ZEBRA

skywire

From Cost Center To Growth Center:

Warehousing 2018

HOW WAREHOUSING OPERATIONS AND IT PROFESSIONALS ARE RESPONDING TO THE SIGNIFICANT CHANGES AND CHALLENGES FACING THE INDUSTRY OVER THE NEXT FIVE YEARS.

A Growing Complexity

At its most basic, warehousing is a simple concept. It's about storing materials or goods and filling orders from one end of the supply chain to the other. But in the real world of today, tomorrow and especially five years from now, warehousing is evolving to become anything but simple. Today's warehousing professionals are feeling significant pressures from multiple internal and external sources.

The global recession affected the industry in many ways. In an effort to free up capital, there were major cuts in held inventory, adding capacity was de-prioritized and expansion of existing or construction of new warehouses and distribution centers scaled back or halted altogether. Now, as the economy has begun to grow, warehouse operations are growing again, too. But as they grow, they are also being transformed by a number of issues that go well beyond simple increases in volume and throughput.

Zebra Warehouse Vision Report

Zebra Technologies examined the current warehousing marketplace in our **2013 Warehouse Vision Report**, conducted April-May of 2013. The survey asked warehouse IT and operational personnel in the manufacturing, retail, wholesale and third party logistics (3PL) market segments to share their thoughts and plans for addressing the new industry realities over the next five years.

New Warehousing Realities

Today's warehouse professionals face a series of significant changes in the ways warehouses, distribution centers and the entire supply chain operate. More facilities and larger spaces demand high-speed mobile communications virtually everywhere on or off the floor. A virtual across-the-board customer demand for personalization is driving an increase in the number of SKUs leading to increased inventory visibility, accuracy and efficiency needs. New regulations call for more accurate product tracking and tracing. The movement to re-shoring is bringing manufacturing and other business closer to the customer, creating a need for more efficient and effective cost and labor management. Fuel cost volatility impacts logistics and much more. The growth of omnichannel transactions creates the need for increased inventory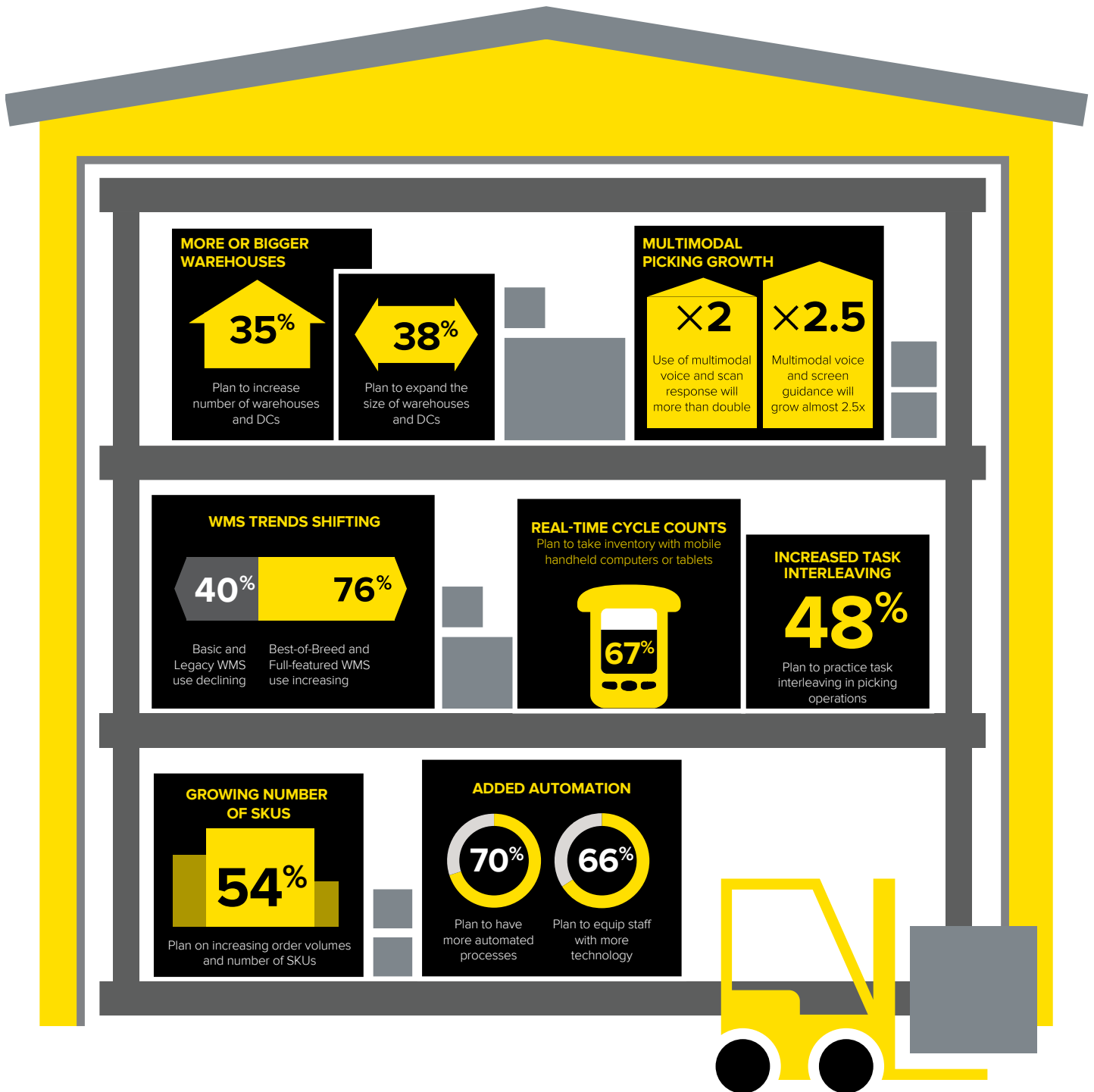 control, flexibility and faster, more accurate fulfillment. All these factors contribute to the need to convert warehouses and distribution centers into assets for competitive differentiation.

Cost Center to Growth Center

Responses to the Zebra survey create a snapshot of how warehouse IT and operations professionals across a number of vertical markets view their operations today, and where they see them going by 2018. In aggregate, survey responses reveal a forward-looking new way of viewing the warehouse: no longer as a pure cost center in which operational focus is placed almost exclusively on wringing out inefficiencies and inaccuracies in order picking, but increasingly as a powerful asset that can drive profitable growth for the business with a heightened focus on improving inbound, storage and outbound material handling.

