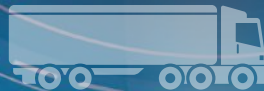


# The e-commerce logistics revolution



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# The e-commerce logistics revolution

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welcome

## E-commerce: Changing the logistics game

IT'S A VAST UNDER-STATEMENT to say that e-commerce has changed the way the logistics and supply chain game is played.

In fact, it's much safer to say that the world of digital commerce has introduced more risk and complexity than logistics and supply chain professionals have ever faced.

From rapid order intake to omni-channel order fulfillment to establishing the optimal distribution network for next-day or same-day delivery windows, both retailers and manufacturers now have to innovate, adapt and evolve—or get knocked out of their markets.

In this Special Digital Issue, the editorial staff of *Logistics Management* has compiled feature stories that encapsulate the software, technology and processes that are helping today's retail and manufacturing professionals exceed ever-increasing customer demands—whether in B2B or direct to consumers. We hope this helps guide you along your digital transformation journey.



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# Major Modes Join E-commerce Mix

While last mile carriers receive much of the attention, the traditional modal heavyweights are in charge of connecting the growing web of facilities that enable e-commerce. Today, all modes as well as freight intermediaries must be poised for growth and flexible enough to keep evolving.

**A**s Amazon continues its inexorable march toward distribution and order-fulfillment dominance, logistics managers are examining the opportunities all modal players are promising as they build out their e-commerce supply chains. As a consequence, the nation's industrial transportation networks have been largely transformed.

BY PATRICK BURNSON, EXECUTIVE EDITOR





According to the CBRE Group, the world's largest commercial real estate services firm, there's been a proliferation of warehouses and distribution centers (DCs) spanning 1 million square feet or larger across the nation. And while "last mile" carriers receive most of the attention these days, the traditional modal heavyweights are in charge of connecting this ever-growing web of facilities.

"The massive warehouses and DCs have sprouted from Southern California to Philadelphia, clustering around metro areas that provide the combination of road, rail, air and sea access that e-commerce users covet," says David Egan, CBRE's head of industrial and logistics research in the Americas.

To date, 117 such facilities were built across the United States from 2010 to 2016 for a total of 141.2 million square feet—a significant increase from the 99 facilities built between 2003 and 2009, according to CBRE data.

The markets in which the most big-box construction occurred over the past

facilities are now underway.

Egan maintains that this trend foretells several different things. "The proliferation of big-box facilities underscores the rapid growth of e-commerce, because these mega-facilities serve as the backbone of retailers' fulfillment networks, distributing goods across multi-state regions," he says.

Furthermore, says Egan, developers prefer to build these big boxes in industrial-powerhouse "metros" that offer the best combination of exceptional transportation access and close proximity to big populations favored by e-commerce users. "While massive warehouses aren't purely a phenomenon of e-commerce, the two are closely related," he says. "E-commerce users typically need two to three times the amount of warehouse and distribution space that traditional users do."

That's mostly because e-commerce fulfillment requires more inventory, labor and automation. According to Lexi Russell, a senior research analyst with

### New air cargo hubs

The impact on air cargo operations is already being felt by upstarts like Greater Cincinnati/Northern Kentucky International Airport (CVG), which will now serve as Amazon's centralized hub for its newly-launched Prime Air Cargo service.

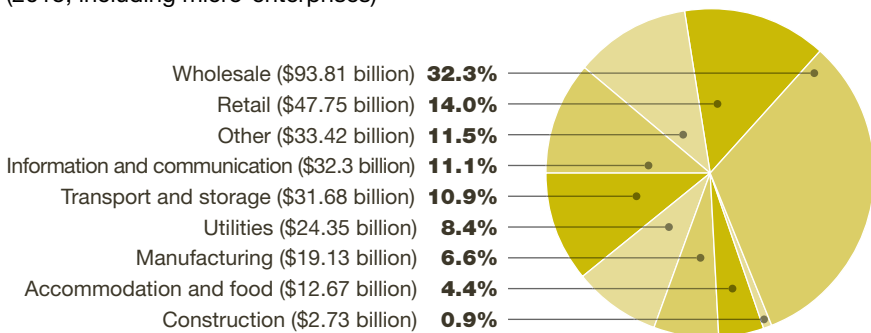
"Amazon advised us of several factors important to them, including site availability and infrastructure," says Candace McGraw, CEO of CVG. "CVG owns more than 7,500 acres of property, four runways, plenty of taxiways, and we're a cost-effective airport. To top it off, we're committed to invest \$5 million in infrastructure improvements that will assist the airport and the overall project," adds McGraw.

Meanwhile, it appears that the "middle-mile" of e-commerce will also be served by established hubs like Dallas Fort Worth International (DFW) Airport. This international cargo gateway recently began installing a cold chain facility that will be operated by AirLogistix USA.

Expected to be operational this summer, the new transfer facility will give DFW the ability to precisely control warehousing temperatures for shipments of pharmaceuticals, flowers and fresh foods. John Ackerman, executive vice president of global strategy and development at DFW, calls it "a natural choice" for the AirLogistix facility, given the airport's location in the center of the United States.

Aaron Ahlburn, senior vice president and director of research for the industrial property consultancy Jones Lang LaSalle, concurs, noting that DFW enjoys a certain geographical advantage. He says location—as well as market timing—is key. "Obviously, there are broad industrial and logistics real estate implications as e-commerce supply chains are perfected," he says.

### Total e-commerce sales via a website, by industry sector (2015, including micro-enterprises)



Source: Office for National Statistics

six years are led by Philadelphia, California's Inland Empire and Dallas/Fort Worth. By way of forecast, CBRE says the Inland Empire, Chicago, Philadelphia and Atlanta lead the busiest markets for on-going construction of 1 million-square-foot DCs. Across the 10 busiest U.S. markets for this type of construction, 29 such

CBRE, the strongest trend to watch now is "build-to-suit," which customizes warehousing for truck, rail and intermodal service. "The dimensions of the warehouse are determined by the client," she says, "to maximize traffic driven by e-commerce in the new demand cycle."



## Middleman in the mix

According to Brandon Fried, executive director of the Air-forwarder's Association, implications for today's freight intermediaries due to the double-digit growth of e-commerce are equally complex—regardless of mode.

"Freight forwarders have traditionally been focused on the business-to-business supply chains, but are now making some inroads into business to consumer deliveries," says Fried. "We see this in many of our members delivering appliances, large electronics and other substantial-sized goods into private homes."

Because forwarders are traditionally "asset light," they can be quite nimble in adapting to changing e-commerce market needs, adds Fried.

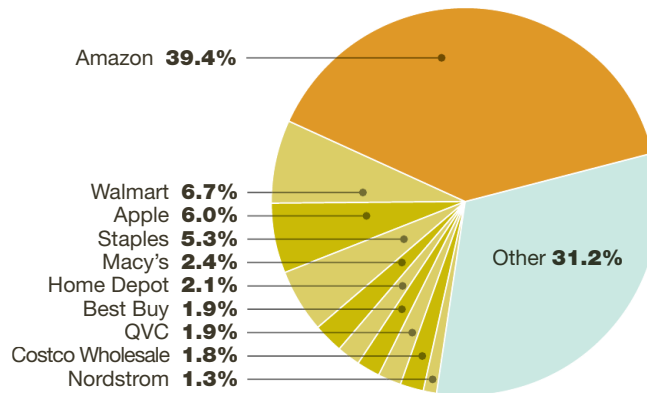
"We are seeing this now in the online ordering environment where forwarders are supplying distribution centers, either the actual brick-and-mortar retail outlets or e-commerce fulfillment facilities with a wide range of shipments from suppliers to maintain their inventory," says Fried.

Indeed, building customized solutions for complex supply chain challenges is where freight forwarders excel, Fried contends. Unlike the "old days" of the 20th Century, forwarders are less mode-centric and more focused on actual solutions where the form of transportation is only part of the overall logistics scheme.

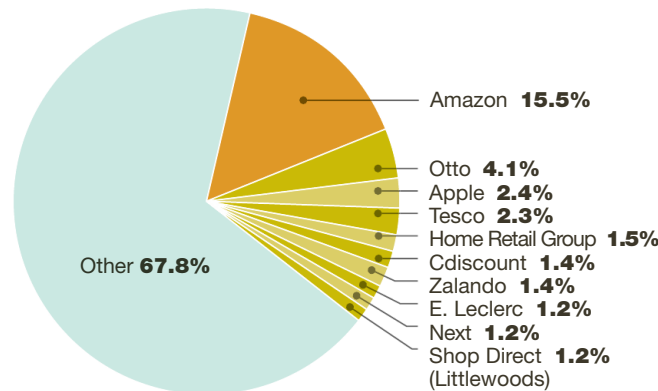
"The freight forwarder role in e-commerce tends to support suppliers moving industrial goods—both finished and in actual components—which may or may not end up in the consumer goods supply chain," he says.

But while transport infrastructure

## Top 10 online retailers: U.S.



## Top 10 online retailers: Europe



Source: eMarketer for U.S. data; RetailMeNot, Centre for Retail Research, ibusiness and Veraart Research for Europe data

and warehousing is moving at warp speed, the learning curve, as well as the pace of adoption among forwarders, is being brought into question by air cargo industry experts.

Dr. Michael Hanke, founder and managing director of SkaiBlu, an e-commerce consultancy assisting clients in the aviation industry, says that recent analysis of the top 50 airfreight forwarders found them unprepared for "digitized" commerce.

"Across the board, results were not encouraging and many forwarders don't appear to be fit for a competitive cyberspace presence," says Hanke. "Many sites suffer from slow speed, are not optimized for mobile devices, lack information on their handling of digital customer data including information on

cyber security measures."

According to Hanke, most forwarder websites are poorly designed, and have a small, if any, presence on social media platforms. "This is just a snapshot of the findings," he says. "Essentially, if any of these companies want to be relevant for their customers, these e-basics have to be addressed soon," he says.

## Intermodal imperatives

The Intermodal Association of North America (IANA) examined the rise of e-commerce and the future of expedited intermodal at its last annual conference, and will likely address the issue in greater detail throughout the year.

"E-commerce and associated services have fueled ever-increasing service expectations on the part of shippers," says Derrick Broome, vice president of intermodal

for C.A.T. Global, a multimodal service provider. As an IANA board member, he also notes that the mission for surface mode transport providers will now be to determine how the marketplace requirement is evolving under increased pressure in the demand cycle.

"For intermodal to remain in the game, intermediaries are going to have to move light years ahead in the way they process information," says Broome. "This not only speeds up business, but creates a closer bond with the shipper as transparency is enhanced."

Logistics terminals that facilitate the transfer of goods between rail and motor carrier are now being increasingly co-located in high-density business districts with facilities that can process a range of commodities and distribution centers for

finished, containerized goods, notes Bill Renicke, partner at the global management consultancy Oliver Wyman.

“Compressing distances in these ways could drive the development of new regional services, including blended trains—with a mix of bulk commodity, automotive and containerized traffic—and more direct point-to-point services,” says Renicke.

### **Waterborne worries**

Shippers are rightly concerned about the wave of ocean carrier consolidation, but they should also consider the “digital divide” keeping some players out of the e-commerce marketplace.

To date, the most significant news in this regard surfaced last January when global container shipping giant Maersk announced that it will partner with Alibaba—a Chinese e-commerce provider. This endeavor will enable ocean shippers to book space on Maersk vessels through Alibaba’s booking service called OneTouch.

According to John Fay, CEO of INTTRA, a leading provider of e-commerce services for the ocean freight industry, that gap may be widening. “The main impact of consumer-driven e-commerce on ocean shipping is not on deployments and schedules, but rather shippers’ needs for more efficient logistics management,” he says.

Fay’s company recently announced that it generated 16% growth in 2016 over 2015 in container orders, which include bookings, shipping instructions and shipping orders. According to Container Trade Statistics, INTTRA processed 38.5 million container orders on its platform, while containership sailings in the industry rose by just 3% in 2016.

“We played a significant role in 2016 as the rate of technology and digitization accelerated rapidly in the ocean industry,” says Fay. “We believe that digitization is

### **E-commerce: Dramatic shift in service sector**

**A** new report released by the London-based think tank Transport Intelligence (Ti) notes that the logistics industry has undergone a “transformation” with a dramatic shift in service sector domination.

According to research contained in Ti’s latest report “Global e-commerce logistics 2017,” a powerful mix of demand and supply side factors means that further restructuring is possible—if not probable.

“The global logistics industry is vast, both in terms of market size and the huge numbers of people employed in the sector,” says Professor John Manners-Bell, CEO of Ti. “It’s therefore surprising that its role in the development of the global economy is generally overlooked.”

Ti estimates that the global e-commerce logistics market grew by 18.1% in 2016 and has forecast a 2016-2020 compound annual growth rate of 15.6%. Low, expected and high forecast scenarios have been presented.

“E-commerce is making everything more unpredictable,” says Ti analyst Ken Lyon. “To cope, organizations will need to react faster by breaking down functional silos to enhance communication and reaction, use systems that support flexibility rather than rigid process, and establish operational networks and alliances that can respond and flex to demand,” he says.

