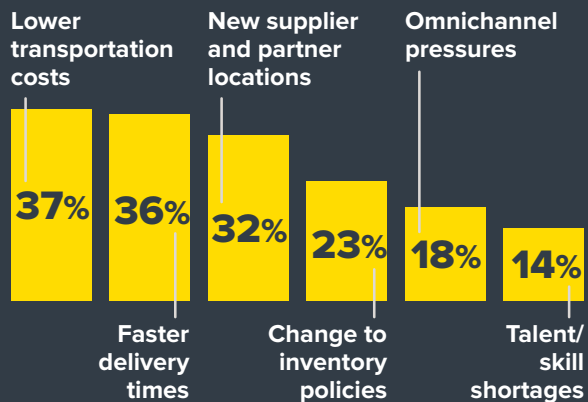ZEBRA

**Building the Smarter Warehouse:**

# Warehousing 2020

**REDEFINING SUPPLY CHAIN AUTOMATION IN THE AGE OF DIGITAL TECHNOLOGY: NORTH AMERICA REPORT**
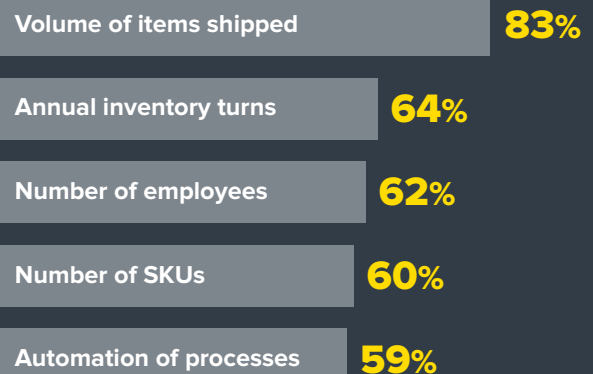
# ZEBRA WAREHOUSE VISION REPORT

Zebra Technologies analyzed the state of the warehousing marketplace. The online survey asked IT and operations personnel in the manufacturing, retail, transportation and wholesale market segments to share their insights and business plans over the next five years, in light of a rapidly changing industry.
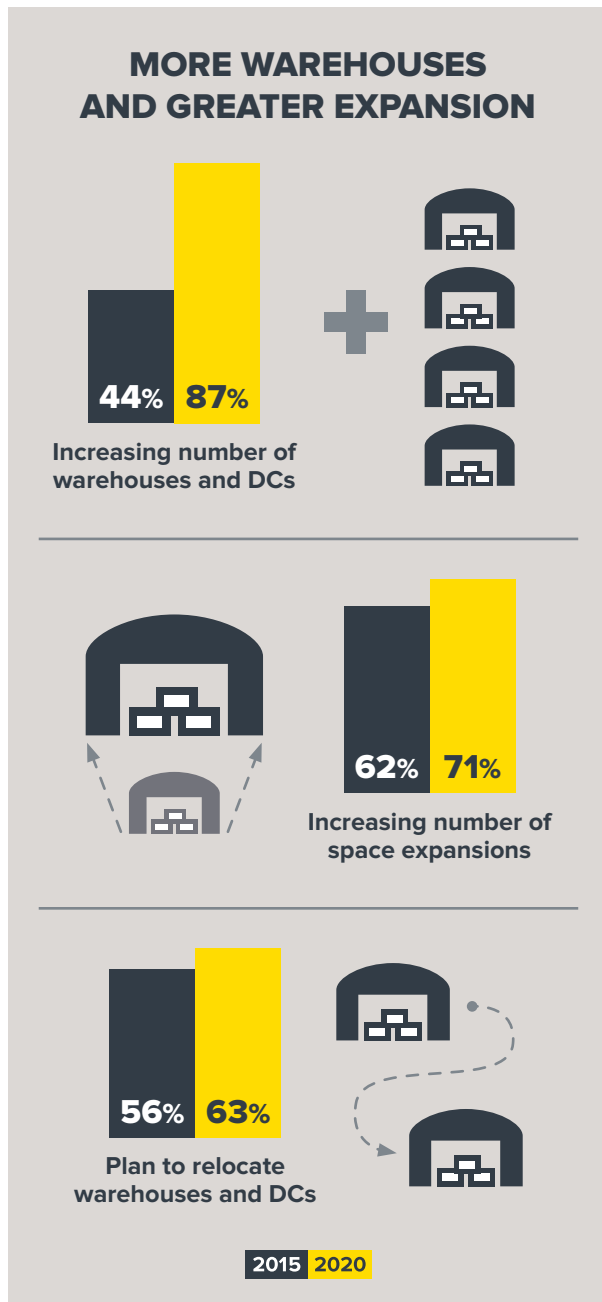
## FACTORS DRIVING CHANGE

**Lower transportation costs** — 37%

**Faster delivery times** — 36%

**New supplier and partner locations** — 32%

**Change to inventory policies** — 23%

**Omnichannel pressures** — 18%

**Talent/skill shortages** — 14%

## PLANS TO EXPAND

| | |
|---|---|
| Volume of items shipped | 83% |
| Annual inventory turns | 64% |
| Number of employees | 62% |
| Number of SKUs | 60% |
| Automation of processes | 59% |

# STATE OF THE INDUSTRY

The exponential growth of omnichannel shopping and ever-burgeoning demand for faster merchandise deliveries is redefining the supply chain's distribution of consumer products goods. A seminal shift in how shoppers increasingly buy via multiple touch points — online from desktop computers, mobile devices and in-store — has created the need for the "smarter" warehouse to serve today's connected consumer. As retailers look to merge their brick-and-mortar and online operations to cut costs and boost efficiency, warehouse management systems must keep pace.

