

Choosing the Right Order Fulfillment Automation Solution

By **Mike O'Brien**, Multichannel Merchant

Direct-to-customer retailers in 2016 are constantly being asked to address the needs of individual shoppers. They're seeing double-digit growth in a business that requires them to fulfill orders of low line numbers, often just a single item, compared to bulk orders for store fulfillment.

Not only do they have to support this tremendous ecommerce growth, but there are also issues of seasonality to grapple with. The period from Black Friday through Christmas can involve five to 20 times the normal order volume. All of a sudden, what had been done in a week is happening in two to three days. This creates a tremendous need for temporary hiring of operations personnel, and an all-hands-on-deck footing. While the temps are trained as rigorously as possible, picking and order accuracy rates are inevitably going to suffer. And mis-picks inevitably lead to higher return rates, driving costs up and customer satisfaction down.

With ecommerce and DTC operations dealing with shrinking order sizes yet higher order volume and high service levels, historically successful but rudimentary equipment and processes can reach the stress point in terms of space, systems, people and product.

For a growing number of merchant companies, automated systems have become a way to address the issue of increased throughput, order accuracy and returns. In addition to accuracy, often the biggest driver of automation decisions, the ability to achieve higher throughput per headcount, increasing efficiency while keeping down labor costs, is also paramount.

There are a wide array of choices, everything from RF scanners, ASRS, conveyors and pick-to-light to voice-directed systems, tilt trays, fully automated goods-to-person and robotics. But what level of automation is



right? A lot depends on your business goals and what you're trying to achieve, how optimized your current operations are, what you can afford and ROI requirements.

Conducting a Current State Assessment

Companies need to determine at what level of order volume they should start to consider order fulfillment automation. Curt Barry, principal of DTC operations consultancy F. Curtis Barry and Co., said order levels of 5,000 to 10,000 per day could be a sufficient threshold to cost-justify a move into automated solutions.

First, Barry said, companies need to focus on exhausting all non-automated possibilities for improving existing operations. Starting with a focus on automated solutions could lead to over-building or unnecessary investments. Further, he said, it's a mistake to try to overlay automation on a poorly functioning set of processes and systems.

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Barry's advice is to go through all aspects of your current layout, design and systems, and make sure you've captured all the potential savings. Since picking and packing usually account for more than 50% of labor costs, identify all non-automated ways to streamline the labor involved in those operations.

Some other tips from Barry:

- Conduct an objective analysis of operational pain points and costs. Take a methodical approach to defining all opportunities and potential solutions, and involve warehouse staff. Frontline personnel know the issues and can often contribute valuable ideas.
- Get a thorough understanding of existing productivity and costs by department, unit and line, as well as per order and per package shipped. Be selective and methodical about identifying and assessing areas and applications most likely to yield cost-justifiable benefits.
- Assess every conceivable area where automation might help will simply result in confusion, paralysis and a lot of wasted time and effort. Focus on assessing just those areas that are most likely to deliver business benefits.
- For each area, estimate the savings in labor reduction, the ability to track inventory through the center, reduction in errors and throughput of customer orders, using an 18-month payback as the guideline. This will provide a solid read on the level of automation that can be cost-justified based on your operation and cost structure.
- Make sure the solution you're considering is sufficiently flexible and scalable to accommodate changes like product assortment or increased volume that would affect layout needs or the fulfillment model.

Chris Groseclose, general manager of Crutchfield Corp., agreed with Barry on the importance of employee feedback in the automation decision process. For instance, he said, his company's frontline workers were frustrated with printing devices for shipping labels that worked most of the time, but when they failed, the result was painful. Also, he said, workers became sick of manual processes like pushing carts around the warehouse, which led to a decision to implement a new conveyor system.

If you're running out of floor space or know you'll be there soon, automating your storage and picking process can greatly improve storage capacity and allow room for growth. Systems like a vertical lift module or



another goods-to-person system can improve storage capacity by 40%–60% or more. You also need to weigh the cost of investment in your overall facility vs. automation equipment. Typically, the time, effort and cost of retrofitting your building far outweigh the cost of an order fulfillment automation system.

What System Do You Need?

While you might hear the word “automation” and immediately think “outrageously expensive,” there are many solutions that smaller and mid-market companies can afford and cost-justify with an ROI of two to three years or less.

Jeff Hedges, president of Opex Corp., said given the rapid growth in ecommerce operations, it's critical that the system is designed with enough flexibility to meet not only current but also future needs. In some cases, Hedges said, an automation system might be designed and built based on where an ecommerce business thinks it will be in 5–10 years, but sometimes growth is so rapid they get there in two.

A good place to start is with **RF and barcode scanning**. It reduces labor and error rate, improves efficiency in a number of areas and gives you real-time data access. This technology is the foundation for all automated picking and conveyor systems as well as solutions involving voice-enabled applications.

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Voice-directed systems convert computer data to voice instructions and vice versa. These headset-and-microphone devices, which require RF capabilities as a prerequisite, can be used in many warehouse functions for which instructions and confirmations are required. Benefits include reduced costs, more effective use of a multilingual workforce, fewer errors and more efficient and faster picking.

In **pick-and-pass systems**, conveyors or carts move the orders past pickers and often on to packers. Large centers often create pick-and-pass zones based on different types of orders and products.

Pick-to-light uses LED displays to indicate which product is to be picked and the quantity. They can be used with a variety of product shelving and rack storage media. Pickers are stationary or move short distances, so they're best for high volumes of a particular SKU and limited numbers of SKUs (hundreds to low thousands).