Warehousing's Five-Year Outlook

Respondents to The 2013 Zebra Warehouse Vision Survey identified fundamental shifts in warehousing in the next five years, including:

MORE OR BIGGER WAREHOUSES

35%
Plan to increase number of warehouses and DCs

38%
Plan to expand the size of warehouses and DCs

MULTIMODAL PICKING GROWTH

×2
Use of multimodal voice and scan response will more than double

×2.5
Multimodal voice and screen guidance will grow almost 2.5x

WMS TRENDS SHIFTING

40%
Basic and Legacy WMS use declining

76%
Best-of-Breed and Full-featured WMS use increasing

REAL-TIME CYCLE COUNTS
Plan to take inventory with mobile handheld computers or tablets

67%

INCREASED TASK INTERLEAVING

48%
Plan to practice task interleaving in picking operations

GROWING NUMBER OF SKUS

54%
Plan on increasing order volumes and number of SKUs

ADDED AUTOMATION

70%
Plan to have more automated processes

66%
Plan to equip staff with more technology
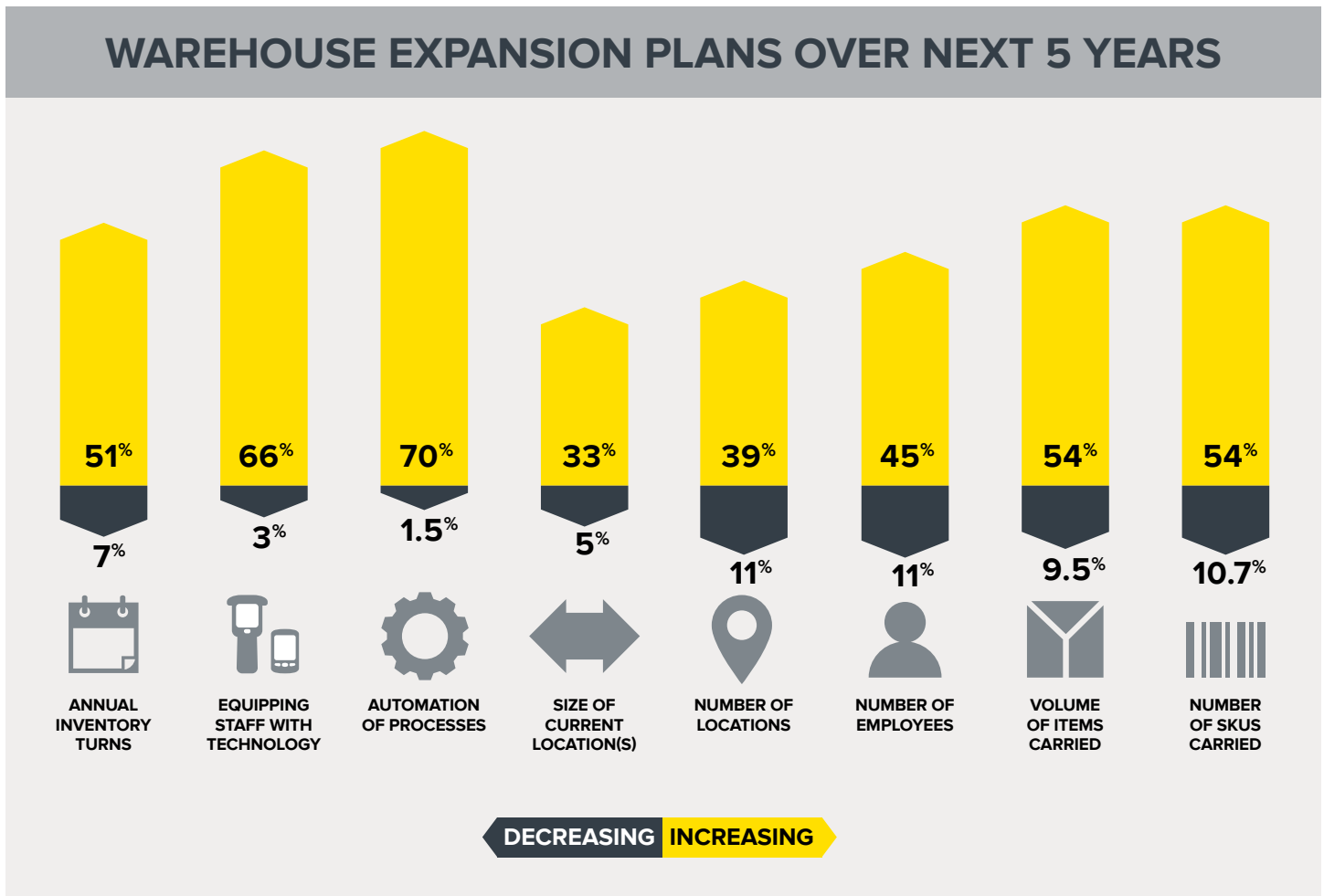
REALITY TO VISION:

The Future Of Warehousing

As the global economy continues to recover, the warehousing industry—after a period of marking time while under intense pressure to reduce inventory levels to free up capital—is now in the position of having to quickly keep pace with today's increased fulfillment demands. The industry must also anticipate the areas in which even greater growth will occur in the next five years and beyond.
This has vast ramifications for both operations and IT.

Of course, before you start planning for the future, your organization must first identify its current status, honestly answering the question, "where are we now?" Once you have a handle on today's reality, you've got to clarify your vision of where you want to be in two, three, four and five years, and make the critical decisions of where to invest, and what types of investments should be considered.

Respondents to the survey represent many organizations currently in the midst of making these assessments and decisions. In their responses, they identified some of the most important of today's realities, and shared their visions for the next five years.

WAREHOUSE EXPANSION PLANS OVER NEXT 5 YEARS

51%	66%	70%	33%	39%	45%	54%	54%
7%	3%	1.5%	5%	11%	11%	9.5%	10.7%
ANNUAL INVENTORY TURNS	EQUIPPING STAFF WITH TECHNOLOGY	AUTOMATION OF PROCESSES	SIZE OF CURRENT LOCATION(S)	NUMBER OF LOCATIONS	NUMBER OF EMPLOYEES	VOLUME OF ITEMS CARRIED	NUMBER OF SKUS CARRIED

DECREASING | **INCREASING**

REALITY TO VISION:

Top 5 Alignment Opportunities

Today, the reality in many, if not most, warehouse operations is the existence of separate islands of information. The vision for the future is the linkage, integration and consolidation of the Warehouse Management System (WMS) with Enterprise Resource Planning (ERP), the Yard Management System (YMS) and Transportation Management System (TMS). These linkages help remove inefficient information silos, promoting collaboration and increasing the recognition that changes in one process can and will affect others downstream and upstream. For example, changes in packing and staging can affect load plans, trailer drops, routes selection, rates and more. Anticipation of—and response to—these effects is crucial to not only improve warehouse efficiency and productivity, but also to create a more synchronized and agile supply chain.

	REALITY	VISION
OPTIMIZE STORAGE AND DISTRIBUTION NETWORK GROWTH	Evaluation and adjustment of the storage and distribution network to reduce total landed costs, enhance customer service and minimize fulfillment costs.	New initiatives to increase the number of warehouse facilities launching twice as fast as expansion plans for existing warehouses; lower transportation costs; shorter delivery times; responding to new supplier and partner locations and requirements. Shifting view of the warehouse and DC from cost center to center with potential for differentiation and growth.
DECREASE LABOR TURNOVER AND TRAINING TIME	Need to decrease the impact of labor turnover and shortages, and reduce the time and cost of training (currently taking 48 hours or more before reaching full productivity).	Reduce average length of training by 44 percent, while at the same time preparing employees for an increase in new procedures they will need to perform as a result of task interleaving. Realizing such a dramatic reduction in training time will require new thinking, new solutions and new technologies.
REDUCE RATE OF RETURNS	Even as the volume of returns grows—due in part to the rise of omnichannel and Internet retailing—retailers and wholesalers expect to reduce the orders resulting in returns by nearly 20%.	The percentage of organizations with reverse logistics programs is expected to almost double; from only 16.7 percent in 2013 to 30 percent by 2018. Redesigning returns management from one of the least automated processes in the warehouse into one in which automated reverse logistics enables faster receiving, return to inventory and customer credit issuance. In addition, reduce the volume of returns caused by internal warehouse problems by consistently operating outbound order fulfillment in a "no fault" mode.
INCREASE AUTOMATION IN INBOUND AND OUTBOUND HANDLING	Need for increased efficiency in inbound and outbound handling processes by requiring more ubiquitous barcoding and increasing supplier requirements and support for more automated processes.	The industry vision is to increase the number of barcoded items received at a warehouse or DC from 67 percent today to 84 percent by 2018. It is also to ensure that supplier and partner processes meet the requirements of, and properly utilize the capabilities of, GS1, GDSN, ASN and RFID, support more highly prioritized picking and storage processes and enable stronger collaboration across the supply chain.
LINK AND INTEGRATE WAREHOUSE SYSTEMS	Desire to consolidate and integrate islands of information in the warehouse: ERP, WMS, YMS, TMS to increase visibility and accuracy in every aspect of supply chain operations. Increase awareness of how changes in one system can affect others.	Unlocking value by providing a single source of accurate information. A strong shift away from homegrown and basic WMS solutions, with 68 percent of organizations moving incrementally to best-of-breed, cloud-based and full-featured WMS systems, and to increasing communications and collaboration across IT and operations.