## MORE WAREHOUSES AND GREATER EXPANSION

**44%** **87%**

**Increasing number of warehouses and DCs**

**62%** **71%**

**Increasing number of space expansions**

**56%** **63%**

**Plan to relocate warehouses and DCs**

2015 2020

This wave of next generation, technology-enhanced warehouses is bringing unprecedented levels of real-time visibility into organizations' assets, people and transactions across a myriad of industries, from discrete manufacturers in automotive, electronics and machinery to food and beverage processing companies, to the healthcare and pharmaceutical sectors, to name just a few.

But it's the transformation of the supply chain ecosystem that has prompted operations professionals to take a hard look at upgrading their warehouses with an eye towards boosting productivity, slashing transportation costs and expediting merchandise shipments.

As a result, supply chain networks are poised to undergo an extreme makeover over the next few years. Indeed, the retail, wholesale, transportation and logistics sectors are transitioning to "best-of-breed" warehouse management systems that take autstomization to new heights — from equipping workers with mobile devices that increase the speed and accuracy of order picking to the rollout of radio frequency identification technology (RFID) for real-time inventory visibility.

At the same time, executives plan to roll out more warehouses, while expanding their size and retrofitting them from legacy systems into highly mechanized, leaner facilities. This approach is designed to reduce costs and increase responsiveness to customers.

The technology overhaul of warehouse management systems has become something of an industry mandate: A nimble supply chain is critical to competing in the era of digital shopping. Online sales in the U.S. are projected to reach $523 billion in the next five years, up 56 percent from $335 billion in 2015, according to Forrester Research. Warehouses must be equipped to handle the attendant deluge of goods moving through the product-delivery pipeline.

# INVESTING FOR THE FUTURE

As warehouse executives prepare to increase the volume of items shipped in the coming years, they rank outfitting staff with new technology, as well as increasing the use of barcode scanning, tablets and the Internet of Things, as their top initiatives and lead investments for an optimized supply chain.

**Equipping staff with technology:** Executives have big plans to outfit their staffs with technology that increases visibility and mechanization across warehouse processes, from inventory validation and order picking to packing and loading.
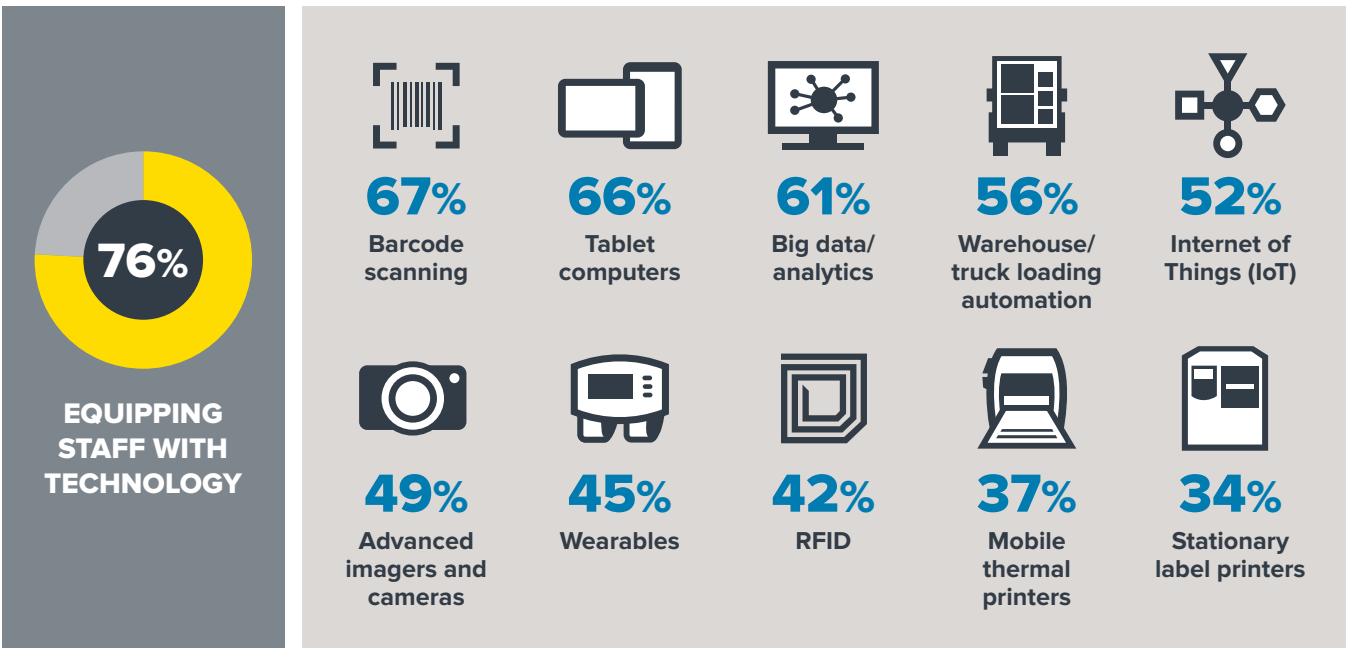
**Barcode scanning:** Warehouse executives plan to expand the use of barcode scanning by 67 percent over the next five years. That expansion is driven by the marketplace's increasing demand for greater efficiency, automation and speed in the handling of inbound and outbound inventory, as well as more stringent supplier requirements.

