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Carl Marcinkowski, senior VP of distribution and logistics at Destination Maternity

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MICHAEL LEVANS
GROUP EDITORIAL DIRECTOR

Destination Maternity's leap of faith

So many of our conversations—and so much of our coverage—over the last few years has revolved around the idea of working smarter through the appropriate application of technology inside warehouse and distribution center operations.

While equipment remains vital, it's now the digital orchestration of that equipment that's driving productivity improvements—and often serving as the foundation of a company's core mission. In fact, this marks the fourth year in a row that *Modern* has devoted the majority of our July issue to a deeper look at how the industry is embracing innovation and how well it's putting the available technological toolkit to work.

Instead of offering platitudes on where we should be in theory, we continue to build our Technology & Innovation Issue around our "2016 Warehousing & Distribution Center Software Usage Study" (page 38)—the most comprehensive snapshot of current and future investment plans available—as well as practical features to help explain emerging trends and show real-world examples of operations that have gone through the transformation process.

The goal is to help alleviate any technology anxiety, show where our peers stand in terms of application and then push readers to make a leap of faith. In fact, you'd be hard pressed to find a better System Report than Destination Maternity to kick off this year's special issue to help readers make that leap.

"Here was a fairly conventional DC operation that simply wasn't up to meeting the new complexities of the retail distribution landscape," says executive editor Bob Trebilcock, the author of this month's System Report. "What results is a highly automated DC, built from the ground up, that simultaneously manages the complexity of the business while simplifying the fulfillment processes. It's a pretty remarkable story."

One of the most impressive elements is how Carl Marcinkowski, Destination's senior vice president of distribution and logistics, took a lot of the guesswork out of this daunting project by sticking to a few guidelines to keep the project focused. Marcinkowski made sure his management team was involved from the start by having them create a wish list of objectives for their building after visiting more than 30 different operations.

First, they felt that the new system had to make every second count, optimizing equipment, inventory and labor while continuously executing processes across all business channels. Second, they stressed the need for flexibility, or ways the different processing methodologies could be incorporated into the same pieces of equipment.

The team knew what they needed, but felt many of the systems they saw fell short, since most were controlled by a warehouse management system (WMS), a warehouse control system (WCS) and a warehouse execution system (WES) all from different vendors.

This is where their leap of faith took place. "The industry has wondered whether you can run a highly automated facility without a traditional WMS," says Trebilcock. "Destination Maternity's answer is 'yes.'"

All of their WMS/WCS/WES functionality came from their system integrator, and they believe that's the most efficient way to operate this facility. To this system, an order is an order and a piece is a piece, and they're making every second count. It appears that this leap of faith is paying off.

Destination Automation

Front: Carrie Weber, director of distribution center; Robert Hodgson, director of engineering; Evelyn Pogue, senior director of distribution

Back: Ted Uhlman, senior director of distribution process improvement; Cindy Lewis-Proll, director of logistics; Jim McDermott, director of compliance; Carl Marcinkowski, senior vice president of distribution and logistics

Jessica Kourkounis/Getty Images

Running short of space in its old facility, Destination Maternity Corp. built a new, highly automated DC driven by an integrated warehouse management and execution system. The result is a strategic weapon helping to drive the business forward.

IF CARL MARCINKOWSKI had to choose one word to describe the changing landscape of retail distribution, it would be complexity.

"Back in 2013, when we started the design of our new distribution center, our business had become too complex for our existing distribution center," says Marcinkowski, the senior vice president of distribution and logistics for Destination Maternity Corp., the world's largest designer and retailer of maternity apparel.

Complexity may be an understatement. Then, Destination Maternity, the company's trademarked, go-to-market name, was servicing almost 600 retail stores and leased spaces in another 1,300 department stores; supporting a wholesale business that supplied maternity wear to nearly 150 international franchise locations and other retailers; and filling orders for its growing e-commerce business.

By Bob Trebilcock, executive editor

The heart of the facility is a bomb-bay unit sorter that feeds 600 chutes and processes 15,000 units an hour. The sorter manages store fulfillment, wholesale distribution and online fulfillment.

All of that activity was taking place in a slightly bigger than 200,000-square-foot facility in downtown Philadelphia with limited automation, a less than optimal layout and an enterprise resource planning (ERP) system that was not very flexible.