David Buckby, an economist with Ti, observes that e-commerce volume now accounts for 20% of DHL Express total volumes, up from about 10% in 2013. “That’s not necessarily all international volume growth, but I reckon a good portion of it is,” he says.

For Alex Leroy, a Ti analyst, another obvious impact is that cross-border e-commerce is proving to be a major “shot in the arm” for airfreight. “DHL’s latest report claims that cross-border e-commerce accounts for about 15% of total e-commerce, and has an annual growth rate of 25%, with one in 10 dollars spent on shipments,” he says.

In addition to the roles of the contract logistics and freight forwarding sectors, the Ti report also examines the dynamics of the express parcels, container shipping, air cargo, trucking and intermodal industries.

“While global macro-trends are highly important to the long-term future of these sectors, conversely it’s the structure and competitive nature of these sectors that has a ‘bottom up’ influence on supply chain management and hence global economies,” concludes Manners-Bell.

—By Patrick Burnson, executive editor

now indispensable.”

NavisWorld, a biannual conference to help port terminal operators optimize the movement of containers with the use of advanced technology, will also focus on e-commerce this month when it convenes in San Francisco. “While the main impact of e-commerce to date has been around last mile logistics and warehouses, it’s interesting to think how e-commerce can link back to what’s happening in the terminal and port,” says Andy Barrons, senior vice president for Navis.

According to Barrons, the new warehousing infrastructure and downstream

processes need to be reinforced with accurate and near-real-time information flows from the upstream container movement from vessel arrival through to container availability and yard management that feeds the gate and rail process.

“Terminals and ports will see greater demand for providing visibility and predictability to container moves for logistics providers and shippers,” adds Barrons. “This in turn will drive more automation of processes.” •

Patrick Burnson is executive editor of  
Logistics Management





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# BATTLE

*for the*

# Last Mile

**Established carriers and logistics services providers are clashing with tech-savvy newcomers to gain market share in this critical, final piece in the e-commerce puzzle.**

**In one corner, we have some of the largest transportation** and logistics services companies in the world, with the likes of UPS, FedEx, XPO Logistics and many other asset-heavy and asset-light companies looking to improve their dominant position as the key, last-mile carriers servicing the fast-growing, \$2 trillion e-commerce market.

In the opposing corner, we have countless startups and relative newcomers, fueled by venture capitalist money, that are trying to crack into this highly lucrative transport market with high-tech, no-asset platforms designed to leverage available capacity in the marketplace.

Who wins this e-commerce heavyweight fight will go a long way toward shaping the face of freight transportation in the next decade.

BY **JOHN D. SCHULZ**, CONTRIBUTING EDITOR



Daniel Vasconcellos

First, let's look at the size and scope of this e-commerce market. FedEx Corp. chairman and founder Fred Smith recently testified before Congress that sales in e-commerce are expected to reach \$2.4 trillion worldwide by 2018—a 26% jump from 2016.

“E-commerce shopping isn't a trend—it's a fundamental part of retailing today in the U.S. and is growing exponentially worldwide,” Smith told the House Transportation and Infra-

structure Committee on Feb. 1. “The changing landscape of the marketplace has presented FedEx with a wonderful growth opportunity well into the future.”

Adding to the projections, Smith estimated that B2C e-commerce is expected to generate \$3.2 trillion in revenue by 2020 while the B2B e-commerce market is expected to be twice that size. In terms of transport revenue, global B2C e-commerce produced \$85 billion in 2015, and is

expected to grow by a 15% compound annual rate by 2019.

Of course, Amazon is the 800-pound gorilla in this space. However, veteran Stifel transport analyst John Larkin says that carriers and other established service providers may be in a no-win position with Amazon, which is already experimenting with its own fleet of equipment and owner-operators to deliver low-hanging, profitable last-mile freight.



“Joining Amazon may be every bit as tough as beating the e-commerce juggernaut,” says Larkin, who adds that’s due to the fact that core carriers and dedicated carriers appear to be used by Amazon only in cases where brokers can’t find cheaper capacity in the open market.

Anecdotally, several large traditional carriers privately say that they have backed away from Amazon for this reason. But that still leaves Amazon with thousands of other options among the established, for-hire carriers as well as Amazon’s growing private fleet.

Over the next couple pages we’re going to put the small package and under-150 pound e-commerce segment dominated by the Big Three—UPS, FedEx and the U.S. Postal Service—aside. Instead, we’re going to concentrate on the roiling battle between traditional carriers and the tech-savvy upstarts that strive to perform heavy freight deliveries, set-up and installations, reverse logistics and a gamut of other last-mile services.

### **Old guard adapts**

Nearly every large trucking company has a dedicated, last-mile division. These include such large truckload giants as Swift Transportation, J.B. Hunt, XPO Logistics, ArcBest Corp. and countless others.

In fact, ArcBest recently told Wall Street investors that it sees the last-mile “opportunity” as a \$3 billion market for transport providers, while others have estimated it as large as \$13 billion.

“We believe that in many ways e-commerce is still in its infancy and will continue to experience explosive, double-digit growth for the foreseeable future,” says Mark Davis, vice president of pricing and traffic for less-than-truckload carrier Averitt Express.

Beyond Amazon and Walmart, Davis says he sees “many small- and medium-

sized businesses on Main Street” entering the online marketplace, and they need final-mile capabilities as much as the big boys. “The spirit of entrepreneurship is very strong within the e-commerce market, and we’re seeing countless start-ups launching daily.”

Bottom line: It’s a massive freight

**“We believe that in many ways e-commerce is still in its infancy and will continue to experience explosive, double-digit growth for the foreseeable future.”**

—Mark Davis, Averitt Express

market, and all the competitors are gearing up for a fight. Last year, Schneider, the nation’s second-largest truckload carrier, simultaneously bought two companies—Watkins & Shepard and Lodeso—to bring together final-mile delivery and handling with a more innovative technology platform.

“We’re facing a large increase in demand for our services, and that requires investment in people, equipment and facilities,” says Ray Kuntz, CEO of Watkins & Shepard.

Perhaps the largest player in this traditional market is XPO Logistics, that recently said it arranged more than 12 million last-mile deliveries last year of things like furniture, refrigerators, ovens, computers, fitness equipment and heaven knows what else.

“Our secret sauce is 5,000 contract carriers—that’s the most capacity that anyone has in this space by a good margin,” says Charlie Hitt, president of last mile for XPO, who oversees 45 market delivery centers for “staging” goods for multiple customers, arranging pre-delivery and assembly.

“The big differentiator is technology,”

Hitt explains. “Everybody at XPO looks at technology as a leading driver as to what we do with customers. Technology manages workflows, directs the customer experience and provides visibility to all parties, customers and retailers. In addition, all our contract carriers and operations teams can use it—and the end consumer can see it.”

Hitt adds that allowing consumers to have visibility into the process in delivering a seamless buying experience online is the goal. “It’s not easy, and it can make or break any brand’s reputation. The last-mile delivery person in the home is replacing the in-store associate, and that last-mile person is about to become the most memorable person for a consumer to have that’s connected to that company.”

Others agreed that being aligned with the customer is absolutely critical for success in the e-commerce space. “The carrier must have a clear understanding of the customer’s expectations and their operations,” says Averitt’s Davis. “Communication not just at the ‘deal-making’ level, but at the ground level is crucial. The key to success is constant and transparent communication.”

That communication enables suppliers to meet strict delivery windows and compliance standards that have been set forth by many major retailers. Failure to make on-time deliveries can result in costly surcharges. On the plus side, same-day deliveries can mean a 25% to 30% premium in last-mile delivery rates—another reason the last mile is being heavily invested in by all parties.

### **Startups dream big**

Established companies such as XPO, UPS and FedEx have the advantage of already having solid and suitable e-commerce networks in place. But, what about the newcomers?

First, they’re hardly household

names. Start-ups such as Cargo Chief, Cargomatic, Convoy, Deliv, Fleet, Flexport, FourKites, Freighters, Haven, HaulHound, Instacart, Transfix and Trucker Path are just some of the new players entering this space in the last two years. Second, they all have a dream—to make a big enough splash to be taken over by a larger fish or perhaps become the next Amazon or Google in this space.

“The startups seem to be attacking this huge industry the way large insurance companies are being pecked at by startups going after specific niches in that industry,” says Andy Kim, president of Chicago-based HaulHound. “We see our last-mile startup customers on HaulHound being able to gain incredible visibility to their niche services such as car transportation and food delivery.”

Kim says that HaulHound’s approach is to “come from a holistic model.” By that, he means the company uses a just-in-time technology model that is not wedded to any one carrier, or even one mode. “Our advantage is flexibility,” he says. “We see a lot of 800-pound gorillas in this market. But our model is to be the aggregator who brings together all pieces of the puzzle.”

HaulHound’s matching technology is free to shippers and operates nationwide, says Kim, who adds that it has the potential to work internationally as well. “It provides immediate, real-time matches at the rate independent truckers set,” he says. “The goal is for our search engine to eventually aggregate all supply chain data, cutting into the brokerage market.”

Chris Cunnane, senior analyst for ARC Advisory Group, says that these newcomers want to become the “Uber” of the last-mile world.

“The first company that comes to mind is Uber itself,” says Cunnane. “It has launched UberRUSH and Uber-

EATS, both of which are delivery services for products. Additionally, Uber has run a number of promotions that let customers get deliveries from Uber that included ice cream, cats and everything in between.”

Another startup, Deliv, is an example of a company that’s partnering with retailers for crowd-sourced delivery

**“The keys to last-mile success are the same as in traditional trucking—know your costs, have good processes to get productivity from your drivers and price the product correctly with customers.”**

—Satish Jindel, SJ Consulting

options. Deliv uses a smartphone app to alert pre-qualified drivers of a pending delivery. The driver simply picks up the merchandise from the retailer and delivers it to the customer.

San Francisco-based Instacart is an example of crowd-sourced delivery option for last-mile services. This company connects personal shoppers with customers to deliver local groceries.

What are common mistakes some newcomers make in this space? “The biggest mistake is not fully understanding the market,” Cunnane explains, who adds that this comes in a number of forms, including not understanding actual costs for delivery, not understanding just how high the return rate is for e-commerce, and not understanding how to meet customer demands.

“The market is a crowded one, with more companies forming to try to take advantage of the sharing economy,” says Cunnane. “Unfortunately, too many companies don’t have the means to scale, so they’re fighting an uphill battle.”

The biggest thing that these com-

panies are trying to offer is same-day delivery, usually within an hour or two, adds Cunnane. Density is the key, and that means lots of deliveries over a short distance.

“The newcomers simply don’t have the density to accomplish this,” Cunnane says frankly. “These companies may be offer a more personalized experience than FedEx, UPS, or USPS, but they don’t have the required density to make it work.”

Still, some of the old guard carriers say that they’re watching these startups—and trying to maintain their edge. “Competition makes us all better, and it’s always going to be there,” says XPO’s Hitt. “We’re not worried about competition. We watch them and we adapt. We just have to watch what’s going on.”

Cunnane’s advice for startups is to develop partnerships with major retailers as part of the process. “Without these partnerships, it will be a difficult model to crack,” he adds.

Other seasoned freight transportation experts agree. Satish Jindel, principal of trucking analyst firm SJ Consulting, says that most of these startups are “weeks away from going out of business” due to a lack of freight transportation experience.

Jindel says that the keys to last-mile success are the same as in traditional trucking—know your costs, have good processes to get productivity from your drivers and price the product correctly with customers. His forecast for the startups is not rosy.

“They have high-flying hopes and a lot of venture capital, but no knowledge,” says Jindel. “They don’t even know how many wheels there are on an 18-wheeler.” •

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*John D. Schulz is a contributing editor of Logistics Management*

## 2017 Parcel Express Roundtable:

# Paying for peak performance

**Our panel provides an update on all the market shifts in store for parcel shippers—especially when it comes to pricing, service and managing an e-commerce-centric supply chain.**

BY **JEFF BERMAN**, GROUP NEWS EDITOR

It can be hard to believe that very much happens in a year, but that theory is put to the test when it comes to the parcel express market.

In fact, over the past 12 months we've seen major changes in pricing from the parcel duopoly of FedEx and UPS; the accelerated emergence of regional parcel players; and don't forget we're all watching the increasing power and reach of e-commerce giant Amazon as it grows its own delivery capabilities globally.

These developments require parcel shippers to do whatever it takes to stay on top of their parcel game from both a financial and operational perspective. To help them along, *Logistics Management* has gathered Jerry Hempstead, president of Hempstead Consulting, a parcel advisory firm; David Ross, transportation and logistics director at investment firm Stifel; and

Rob Martinez, president and CEO at Shipware, an audit and parcel consulting services company.

Over the next few pages, our experts offer their insight into what's driving parcel market trends and offers some practical advice for how shippers need to re-adjust to ever-changing market conditions.

***Logistics Management (LM):* How would you describe today's parcel marketplace?**

**Jerry Hempstead:** All of the parcel carriers are doing well in volume and earnings—even the USPS is making money if you back out the Congressional mandates. And it's clear that e-commerce is driving the volumes. To top it off, service levels this year are at record levels and are predictable and consistent.