**Tablet computers:** For inventory validation, warehouses will upgrade from pen/paper, spreadsheets and computer on wheels to mobile/handheld tablets that offer real-time access to warehouse management systems.

**Warehouse/truck loading automation:** Load optimization is expected to grow by 6 percent over the next few years. Warehouse executives will turn to new mobile and data capture load optimization technology solutions to maximize efficiency and agility in packing, staging, loading and shipping. These pack and load solutions offer real-time analytics designed to boost worker productivity and reduce transportation costs.

**The Internet of Things (IoT):** A new wave of connected devices, also known as The Internet of Things, is poised to grant warehouses a heightened level of visibility into every facet of the supply chain. IoT technologies offer the promise of facilitating real-time workforce interaction to elevate productivity, while adding a new level of precision to tracking the route of inventory throughout the supply chain, among other things.

## TOP 10 TECHNOLOGY INVESTMENTS

**76%**

**EQUIPPING STAFF WITH TECHNOLOGY**

**67%** Barcode scanning

**66%** Tablet computers

**61%** Big data/ analytics

**56%** Warehouse/ truck loading automation

**52%** Internet of Things (IoT)

**49%** Advanced imagers and cameras

**45%** Wearables

**42%** RFID

**37%** Mobile thermal printers

**34%** Stationary label printers

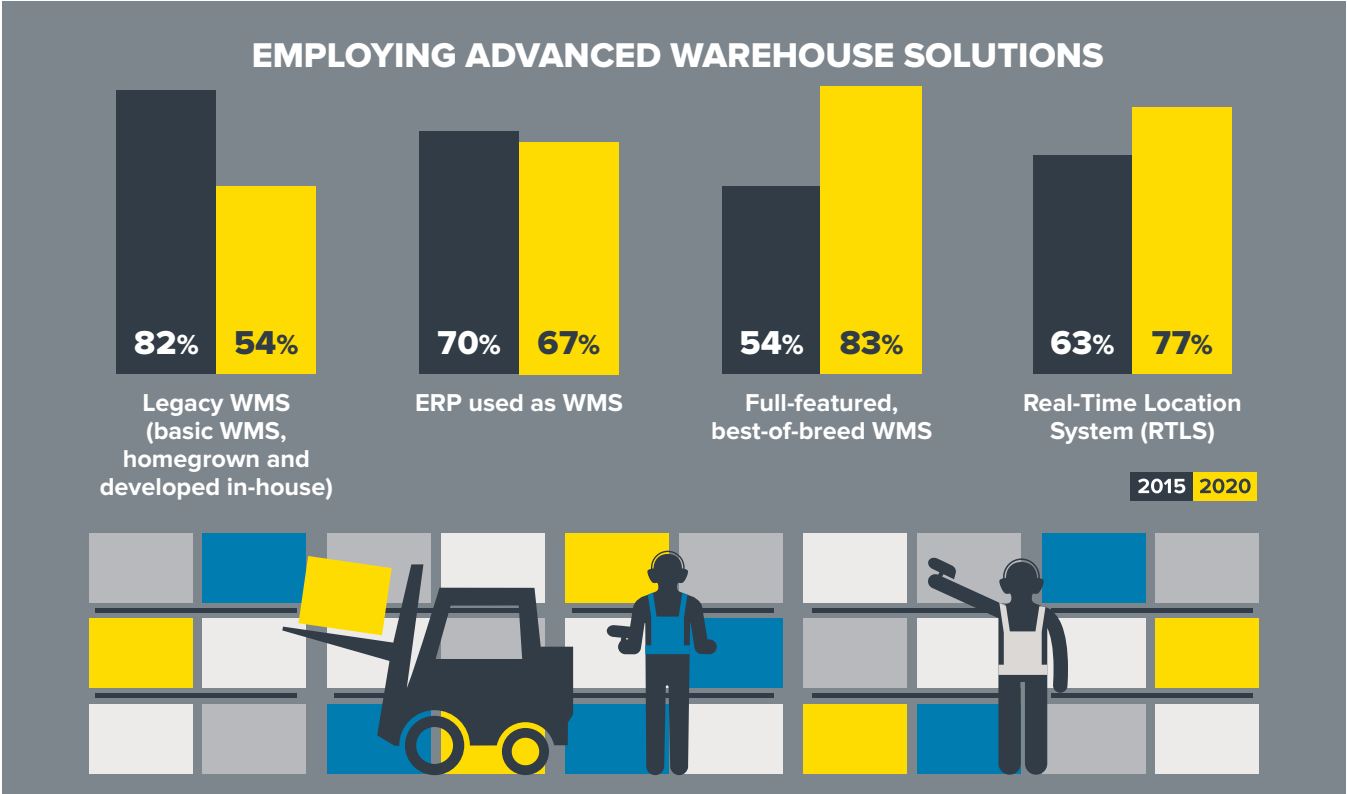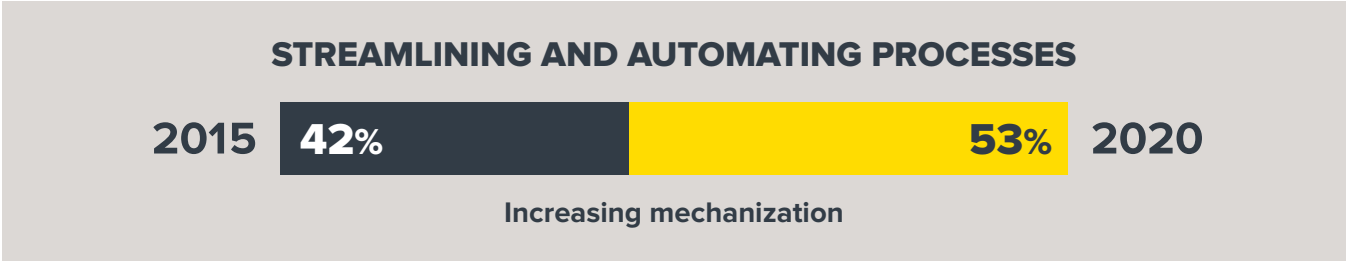# MOVING TO BEST-OF-BREED, REAL TIME WAREHOUSE MANAGEMENT SYSTEMS