Ensuring IT And Operations Alignment

To maximize warehouse and DC productivity, operations and IT leaders must be on the same page in terms of technology systems and business processes. Although we often see at least partial alignment between IT and operations today, in many instances there is still a basic technology divide. It starts with differences in overall assessment of current capabilities and risk perspectives for the future. Survey results demonstrate that today IT often perceives higher levels of WMS integration with other systems than does operations; in addition, IT projects higher incremental integration rates by 2018 than their operations counterparts. Today's IT departments also tend to be more aggressive in setting new standards and deploying new tools to reduce technical risk—and to be more accepting of business risk—than operations, which is usually more risk-averse and focused on running the day-to-day operations of the warehouse with minimal technical disruption. Bringing the two departments together to share a common vision is one of the most crucial goals moving ahead in the next five years.

Automation and Mechanization

As the industry prepares for the future, it's vital for IT and operations to be aligned in terms of WMS plans, since these systems are the backbone of the entire warehouse/supply chain operation, and the seed from which all automation plans grow. One thing both departments agree on is the need for substantial increases in process automation and mechanization; another is the critical importance of the WMS. Survey responses indicated that while about 40 percent of today's organizations are not currently pursuing increased mechanization to streamline processes, this percentage shrinks to 17 percent by 2018. But if there is agreement on the importance of WMS as the underpinning for greater automation plans, there are other areas of dispute.

The Batch Access Battleground

One of the most glaring differences is a divide in the projected use of batch mode access versus real-time access to the WMS and other relevant business systems. This is especially problematic in the cycle counting process. Historically, cycle counting has been much less automated than picking, but that's about to change.

Although both IT and operations agree that cycle counting needs to become more automated, they seem to be at odds about the best solution for leveraging the WMS for inventory control and validation in the future. IT forecasts a slight increase in the use of mobile batch access to the WMS, while operations has a different view. They predict a movement away from the computer-on-wheels or handheld batch access model, to providing workers with mobile handheld technology with immediate, direct access to the WMS.

Direct WMS Access

The survey indicates that in the next few years, more organizations will begin moving away from manual and batch systems access to full-featured access of the integrated WMS. Going forward, it seems clear that IT and operations will need to come to an agreement on shifting their focus to end user requirements and enhanced worker productivity, with a healthy balance between technical and business risk tradeoffs. To this end, they will need to collaborate in the selection of both an overall solution architecture and the specific mobile computing and advanced data capture devices that will enable workers to streamline virtually every aspect of warehousing operations.

WHERE IT AND OPERATIONS AGREE, 2013-2018

WMS EVOLUTION	The use of Warehouse Management Systems continues to evolve, with about 51 percent of respondents planning to use Best of Breed WMS applications or Full Featured WMS systems.
SYSTEMS LINKAGE AND INTEGRATION	Linking WMS systems with other systems will continue to grow, with 52 percent of respondents expecting to link WMS with ERP by 2018, 35 percent linking it to the Transportation Management System and 20 percent linking it to the Yard Management System.
INCREASED SUPPLIER AND CUSTOMER REQUIREMENTS	A growing number of warehouses are planning to increase efficiency by placing more stringent requirements on suppliers. By 2018, for example, 38 percent of respondents will require suppliers to use RFID; 33 percent requiring them to use ASNs; 22 percent requiring compliance with GSDN standards, and 15 percent requiring GS1 standards.
EXPANDED AUTOMATION	Automation is expanding from the picking process to adjacent materials management and inventory control processes, such as cycle counting. By 2018, only 12 percent of respondents expect to use pen and paper-based processes; 66 percent plan to use handheld mobile computers with real-time access to WMS systems.

Streamlining The Path To Flawless Fulfillment

It wasn't so long ago that warehousing automation conversations were dominated by picking and replenishment topics. That's no longer the case. As warehouse professionals are facing increasing pressures to deliver more top- and bottom-line value, they are taking a broader view and re-evaluating their capabilities across all their major warehousing processes.

The goal is flawless fulfillment, and it calls for a pragmatic, workflow-driven analysis of how you want to run your warehouse. The technology keys are increased flexibility, automation, integration and real-time access to the WMS with purpose-built, yet adaptable, solutions that can demonstrate lasting value in the face of changing demands. The survey reiterated that order picking and filling remains the top investment priority due to its relatively high costs and greater opportunities for errors. But in today's warehouse environment, the search for increased efficiency, accuracy and productivity also requires a broader, more holistic workflow and process evaluation. Achieving truly flawless fulfillment demands it.

Harder Working Workflows

In pursuit of flawless fulfillment, warehouse professionals are raising the bar for efficiency across every part of their workflow: inbound handling, storage and inventory control, pick and fill and outbound handling. In the past, and largely even today, these tasks were performed in isolation, often using separate teams for each function. This model drives efficiency in specialization, but suffers from some fundamental overlap and duplication of effort, such as when a picking employee walks down an aisle followed by an employee doing cycle counting, each in the same place at the same time, but doing a different job. These situations are leading to innovative new processes—such as task interleaving—aimed at integrating activities across several processes, reducing inefficiencies, improving productivity and decreasing costs. As processes collapse and change, the technology used in performing them must change as well.

HOW TASK INTERLEAVING ENHANCES PRODUCTIVITY

As warehouses strive to increase worker efficiency, more organizations are practicing task interleaving to help increase workflow flexibility by cutting down on walk time. With task interleaving, workers no longer have to concentrate on a single task, but are able to support multiple workflows through an ability to perform a range of tasks during each trip. The process begins with an in-depth analysis to determine the optimum workflow and technology decisions for alignment within the new, commingled task workflow. Key to the process is embracing a broader, more intuitive, more flexible hardware and software portfolio.

SURVEY RESPONSES REVEAL THE PROJECTED AMOUNT OF TIME PICKING STAFF PRACTICES TASK INTERLEAVING:

30%	48%
2013	**2018**
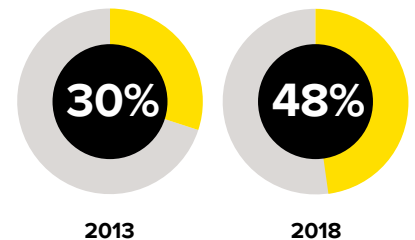
KEYS TO FLAWLESS FULFILLMENT: FIVE-YEAR VIEW

INBOUND HANDLING
The receiving and put-away functions will grow in importance as the first chronological step in streamlining warehouse operations. Changes include growth in the percent of inbound materials that are barcoded, more stringent demands from suppliers to support the receiving process, and increased use of productivity enhancing activities such as cross docking.