My observation is that there's no sta-

tistical difference between the service performance offered by FedEx and UPS across a year's worth of activity, although FedEx offers a faster delivery on ground to about 25% more city pairs than UPS. This pressure on speeding up the promise and refining the networks to make the magic happen will only improve the consumer experience in parcel services.

**Rob Martinez:** As a professional in the parcel industry for nearly 30 years, I find today's parcel marketplace tremendously exciting. It's a dynamic industry that's constantly changing. The big three—FedEx, UPS and USPS—rolled out aggressive rate increases and pricing changes that require shippers to be even more vigilant in monitoring costs.

This past year, UPS leveraged its acquisition of Coyote Logistics to deliver a smooth peak season, and FedEx finalized the integration of TNT Express in April. While FedEx and UPS continue





Daniel Vasconcellos

to dominate market share, the USPS and regional parcel players are making inroads in their push for a seat at the table. All the while, Amazon quietly continues to build out its delivery business.

**Dave Ross:** Jerry and Rob are right on. The parcel market is growing, changing, and we're seeing even more two-way services—deliveries and returns. B2C is actually growing much faster, led by the continued rise of Amazon, and UPS said on its earnings call that its package volume mix was

55% B2C—the highest ever seen, and it's unlikely to stop there.

**LM:** How would you describe the current rate and pricing environment for parcel shippers?

**Martinez:** FedEx and UPS are public companies, of course, and Wall Street rewards or punishes the shipping giants on margin—or yield per package. Therefore, the more they make per shipment, the higher the stock valuation. As a result, the current rate and pricing envi-

ronment is very tough on shippers.

While 2017 GRIs may have seemed modest, the changes in dimensional pricing have resulted in double-digit rate increases for many shippers. FedEx changed its dimensional divisor from 166 to 139 for all domestic packages. And while UPS will match the 139 divisor, it only applies to packages exceeding one cubic foot. Don't forget, both carriers adjusted fuel surcharges weekly—rather than monthly—starting February 6, 2017.

## “While 2017 GRIs may have seemed modest, the changes in dimensional pricing have resulted in double-digit rate increases for many shippers.”

—Rob Martinez

**Ross:** I agree with Rob. The rate environment is very difficult, unless volumes are growing and the shippers can hit price breaks. Pricing continues to rise, but many shippers are unable—or unwilling—to pass this increased cost through to customers, as “free shipping” has been pushed for a long-time by Amazon and is now expected by many on-line shoppers.

**Hempstead:** I’ll add that the key for shippers is that none of the air and ground base tariffs of FedEx and UPS will match in 2017. That gets compounded because UPS has a much higher fuel surcharge—and both are going to be adjusting the fuel surcharge weekly this year as Rob had mentioned. However, FedEx did make the predicted announcement that they were changing the dimensional divisor from 166 to 139.

An aspect that FedEx has not yet embraced is the 2.5% fee UPS imposed last year on transactions that are third-party billed. The USPS announced that on January 22 Shipping Services prices will change by 3.9% percent on average, and DHL Express announced a 4.9% general average price increase for U.S. account holders, effective January 2, 2017.

**LM:** Let’s concentrate on the dim divisors switching to 139. What are the “red flags?”

**Hempstead:** It’s hard to visualize what the change to 139 means for a shipper. Let’s take a 10-pound, one-square-foot box at 12” x 12” x 12”. That’s 1,728 cubic inches. Today, FedEx bills that box for the actual weight or dimensional

weight by dividing by 166, which is 10.4 lbs. and that rounds up to 11. And 1,728 cubic inches divided by the new divisor of 139 will yield a weight of 12.4 lbs. rounded up to 13 lbs.

So, FedEx will not charge \$12.91 [with 4% fuel] for a zone five package, and they will not charge \$12.99 based on the 166 rule, but they will charge \$13.55 for the 13 lbs. dimensional weight, or 5% more than the price for actual weight. It’s another increase that’s hard for a shipper to plan for unless the customer asks the carrier: what’s this going to cost my business?

**Ross:** So, to build on Jerry’s example, don’t waste space in packaging. Pack enough so the freight is delivered safely without damage, but not much more, as you’ll be paying for the empty space. The switch of the dim divisor is reflective of the significant increase in large package volume that has a higher cost associated with it than smaller packages—both with the sort and the delivery. FedEx and UPS are just raising the price to account for this increased cost pressure on their operations.

**LM:** How are market conditions affecting service, and what role is the “uneven” U.S. economy playing?

**Hempstead:** Because of e-commerce, the carriers are handling more packages than ever. And generally speaking, the U.S. economy has had little impact on the top line or bottom line of the carriers. In addition, the revenue of the integrators is now so balanced globally they’re more affected by global trade conditions than domes-

tic, but the bulk of the transactions handled by both FedEx and UPS are domestic air and ground.

If someone wants to purvey their items on the Internet and use a carrier that has it all, then they have to use one of the two carriers to deliver the goods and pay the price. The carriers have made the investments so that the service levels are not now severely compromised. In fact, service levels this year are the highest recorded.

**Ross:** There is no material impact on service from current market conditions. The uneven U.S. economy is tilting the shipment profile more to B2C than B2B, as the consumer side has been doing better than the industrial side for the last couple of years.

**LM:** What does the future look like for Amazon?

**Hempstead:** Let’s put it this way: Amazon is gradually building out its own logistics network; they have opened 20 of their own regional sort centers; and they’ve started their own air network contracting with ATSG and Atlas airlines. Where they have critical mass they do their own drops into the USPS network and use Parcel Select for the last mile.

They’re innovative and willing to go out on a limb. They’re testing drone delivery of parcels; they’re building an Uber like app for freight; and I’m sure driverless delivery and line haul vehicles have been discussed.

However, they’re still a customer of the integrators and most likely will continue to do so for a long time. Although Amazon will try to chip away the business they give to others to deliver, their incredible growth will continue to force co-opetition with the big parcel delivery firms.

**Martinez:** To follow up on Jerry’s

comments, Amazon's steps to build out its delivery business certainly has the industry abuzz. Amazon's stated goal—rather than to compete with the likes of FedEx and UPS—is simply to minimize their reliance on the national carriers. But make no mistake about it: Amazon is already into the transportation business in a big way.

In the past few years, they've amassed a fleet of delivery vehicles, negotiated extended leases on forty 767 air freighters, announced plans to invest \$1.5 billion in an air cargo hub in northern Kentucky, and recently started acting as a freight forwarder by handling ocean shipments from China. While the national carriers publicly feign disinterest in Amazon's recent moves, only stating that Amazon remains a very good customer, secretly they have to be nervous.

**Ross:** Rob and Jerry nailed it. They'll be getting bigger and bigger, but we don't know how big and in what areas and what challenges will come with increased scale. Certainly, the company is investing more in logistics, and we expect them to do more in-house where it makes sense, but we don't believe they want to put FedEx out of business as we've read in headlines.

**LM: How do you view the current state of the USPS, given their ongoing financial travails?**

**Ross:** The USPS is better than people give them credit for in that it has a good value product and it's critical to the e-commerce supply chain. They just need to work out their pension issues and raise the stamp price a bit and they'll be fine.

**Martinez:** I agree. And despite the doom and gloom we all hear about declining First Class Mail and financial losses at the USPS, its shipping

**“This pressure on speeding up the promise and refining the networks to make the magic happen will only improve the consumer experience in parcel services.”**

—Jerry Hempstead

and packages business unit has actually been doing very well. Following 2015 volume growth of 14.1%, the business segment has continued its strong performance with volume growth of 13.8% for fiscal 2016 and revenue growth of 15.8%.

Still, the USPS lost \$5.6 billion in fiscal 2016. However, most of the loss was driven by mandated future retiree health benefits. Remove that from their income statement and the USPS would have recorded positive net income of approximately \$200 million. With the continued growth in e-commerce, the service is well positioned to flourish in the years ahead. I don't think shippers have anything to worry about, especially if the USPS is able to achieve legislative relief on the onerous pre-funding obligations.

**Hempstead:** David and Rob are spot on. And don't forget, the USPS is the only delivery company that goes to every address in the U.S. six days a week and is experimenting with Amazon deliveries on Sunday. The model is so perfect that the largest customers of Parcel Select outside of Amazon are FedEx (Smartpost), UPS (SurePost), DHL (e-commerce) and Newgistics.

In fact, Parcel has been the shining star for the USPS, and their future is to some degree pinned to the continued success of their package services. So far they have been executing well and have been investing in the required enhancements to the services, in particular tracking—and there are more improvements coming.

**LM: What advice do you have for parcel shippers in 2017?**

**Ross:** My simple advice is to know your freight and know your options.

**Hempstead:** Indeed, and keep in mind that the devil is in the data. The carrier being utilized knows more about a shipper's business than the shipper does. The integrators have armies of data analysts and massive computing power that allows them to tweak pricing to extract revenue and navigate through the next price increase. They know to the penny how much additional revenue will be garnered with each rule change and tariff price change, in both base rates and accessorial charges.

**Martinez:** I'll add that for parcel shippers going into 2017, managing transportation spend has become even more complicated. Taken in combination with the 2017 GRI, dimensional pricing changes are very significant. However, just like discounts on published pricing, dimensional divisors are also negotiable.

Shippers are also wise to decrease dimensioning through improved packaging. Shippers should leverage the competitive marketplace, including the USPS, regional parcel carriers and package consolidators. And while parcel in 2017 has become more complex and costly, winners will be those shippers that take the time to analyze, optimize and diversify their parcel networks. •

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*Jeff Berman is Group News Editor for Logistcis Management*





## Freight Forwarding 2017: **DIGITIZATION** & **E-COMMERCE** continues to reshape marketplace

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The global freight forwarding market has grown by 2.7% in real terms since this time last year, but owing to a continuation of excess capacity issues and lower average oil prices, rates continue to fall in both air and sea freight. Forwarders now need to ramp up the value-add visibility services in an effort to boost revenues and keep shippers smiling.

**O**ver the course of 2016, real revenue and volume growth in the air and sea freight forwarding markets was remarkably similar globally, but this disguises significant differences across important countries and regions, say analysts who keep a close eye on the market.

By Patrick Burnson, Executive Editor



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**Top 25 Global Freight Forwarders**  
 Ranked by 2016 Logistics Gross Revenue/Turnover and Freight Forwarding Volumes\*

| A&A Rank | Provider                             | Gross Revenue (US\$ M) | Ocean TEUs | Air Metric Tons |
|----------|--------------------------------------|------------------------|------------|-----------------|
| 1        | DHL Supply Chain & Global Forwarding | 26,105                 | 3,059,000  | 2,081,000       |
| 2        | Kuehne + Nagel                       | 20,294                 | 4,053,000  | 1,304,000       |
| 3        | DB Schenker                          | 16,746                 | 2,006,000  | 1,179,000       |
| 4        | DSV                                  | 10,073                 | 1,305,594  | 574,644         |
| 5        | Sinotrans                            | 7,046                  | 2,950,800  | 532,400         |
| 6        | Panalpina                            | 5,276                  | 1,488,500  | 921,400         |
| 7        | Nippon Express                       | 16,976                 | 550,000    | 705,478         |
| 8        | Expeditors                           | 6,098                  | 1,044,116  | 875,914         |
| 9        | UPS Supply Chain Solutions           | 6,793                  | 600,000    | 935,300         |
| 10       | CEVA Logistics                       | 6,646                  | 681,600    | 421,800         |
| 10       | GEODIS                               | 6,830                  | 690,000    | 330,000         |
| 11       | Bolloré Logistics                    | 4,670                  | 856,000    | 569,000         |
| 12       | Hellmann Worldwide Logistics         | 3,443                  | 902,260    | 576,225         |
| 13       | Kintetsu World Express               | 4,373                  | 556,640    | 495,947         |
| 14       | Yusen Logistics                      | 4,169                  | 633,056    | 332,389         |
| 14       | Kerry Logistics                      | 3,097                  | 1,055,600  | 282,200         |
| 15       | DACHSER                              | 6,320                  | 481,400**  | 272,100         |
| 16       | C.H. Robinson                        | 13,144                 | 485,000    | 115,000         |
| 17       | Agility                              | 3,576                  | 513,500    | 372,700         |
| 18       | Hitachi Transport System             | 6,273                  | 430,000    | 230,000         |
| 19       | Toll Group                           | 5,822                  | 542,000    | 114,000         |
| 20       | Damco                                | 2,500                  | 659,000    | 190,000         |
| 21       | XPO Logistics                        | 8,638                  | 131,500    | 72,300          |
| 22       | Logwin                               | 1,095                  | 600,000    | 140,000         |
| 23       | NNR Global Logistics                 | 1,676                  | 146,278    | 286,897         |

\*Revenues and volumes are company reported or Armstrong & Associates, Inc. estimates. Revenues have been converted to US\$ using the average exchange rate in order to make non-currency related growth comparisons. Freight forwarders are ranked using a combined overall average based on their individual rankings for gross revenue, ocean TEUs and air metric tons.

\*\*Includes LCL shipments.

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For example, airfreight forwarding growth in China is thought to have been robust this past year, while sea freight growth was much weaker. Conversely, the United States saw moderate expansion in sea freight as air cargo growth faltered over the same period.