Succeeding in the new supply chain paradigm calls for shortening merchandise delivery times and slashing transportation costs, which were cited by executives surveyed as the core reasons driving the move to the smart warehouse.

Warehouses must adapt to the growth of e-commerce in the retail sector, and the flood of online orders and proliferation of goods in the supply chain.

These initiatives reflect the move to best-of-breed warehouse management systems and Real-Time Location Systems (RTLS) — which track the whereabouts of objects in real time — and will replace legacy operations, survey respondents said.

As part of that shift, warehouses will upgrade to yard management systems, for one, which offer real-time data on the location of trailers in the storage yard, enabling yard employees to move trailers from staging to docks to fill orders more efficiently.

Warehouses will also migrate to on-demand and cloud based, SaaS (software-as-a-service) systems to eliminate the cost of on-premise equipment and personnel.

## STREAMLINING AND AUTOMATING PROCESSES

2015 | **42%** | **53%** | 2020

**Increasing mechanization**

## EMPLOYING ADVANCED WAREHOUSE SOLUTIONS

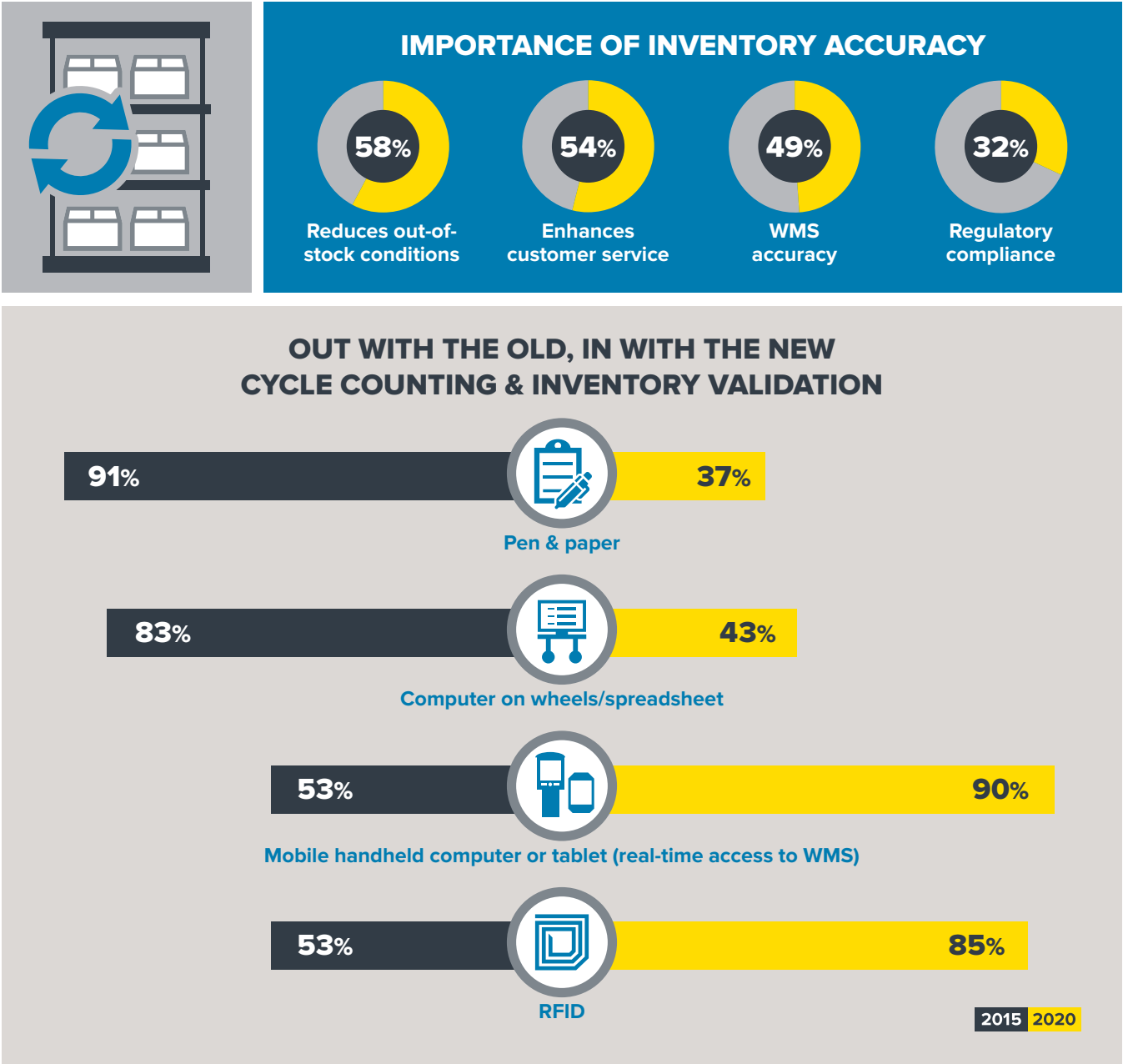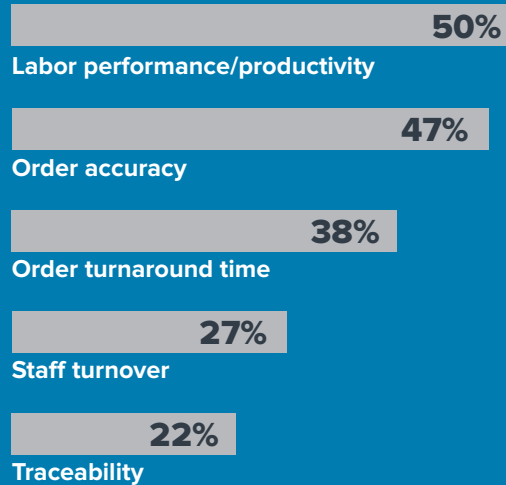| Legacy WMS (basic WMS, homegrown and developed in-house) | ERP used as WMS | Full-featured, best-of-breed WMS | Real-Time Location System (RTLS) |
|---|---|---|---|
| 82% / 54% | 70% / 67% | 54% / 83% | 63% / 77% |

2015 2020

# INVENTORY MANAGEMENT MAKEOVER

Big investments in automating inventory management, the heart of a warehouse operation, are another strategic imperative.