The solution was a 406,375-square-foot greenfield distribution center in nearby Florence, N.J. It was designed from the ground up to use automation to simultaneously manage the complexity of Destination Maternity's business while simplifying fulfillment processes. The unique design developed by Marcinkowski's team in partnership with a systems integrator (Invata Intralogistics, invata.com) was governed by two overriding principles:

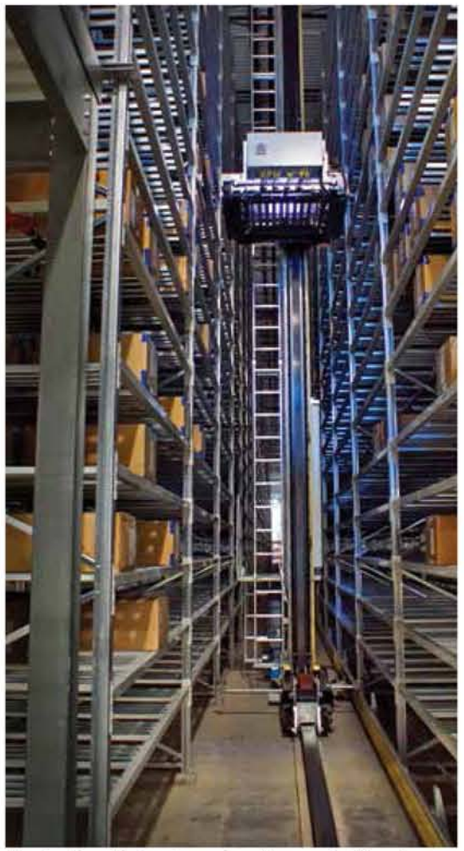
Make every millisecond count: The system was designed to dynamically optimize the equipment, inventory and labor in real time while continuously executing processes across all business channels. The key to making this work is an integrated warehouse management system (WMS), warehouse execution system (WES) and equipment controls systems, all provided by the systems integrator. While getting all three solutions from one vendor represented a unique approach, the Destination Maternity team was convinced that a single source for its software and controls—rather than a segmented approach—was the best way to create the processing environment needed to accomplish its goals.

Flexibility: Automation and flexibility are often thought of as mutually exclusive. In this case, highly automated storage and goods-to-person picking technologies come together in a way that allows different processing methodologies to be incorporated into the same pieces of equipment. For example, the same processes and equipment used to fill outbound orders are used to process merchandise returned from the stores for repositioning elsewhere across the network. Think of it as shifting from drive to reverse to drive again.

The result is a true omni-channel distribution center using software and automated storage and picking technologies for real-time execution and optimization.

Efficiency is among the most quantifiable benefits; Destination Maternity has realized a significant reduction in labor related expenses—the wholesale picking process now requires just 40 people to hit the same pick rate that previously required 90 people, and the number of touches required to process e-commerce orders has been reduced by 82%.

What's more, the system can easily handle new business opportunities. "In the past, our buying and merchant teams would come up with a new initiative, and we'd say, 'We need weeks to get ready,'" says Marcinkowski. "Now, we say, 'Bring it and we'll get it out the door.'"



Destination Maternity makes the most of its storage space with a mini-load AS/RS (shown) for cases and totes and a shuttle that manages 26,000 SKUs.

Out of space

Destination Maternity was launched in 1982 as a mail-order business selling maternity apparel for professional women after Rebecca Matthias, the 28-year-old founder, had difficulty finding maternity clothing that was appropriate for the office. Today, it touts approximately $500 million in annual revenue and is the only nationwide chain of maternity apparel specialty stores in the United States.

Destination Maternity goes to market under two brands, Motherhood Maternity and A Pea in the Pod. As of April 30, 2016, Destination Maternity operates 1,487 retail locations in the United States, Canada, Puerto Rico and, most recently, England, including 530 stores, and 957 leased department locations.

Along with a wholesale business, Destination Maternity has international store franchise and product supply relationships in the Middle East, South Korea, Mexico, Israel and India. And, it sells through several Websites, including Motherhood.com, APeaInThePod.com and DestinationMaternity.com.

Servicing that diverse set of customers was the catalyst for the new distribution center. Destination Maternity has always had to contend with piece picking, since its store formats are small and mixed cases are the norm, even for its wholesale customers.