Looking ahead to the next 12 months, the market is anticipated to grow at a real compound annual growth rate of 4.1%, as global trade volume growth accelerates. Meanwhile, logistics managers moving freight globally should plan their budgets accordingly.

According to the new “Global Freight Forwarding 2017 Report” compiled by the London-based think tank Transport Intelligence (Ti), a continuation of excess capacity issues and lower average oil prices in 2016 led rates to fall in both air and sea freight, meaning most forwarders reported lower year-on-year revenues.

“While air and sea volume growth picked up a bit in 2016, most forwarders experienced declining revenues on the back of substantial rate declines,” says David Buckby, an economist at Ti. “However, and as usual in such circumstances, the fall in forwarder sell rates did not match the drop in their buy rates, leading to improved gross profit margins.”

Over the medium term, Buckby expects growth to pick up in line with higher global trade volume forecasts in 2018, though risks are tilted to the downside due to factors such as political uncertainty and continued trade protectionism rhetoric.

### **Deep dive into the market**

The Ti report also explores the performance of the top players against the rest of the market; disintermediation; regionalization; vertical sector opportunities and the effectiveness of online booking platforms.

On profitability performance, survey results indicate that excluding the impact of volume and rate changes, margin pressures for forwarders will intensify over the next five years. Indeed, researchers feel that with investment in technology and offering new or more value-added services, middlemen will develop more successful strategies to

sustain margins. In addition, it appears that conventional forwarders are set to lose volume share to other parties like smaller, more technologically savvy 3PLs, but the threat may be “asymmetrical” for air and sea.

A deep dive into the world of freight forwarding technology reveals the disruption caused by digitization, changes to the competitive landscape, and, ultimately, whether forwarders can adapt and sur-



vive the upheaval being caused by the continued evolution of the digital supply chain.

“The research we’ve conducted indicates that there’s substantial demand for online interfaces that allow forwarders to better serve shippers,” says Ti analyst Alex Le Roy. “Nonetheless, it’s clear that the scope of these solutions, in terms of geographic coverage for example, needs to broaden in order for them to deliver value. This will occur, but we are now bearing witness to a race for scale amongst the start-ups.”

John Manners-Bell, CEO of Ti, also asserts that the forwarding sector is facing a challenging time, not least because the global economic environment has remained volatile and difficult to anticipate—though this was nothing new, and the sector has always coped well in such circumstances. He warns, however, that structural challenges such as trends toward regionalization and near-sourcing, coupled with greater technological demands, will prove more difficult to manage.

“Political, economic and technological pressure

will continue to shape the industry in the coming year,” says Manners-Bell. “One thing is certain, whether large or small, freight forwarders will need to remain agile if they are to flourish in an uncertain and complex world.”

### Digitize or die

The Ti report mirrors much of what’s contained in a recent survey conducted by the consultancy Logistics Trends & Insights. According to “The Evolving Freight Forwarding Market 2017,” digitization is looming large in the immediate future.

Cathy Morrow Roberson, president of the consultancy, maintains that the advent of non-traditional players riding the wave of e-commerce growth—such as Amazon, Alibaba, and the many new tech-based startups—are changing the face of forwarding.

“The digitization of supply chains has forced many traditional forwarders into investing and automating their processes,” says Morrow Roberson. “The new generation entering the logistics markets have grown up with the laptops and smartphones and expect business transactions to be the same or just as easy as ordering a pair of shoes from Amazon.”

When asked what improvement will be utilized the most over the next five years, 58% of responding shippers named “digitization,” with

**“The new generation entering the logistics markets have grown up with the laptops and smartphones and expect business transactions to be the same or just as easy as ordering a pair of shoes from Amazon.”**

— Cathy Morrow Roberson, *Logistics Trends & Insights* Morrow Roberson.

92% of survey respondents saying “digitization adds value.” Furthermore, says Morrow Roberson, 58% of survey respondents view online freight marketplaces as an opportunity for traditional forwarders.

“In fact, we’re seeing partnerships being established between traditional forwarder and non-traditional,” says Morrow Roberson. “DB Schenker and uShip, for example. Schenker acquired an equity stake and is using uShip within the European road freight market. Drive4Schenker uses uShip technology to connect the some 30,000 transport partners in the European land transport network to their freight.”

Morrow Roberson adds that partnering with an online freight marketplace allows a traditional forwarder to offer a digital solution in a faster manner. As an example, she points out that DHL introduced its online marketplace—CILLOX—that matches full truckload and less-than-truckload shipments with available transportation providers.

“A big plus for digitization is that it levels the playing field for small- to medium-size forwarders as well as the larger ones,” says Morrow Roberson. “And it’s not only forwarders, but also shippers of all sizes. Shippers can take advantage of numerous online marketplaces, such as Freightos, to obtain a rate, book the freight and track it from beginning to end.”

According to Morrow Roberson, a drawback to many, if not all of these marketplaces, is that not all trade lanes are included; so shippers will need to choose wisely which marketplace to use and remember to compare rates among all of them, including those of traditional forwarders.

“The big question to ask,” cautions Morrow Roberson, “is as if the rates are published or negotiated.”



## Margin watch

Dr. Zvi Schreiber, CEO of Freightos, a technology provider focused on instant freight quotes for freight forwarders and shippers, admits that the last quarter “ended on a somber note for digitization” due to cyber-attacks that temporarily crippled some of the major global forwarders.

“However, the shipping community will remain vigilant in safeguarding the progress we’ve made toward transparency,” says Schreiber.

The most recent Freightos newsletter, “LogTech Review: Q2 2017,” notes that during the second half of June, Amazon and Alibaba both held conferences in the United States, appealing to small and midsize businesses selling on their platform.

“While Alibaba was advocating sales to China as Amazon encouraged cross-border importing, both were clearly pursuing a small- to medium-sized business focus, as Big Box retailers continue to struggle,” says Schreiber.

For enterprise forwarders and carriers, the marching orders for the second quarter appeared to be freight visibility, as a number of companies unveiled solutions to enhance cross-supply chain visibility of shipments. The last-mile drone delivery space stayed hot, both in the air and on the ground. Meanwhile, Uber Freight formally launched its product, while continuing to face strong competition from other on-demand trucking startups.

“The second quarter of this year was a strong quarter for visibility technology,” says Schreiber, “particularly for DHL’s varied divisions.” DHL Global Forwarding launched Ocean View, which offers real-time updates on maritime shipments; DHL SupplyWatch, an AI program for identifying supply chain disruptions; and Saloodo, an online trucking marketplace.

Meanwhile, DP World also released a container visibility solution in the UK, as French startup Traxens unveiled a smart freight train tracking solution. In Germany, Panalpina launched a pilot ocean



shipment management system. “Finally, CHAMP took tracking further with voice-based air cargo tracking via Alexa,” says Schreiber. “And the timing couldn’t be better.”

Brandon Fried, executive director of the Air Forwarders Association (AFA), agrees with Schreiber positive take on the innovation being pushed into the market, noting that while air cargo volumes have increased, margins remain depressed and most of AFA members are looking forward to more tech-driven opportunities in which profitability may improve.

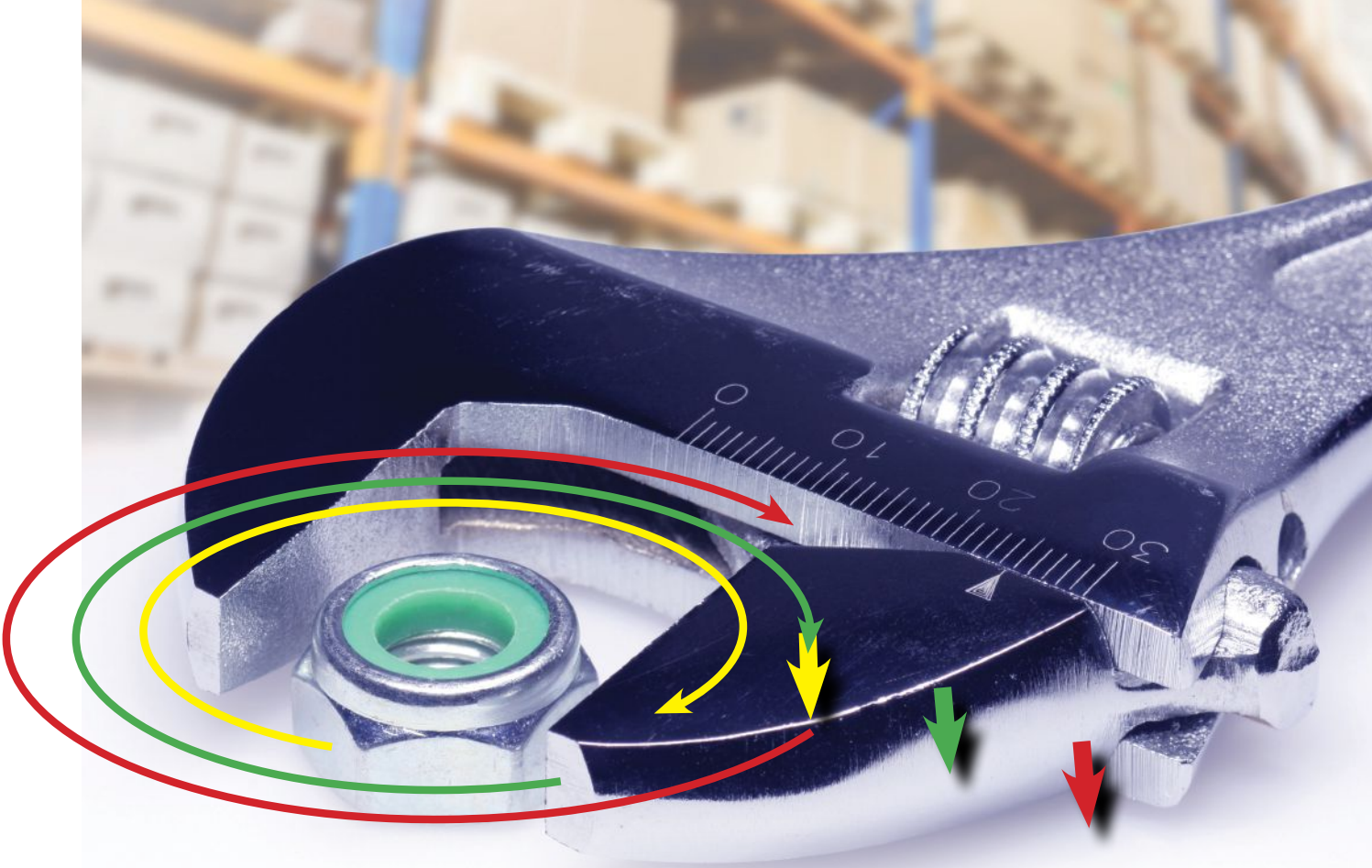
“One influencing factor to consider is the growth of capacity we’ve seen over the past couple of years, keeping pricing at lower levels,” says Fried. “This increase in space is attributable to the large amount of new and efficient wide-body aircraft, each with generous belly space flying the popular trade lanes.”

Another significant factor inhibiting this growth in many cases lies with lower customer pricing agreements that may no longer reflect today’s market conditions. Once these contracts expire, says Fried, prices and margin should improve overall.

“However, new transport pricing agreements alone will not assure increased profitability, and this is why forwarders must be searching for more operational efficiencies that only technology can provide,” says Fried. “People still play a crucial role in our business, but technology will help them work smarter and provide an improved customer experience.” •

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*Patrick Burnson is executive editor of  
Logistics Management*



## 2017 Warehouse/DC Operations Survey:

# In the thick of e-commerce adjustments

**As e-commerce fulfillment pressure continues to climb, our annual survey points to the many changes taking hold—from more investment in automated approaches to piece picking, more use of robotics, increased interest in throughput metrics and general process improvement.**

BY ROBERTO MICHEL, CONTRIBUTING EDITOR

**D**uring the adaptation of industry trends, there comes a point when you pass the early stages of adjustment and dive into really doing things differently. Our “2017 Warehouse and Distribution Center (DC) Operations Survey” shows us an industry that’s now in the midst of that change—and we’re getting into the thick of e-commerce adjustments.

The tweaks include more investments in automated order picking, voice-directed systems and other technology. We’re also seeing pain points continue to swell; foremost among these is the struggle to find qualified workers. Also emerging are data that suggest respondents may





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be reshaping their DC networks with smaller facilities to serve as fulfillment centers closer to the point of demand.

The survey, conducted annually by Peerless Research Group (PRG), drew more than 300 responses this year from professionals in logistics and warehouse operations management across multiple verticals. One of the clearest data points, and the issue that is likely driving change of many types, is the level of e-commerce involvement, according to Don Derewecki, a senior consultant with St. Onge Company, and Norm Saenz, Jr., a managing director with St. Onge, a supply chain engineering consulting company and partner for this annual survey.

In fact, 19% of respondents now say they do omni-channel fulfillment, up 3% from last year, while 37% say they do e-commerce, up by 2% from last year. This steady growth in e-commerce and all the pressures that brings around piece picking, labor management, and cycles times, is driving deep change for respondents, notes Derewecki.