PICK AND FILL
As the number one priority for most warehouse operations, pick and fill processes are becoming even more automated and more flexible using efficient new procedures such as task interleaving. Major technology changes include the reduction of scan-only or voice-only picking and replenishment, giving way to more productive multimodal processes using efficient new handheld and wearable devices.
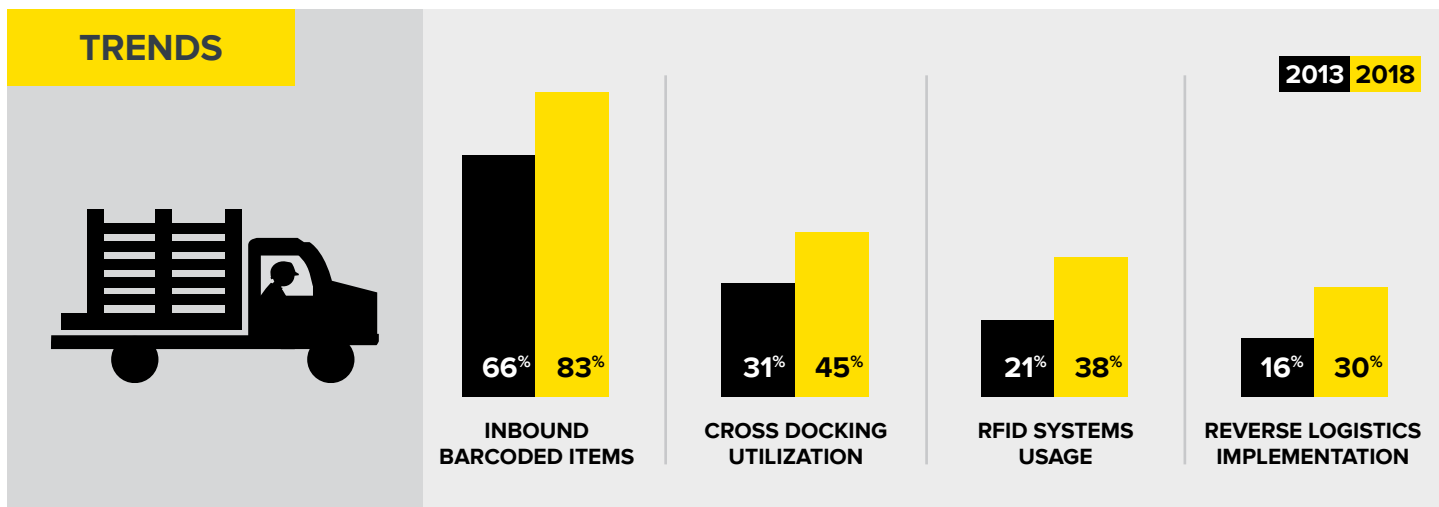
STORAGE AND INVENTORY
Paper cycle count processes are on the endangered list as organizations turn to real-time, automated WMS entry, more frequent cadence for inventory validation (instead of just compliance for financial regulations), technology driven efficiencies in cold storage and improved asset tracking and management.

OUTBOUND HANDLING
In the new warehousing world, customer satisfaction is seen as a major corporate objective and differentiator. Fast and accurate customer-driven requirements are playing a more important role in the packing, staging, loading and shipping functions, taking advantage of processes such as load optimization and performance monitoring.

Inbound Handling:
TODAY AND TOMORROW

Receiving and put-away processes can have a domino effect on virtually every other warehouse process. The harsh reality is, receiving and put-away inefficiencies are a significant cause of potential problems upstream and downstream. In response, today's warehousing professionals are currently trying to solve a number of significant inbound handling issues.

TRENDS

2013 | 2018

INBOUND BARCODED ITEMS	CROSS DOCKING UTILIZATION	RFID SYSTEMS USAGE	REVERSE LOGISTICS IMPLEMENTATION
66% / 83%	31% / 45%	21% / 38%	16% / 30%

Today's Realities

Too many shipments arrive with missing or damaged barcodes and other auto-ID technology, causing slow and inaccurate receiving, sortation and put-away. Pallets and cases can be placed in the wrong locations, causing them to become "lost" within the facility. Slowdowns in put-away can cause longer out-of-stock conditions and restrict cash flow. Usage of cross docking is low, resulting in crowded, clogged receiving areas. Inbound items frequently have no data—such as lot numbers or expiration dates—to help in tracking and traceability. Even with increasing return rates, reverse logistics are non-automated and slow, adversely affecting inventory accuracy as well as customer satisfaction.
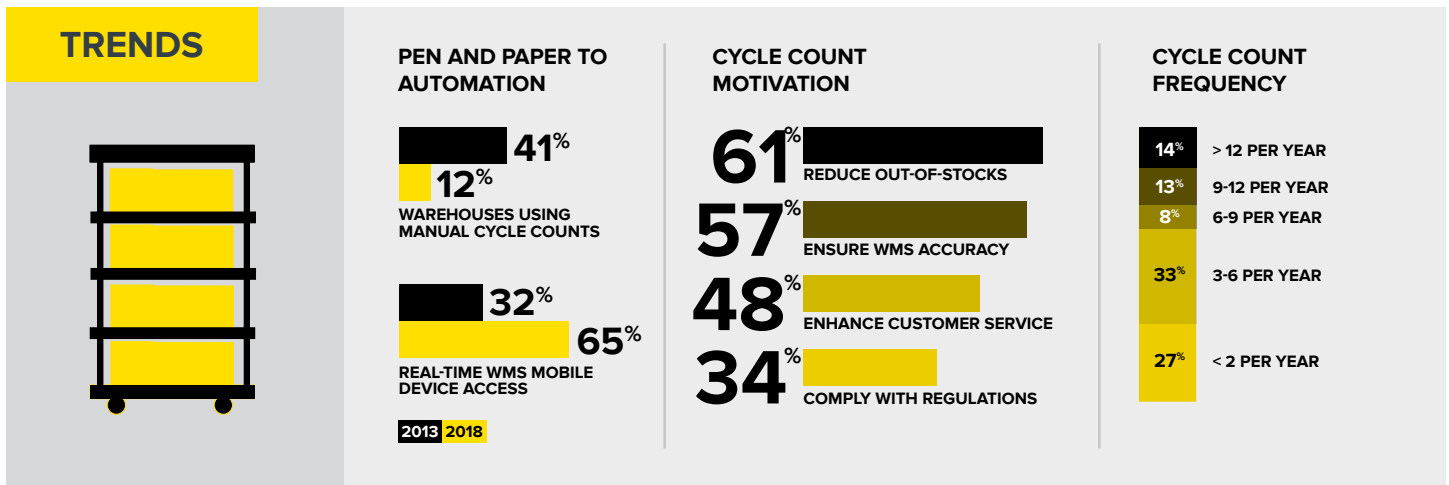
Tomorrow's Solutions

Survey responses showed a growing commitment to enhancing the receive/put-away process. Stronger supplier management programs will result in increasing use of Advanced Ship Notices (ASNs), GS1-compliant barcodes and RFID tags for accurate, automated shipment identification. Higher use of cross docking will increase throughput and decrease delivery times without requiring additional storage capacity. When validated and accepted into inventory, inbound materials will be put away in the right locations and linked directly to the WMS. Consistent track and trace solutions will enhance quality control—including overages, shortages and damage (OS&D)—as well as compliance and recall management. Streamlined, automated reverse logistics systems will help the returns process become faster and more accurate.