To automate cycle counts, warehouse executives plan to replace pen and paper spreadsheets with mobile handheld computers and tablets that provide real-time access to warehouse management systems. The idea is to boost inventory accuracy, reduce out-of-stocks, and enhance customer service.

That means phasing out the manual computer-on-wheels or handheld batch access models, and moving toward providing workers with mobile handheld technology with instant, direct access to the WMS.

## IMPORTANCE OF INVENTORY ACCURACY

**58%**
Reduces out-of-stock conditions

**54%**
Enhances customer service

**49%**
WMS accuracy

**32%**
Regulatory compliance

## OUT WITH THE OLD, IN WITH THE NEW
## CYCLE COUNTING & INVENTORY VALIDATION

**91%** — **37%**
Pen & paper

**83%** — **43%**
Computer on wheels/spreadsheet

**53%** — **90%**
Mobile handheld computer or tablet (real-time access to WMS)

**53%** — **85%**
RFID

2015  2020

## LARGEST PICKING & FULFILLMENT ISSUES

**50%**
Labor performance/productivity

**47%**
Order accuracy

**38%**
Order turnaround time

**27%**
Staff turnover

**22%**
Traceability

## RANKING METRICS FOR ORDER FULFILLMENT

**1** On-time delivery

**2** Order accuracy

**3** Order fill rate

**4** Order cycle time

**5** Perfect order completion

# MAKING VISIBILITY A REALITY

RFID technology is another big push. The Internet of Things, objects enhanced with electronics, sensors and network connectivity that enable them to collect and exchange data, has sparked a big buzz around "smart' consumer products, such as fitness wearables that track a user's activity level.

But the warehouse industry is also banking on the IoT to streamline and link up the many moving parts of a supply chain by allowing for real-time, sharable and actionable data insights across a variety of processes, from inventory tracking and order picking to maximizing fleet routes.