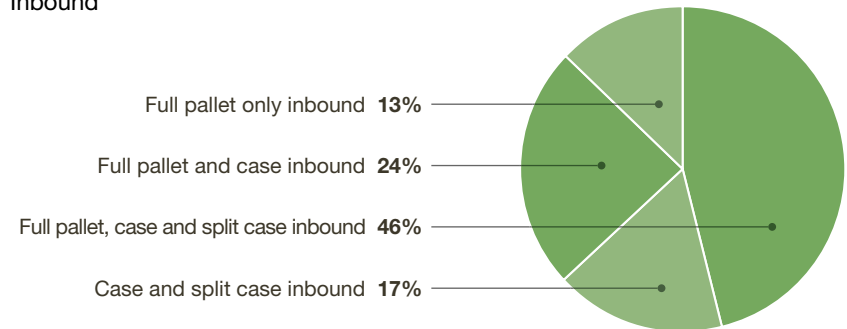
“Overall, what we’re seeing and what seems to be consistent with the study results is that there is more of requirement for speed and accuracy, driven very much by e-commerce expectations,” says Derewecki.

In response, the survey shows that some technologies that had been flat the last few years are on the increase this year. Many of these involved each picking that is a hallmark of e-commerce fulfillment, notes Saenz. “The investments are increasing a bit more for certain areas like voice,

## Nature of DC’s inbound/outbound operation

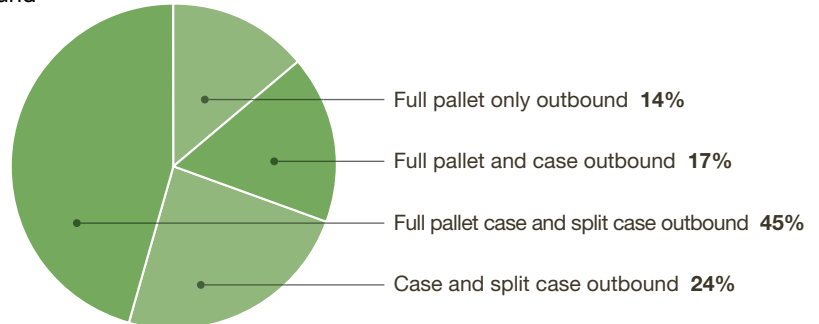
### What is the nature of your distribution center’s operation?

#### Inbound



### In what unit load quantities are products shipped outbound?

#### Outbound



Source: Peerless Research Group (PRG)

pick- to-light, and put walls, which points to operators applying some technology to e-commerce pressures,” says Saenz.

The annual survey of decision makers for warehouse/DC operations spans multiple areas, including facility; labor and other operations trends; use of technology; capital expenditure levels; and use of metrics. We also ask about disruptions from natural disasters. And with the disastrous hurricane season of 2017 fresh on people’s minds when the survey was in the field, the response for this question jumped, with 15% saying they had experienced a catastrophic event, up from just 6% in 2016.

Most participating companies came from manufacturing (46%), followed by distributors (27%), third-party logistics providers (11%) and retailers (6%). Leading verticals included food & grocery, automotive & aerospace, general merchandize, electronics, fabricated metals, and paper products.

### Operations snapshot

In recent years, the survey has trended toward “more” as the norm when it comes to factors like facility clear heights and labor forces. This year’s survey results, however, has some data that runs contrary to these recent trends, but is consistent on others like the nature of inbound and outbound

shipments, as well as the steady march of e-commerce.

For 2017, 14% of respondents handle full pallets on the outbound side, up from 9% last year. On the inbound side, full pallet was only at 13%, which is the same as last year. On the outbound side, 45% handle full pallet, case and split case, while 24% handle case and split case, for a total of 69% for those two answers, the same as last year. Thus, while the response for outbound “full pallet only” grew slightly, the outbound profile is relatively consistent.

Wholesale (67%) and retail (58%) remain the most common channels serviced, with wholesale staying equal to the previous year’s 67%, and the response for retail down by 2%.

This year, 37% say that they service an e-commerce channel, up from 35% in 2016. Additionally, 19% say they have an omni-channel service environment, up from 16% last year.

While there is likely some overlap on these answers, 56% now say they service omni-channel or e-commerce needs.

How channels are being fulfilled—in terms of using third-party logistics (3PL) sites, servicing channels in-

house (self-distributed) from one DC, or self-distributed with separate DCs for different channels—also experienced some change. Those saying they self-distribute for all channels from one DC fell from 42% last year to 37% for 2017, while 30% now say they self-distribute with separate DCs for different channels, up from 24% in 2016.

The survey’s findings on inventory where slightly different from

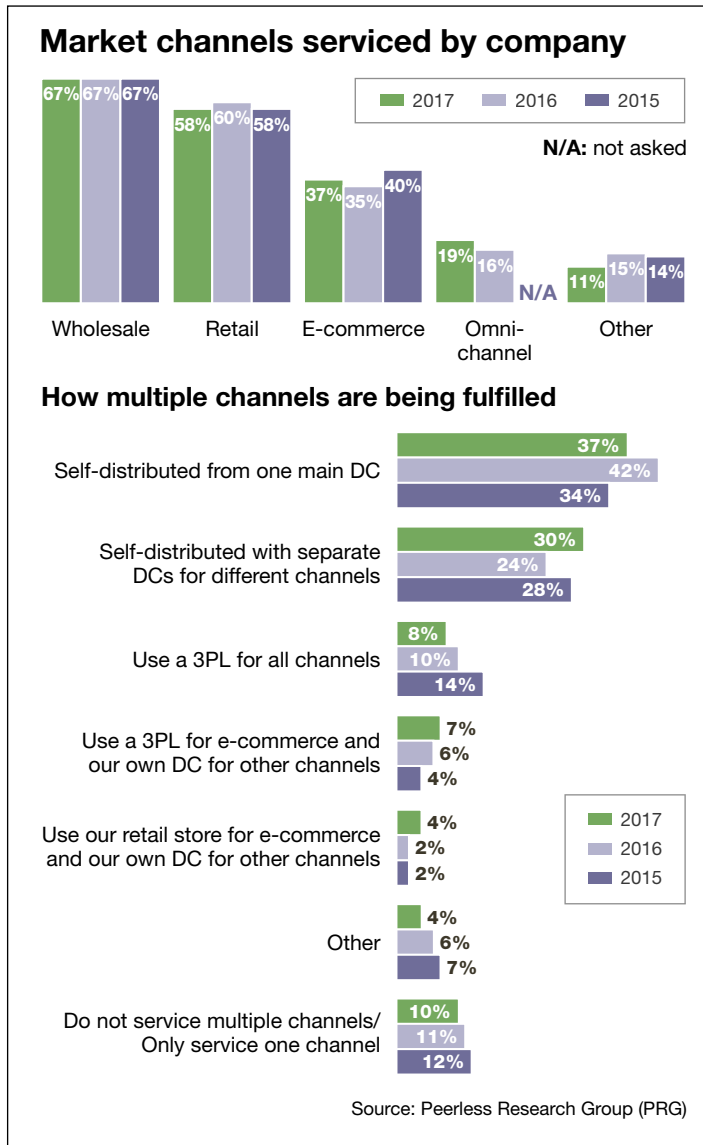
the previous year. The average number of SKUs declined to 13,130 this year from 13,774 the previous year. The percentage of SKUs that are conveyable or can be handled robotically was 29%, down from 36% the year previous. Annual inventory turns for 2017 came in at 8.5 turns, a decline from 9.2 turns the year previous.

While more turns is typically desirable, a couple of factors may be playing into the slower movement. One, notes Derewecki, is that the cost of financing remains low, so there is less cost involved in carrying more inventory than if rates were higher.

The widening of the Panama Canal and enhancements to some U.S. ports to accommo-

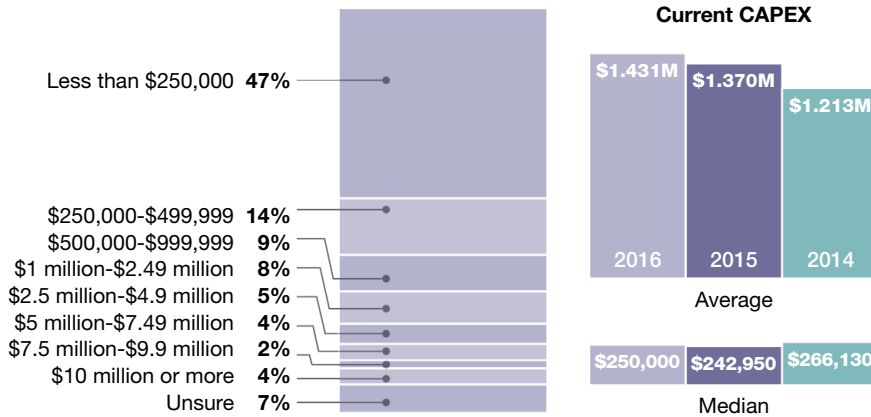
date larger freighters also has tended to increase the volume of cargo that can be imported at an attractive cost. Such factors may be contributing to a tendency to carry more inventory, notes Derewecki, in addition to the need to maintain high service levels for multiple channels.

At the same time that some of these macro-level factors may be driving inventory levels higher, respondents are after better, tighter

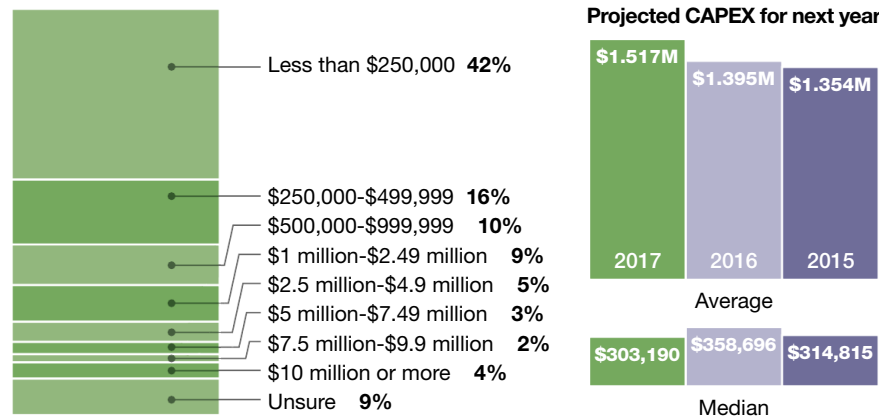




### 2016 capital expenditures for warehousing equipment and technology



### Estimated capital expenditures for warehousing equipment and technology in 2017



Source: Peerless Research Group (PRG)

inventory control. In fact, when asked about actions taken to lower operating costs, “improving inventory control” was the second most common answer, with a 63% affirmative response, up from 60% the previous year.

#### DCs and labor forces

The trend toward “bigger, taller and more” when it comes to facilities and labor altered slightly for the 2017 survey. For example, when asked about most common square

footage for buildings in the DC network, the average for 2017 was 193,190 sq. ft., down slightly from 199,040 feet last year.

Average clear height of buildings was 29.8 feet for 2017, down from 31.1 feet in 2016, and 30.8 feet the year previous. However, 27% of respondents said that clear height ranged from 30 feet to 39 feet, up 1% from 2016.

Total square footage in the network averaged 473,400 sq. ft., down from 539,00. The median dropped as well,

from 240,410 to 176,600, while the “mega-sized” DC network response (two million sq. ft. or more) stayed at 10%.

When it comes to the most common square footage for a single DC, when the network is four buildings or more, the average square footage for 2017 was 264,675, up slightly from 264,445 last year. For networks of three buildings or less, the average square footage was 159,510 in 2017, down from 178,090 last year, but very close to the 158,955 sq. ft. back in 2015.

Why the shift in facility and DC network sizes? To some extent, there is natural variation year to year due to different sets of respondents. Another factor at play may be the growth of e-commerce, notes Saenz. With industrial real estate availability tight, and a growing need to service e-commerce orders quickly, it may be that some operators are opening relatively smaller fulfillment centers versus big DCs that service traditional channels and large regions.

“I think e-commerce is really starting to drive some of the survey results we’re seeing, even in areas like clear heights or smaller facilities,” says Saenz. “Buildings last a long time, so some smaller facilities built decades ago may be getting repurposed as fulfillment centers for e-commerce. Also, I think the growth in e-commerce volume has pushed the need to have the inventory and processes set up in a separate building. As a result, some of the findings that at first glance seem confusing start to make sense once you realize that e-commerce growth is driving various changes.”

When asked about DC expansion plans, 23% said that they plan to expand square footage, down slightly from 27% last year. However, 17% say they plan to expand the number of buildings, up 3% from 2016. Employee/labor expansion plans for DCs also are on the rise. Over the next 12 months, 36% are foreseeing expansion in the number of employees, up from 33% last year.

The number of employees in a DC network trended slightly downward. For 2017, the average number of employees for a network was

228, down from 278 in 2016. However, the 1,000-plus employee bracket drew a 12% response, up slightly from 10% in 2016.

The “less than 25” employee bracket grew significantly, while the 500 to 999 employee range decreased from a 11% response in 2016, to just 5% this year. These changes might be due to a different mix of respondents, or deeper shifts in DC networks that may be developing.

Capital expenditures continued the general growth pattern of recent years. The average current capex reached \$1.43 million in 2017, up from \$1.37 million last year. Median capex increased from \$242.95 million last year to \$250,000 this year.