But the growth of the business coupled with requirements, such as quick fulfillment for e-commerce orders and compliance labeling for wholesale and international orders, was overwhelming the old facility in downtown Philadelphia that often had to close down a city street so a trailer could back into a dock.

Marcinkowski adds that processes in the old facility were "very linear, and our ERP system did not allow for the commingling of our two brands." A customer who ordered case goods and items from a garment-on-hanger system from both brands could end up with four separate cartons and multiple deliveries.

It took as many as 29 touches just to fill an e-commerce order, and shipping costs were on the rise. Destination Maternity also had to contend with an increasingly diverse labor force, speaking as many as 27 different languages—any process that wasn't simple and intuitive presented challenges. "If we were going to continue to grow our different channels, we had to be able to integrate new business and better service our customers," Marcinkowski says.

A new approach

The path to a new distribution center began with a network analysis and the selection of a location about 30 miles away in Florence. The next step was to design a building that would achieve the goal of servicing expecting and new

Once items are sorted on the bomb-bay unit sorter, multi-line, store and wholesale orders are completed in a put wall area with more than 2,000 lights.

moms with a flexible and operator-friendly solution.

Based on past experience, Marcinkowski says he and his team created a wish list of objectives for the building. "I'd worked in retail long enough to know that you have to be prepared for change," he says. "And, I wanted a system that was automatic, intuitive and operator friendly."

More specifically, he wanted a tightly integrated system that reduced touches, provided the speed necessary to fill e-commerce orders and could be used for both outbound orders and reverse logistics and repositioning of inventory. The project team visited nearly 30 different operations that included three-tier pick modules, conventional batch picking, and goods-to-person systems. While the latter held the most promise to eliminate touches and travel time, in the teams' view, they all fell short.

"There were some great systems out there, but nothing clicked with us," Marcinkowski says.

The biggest limiting factor, in the view of Destination Maternity, was the fact that most of those systems were controlled by a WMS from one vendor, a control system from another, and a WES from a third. The question was whether they could—or even should—get one software system from one vendor?

"We had a lot of debate about whether we should go with an integrated WMS, WES and control system rather than a more traditional approach," says Marcinkowski. "The way we did it was through a lot of research, analysis and detail on the part of my project team. They really took ownership of the project."

To aid that analysis and development process, the design firm created a fully functioning simulation environment to test and prove the automation software applications along with the performance of the system software for the shuttle system, mini-load, the bomb-bay unit sorter and the put wall displays.

In the end, Marcinkowski says, "The decision was very analytical and thoughtful and well proven, but still a leap of faith." But, it was a leap made with confidence. "Years ago, I was at a company that was an early adopter of a new warehouse management system," he says. "Other members of my team had also been early adopters of technology. We had the confidence that we could execute a unique concept of this magnitude."

Automation at a glance:

The heart of Destination Maternity's solution is a bomb-bay unit sorter with 12 induction stations. The unit sorter feeds 600 dual chamber discharge destinations at an average of 15,000 units per hour. The facility also features:

- a two-aisle high-speed shuttle system with 24 shuttles and storage for 26,000 totes stored two deep on either side of an aisle – one tote for every SKU in the building,
- a four-aisle mini-load AS/RS with four cranes and storage capacity for 54,400 containers,
- a multi-purpose put wall with more than 2,000 light displays,
- two shipping sorters including a small package sortation system for e-commerce packages, and
- wearable RF technology for all transactions.

Tie it together

The solution Destination Maternity chose met all of Marcinkowski's criteria for a system that can fill orders across all business channels and handle returns from stores on the same equipment, all while reducing touches, increasing speed and providing the flexibility needed to take on new channels of business and new strategies. And, it does it with one integrated software system to manage people, processes and equipment.

In doing so, the facility limits the use of traditional pallet rack and shelving for storage. Instead, most product is stored in the mini-load automated storage and retrieval system with 54,400 locations or in a high-speed shuttle with 26,000 locations.

The system uses a goods-to-person strategy that automatically routes containers and totes from the shuttle, mini-load and other storage areas to 12 induction stations at a bomb-bay unit sorter.

"We wanted product coming to our people and not the other way around," says Marcinkowski. "If we empty a tote and are short of the number of items we need, the integrated system will call another tote from the shuttle or mini-load." The unit sorter serves 600 drop points, or chutes. The WES, meanwhile, has the capability to monitor operating conditions on the floor and re-allocate orders and work in real time to optimize the fulfillment process.