Technology Enablers

The technology portfolio for inbound handling is growing more innovative. Increased use of ASNs and GS1 standards will help speed receiving and put-away at the pallet and case levels. Handheld and wearable computers, scanners and multimodal devices will speed sortation. Use of tablet computers will enable workers to view a full manifest quickly and easily. Vehicle-mounted mobile computers and long-range imagers provide the foundation for omnidirectional scanning from rolling stock, and support for both 1D and 2D barcodes.

Storage and Inventory:
TODAY AND TOMORROW

In the next five years, warehouse storage and inventory processes are poised to undergo a seismic shift, moving from still prevalent pen and paper processes to automated and mechanized inventory solutions. With these new automated processes, cycle counts will be performed more often and with less effort, increasing inventory visibility, and leading to more accurate fulfillment, fewer out of stock situations and fewer lost sales. More confidence in inventory accuracy will lead to a new focus on optimizing mix, expanding selection and accelerating inventory turns.

TRENDS

PEN AND PAPER TO AUTOMATION

41%
12%
WAREHOUSES USING MANUAL CYCLE COUNTS

32%
65%
REAL-TIME WMS MOBILE DEVICE ACCESS

2013 2018

CYCLE COUNT MOTIVATION

61% REDUCE OUT-OF-STOCKS

57% ENSURE WMS ACCURACY

48% ENHANCE CUSTOMER SERVICE

34% COMPLY WITH REGULATIONS

CYCLE COUNT FREQUENCY

14%	> 12 PER YEAR
13%	9-12 PER YEAR
8%	6-9 PER YEAR
33%	3-6 PER YEAR
27%	< 2 PER YEAR

Today's Realities

In the many facilities still using pen and paper systems, cycle counting is seen as a costly, disruptive, non-value-added activity. Today's manual counts are generally performed either haphazardly when time and resources happen to be available, or during a costly and inefficient total facility shutdown. Manual processes are also more disruptive of operations, and are prone to re-entry delays and transcription errors. These inaccuracies lead to a WMS that is not up-to-date, resulting in inflated errors-and-omissions, write-downs and unnecessary accumulation of held inventory, or the occurrence of costly and avoidable out-of-stock conditions. In facilities where dry storage and cold chain operations co-exist, typical bifurcated operations use different processes and supporting technology, leading to costly inefficiencies.
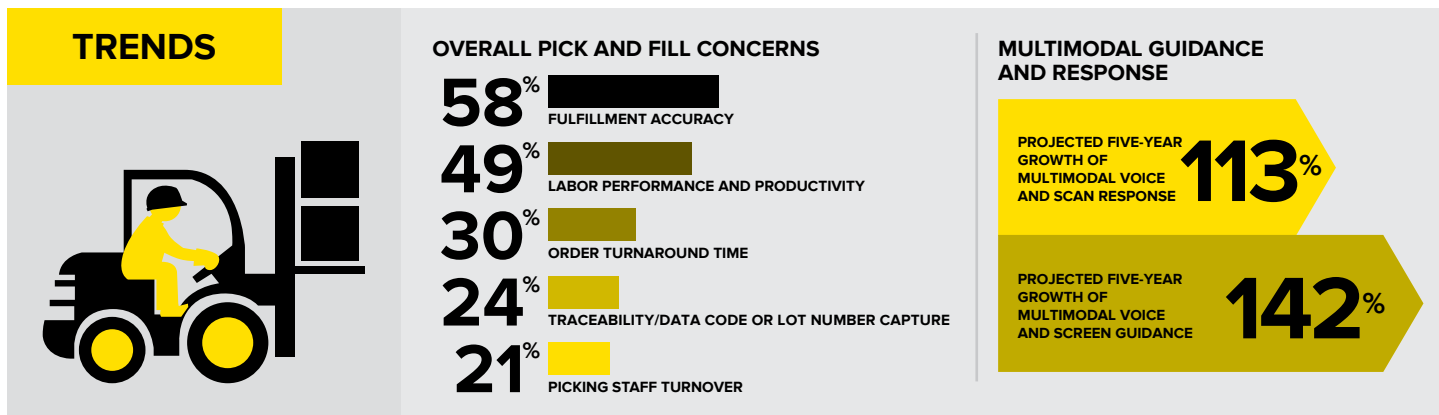
Tomorrow's Solutions

In the next five years, the trend is toward conducting cycle counting more often, with a significant opportunity to interleave it with other activities that happen every day in the warehouse. The goal is to ensure that what is in the WMS is on the shelf, and vice versa. The focus is also shifting: moving from regulatory compliance to minimizing costly out-of-stock conditions. Increasingly, cycle counts will be used to drive better top- and bottom-line performance. Workers will also have direct access to the WMS on a variety of new mobile devices. In warehouses where dry goods and cold chain are part of the same facility, the trend is toward using more automation and more consistent processes to move away from inefficient and expensive bifurcated systems.

Technology Enablers

Innovative inventory and storage technology includes adaptive, platform-based and modular computing solutions that deliver the flexibility needed for enhanced interleaving that enables cycle counting to be conducted simultaneously with other processes. Mobile access throughout the warehouse is provided by intuitive, easy-to-use industrial browsers on larger format tablet and vehicle-mounted computers. Also growing is the use of robust, reliable network and device options that enable consistent operation across cold chain and dry storage operations.

Pick and Fill:
TODAY AND TOMORROW

The warehouse survey reiterated that the picking and replenishment processes—which account for up to 70 percent of operating costs in a warehouse—remain the top priority for warehouse professionals to address with advanced technology solutions. As the industry continues to reduce pick and fill costs and increase worker efficiency and productivity, it is turning to innovative processes, such as task interleaving, and innovative mobile technology, increasingly using wearable, vehicle-mounted and handheld devices capable of multimodal operation.

TRENDS

OVERALL PICK AND FILL CONCERNS

58% FULFILLMENT ACCURACY

49% LABOR PERFORMANCE AND PRODUCTIVITY

30% ORDER TURNAROUND TIME

24% TRACEABILITY/DATA CODE OR LOT NUMBER CAPTURE

21% PICKING STAFF TURNOVER

MULTIMODAL GUIDANCE AND RESPONSE

PROJECTED FIVE-YEAR GROWTH OF MULTIMODAL VOICE AND SCAN RESPONSE **113**%

PROJECTED FIVE-YEAR GROWTH OF MULTIMODAL VOICE AND SCREEN GUIDANCE **142**%

Today's Realities

Due to the high cost of labor and employee management, picking and replenishing is usually among the most technologically enhanced warehouse processes, although many organizations are using older, less flexible and less ergonomic and intuitive technologies. In many warehouses, there tends to be more automation at the piece and case level, and less at the pallet level. This can be a significant issue depending on omnichannel fulfillment pressures and where in the end-to-end supply chain the warehouse is located. In general today, picking operations tend to focus either on scanning or voice-directed solutions, with limited integration between the two, which often results in awkward adaptation of workflow to technology instead of the other way around.

Training is also a time- and cost-sensitive issue, which is a problem in high-turnover warehouse environments. In addition, because pickers are under a great deal of pressure to meet volume and accuracy targets, downstream activities like staging and loading can be negatively affected in the rush for ultimate picking expediency. And in today's marketplace, as order volume increases and per-order value decreases, pick and fill costs eat away at margins, and warehouse managers are looking for new solutions to help protect profitability.