In **put-to-light**, LEDs guide sorting and packing into shipping containers, directing where and how to allocate product.

Wave picking systems allow all items, regardless of location or zone, to be picked simultaneously and directed to one location, where they are sorted and combined into individual orders.

In **automated packing**, conveyors bring orders to pack stations and move product to shipping and manifesting for sorting into trucks. Low-tech options include box erectors, automated sealers and envelope inserters.

Carousels, horizontal or vertical automated storage and delivery systems, send products to a fixed location. Multiple units are typically used to eliminate picker "dwell" time. They work well for picking small and split-case items.

Flow racking utilizes slanted roller sections within a frame that provide high-density pick facings with corresponding storage behind the pick carton. High-volume, fast-selling products are used to cost-justify this investment.

In-line scales and scanners are positioned as part of shipping conveyors. This allows manifest information to be gathered without manual barcode scanning while products continue to move to the shipping area.

Motorized conveyors move product between different processes and functions. They can bring products to work areas, and take cartons, totes and other containers away.

Spiral conveyors move product from one level to another within a small footprint by using a tight spiral configuration. Consider the gradient and how likely products are to break if they fall off.

Flex conveyors are portable and can be expanded, contracted or curved as needed. Used primarily to move cartons from the dock to receiving and for truck loading, they're typically affordable for even the smallest operations.

Shipping sorters are conveyor systems that divert and sort cartons of completed orders by shipping carrier lane and/or shipping class of service.

Tilt-tray sorters bring product to the packing area. Moving trays tilt to divert product or cartons to designated locations, and are used for product and carton sorting. They are among the fastest sorters but can be costly.

Bomb-bay sorters drop the product directly over the tote or carton. They can be used for relatively small products as well as for larger but soft items such as apparel.

Cross-belt sorters use a series of carriers to sort product on to other conveyor systems and packing stations.

Unit sorters create an automated process using conveyors and barcode scanning to divert individual units to a packing station.

A step above these solutions is a fully automated **goods-to-person** system. Orders stored in a pick face or racking structure are automatically retrieved using totes or other conveyance devices, based on a command from the warehouse management system using the RF system. They are then brought via a shuttle system to either a pick station or a pallet station. As the traditional process of walking to the product is eliminated, operations gain from improved ergonomics, faster order processing and high productivity.

Hedges said GTP systems allow for very high inventory accuracy, giving companies the ability to do cycle counts or even inventory confirmation on the fly during the picking process. The incidence of lost items goes down, and a better handle on inventory means a reduced need for inventory on hand and thus, less storage space.

Some DTC operations are finding they can cost-justify a fully automated GTP system using criteria like a smaller DC footprint—saving on various facilities costs—and reducing headcount by up to 75%. While it's hard to put a price on increased order accuracy, ecommerce companies have exactly two chances to get it right with the customer: by making the online transaction quick and painless and by ensuring the right

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item shows up at the front door. If either goes wrong, they'll quickly take their dollars elsewhere.

Implementation and Integration

Barry said it's critical to have top management buy-in on what's needed to implement the automation system while keeping day-to-day operations running. Also, the project manager has to be able to handle the significant time and responsibility involved. Some duties may have to be reassigned or shared during a major project.

Groseclose said Crutchfield had a group from its IT department meeting with his team 2–3 times a week 18 months before implementation of a new automated scanner and conveyor system. Having a system integrator whose project programmer worked closely with his team and IT on aspects like setting up the logic controls was an important element in the project's ultimate success.

Because of all the pre-work, designing, planning and discussion, the actual go-live was relatively pain free, Groseclose said, and the system only required a minor debugging session four months in.

Implementing an automation project within an existing operation is a very delicate ballet. Companies need to make sure their operation continues to run while the installation and integration with systems like WMS, WCS and OMS goes on. They need to plan on an extended schedule, including test switchovers, sometimes during slower periods like third shift or on weekends, and need to develop contingency plans. If the company has the luxury of putting the system in a new building, the implementation can be much more direct and easily managed.

Working through the training requirements and process, and allotting a sufficient timeframe for ramping up

proficiency and speed are also critical success factors to any automation project. Prepare for the likelihood of a period of slowed productivity before staff and the new system are in perfect sync.

Looking Ahead

Robotic goods-to-person technology, like Kiva Systems, which Amazon acquired in 2012 for use in its fulfillment centers, rightfully get a lot of attention for their sophistication and high degree of efficiency, accuracy and throughput. But they are typically out of the price range consideration for all but the largest retail operations.

Amazon, in fact, conducts annual competitions among robotics laboratories at leading engineering and tech-focused universities to determine which has the best robotic picking system. While a good deal of progress is being made, even the most advanced of these systems still cannot replicate the human motor skills required to successfully pick and pack any item regardless of shape, size or material composition.

Groseclose said he stays in touch with organizations like The Association for Packaging and Processing Technologies (PMMI) and its events to keep abreast of the latest developments in order fulfillment technology and systems. He said Crutchfield did a deep dive into Kiva a few years ago, and while impressed with the system, could not cost-justify the benefits for his operation.

Hedge said he's watched with interest the progress of robotic applications for material handling and fulfillment for the past 20 years, with the Amazon competition being the latest iteration. The end goal of these endeavors is to develop a fully robotic "lights out" distribution facility, but that desired future state is still quite a ways off, given the dexterity and speed gap between robots and humans.

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