To initiate the order fulfillment process, the WES prioritizes the orders it receives from the ERP system based on key processing variables such as transportation requirements, the SKUs being ordered and the availability of equipment and labor. It then calls for cartons and totes from the storage areas.

Since all totes are single SKU, an associate at an induction point only has to scan the license plate bar code label on the tote before inducting items onto the unit sorter. A display screen counts down the number of items that are required from the tote.

The high-speed, high-density shuttle system provides dense storage of 26,000 totes—one tote for every SKU managed in the facility.

A camera-based imaging system confirms that the item is positioned on the sorter tray. Items drop into a container underneath a chute. When all the items for that order have dropped, the chute is closed and a red light signals to an associate that the carton is complete.

From there, the container or tote is automatically routed to the next stop in the order fulfillment process: that could be directly to shipping, a value-added processing area, a packing station for single-line orders or to a put wall area for order consolidation.

Since going live, Marcinkowski has seen a number of measurable improvements and cost savings. One is a 5% drop in transportation costs since the WES can combine brands and types of product that previously went out as split shipments. That has also led to a significant reduction in the number of cartons going out the door because Destination Maternity can consolidate different types of inventory into one box rather than four. E-commerce orders are processed in a matter of hours, with 98% processed the same day they are received.

The biggest test came not long after the system went live, when Destination Maternity ran a flash sale that turned out to be one of the largest e-commerce ship days in its history, nearly beating the volume of orders from the prior year's Cyber Monday.

What once would have taken three days to process was filled and shipped out the door in hours, while at the same time doing the usual number of store drops. Where distribution was once a hurdle to growth, it is now an enabler of the business.

"Our merchant teams know that if they need us to receive and ship out a million pieces in a week for a floor set change, we can handle it," Marcinkowski says. "It's a strategic weapon that is going to help drive our business and most importantly provide exceptional service for expecting and new moms."

The automation tool kit in action

Destination Maternity's new facility brings together shuttles, mini-loads, a bomb-bay unit sorter and sophisticated software to drive a true omni-channel distribution environment.

Destination Maternity Corp.

Florence, N.J.

SIZE: 406,375 square feet
PRODUCTS: Maternity apparel and accessories
THROUGHPUT: 433,000 units per day at peak
SKUs: 27,000 SKUs
SHIFTS PER DAY/DAYS PER WEEK: 3 shifts per day; 5 days per week, plus one weekend shift
EMPLOYEES: 250+

Destination Maternity's new highly automated distribution center in New Jersey is powered by an integrated warehouse management and execution system that manages all of the processes and equipment while balancing the workload throughout the facility.

Receiving: When shipping containers arrive at receiving (1), an advanced ship notification (ASN) is downloaded from the enterprise resource planning (ERP) system and all containers must have compliant ASN labeling. Once a container is opened, an associate scans cases onto a receiving conveyor. From there, the system determines the storage location and storage medium based on the velocity of the product.

SKUs with the highest velocity or that will be shipped within two days of receipt are routed to a dynamic pick line (5). There cartons are scanned into storage locations.

SKUs with normal velocity or demand are routed to the mini-load (4), which can automatically store corrugated cartons or plastic totes.

Slow-moving SKUs are delivered to the reserve storage area (6).

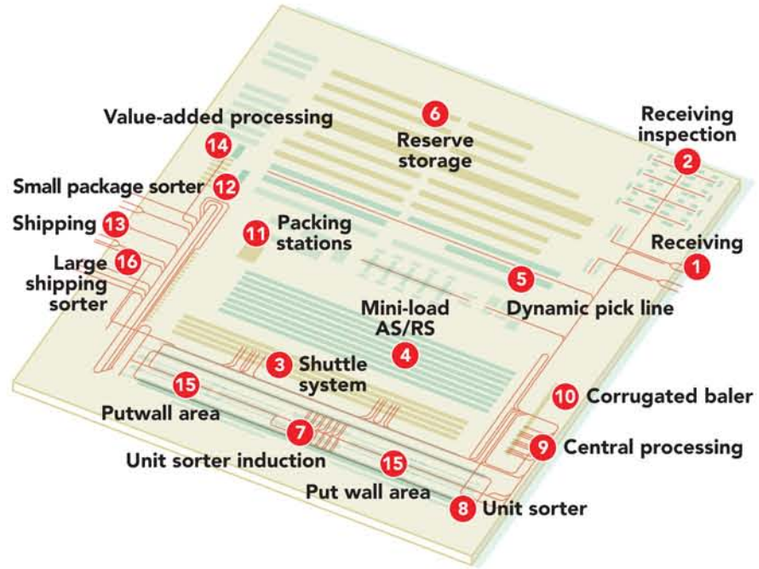
Whenever possible, the shuttle (3) is replenished with newly received merchandise, which is transferred to a plastic tote. The shuttle holds one tote of every SKU managed in the facility.