Tomorrow's Solutions

The picking and replenishment solutions of the next five years will focus on the adoption of more ergonomic, intuitive, adaptable and flexible technologies designed to enhance pick and fill workflows and position the facility for future requirements. There is already a significant shift towards true multimodal picking, with the integration of voice-directed and screen-directed picking on flexible mobile devices that provide for voice-, scan- and keyed-response activities. This also

includes the ability to augment pick-to-light (PTL) and other picking automation schemes with scanning and computing, delivering even higher levels of accuracy and productivity.
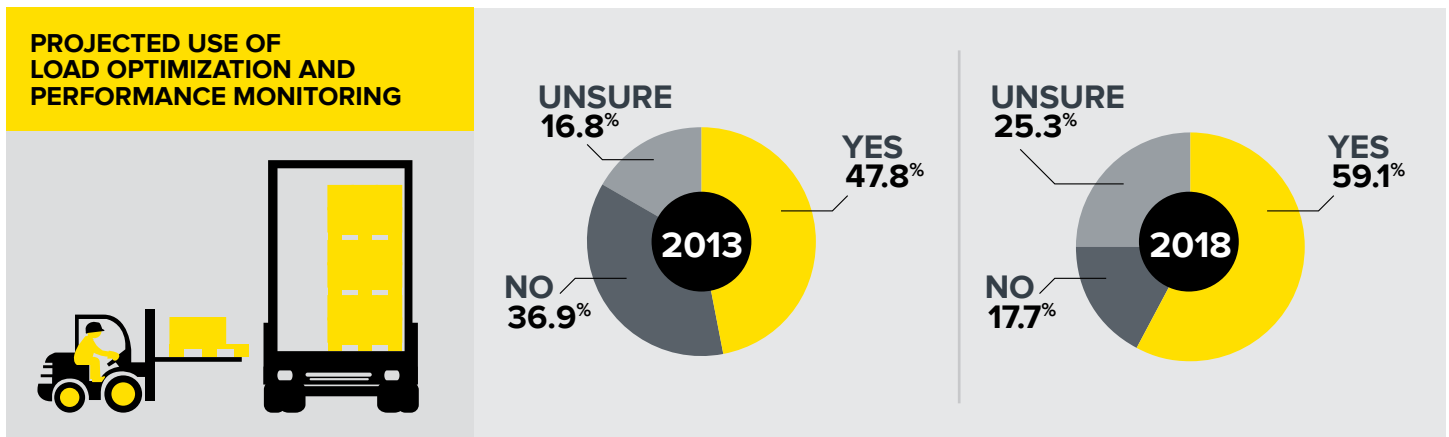
Organizations are also planning strategies for reducing training time by deploying more intuitive and more flexible technologies, while also providing more consistency across piece, case and pallet level picking processes. The need is to capture and validate more information during a picking operation—such as serial numbers, expiration dates, catchweights and more—helping to enhance everything from traceability initiatives to regulatory compliance to more accurate billing to customer service. The need to reduce training time and capture such diverse data is driving the increased use of multimodal devices in which traditional voice picking is reinforced by screen direction and complemented by barcode scanning for challenging data, such as complex serial numbers, or keyed entry for exception-based input. This is particularly important for warehouse operations with a heavy dependence on temporary labor, and for warehouses that plan to share devices between teams or extend the use to non-picking activities.

Technology Enablers

The industry is seeing a major shift to multimodal devices and software tied into the WMS backend systems and offering flexible, user-designed interfaces and workflows. Other new software solutions include client-side and cloud-based picking applications that speed deployment and enhance flexibility, while changing investment models to help achieve an accelerated ROI. In terms of devices, innovative new form factors—handheld, wearable and holstered—offer advanced capabilities to help meet aggressive picking efficiency targets. Robust, facility-wide industrial-grade wireless networks and solutions will maximize reliability while increasing the speed of the picking process, and minimizing delays caused by latency issues or coverage gaps.

Outbound Handling:

TODAY AND TOMORROW

As customer demands and requirements grow, and as customer retention and loyalty become more crucial to profitability, increasing pressures are being placed on warehouse managers to maximize efficiency in packing, staging, loading and shipping. Nothing impacts customer satisfaction more negatively than an inaccurate, damaged or late shipment. At the same time, nothing cements customer relationships better than efficient outbound material handling processes that consistently provide accurate, on-time deliveries and always meet downstream customers' supplier compliance initiatives.

PROJECTED USE OF LOAD OPTIMIZATION AND PERFORMANCE MONITORING

2013

UNSURE 16.8%
YES 47.8%
NO 36.9%

2018

UNSURE 25.3%
YES 59.1%
NO 17.7%

Today's Realities

Customer expectations aren't the only requirements the outbound handling process has to meet. Stringent supplier compliance demands on last mile warehouse operations, if not met, can also result in significant amounts of wasted dollars and time. These include shifting pricing models from carriers, such as changing from weight-based to dimension-based strategies that can affect rates and costs. They also include financial penalties for excessive dwell time and idle time for carriers forced to wait at the dock for shipments that are not ready. Loading and staging workers are encouraged to work faster, but at the risk of an increased number of mistakes, heightened safety concerns and instances of OS&D during the outbound handling process. Limited automation in the packing, staging and loading areas not only decreases efficiency, but also the ability of outbound materials handlers to catch mistakes and protect downstream customers from upstream errors occurring elsewhere in the warehouse or the broader supply chain.

Tomorrow's Solutions

As warehouse professionals look to the future, they are planning to increase efficiency and accuracy through the use of new technologies and enhanced quality control capabilities in the packing, staging and loading processes. Powerful mobile and data capture technologies and devices will help link and integrate WMS, ERP, YMS and TMS systems, providing greater synergies and efficiencies among the warehouse, the yard and the transportation links of the supply chain. Pack and load optimization solutions provide real-time analytics that help reduce transportation costs and penalties from carriers and customers. These systems and devices empower workers to be more efficient while minimizing errors, enhancing downstream compliance and lessening the impact of upstream inconsistencies or disruptions.

Technology Enablers

A wide variety of technology solutions are poised to help warehouse operations provide outbound material handling operations that maximize efficiency, reduce costs and enhance customer satisfaction. Packing stations can be equipped with mobile wireless computers, scanning and RFID devices, as well as fixed mount kiosk solutions, to increase speed and efficiency while reducing errors and damage. Workers can utilize convenient wearable devices to see real-time updates on pack and load plans. Robust wireless outdoor coverage will integrate dock and yard operations with the warehouse, providing end-to-end efficiency. Integrated video capabilities can be used for quality control and proof of compliance.

A NEW FOCUS ON CUSTOMIZED PACKING

Although many warehouses and transportation companies continue to utilize traditional pre-defined packing standards and load pricing, a trend toward dynamic weight and dimension-based packing is rapidly developing. The trend is driven in part by large-scale e-tailers that are increasingly relying on custom-built, just-in-time packages and boxes that minimize wasted materials, space, filler and postage. As reported by the survey, the average percentage of dimension-based packing is projected to rise by almost four hundred basis points by 2018. Similar increases are reported across the board in the retail, manufacturing, wholesale and 3PL market segments.

40.7% 2013
44.4% 2018
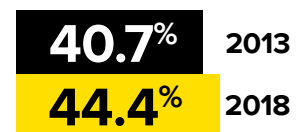
Vertical Market Warehousing:

CONSISTENCIES AND DIFFERENCES

Not all warehouses are the same. In fact, hardly any are. There are significant differences across warehousing operations in the various segments of the supply chain: manufacturing, wholesaling and retailing. But there are also similarities, especially at a macro level.