# IOT AND RFID

When it comes to the application of IoT technology, RFID, once cost prohibitive and now significantly more affordable, will play a critical role in modernizing warehouses for the era of digital commerce. RFID offers the promise of heightened inventory visibility —the ability to know precisely where any pallet, case or SKU is in the warehouse at any given moment. For this reason, retailers, manufacturers, distribution and logistics providers are planning to more than double their usage of RFID for cycle counts and inventory validation by 2020.

An RFID-enabled warehouse-management system can boost efficiencies in put-away and picking, verify shipments received from the manufacturer and those shipped to stores with greater precision, increase everything from inventory accuracy to merchandise replenishment speed — while reducing opportunities for human error.

Optimizing warehouse logistics so that the right goods reach the right customers at the right time has never been more crucial amid the explosion of direct-to-consumer sales.

A changing ecosystem means retailers, wholesalers and transportation companies are not only delivering items to stores, but shipping them to consumers' homes. In addition, they are servicing more customer who buy online, pick-up in-store and meeting the growing demand for same-day deliveries.

# USHERING IN A NEW ERA OF WORKER PRODUCTIVITY

Warehouse executives are also turning to technology enhancements to ratchet up worker productivity when it comes to order picking and fulfillment, which eats up 70 percent of a facility's operating costs.
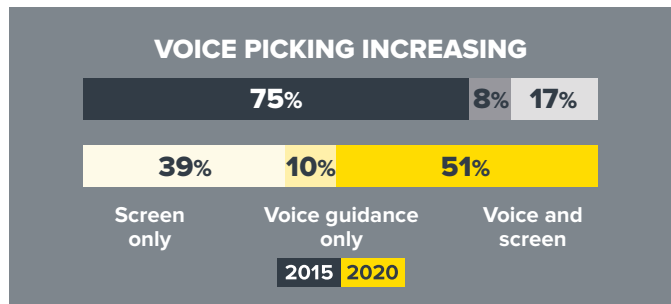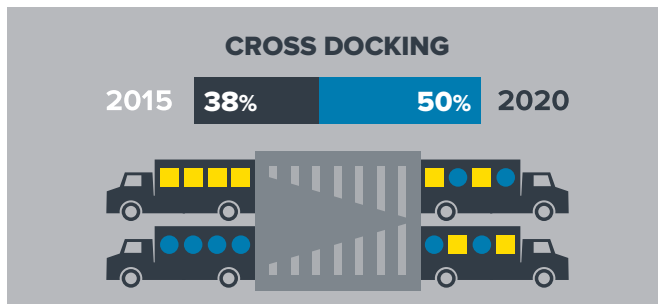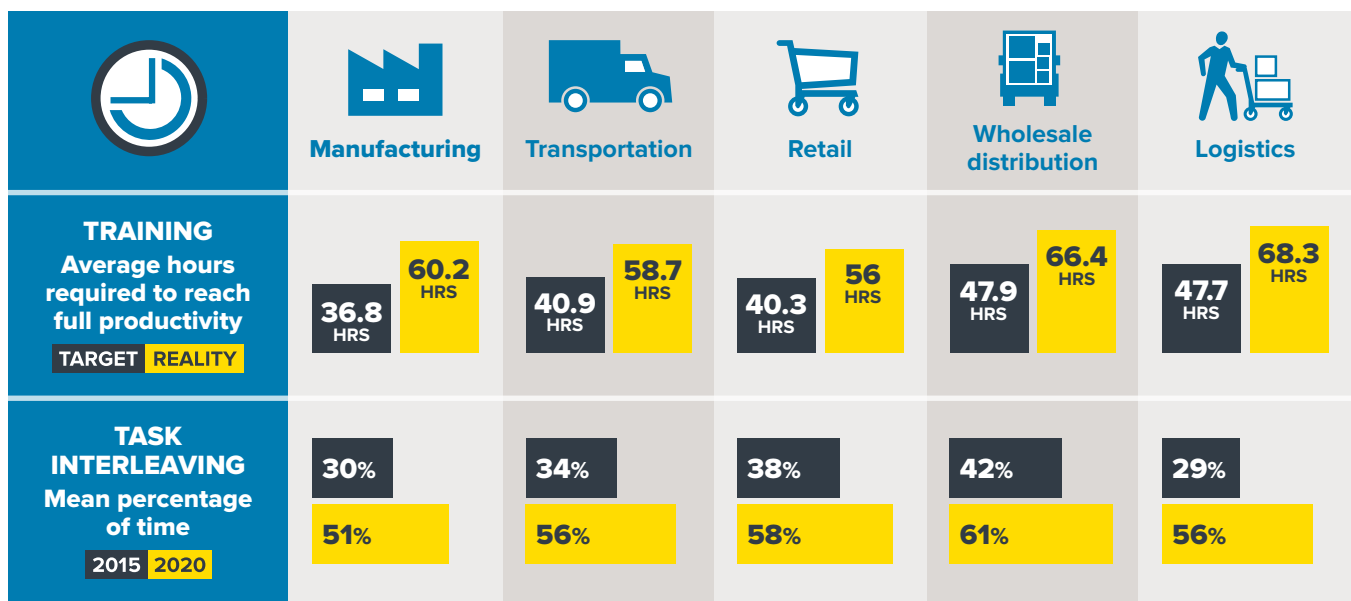
Today, it takes an estimated 60.4 hours of training for new staff to reach full productivity. In a bid to cut that time to 41.2 hours, the industry is moving from voice-only directed picking to voice and screen directed inventory picking and replenishment over the next five years.