Receiving inspection: A select number of cases from every newly received purchase order are conveyed to the receiving inspection area (2). There, cartons are opened, inspected and verified. The items and the case are cubed for handling by the automation and for outbound containerization. Once the inspection and quality assurance are complete, product is re-cartonized, pushed onto a take-away conveyor and routed to the appropriate storage area (3,4,5,6).

Picking: Since almost every order requires piece picking, a pick is a pick and an order is an order, regardless of the channel of business during the fulfillment process. When orders are released, the warehouse execution system (WES) determines the best storage medium from which to pull inventory. The shuttle (3) is always the first choice followed by the mini-load (4), reserve storage (6), the dynamic pick line (5) and inbound inventory (1, 2). The WES also assigns orders across the 600 chute locations served by the unit sorter (8).

Totes from the shuttle system (3) are routed directly to one of twelve induction stations along the unit sorter (8). An associate scans the tote and an item in the tote to verify that the correct contents have been delivered. Once that has been verified, the number of items to be inducted is displayed on a screen. After all the items required for the order have been inducted, the associated pushes the tote onto a take-away conveyor and it is returned to the shuttle (3).

Totes stored in the mini-load (4) are handled just like totes from the shuttle (3). Corrugated cases, on the other hand, are first conveyed to a central processing area (9) for de-trashing. There, the contents of a carton are verified and scanned into a tote, which is then placed onto the conveyor system, routed to an induction station (7) and loaded onto the unit sorter (8). Empty corrugated cartons are sent to an automatic baler (10).



Order consolidation and packing: Every order on the unit sorter (8) is assigned to a chute. Items are inducted onto a sorter tray and dropped into a container under the chute assigned for an order or group of orders. For instance, a batch of single piece orders may be assigned to a unique chute and aggregated into a tote. The WES tracks items as well as the weight and cube of the items as they drop.

When the system determines that a container is full, the overhead chute door automatically closes and a red light indicates the container is ready for the next step in the process. An associate closes out the container and pushes it onto a take away conveyer that routes it to the next stop.

Totes holding items for single item e-commerce orders, for instance, are routed to the packing station (11). There, the WES assigns an item to an order once it is scanned by an associate and automatically prints the shipping label and packing list. Once packed, shipping cartons or bags are placed on an overhead conveyor that routes them to a small package sorter (12). After crossing an in-line scale, the package is diverted to a service carrier lane in shipping (13) and placed in a Gaylord designated for the appropriate service level.

Wholesale customer orders requiring extra handling are routed to one of 12 stations in the value-added processing area (14). There, they are re-ticketed, packed for shipment and palletized if required. They go directly to shipping (13). Alternatively, customer order totes are routed to the pack out area (11) or to a put wall bay (15), where orders are consolidated into totes by customer.

In either scenario, once a tote is sent to the packing area, it is scanned by an associate who verifies that the contents of the tote match the requirements for the order displayed on a screen. Once the order is verified, the system prints out the pack list and shipping label for the shipping bag or carton. These are also placed on the overhead conveyor and sent to the small package sorter (12).

Finally, orders for stores drop into canvas totes while orders for leased stores are placed into corrugated containers. Store orders receive a pre-printed shipping label and security tag and are conveyed directly into an outbound UPS trailer in shipping (13). Corrugated containers destined for leased stores are closed and routed to a corrugated pack lane. There, they pass through a semi-automated taper line, a packing list is enclosed and a shipping label is applied. The cartons are then routed to shipping (13).

Shipping: In order to get to shipping, Destination Maternity-owned and leased store shipping containers are conveyed to the large shipping sorter (16) where they are weighed by an in-line scale and scanner. Based on the weight and scan information, the WES diverts the container to the correct shipping lane (13), marks the status of the container as shipped and uploads a real-time shipment confirmation to the ERP system.