CURRENT VERTICAL WAREHOUSING REALITIES

MANUFACTURING
- Highly capital-intensive, more often seen as cost center
- Prioritization on revenue generating processes and facilities, such as finished goods
- Growing implementation of reverse logistics
- Traceability capabilities becoming more important
- Some interest in third-party logistics management (3PL)
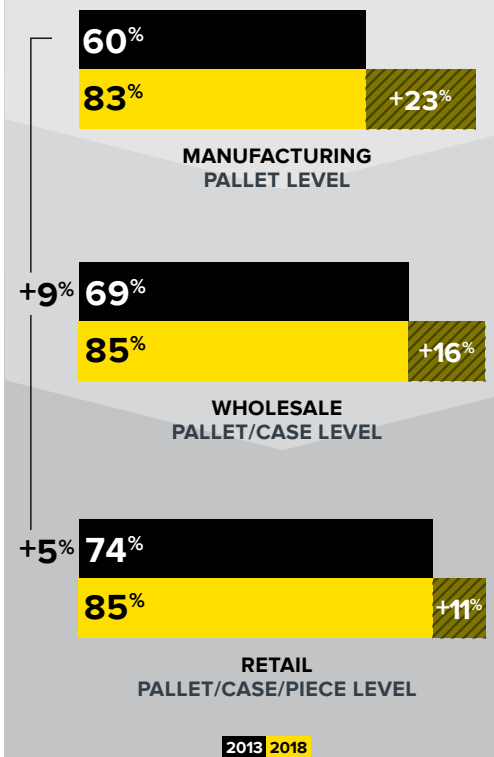
WHOLESALING
- Slow movement towards branch-based automation investment
- Seeking incremental reduction in return rates
- Strong interest in traceability initiatives
- Little interest in 3PL management

RETAILING
- Significant consolidation of direct-to-consumer fulfillment and store replenishment activities
- Seeking a slow but steady reduction of returns as a percentage of business
- Movement away from location level overstock management
- Slight interest in 3PL management

DOWNSTREAM INCREASES IN BARCODING LEVELS TODAY MET WITH UBIQUITOUS UTILIZATION IN THE FUTURE

MANUFACTURING PALLET LEVEL
60% / 83% / +23%

+9% **WHOLESALE PALLET/CASE LEVEL**
69% / 85% / +16%

+5% **RETAIL PALLET/CASE/PIECE LEVEL**
74% / 85% / +11%

2013 2018

Vertical Consistencies

When viewed holistically, similarities exist in virtually all warehouse operations. No matter what vertical market segment they operate in, most IT and operations personnel are committed to three common pillars of warehouse wisdom.

1 Automating and streamlining warehousing processes.

2 Providing the flexibility in technology and process management that increases efficiency, productivity and cost control.

3 Optimizing risk management across IT and operations throughout the supply chain.

Vertical Differences

Although almost all warehouse professionals would agree on these overarching objectives, each segment also has its own specific issues that impact procedures and workflows. These are most efficiently and effectively addressed through unique, segment-specific strategies and tactics for achieving flawless fulfillment, as dictated by each vertical's specific business and management models.

Planning For Change:
EVALUATING YOUR RESPONSE

What steps should your organization be considering in response to the major changes that will impact your warehousing operations today and in the next five years? The time to start is now, and the best way to begin is by carefully analyzing the issues and evaluating the steps you can take to help your warehouses increase productivity while decreasing costs.

Make sure IT and Operations are on the same page.

With the survey uncovering key differences between IT and operations, you need both to work closely together even as each concentrates on its own specific activities. IT must be able to act as a voice of reason for high-level issues such as standardization, integrity and risk management. At the same time, operations must define and execute current workflows, plus identify new business initiatives and align with IT on the new systems, interfaces and workflows they will require.

Understand changing wireless needs and solutions.

The increasing demands on warehouse operations necessitate thinking of them as complete systems that enable and support new standards, devices and capabilities. It's crucial that changes in devices and applications aren't made without corresponding wireless adjustments. New devices like wearable computers, new applications like multi-modal picking, new access systems like industrial browsers, new cloud-based system architectures and new tools like video analytics, can dramatically impact the performance and reliability of existing wireless networks.

Plan for shifts in processes throughout the supply chain.

Look into how the increased shifts in frequency and size of deliveries and shipments, and shifts in upstream and downstream piece, case and pallet identification can affect workflow efficiency and productivity. These and other process shifts can drive many new technology requirements. Movement toward more value-added services means you should explore partners and vendors with a broad portfolio to address your changing needs.

Evaluate purpose-built and adaptable technology alternatives.

Evaluate the benefits of using technology that is purpose-built for specific tasks versus using more flexible, adaptable technology. Flexible devices running on a common core platform, with modular adaptability and a rich accessory ecosystem can help you maximize productivity-enhancing functions—like task interleaving and automating and connecting workers whose activities are not driven by the WMS— while at the same time mitigating obsolescence risks. Consider how best to balance the mix of unique, task-driven form factors with technology that can be more readily adapted to a range of workflows.

Place renewed emphasis on risk management.

Dramatic change is already overtaking the warehousing industry, and with those changes come new and evolving risks. The question becomes how to insulate your organization against these risks, many of which are caused by standards churn. The goal is to turn activities driven by regulations into factors that also drive more value for the business: in terms of accuracy, efficiency, productivity and quality. Many of these are technology-driven, such as the increasing use of data capture at multiple process points and enhanced imaging technology to drive new capabilities with minimal disruption. These enhanced capabilities include omnidirectional and 2D barcode reading, more ergonomic and intuitive design, more frequent and more accurate cycle counts and enhanced traceability.

Consider the ramifications of more and bigger warehouses.

The need to expand the size and/or number of warehouses can significantly impact your technical planning, your staffing requirements and your ability to support processes and workers remotely. Shifting from a centralized system to a branch-based distribution and storage network may require new procurement, deployment, management, troubleshooting and security models for mobile and wireless technologies. Be aware that a move to more but smaller warehouses may strain your existing IT resources, as well require more standardization within your own operations, and greater collaboration with supply chain links and trading partners.

Build an ROI model encompassing top-line and bottom-line results.

In the warehouse industry, ROI models have often been measured purely on cost savings, but as warehousing changes, so do the models used to drive investment decisions. Although the bottom line is obviously critical and cost savings are easier to measure, it's also important to take a broader view of how improvements in warehouse operations can also enhance top-line performance. Among these top-line performance improvements are avoidance of out-of-stock conditions and enhanced pricing power enabled by a track record of faster, more accurate fulfillment, customer-driven enhancements in quality, visibility, traceability and service levels.
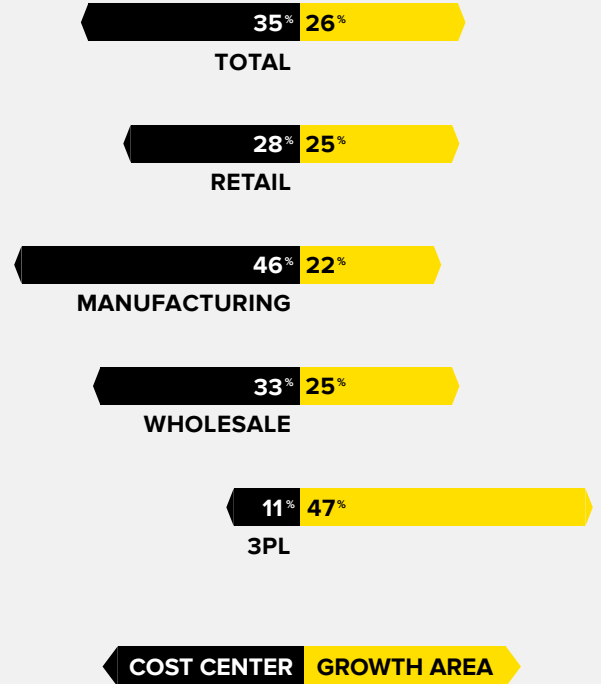
A 5-Year Evolution from Cost Center to Growth Area