When it comes to estimated capex for the next year, the average projection is \$1.51 million, up from \$1.39 million from last year, while the median for projection comes to

\$303.19, down from \$358.69 the previous year. “There’s some new level of investment that’s indicated,” notes Saenz. “It’s not an outrageous increase, but consistent with what might be expected in trying to handle e-commerce more efficiently.”

### Solutions and metrics

The types of technology investments respondents are interested in generally align with the pressures of e-commerce order picking and fulfillment. For instance, 10% indicated that they use some form of automated order picking, up from 3% from last year and the 7% from 2015.

Among specific picking technologies, 12% say they are using a “parts-to-person” system, up from 10% in 2016.

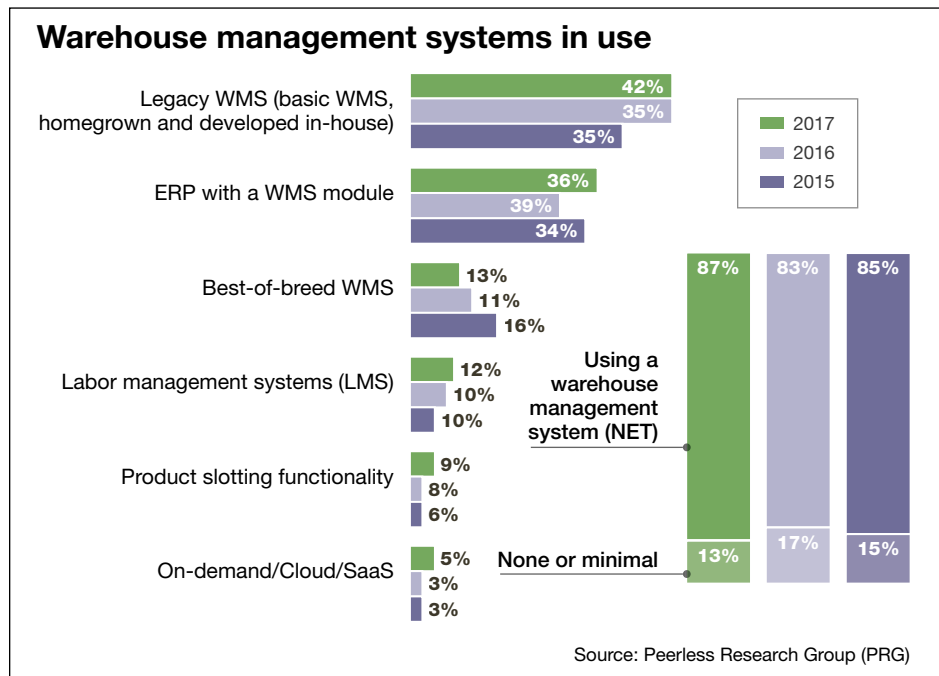
Voice assisted solutions with no scanning came in 7%, up from 3%, while voice with scan verification was also 7%, down 1% from the previous year. Robotic or other

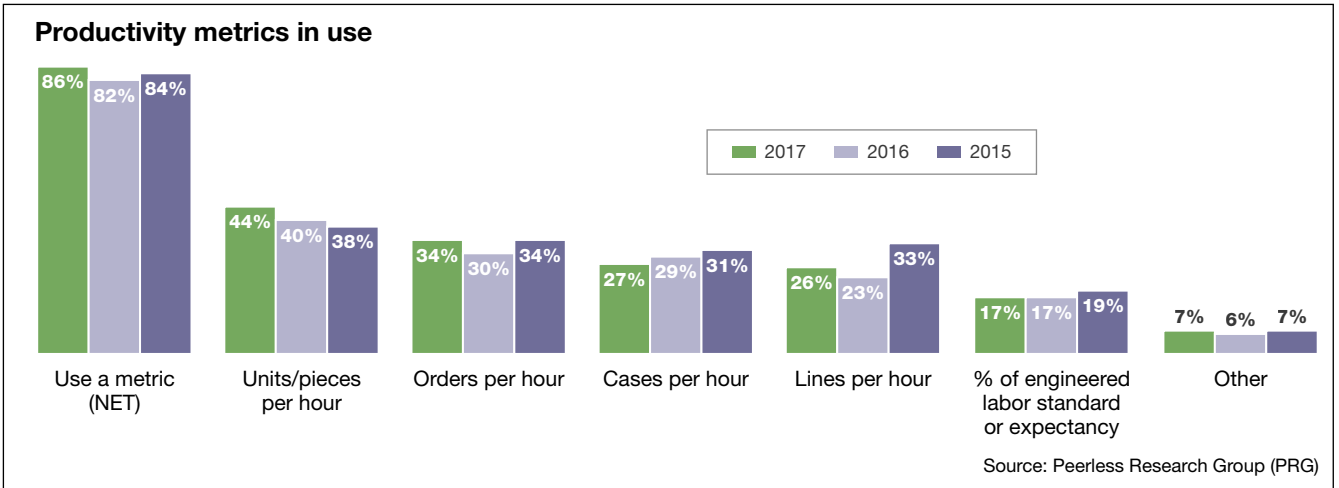
automated technology was in use by 5% of respondents, up from 3% last year. Use of automated storage and retrieval systems was up by 1%, while automated guided vehicle use grew from 3% to 6%.

When it comes to “order filling” techniques, 20% use a “put” to order method, up from 15% in 2016. Use of put walls also grew by 2%.

Use of warehouse management system (WMS) software, from various types of vendors as well as legacy/homegrown, grew from 83% across all types last year to 87% this year. Best of breed WMS grew slightly from 11% to 13%, but somewhat surprisingly, so did the response for use of legacy systems, up by 7%.

While it’s possible that packaged solutions from ERP and WMS vendors have been around so long that some consider older packaged solutions as legacy, the overall trend is that





WMS is in use at the vast majority of respondent locations. In keeping with that use level, 60% of respondents say their primary data collection method to gauge productivity is “automated through a WMS,” up from 59% last year. Manual data collection methods are used by 55% of respondents, down from 57% last year.

Overall, the technology portion of the survey reflects that operators are layering in more automation, though not necessarily big ticket, fixed automation systems. “The e-commerce world drives the need for more labor, and as a result, you have the need to use some forms of automation to give you the productivity gains you need,” says Saenz.

Derewecki agrees that there is strong interest in technology as a means of dealing with the labor-intensive requirements of e-commerce, especially solutions that are quick to reconfigure and change as DC workflows evolve.

“There is greater interest in flexible technology solutions like voice-directed solutions or RF-directed picking, and to some extent, robotics,” says Derewecki. “Generally, the technolo-

gies of interest are all trending with the piece picking volumes associated with e-commerce. Companies are interested in finding ways to fulfill orders with fewer people, because people aren’t easily available right now.”

The percentage of respondents using some type of productivity metric grew from 82% last year to 86% this year. Common metrics used include units/pieces per hour (44%), orders per hour (34%), cases per hour (27%) and lines per hour 26%. Use of “percent of an engineered standard” remained at 17%, the same as last year. Metrics that gained a bigger response this year were units/pieces per hour, orders per hour, and lines per hour.

Respondents continue to take a range of actions to lower operating costs, with 95% taking an action of some kind. Common actions include improving warehouse processes (70%), while 63% tell us they’re trying to improve inventory control, an action that grew by 3% over 2016. Changing racking and layouts increased by 5%, while reducing staff as a means of lowering costs decreased to 21% this year from the 23% who used that as a cost reduction measure in 2016.

Survey findings show continued strong use of metrics as well as interest in cost management methods such as improving warehouse processes and inventory control—pointing to an industry that wants to streamline and standardize as much as possible, both to manage costs and to respond to customer expectations.

“Companies are looking to standardize processes as part of making it easier to comply with rising customer expectations for quality and turn-around time,” says Derewecki. “There is an increasing emphasis on continuous improvement—on streamlining and standardizing—as a means of managing costs and delivering more value to customers.”

**Labor as top issue**

Given the picking, packing and shipping tasks associated with e-commerce, it’s not surprising that the inability to attract and retain labor has become the top industry pain point. Whereas last year, “insufficient space for inventory or operations” remained the leading pain point, this year it gave way to the inability to find hourly workers, which grew from 41%



last year to 49% this year.

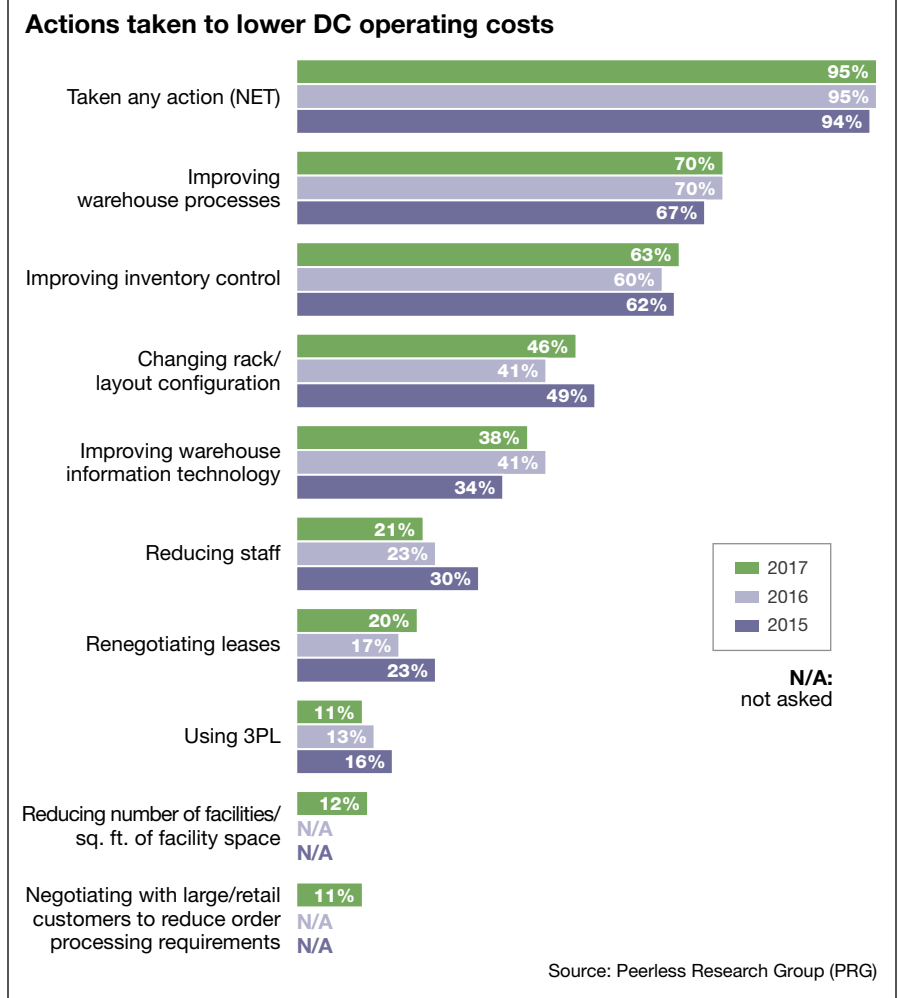
The insufficient space issue—at 40% this year—still ranked number two on the list of major issues, followed by inadequate information systems support (36% this year) and outdated storage, picking, or material handling equipment (33%). What’s more, the fifth most cited issue—the inability to attract and retain qualified supervision—shot up from 11% in 2016 to 25% this year.

“There is a lot of competition to find and retain good, quality employees, so DCs are struggling to find good people,” says Saenz. “This issue is driven in large part by the increase in smaller order handling. E-commerce is driving change in terms of space, different types of facilities, for people, as well as automation.”

For the first time in recent years, the percentage of respondents performing value added services (VAS) reached 90%. Frequently cited types of VAS include special labelling (54%), lot number control (34%), product assembly (31%), serial number control (30%), and kitting (29%). Of these, assembly was up by 4% and kitting by 3%.

The majority of respondents (64%) report that their systems have SKU weight and dimension data in their item masters. This is down from 68% last year, but only 12% see it as a major industry issue, just like last year.

The survey includes an open-ended comment section about “significant change” respondents are seeing. And while responses vary, common comments included adding 3PLs, becoming more automated, adding space or racking, implementing technologies like voice picking or



RF scanning, concerns about finding labor or improving the workforce, improving warehouse processes.

These types of comments make sense in the current environment. E-commerce is marching on, the economy is good, so challenges operators have been experiencing the last few years are only accelerating, concludes Derewecki.

“E-commerce has really become a game changer in warehouse operations,” says Derewecki. “When you couple that with the expectation that the general economy will get better, it puts increasing pressures on DCs on

many fronts—on turnaround times, on being able to find more space on short notice, or finding good hourly workers and supervisors.”

As a result, Derewecki adds that we will continue seeing operators trying to standardize and upgrade processes, and applying some automation. “They’re automating where it’s justified, to reduce the long-term dependence on a large labor force, and also, to be readily able to absorb surges in demand.” •

*Roberto Michel is a contributing editor to Logistics Management*

## State of Mobility:

# Part of the Playbook

**By taking the process to the product, mobility enables a more streamlined, more accurate and faster approach to warehouse and DC management in today's e-commerce age.**

BY BRIDGET McCREA, CONTRIBUTING EDITOR

**I**ntent on improving real-time operations transparency, making better and faster logistics management decisions, speeding up order processing and gaining better control over their operations, a growing number of logistics operations are implementing mobility solutions within the four walls of their warehouses and DCs.