Packages on the small package sorter (12) are handled in the same way, except that they are diverted to ship lanes (13) designated for small package carriers.

System Suppliers

SYSTEM DESIGN AND INTEGRATION, WAREHOUSE EXECUTION AND MANAGEMENT SYSTEMS, WAREHOUSE CONTROLS AND PUT-TO-LIGHT SYSTEM, MINI-LOAD AND SHUTTLE AS/RS SYSTEMS: Invata Intralogistics, invata.com
CONVEYOR AND SORTATION SYSTEM: TGW, tgw-group.com
UNIT (BOMB-BAY) SORTER AND CHUTES: EuroSort USA, eurosort.com
ALIGNERS: Intralox, intralox.com
RF WEARABLE AND HAND-HELD SCANNERS: Zebra Technologies (Motorola), zebra.com
FIXED SCANNERS: SICK, sick.com
CAMERA-BASED IMAGERS: Cognex, cognex.com
AS/RS RACK SYSTEM: Nedcon, nedcon.com
PALLET RACKING: InterlakeMecalux, interlakemecalux.com
MEZZANINES AND WORK PLATFORMS: Wildeck, wildeck.com

Carl Marcinkowski

Destination Maternity

TITLE: Senior vice president, distribution and logistics

LOCATION: Florence, N.J.

EXPERIENCE: More than 30 years operational and financial experience with companies such as Frito-Lay, Lenox China and Destination Maternity.

Jessica Kourkounis/Getty Images

Modern: **The theme of the July issue is technology and automation, and your new facility is highly automated and takes a cutting-edge approach to distribution software. Yet, it replaced a fairly conventional DC. What changed in making that transition?**
Marcinkowski: A tremendous amount. For starters, our management team really had to step up because we were not only implementing new technologies, but we were embracing new processes. They also had to understand the new equipment, a new building and the new order flow, which is very different from the way we used to do things. They also had to understand what now constituted success for a shift or the day.

For example, the entire way they approached their job and performance changed. Every one of our managers went through numerous training sessions prior to starting in the building. Every single person coming into the building was also trained because everyone had a totally new job. We started training very early, before they even stepped into the building, and that helped.

Modern: **Were you able to retain staff, since you moved about 30 miles from your original DC in Philadelphia?**
Marcinkowski: Part of our network analysis and site selection was based on keeping core employees so we didn't have to start up with a completely new labor force that didn't know our customer or company. We were lucky to have supplemented this staff from a great workforce in the local area.

Modern: **One of the differences between a conventional DC and a highly automated DC is what's required to keep it running.**
Marcinkowski: You're so right. Look at something like maintenance of equipment. We were able to keep a large percentage of our existing maintenance team. However, they went through extensive training with Invata Intralogistics, our system integrator, and the equipment manufacturers. Now they're analyzing problems with iPads instead of screwdrivers. Our team has progressed to a new level along with our technology. I have to tell you that watching a maintenance guy who spent 20 years fixing a very simple mechanical garment-on-hanger system now using an iPad linked to our warehouse execution system (WES) and embracing our new technology is a pleasure to see.

Modern: **Someone from a major consumer products company told us that the eye-opener for them in making this transition was when the line shut down for want of a $6 sensor. Have you had to rethink your spare parts strategy?**
Marcinkowski: Our spare parts inventory is completely different from what it used to be. The old parts went away, and we started with new parts and an inventory tracking system. For one, you're dealing with a higher cost level of spare parts than before. We worked with the manufacturers of equipment to develop our spare parts list to minimize downtime exposure. We've worked hard to keep the right spare parts in inventory. This is truly a joint experience for us and our integrator, to collaborate on keeping the equipment downtime to a minimum.

Modern: **Having gone through a successful design and implementation process, do you have advice?**
Marcinkowski: First, you have to have a good team. I am thankful that I have a great team. Getting them involved early in the process was critical. I think too many companies rely on consultants and a small group of employees. Our whole team was involved in the analytics and vetting process early on—they owned it. That kind of involvement and commitment has a better chance of success than if we just handed them a system that we picked and told them to run it.

Second is that due diligence is critical. We've had a lot of people who are considering automation come to visit our new building to see what we're doing, but there are a lot companies that don't perform that level of due diligence. In the end, the more you see, the more you'll learn and the more successful you will be.