As customer satisfaction and supply chain efficiency become more important drivers of warehousing operations, the industry is re-examining its perceptions of the business. Fewer organizations continue to view warehouses and DCs simply as commoditized links between endpoints of the supply chain. Senior business executives across all market segments can no longer afford to simplistically look at warehouses as necessary evils that are fundamentally cost centers. The movement from linear to complex, multi-node supply chains recognizes this shift in perception, and is being driven by greater volatility, constrained capacity, evolving regulations, major shifts in customer demographics and buying patterns, and increasingly demanding customer and supplier requirements. Overall, the warehouse survey points to more industry professionals seeing the bigger picture and viewing warehouses and distribution facilities as historically underleveraged centers that can drive competitive differentiation and, by doing so, increase profitable growth.

These changes are positive. They provide warehouse management with an opportunity to benchmark their current capabilities against what their businesses, their suppliers and their customers are going to need in the next five years and beyond. They can also take inventory of where their current performance levels are, and how they stack up across their different processes—from inbound handling to storage and inventory control to picking and filling orders and, ultimately, to outbound handling. This reshaped vision of warehouse operations as a fundamental driver of top-line and bottom-line business value points the way to achieving the ultimate objective of flawless fulfillment.

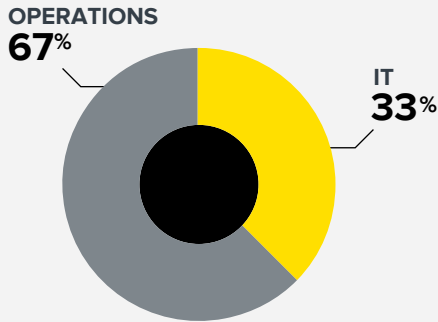## COST CENTER OR GROWTH AREA?

How a cross-section of organizations currently view warehouse and distribution center operations
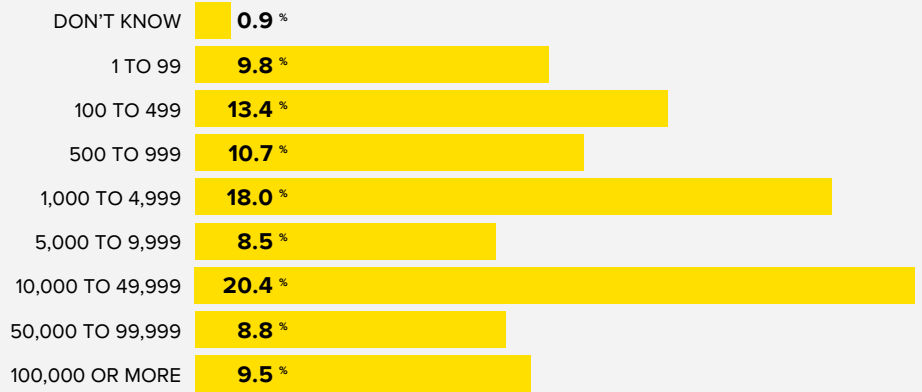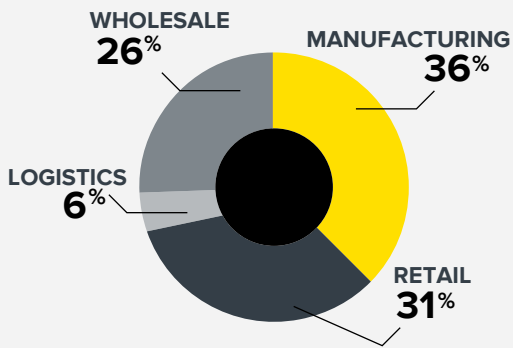
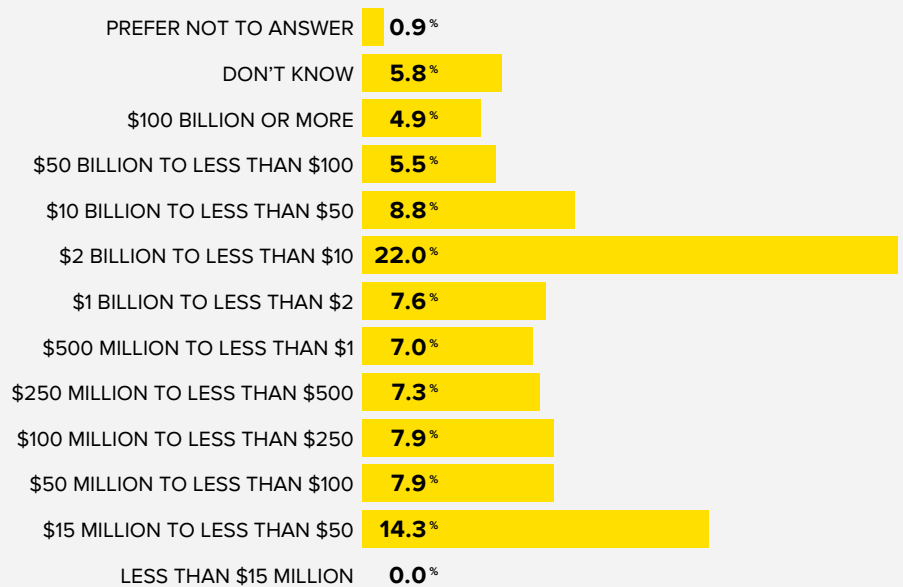|	Cost Center	Growth Area
TOTAL	35%	26%
RETAIL	28%	25%
MANUFACTURING	46%	22%
WHOLESALE	33%	25%
3PL	11%	47%

COST CENTER | GROWTH AREA

Respondent Profiles

BY DEPARTMENT

OPERATIONS
67%

IT
33%

BY COMPANY SIZE

DON'T KNOW	**0.9** %
1 TO 99	**9.8** %
100 TO 499	**13.4** %
500 TO 999	**10.7** %
1,000 TO 4,999	**18.0** %
5,000 TO 9,999	**8.5** %
10,000 TO 49,999	**20.4** %
50,000 TO 99,999	**8.8** %
100,000 OR MORE	**9.5** %

BY INDUSTRY

WHOLESALE
26%

MANUFACTURING
36%

LOGISTICS
6%

RETAIL
31%

BY ANNUAL REVENUE

PREFER NOT TO ANSWER	**0.9** %
DON'T KNOW	**5.8** %
$100 BILLION OR MORE	**4.9** %
$50 BILLION TO LESS THAN $100	**5.5** %
$10 BILLION TO LESS THAN $50	**8.8** %
$2 BILLION TO LESS THAN $10	**22.0** %
$1 BILLION TO LESS THAN $2	**7.6** %
$500 MILLION TO LESS THAN $1	**7.0** %
$250 MILLION TO LESS THAN $500	**7.3** %
$100 MILLION TO LESS THAN $250	**7.9** %
$50 MILLION TO LESS THAN $100	**7.9** %
$15 MILLION TO LESS THAN $50	**14.3** %
LESS THAN $15 MILLION	**0.0** %

For more information visit **www.zebra.com/warehouse**

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