to this approach is to allow internal processes in each facility to be more focused and easier to control. The disadvantages are obvious: redundant infrastructure, excessive inventory and high overhead — all resulting in high costs."[5]

The challenge for multi-channel retailers, therefore, is how best to consolidate two or more of these different facilities into a single omni-channel distribution center. To do so successfully requires a considerable investment in automated material handling systems. This white paper addresses some of the areas a retail corporation should consider when evaluating such a project.

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[1] Chuck Jones, "Ecommerce Is Growing Nicely While Mcommerce Is On A Tear," Forbes.com Tech Blog Post of 10/02/2013, accessed April 28, 2014, http://www.forbes.com/sites/chuckjones/2013/10/02/ecommerce-is-growing-nicely-while-mcommerce-is-on-a-tear/

[2] David P. Schultz, "Hot 100 Retailers: The nation's fastest-growing retail chains 2013," Stores Magazine Cover Story, August 2013, accessed April 28, 2014, http://www.stores.org/hot-100-retailers

[3] Chuck Jones, "Ecommerce Is Growing Nicely While Mcommerce Is On A Tear," Forbes.com Tech Blog Post of 10/02/2013, accessed April 28, 2014, http://www.forbes.com/sites/chuckjones/2013/10/02/ecommerce-is-growing-nicely-while-mcommerce-is-on-a-tear/

[4] MHI and Deloitte Consulting LLP, "The 2014 MHI Annual Industry Report: Innovations that drive supply chains," PDF, 5.

[5] Kevin Gue, ed., "The U.S. Roadmap for Material Handling & Logistics," www.MHLRoadmap.org, 34-35.

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## POTENTIAL CHALLENGES

Transitioning from multi-channel distribution to an omni-channel model presents several challenges. That's because each retail fulfillment channel has different picking, packing and shipping requirements.

> Retail store replenishment: Consolidated, built-to-store orders consisting of multiple cases of stock keeping units (SKUs). SKUs represent different product lines and sizes, typically packed in mixed-case pallet loads. Shipments may be seasonal, monthly or bi-weekly.

> Wholesale shipments: Full pallet loads of products, possibly specially branded, shipped to resellers' warehouses or direct-to-store. Shipments may be seasonal or monthly.

> E-commerce orders: Hundreds of small parcel shipments, typically containing one-to-two line items per order, sent directly to customers. Shipments go out daily, with consumer expectations driving a current standard of 48 hours between the time an order is placed and delivered. A process for managing returns must also be implemented.

Attempting to fill individual online orders via facilities that are designed for high-volume retail replenishment or wholesale simply won't work. Likewise, treating retail stores as mini-warehouses that can fill online orders with in-store inventory is impractical. Store associates are busy serving customers. Asking them to locate, pack and ship items from in-store inventory takes them away from creating an optimal customer experience. Finally, many retailers simply do not have the software and systems in place that give accurate visibility into inventory availability and location across the entire enterprise.

Therefore, designing an automated system that can manage case, pallet and individual SKU picking, packing and shipping is key to successfully implementing an omni-channel fulfillment model.

## OMNI-CHANNEL DISTRIBUTION BENEFITS

With all the challenges, why consider an investment in an automated omni-channel fulfillment center? There are a variety of benefits to be gained. Among them:

> Customer Service: No longer is return-on-investment (ROI) the primary driver behind the decision to implement automation. Thanks to the rise of e-commerce, today's retailers compete on speed to delivery and extended order cutoff times. Automated systems provide the means to give customers what they want, where they want it and when they want it.

> Operational Efficiencies: Maintaining multiple facilities to serve multiple channels means multiple redundancies: including buildings, workforces, information technology (IT) systems and support. Merging facilities lowers total operating costs.

> Shared Inventory: Combining inventory from multiple locations yields an opportunity to reduce buffer, or safety, stock. It also gives greater real-time visibility into inventory availability. This makes managing seasonal peaks or promotional demands easier, as well as enables parcel delivery of a unique item to a customer who couldn't find it in the brick-and-mortar store.

> Information Technology (IT) Synergies: It can be very difficult to maintain two (or more) operating systems per channel. Combining disparate data sources into a single system reduces costs and provides real-time inventory and productivity information. Better data access is also the foundation of predictive analysis and simulations for forecasting and strategic planning.

› Transportation/Supply Chain Efficiency: Limiting the number of facilities supporting each channel produces tremendous savings in transportation costs by centralizing in-bound and out-bound truckloads. It also enables negotiation of better parcel and freight shipping rates.

## CREATING A POSSIBLE SOLUTION

When designing an automated warehouse for omni-channel fulfillment, there are a number of factors to consider. Among them:

### 1. Picking Processes.

Bulk picking involves the direct shipment of a complete storage unit, such as a pallet load of product, to the customer without breaking it down. These orders can be pulled from storage and sent straight to the shipping dock. Conversely, retail store replenishment and e-commerce orders require smaller quantities (full cases or individual SKUs, respectively). Picking cases and items typically requires roughly 70 percent of a warehouse's total labor force. Because of that, the best automated facility design concept is built first from the picking process, then works backwards (receiving, storage, replenishment) and forwards (consolidation and shipping).