Using handheld mobile devices, vehicle-mounted devices, ruggedized mobile computing solutions and voice solutions, those forward-looking logistics operations are able to better track the productivity of individuals or groups, produce audit trails for improved accuracy and accountability, and streamline inventory

management as well as inbound/outbound materials processing.

“We’re definitely seeing a more widespread adoption of mobile computing in the warehouse right now,” says Don Derewecki, senior consultant at the St. Onge Company. “Whereas 20 years ago integrated scanners and radio fre-

quency [RF] devices were considered ‘new,’ more and more companies are getting away from fixed workstations, using voice, and going to more mobile solutions.”

The benefits associated with these moves are well documented and recognized. Called upon to orchestrate the movement of inbound freight into the warehouse, for example, mobile devices can make or change dock door assignments on a real-time, mobile-enabled basis—that way, employees spend less time waiting for vehicles to show up at the receiving dock.

And when mobile devices can quickly suggest suitable inbound shipment assignments, they can then help reduce the time and effort required to match inbound and outbound cross-docking shipments. Over the next few pages we’ll explore the inroads being made in the mobile warehouse, discuss the key mobility components that go into these facilities and provide some insight into what the warehouse of the future might look like.

### You’ve come a long way, baby

When Dwight Klappich thinks back to the 1980s, he remembers just how enthused companies were to be able to integrate RF technologies into their warehouses and DCs. And while there were some kinks to work through with that particular technology at the time, this research vice president for Gartner says that those early “wins” helped shaped the now-mature warehouse mobility environment.

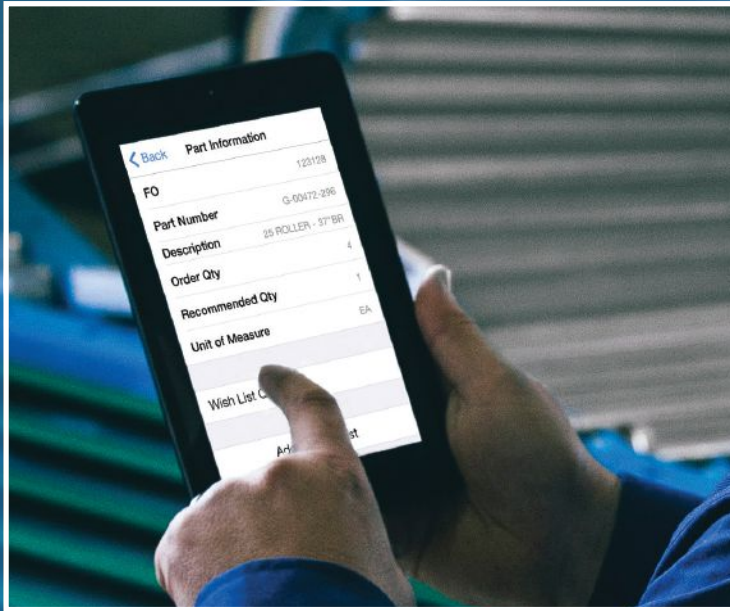
“To be frank, mobility is ubiquitous in the warehouse setting at this point,” says Klappich. “All warehouse management systems [WMS] vendors support traditional, ruggedized, RF-based devices. As

### Picking technologies in use

What kinds of picking technologies are currently in use at your distribution center?

|                                       | 2013 | 2014 | 2015 | 2016 |
|---------------------------------------|------|------|------|------|
| Paper-based                           | 63%  | 60%  | 61%  | 59%  |
| RF assisted with scan verification    | 48%  | 49%  | 50%  | 49%  |
| Light assisted with scan verification | 8%   | 8%   | 8%   | 12%  |
| Parts to person technology            |      |      | 5%   | 10%  |
| Voice assisted with scan verification | 5%   | 7%   | 7%   | 8%   |
| RF assisted with no scanning          | 5%   | 5%   | 4%   | 4%   |
| Automated unit sorter                 | 5%   | 4%   | 4%   | 4%   |
| Voice assisted with no scanning       | 7%   | 7%   | 5%   | 3%   |
| Robotic or other automated technology |      |      | 2%   | 3%   |
| Light assisted with no scanning       | 5%   | 3%   | 4%   | 1%   |
| Other                                 | 2%   | 2%   | 2%   | 1%   |

Source: Peerless Research Group (PRG)





a result, the early barriers we dealt with on the mobility front are now gone.”

Globally, Klappich says that one of the more interesting mobility trends is the fact that emerging economies have embraced these state-of-the-art technologies on a widespread basis. “Workforces around the world are using mobile devices, and many of the emerging economies don’t even use land-lines anymore—so moving to mobile has been even easier for them,” Klappich observes. “As a result, we’re seeing very rapid ramp-ups in terms of companies getting workers to use mobile solutions in the warehouse.”

Helping to drive some of the growth in warehouse and DC mobility, says Klappich, is the introduction of consumer-grade devices that are capable of operating in—and standing up to the rigors of—today’s work environment. In other words, a logistics operation doesn’t necessarily have to invest in a bevy of ruggedized devices, tablets and handhelds to be able to gain global connectivity within its warehouses.

“There’s really no reason why that company can’t use less expensive, consumer-grade devices,” says Klappich. “We’ve yet to see any large upticks in the usage of these devices, namely because of the advantages that ruggedized devices offer within the industrial setting.”

### Working without wires

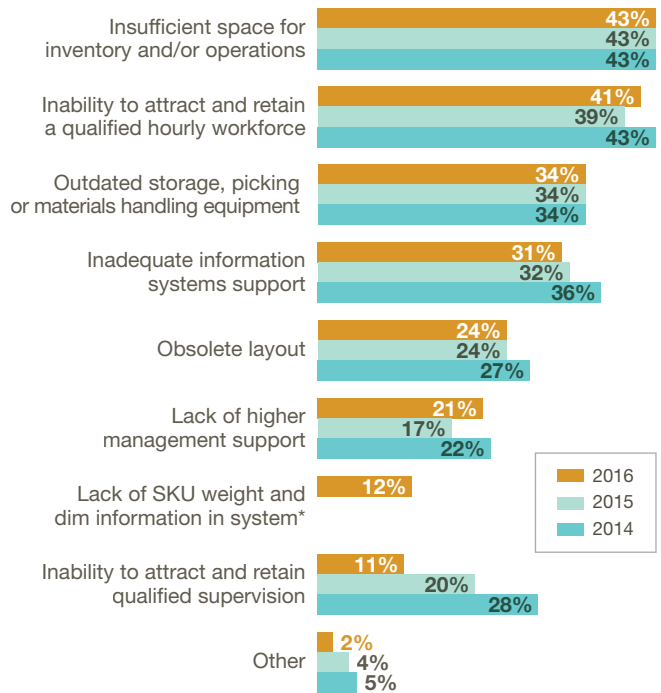
In surveying the modern-day warehouse, Klappich says that he’s seeing more mobility solutions being developed with the warehouse supervisor and logistics manager in mind.

No longer tied to a desk, these employees can be out on the warehouse or DC floor, armed with a tablet or other mobile device, pushing out alerts, reviewing analytics, keeping an eye on dashboards—and keeping their fingers on the pulse of the facility.



### Major issues as it pertains to warehouse/DC operations

Which of the following would you consider to be major issues?



\*Not asked before 2016

Source: Peerless Research Group (PRG)

“Anything they used to be able to do in their offices they can now do while they’re out on the floor,” says Klappich, who is also seeing more interest in voice-based solutions that allow employees to work on a largely “hands-free” basis when fulfilling orders.

More expensive than traditional RF solutions, voice offers a more adaptive and less expensive mechanism than, say, an automated solution. Interest in voice, wearables, and products like Google Glass is largely being driven by the growth in smaller, high-volume e-commerce orders, says Klappich, and the realization that traditional picking and packing methods don’t always cut it when order velocities and volumes reach a certain level.

Looking ahead, Klappich expects the current level of warehouse mobility to continue and even pick up slightly as more shippers work through the challenges associated with e-commerce, omni-channel and multi-channel distribution. “We’ve all received boxes that were packed poorly, or the one big box that’s full of peanuts and one single memory card stuck in the middle of it,” says Klappich. “Going forward, we’ll start to see mobility applied to very specific use cases, versus just heavy-duty transactional use.”

## Seasonal support

In a recent “Logistics Viewpoints” post, ARC Advisory Group’s Clint Reiser discussed Singapore Post’s (SingPost) new e-commerce logistics solution integration. Owned by e-commerce giant Alibaba, SingPost is a third-party logistics provider that’s building an e-commerce hub to support its growing direct-to-consumer retail channel.

The company is using HighJump’s WMS to support its logistics centers, where Android handhelds are used to improve operational efficiencies and quickly onboard temporary workers—particularly during peak times—at a fairly low per-device cost.

Reiser compares this development to Manhattan Associates’ introduction of a mobile app that runs on iOS and Android, thus giving shippers more flexibility in terms of the actual device that they choose to use out on the warehouse or DC floor. “These mobility developments are mainly geared toward getting seasonal or temporary workers geared up and ready to handle peaks in order volume quickly and without much training,” he says.

Reiser adds that the drivers behind this trend are straightforward: Pretty much everyone already knows how to use a smartphone, and the cost-per-device is cheaper than industrial-grade, ruggedized options. “On the negative side, smartphones are more vulnerable to damage, and I’m not sure how accurate and fast these devices’ scanning and processing capabilities are,” he points out. “In the end, it’s really more about getting up and running quickly and saving some money.”

## Taking the process to the product

As more shippers explore their options in the world of mobility, and as the challenges associated with e-commerce and omni-channel continue to mount, Derewecki envisions a time where companies strive for a completely hands-free, ergonomically-friendly work environment. He also expects more shippers to invest in equipment like mobile printers, which—by allowing employees to print labels where they’re working, versus having to walk back to a central location to do so—help cut down on the time it takes to fulfill an order.

## Warehouse & DC Management Feature: Mobility

### 10 key mobile warehousing/DC trends to Watch in 2017

Don Derewecki, senior consultant at the supply chain advisory firm St. Onge Company, tells shippers to keep an eye on these 10 trends in warehouse mobility during the coming year.

- 1** More device types, including integrated devices with printers, voice recognition, RFID capabilities, cameras and other specialized functions.
- 2** More tablets, wearables and robots being used in a variety of conditions, including outdoors and a wider variation in working environment temperatures
- 3** Bring-Your-Own (BYO) deployment. “This flexibility allows users to access work information from their personal devices in a secure and managed manner,” says Derewecki.
- 4** System-directed navigation and positioning for warehouse equipment.
- 5** More integration of Web-based apps. In November, for example, UPS launched the beta version of a “chatbot,” an artificial-intelligence-enabled platform that mimics human conversation to help users easily find UPS locations, get shipping rates and track packages.
- 6** Increased use of biometrics.
- 7** A shift toward unified endpoint management (UEM), which brings together the management of mobile and laptop/desktop devices onto a single solution. “A UEM solution is able to manage a device from the top down,” says Derewecki, “and able to manage a device ‘out of the box’ with the original operating system on the device.”
- 8** Increased use of artificial intelligence (AI) for automating repetitive service tasks, such as looking up shipping information, return policies and product details.
- 9** More attention being paid to mobile/IT security and user privacy—an issue that many shippers are still concerned with, according to Derewecki.
- 10** Delivery of mobile services via the private Cloud.

“The printer could be mounted onto a cart and used as a mobile workstation, or maybe the printer is hanging off someone’s tool belt and controlled using a wristband device,” says Derewecki. “Whatever the specific format is, the ultimate focus will be on taking the process to the product, versus bringing materials back to a central processing workstation to do the work.”

In assessing just how far warehouse mobility and connectivity has come over the last 20 years—and how far it still has to go before shippers can truly say they’re working “without wires”—Derewecki says that while the progress has been substantial, there’s still more work to be done. “Focused on improving labor productivity, the most aggressive companies are already seeing the results of their investments in mobility,” he says, “with many already integrating voice operations with scanning and printing to achieve operational improvements.” •

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*Bridget McCrea is a contributing editor to Logistics Management*

# The Evolving

BY ROBERTO MICHEL,  
EDITOR AT LARGE

**With the growth of e-commerce, the technology stack for distribution centers is expanding. We explore why WES/WCS software is gaining prominence and share how operations are expanding their use of data science.**

**T**HE FAMILIAR TECHNOLOGY STACK OF warehouse management systems (WMS) to manage transactions and

inventory at the distribution center level and then hand order requirements down to the automation layer is not as simple as it used to be. With the complexities of e-commerce fulfillment, the need to orchestrate and optimize operations is driving the need for advanced execution software in the middle of the stack and for more optimization tools.

In short, the DC tech stack has changed. It's no longer just WMS on top, warehouse control system (WCS) software in the middle, and automated materials handling systems at the floor level. The stack has expanded, and while

not every DC needs the same foundation, failure to grasp evolving areas could end up stacking the deck against omnichannel success. What's more, while automation hardware—including robotic goods-to-person systems, pick-to-light systems and high-end sortation—play a role in the tech stack for e-commerce, even automation providers say the stack is software driven.