The move to multi-modal picking, which augments voice picking with screen-directed picking on mobile devices, be they handheld and vehicle-mounted or wearables, is designed to automate and quicken the workflow to accommodate order volume surges in the supply chain, reduce pick and fill costs and enhance profit margins.

At the same time, companies will turn to task interleaving to boost worker efficiency. The productivity practice

maximizes employees' movements based on their location and equipment usage in the space by assigning them multiple tasks, such as order picking or truck loading. Studies show that task interleaving can boost worker productivity from 10 percent up to 40 percent.[1]

Over the next five years, warehouse executives will expand the use of cross-docking, which minimizes material handling by eliminating unnecessary put away. Their goal is to increase inventory throughput and decrease delivery times without the need for additional storage capacity — efficiencies that have gained new importance as order volumes increase and per order values decrease.

|  | Manufacturing | Transportation | Retail | Wholesale distribution | Logistics |
|---|---|---|---|---|---|
| **TRAINING** Average hours required to reach full productivity — TARGET / REALITY | 36.8 HRS / 60.2 HRS | 40.9 HRS / 58.7 HRS | 40.3 HRS / 56 HRS | 47.9 HRS / 66.4 HRS | 47.7 HRS / 68.3 HRS |
| **TASK INTERLEAVING** Mean percentage of time — 2015 / 2020 | 30% / 51% | 34% / 56% | 38% / 58% | 42% / 61% | 29% / 56% |

## CROSS DOCKING

2015  **38%**     **50%**  2020

## VOICE PICKING INCREASING

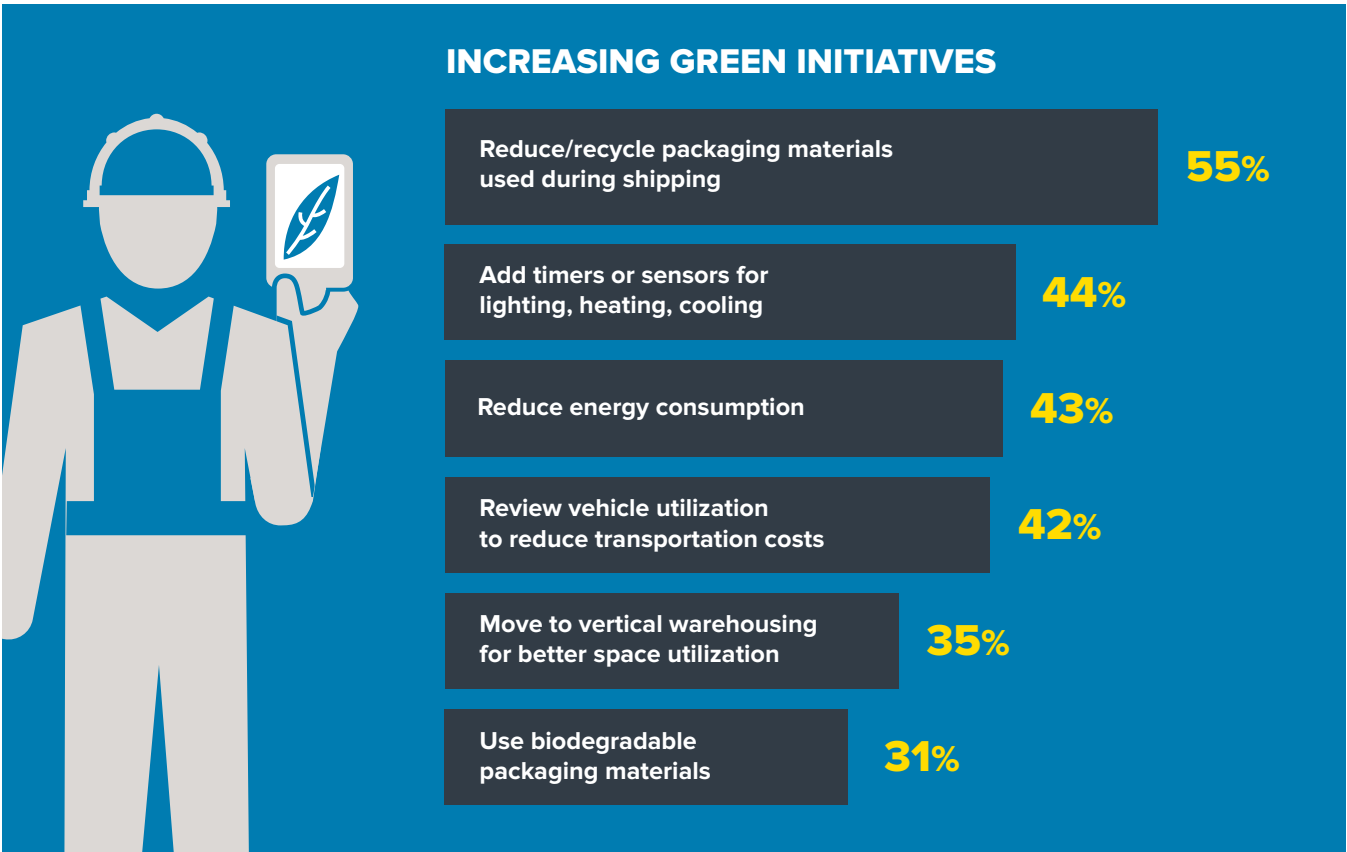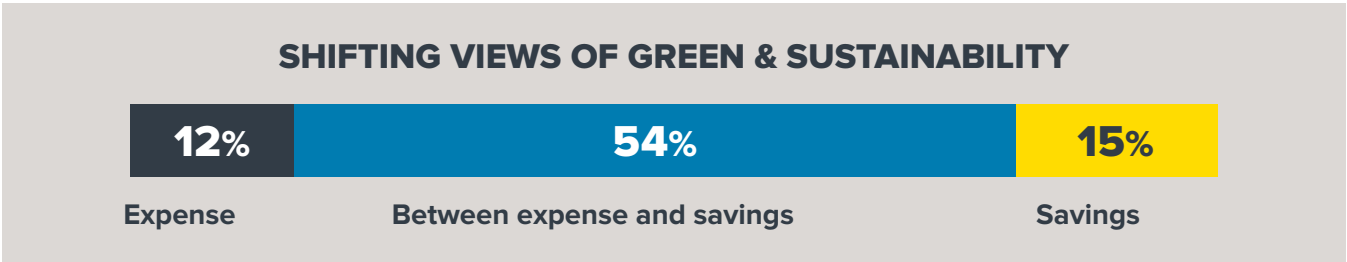| **75%** | **8%** | **17%** |
|---|---|---|
| **39%** | **10%** | **51%** |
| Screen only | Voice guidance only — 2015 / 2020 | Voice and screen |