### 2. Peak or Seasonal Demands.

Retail store replenishment and wholesale bulk fulfillment tends to follow seasonal peaks, such as back to school or Christmas holidays. E-commerce order fulfillment, on the other hand, often has daily peaks, such as hourly spikes related to order cut-off or shipping deadlines. Because of that, it's critical to consider the labor needed to support the automated system during those peaks early in the design process. Look at both the quantity and quality of labor required, along with operational plans, to determine what type of automated process can effectively be deployed. For example, if an automated design is dictated by average instead of peak throughputs, a plan for flexing up to accommodate peak periods must be established. The complexity of the flex up plan should be weighed against the labor available; if untrained temporary workers will be used, processes must be easy to learn and system output must meet service level agreements. Alternately, it may be more desirable to automate to peak levels in order to maintain consistency of process and service levels without requiring temporary labor. These alternatives should be examined as a capital expenditure versus an operational expenditure, and require a deep understanding of the ultimate omni-channel fulfillment strategy.

### 3. Frequency of Change.

Smart automated system designs make accommodations for changing throughput rates and storage capacities. Look for scalable technologies that can adapt to the varying order volumes and peak patterns generated by the different fulfillment channels on a day-to-day basis. Also, the best designs anticipate future growth, allowing for capacity expansion without requiring a complete shutdown of the existing facility.

### 4. Use of Space.

Unlike in Europe, where real estate is limited and square footage prices demand a premium, facilities in North America tend to have large footprints. Items are commonly stored without much consideration of the opportunity to use overhead space. The ideal automation system increases storage density because it maximizes the vertical space of a building, as well as tightly compresses the items it contains.

### 5. Handled Materials.

Consider the SKUs that all components of the system (including automated storage and retrieval systems, conveyors, sorters, palletizers and more) will be storing, transporting and handling. Most in-bound pallet loads are uniform, but out-bound pallet loads may not be. Broken cases or eaches may need to be handled in dimensionally consistent plastic totes. Eaches traveling on conveyor or sorter outside of a tote may have dimensions, packaging or contents that pose a challenge for the system—such as irregular shapes, glass or bottles, slick shrink-wrap, fragile items or even magnetic components that stick to the handling equipment. The design of the system needs to accommodate those SKU profiles.

### 6. Labor Productivity.

Automated facilities still require personnel to perform certain tasks, such as custom packing. To maximize employee productivity—whether building pallets to meet store shipment value-added service (VAS) requirements, or gift wrapping individual orders for e-commerce fulfillment—it's important to design flexible workstations. The best automated solution incorporates the tools workers need to support each channel's unique handling requirements.

### 7. IT Optimization.

An automated facility utilizes a high-level control system that manages and optimizes picking, packing and sorting processes with technologies to meet the demands of each order profile. To do this, it combines data from an enterprise resource planning (ERP) system, warehouse management system (WMS) and/or warehouse control system (WCS). The functional capabilities of an organization's ERP, WMS and WCS often dictate key aspects of an automated facility's design, with certain processes and equipment managed by algorithms at different subsystem levels. The ideal automated system flexibly incorporates these software systems to control and direct all handling processes across the entire enterprise. This is a must for omni-channel fulfillment operations, in order to leverage real-time productivity and inventory data. Network-wide, the combined systems should also reduce data management complexity while offering robust architecture to support a variety of modules—including transportation management, supplier connectivity and point-of-sale data analysis.

### 8. System Flexibility.

Particularly for omni-channel facilities serving more than one channel, designing operational flexibility into an automated system is key to managing the demands of those different order profiles. The picking process for store replenishment and wholesale shipments may be virtually identical to that for e-commerce order fulfillment—but the packing process might be routed separately for each. For example, online orders route to a unit sorter, whereas store and wholesale orders route instead to a rebin area, where they are consolidated and packed for bulk shipments. Look for an automation system design that flexibly integrates variable operating modes per subsystem to accommodate different channel needs, and ensure those subsystems are future proofed against a range of what-if scenarios. This enables changes to the operating plan as the business changes, and avoids a scenario where the automated system drives, or constrains, the ability to serve customers.

### 9. Supplier Expertise.

There are several equipment suppliers and independent system integrators who design and implement automated distribution centers. Retailers considering an automated, omni-channel fulfillment center design should look for a service provider with a broad range of experience that encompasses both unit load and parcel automation projects. The ideal supplier is staffed with a seasoned team of system engineers who possess expertise in design concepting, as well as a deep understanding of the unique challenges faced by retailers seeking to combine separate fulfillment networks in to a single facility.

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### ABOUT VANDERLANDE INDUSTRIES INC.

Vanderlande is a leading global supplier of integrated logistics solutions that automate warehousing and material handling in distribution centers. With more than 1,000 successful automated warehouse and distribution systems—both in greenfield and retrofit facilities—designed, engineered and implemented, companies around the world rely on Vanderlande to help them meet the fulfillment demands of their customers. For more information, visit www.vanderlande.us or call 770-250-2800.

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