"The new types of automation hardware are extremely important, but I think it's a matter of hardware and software as a combined solution that give users the advantages and throughput they are after, especially when you have Amazon pushing the same-day delivery model, and everyone is chasing and trying to achieve that same panacea," says Michael Howes, vice president of software and controls



# DC Tech Stack

for Swisslog Warehouse and Distribution Solutions (WDS) Americas, which offers automated materials handling as well as software solutions.

E-commerce means that DCs have a greater volume of small orders that make it more complex to orchestrate systems, not only within the four walls of the DC, but with order fulfillment and transportation management decisions.

“Everyone is being pushed to ship smaller and faster,” says Joe Vernon, senior manager of North America supply chain technologies for the consulting firm Capgemini. “The demand/fulfill cycle has been cut from days to hours, and freight costs are more often absorbed now, rather than passed along to a customer.”

Vernon sees distributed order management (DOM) solutions, as well as new types of optimization software that can synchronize pick sequencing, staging and loading, as gaining in importance.

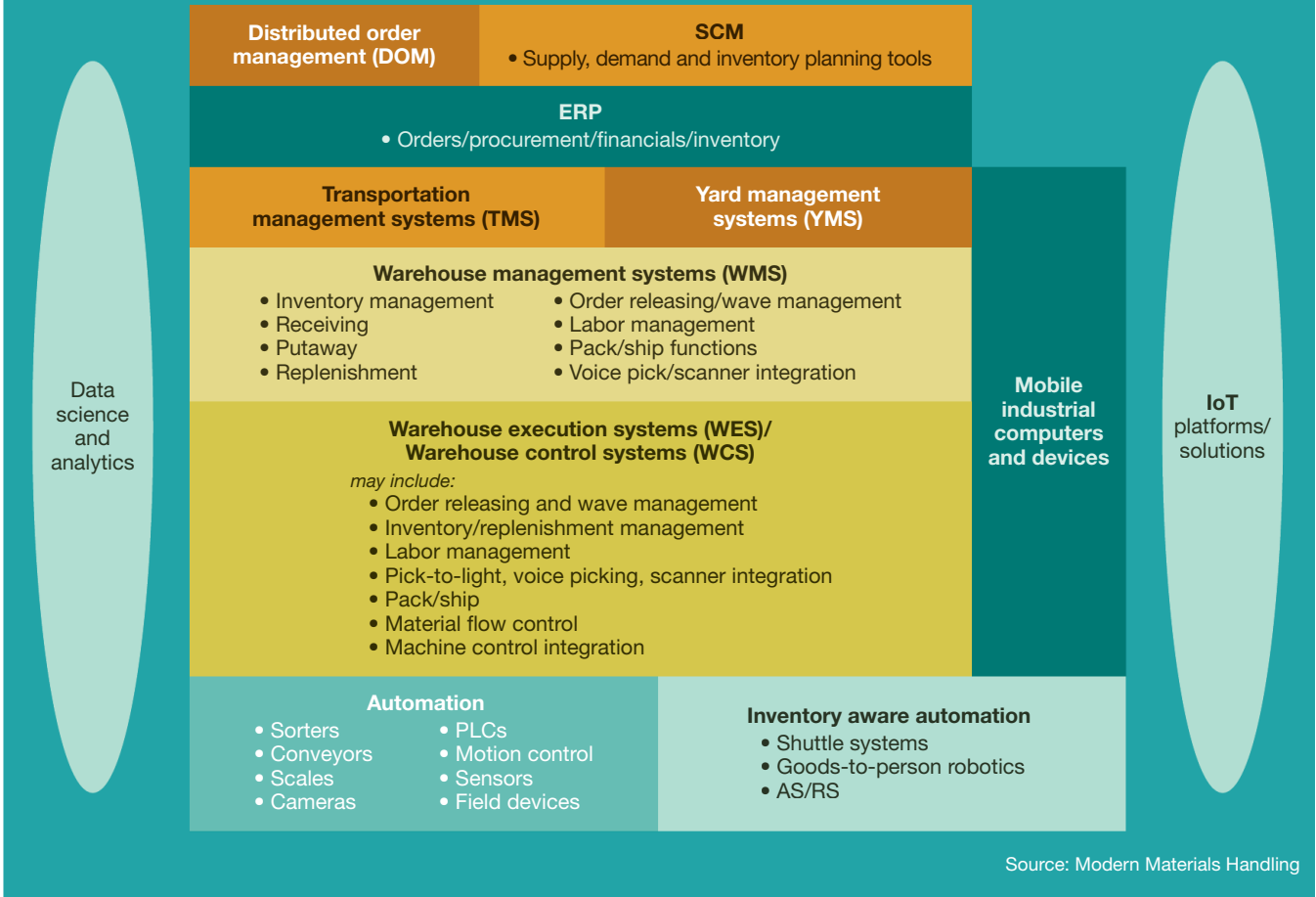
Perhaps the biggest shift in the DC tech

stack for e-commerce has been the emergence of warehouse execution system (WES) software, an evolution of WCS. WES brings in richer functionality around order releasing and wave management, resource optimization and analytics, in addition to WCS solutions’ more traditional role of coordinating automation and material flow.

## **The role of WES**

WES solutions provide visibility and management capabilities around order requirements, inventory information, and equipment and labor resources, observes Mike Dunn, group vice president with Fortna, a distribution consulting and engineering firm. “The interesting technology questions inside the DC are: ‘What systems should I own to have visibility into those three components,’ and then, ‘What software can I use to really optimize my processes?’” Dunn says.

## Evolving DC tech stack



WES tends to be at the center of things in today's tech stack, says Dunn, because with its WCS roots, it has real-time knowledge of equipment processes; it knows labor availability details; and it can take the order requirements from the enterprise level to manage the order pool and decide what should be processed next by the DC's resources. While some WMS systems are getting better at grouping orders into smaller waves for processing, most WMS systems tend to batch work into large static waves, says Dunn, whereas WES excels at releasing chunks of work to the floor in the right size and sequence to satisfy orders while squeezing maximum efficiency from resources.

"When we think about how to really optimize inside of a warehouse, it's about creating chunks of work that are large enough to drive productivity, but small enough to react to and satisfy customer demands," says Dunn. "And the optimal size

for work may change every hour. In the morning, you may be able to process a larger chunk of work efficiently while still meeting demand, but later in the day, you may need to use much smaller chunks of work, which are suboptimal from a productivity standpoint, but are necessary to meet demand."

While WES has gained in importance, it can't do everything, says Dunn. Omni-channel companies have often turned to DOM to manage where orders should be fulfilled from, and at many companies, a WMS handles overall inventory, says Dunn. Down at the automation level, he adds, DCs often have strong interest in technology such as goods-to-person systems or pick-to-light systems that minimize or simplify the labor requirements for order picking. But Dunn sees WES as the best solution for the order releasing and resource management decisions that need to be made around order priorities.

"We believe the best solve for many of these business

problems is going to be a combination of WCS and WMS capabilities,” Dunn says. “Finding a way to have those two types of systems work well together to release and process work is going to be the optimal solution.”

No one wants chaotic, inefficient peaks and lulls in the pace of work, so WES providers often focus on enabling a demand-driven, level pull of work through a DC and its various points of automation. So it’s not just software bells and whistles to consider with WES, but the approach used to achieve flow, explains Walter High, vice president of marketing with Invata Intralogistics, a WES provider and consulting firm.

“In building out system infrastructure, we take a whole system approach to optimizing process flows that embraces lean engineering techniques in the physical layout of our systems, the intelligence of our software, and the application of advanced technology that maximizes the efficiency of human interaction, while eliminating toilsome labor requirements,” says High. “In doing so, we eliminate as much manual and planned push-based processing as possible, and replace it with pull-based, self-regulating and self-maintaining systems.”

Projects around orchestrating flow also benefit from a data science approach in which data analysis, modeling and simulation are used to determine how to best configure the DC’s technology stack, adds High. “Using data science, we are able to look an existing operation and test options to determine their affect on that operation,” he says. “So while the technology stack can dramatically affect a company’s strategic advantages in the market, changing it out when productivity languishes is not always the right answer. The answer is derived through understanding a customer’s data, business requirements and growth expectations, and scientifically modeling that information in a way that delivers direction.”

### **Broader needs**

While some omni-channel retailers are leveraging WES solutions, there remains a big chunk

of the market with simpler tech stack needs, observes John Sidell, principal with supply chain consulting firm New Course. For many consumer goods manufacturers or other companies that aren’t at the bleeding edge of omni-channel, but do have growing e-commerce needs and more pressure from small rush orders, the key concern is identifying when e-commerce volumes force a change to the tech stack, explains Sidell.

“There are consumer goods companies and others who are asking, ‘where is my tipping point—in terms of e-commerce volume and complexity—when I either bring in a third-party logistics partner or create a new operation dedicated to e-commerce?’” says Sidell. “Where they are with that tipping point greatly influences what they need in a technology stack.”

For some companies who have relatively modest e-commerce pressures, the tech stack will tend to be more streamlined compared to what an omni-channel retailer would put in place at a DC, says Sidell. A WMS with a more agile approach to wave management, some zone picking, or perhaps a voice-picking solution combined with WMS might be key pieces of a tech stack for many organizations. “For some companies, the current tech stack can be adapted to support new methods of order picking,” says Sidell. “If they can tap additional functionality from their WMS vendor, turn that on and train the users, that may meet their needs. That said, as your online business grows, the need for more automation grows with it.”

The growth of e-commerce also has elevated the importance of DOM and the inventory visibility DOM relies on, says Sidell. Well-implemented, accurate WMS systems support this visibility, says Sidell, as do accurate store-level systems. “One of the most crucial elements with omni-channel is real-time inventory visibility across your supply chain network,” says Sidell. “To have effective DOM and fill orders with confidence in the promised service level, this inventory visibility is a must.”

**“There are consumer goods companies and others who are asking, ‘where is my tipping point—in terms of e-commerce volume and complexity—when I either bring in a third-party logistics partner or create a new operation dedicated to e-commerce?’”**

—John Sidell,  
principal, New Course



**“The future is to make this whole ecosystem smart, optimized and predictive.”**

—Joe Vernon, senior manager of North America supply chain technologies, Capgemini

The solution stack for DCs increasingly needs to look beyond the four walls of a single site to optimally process and ship orders, says Capgemini’s Vernon. Some sites might have multiple buildings within a “campus,” notes Vernon, which adds to the complexities of the DC-level inventory moves, processing and staging. The whole process constitutes a “multi-tiered, multi-constraint optimization puzzle,” says Vernon, to get the right goods to the right dock doors at the optimal time for pickup by carriers.

To solve this challenge, says Vernon, DCs are adopting solutions for pick sequencing, staging and loading optimization with integration to robotics and automation. Vendors in the space such as warehouse optimization can help DCs schedule complex activities in a synchronous way to achieve flow and better use labor, according to Vernon.

Capgemini is involved with pick sequencing, staging and loading optimization by offering data science services that assess actual performance in shipping orders against the model in the software, so that the model can be improved for further efficiencies.

Providers of robotic goods-to-person systems and other warehouse automation systems also employ data science to refine the effectiveness of their solutions, says Vernon. The data science for pick sequencing and loading will build on data science from the automated equipment providers, rather than replicate it, he adds.

Expect to see more data science from solution providers and consultants, says Vernon, since some DCs are becoming highly automated and generate a constant data stream that can be analyzed to refine optimization engines. “The future is to make this whole ecosystem smart, optimized and predictive,” says Vernon.

### **On the edge**

Another aspect of the tech stack for omnichannel is various “edge” hardware such as sensors, mobile computers, and voice-system

components that enable workers and processes. Much of the value from this hardware comes from the ability to consolidate data generated on the edge and make real-time decisions with it, says Bruce Stubbs, director of supply chain marketing for Honeywell Safety and Productivity Solutions.

One enabler of these actionable insights is Cloud-based gathering of data generated by sensors in trucks or other supply chain locations, says Stubbs. Honeywell has already leveraged its Cloud platform capability gained from its acquisition of Movilizer to do things like generate Cloud-based insights into “cold chain” events in sectors such as food and pharmaceuticals, according to Stubbs.

Another tech stack evolution Honeywell is involved with is performance analytics of data generated by voice systems. Whereas once the software component of voice systems was mainly about generating effective voice prompts and integration to WMS, now there also is analysis software that combs data generated by voice-based processes to improve performance.

To this end, says Stubbs, Honeywell offers an operational intelligence software for its voice system that provides actionable insights for associates on the floor, such as slot skipping that degrades efficiency, while also generating reports for managers on issues like how actual, current performance compares against productivity standards, or to budget targets.

According to Stubbs, such software is an increasing part of the value proposition today. “We’ve transformed from a hardware-oriented company to a total solutions provider, and that involves a lot this software on the edge to enable connected workers,” says Stubbs. “We’ve enhanced our [operational intelligence] platform to be able look at all the task-related data that exists and leverage it in a real-time, actionable way to improve work processes and head off problems before they start.” •