# GOING GREEN

Over the next few years, warehouses will become increasingly eco-friendly. As "conscious capitalism" has moved from the margins to the mainstream in business practices, the warehouse industry is no exception.

Key eco-conscious initiatives include reducing and recycling the packaging materials used during shipping, and cutting down on energy consumption by purchasing high-efficiency equipment.

When it comes to implementing environmentally friendly practices, doing good can also mean doing well: While most respondents said they view green initiatives as an expense, they also see it as a savings opportunity.

Beauty company Kiehl's, for example, recently switched from box to envelope shipping. The move reflected a push toward sustainably, but it also ended up reducing Kiehl's product shipping costs.

## SHIFTING VIEWS OF GREEN & SUSTAINABILITY

| 12% | 54% | 15% |
|---|---|---|
| Expense | Between expense and savings | Savings |

## INCREASING GREEN INITIATIVES

| Reduce/recycle packaging materials used during shipping | 55% |
|---|---|
| Add timers or sensors for lighting, heating, cooling | 44% |
| Reduce energy consumption | 43% |
| Review vehicle utilization to reduce transportation costs | 42% |
| Move to vertical warehousing for better space utilization | 35% |
| Use biodegradable packaging materials | 31% |

## CUSTOMER REQUIREMENTS

### BARCODING INBOUND ITEMS

**68%**
**84%** +16%

### ADVANCED SHIP NOTICE

**40%**
**55%** +15%

### GSI SYSTEM OF STANDARDS

**15%**
**28%** +13%

### GLOBAL DATA SYNCHRONIZATION NETWORK (GDSN PACKAGE)

**15%**
**29%** +14%

### RFID

**21%**
**36%** +15%

### LABELING COMPLIANCE

**49%**
**60%** +11%

2015 2020

# CHANGING REQUIREMENTS: INDUSTRY MANDATES PROPEL WAREHOUSE UPGRADES

Warehouse executives said technology upgrades are being driven in part by the demand to comply with changing customer requirements.

**Barcoding inbound items:** expected to increase from 68 percent to 84 percent by 2020.

**Increasing use of Advanced Ship Notice (ASN):** projected to increase from 40 percent to 55 percent by 2020.

**Meeting GDSN standards:** the Global Data Synchronization Network (GDSN) enables trading partners to exchange business data automatically. Hence, when a supplier or retailer, for example, updates it database, the other is updated too. The GDSN's package measurement standards will increase from 15 percent to 29 percent over the next five years.

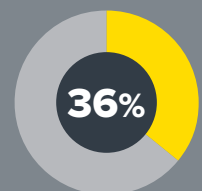**Implementing RFID technology:** poised to expand from 21 percent to 36 percent by 2020.

### WAREHOUSE UPGRADES
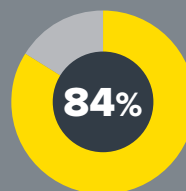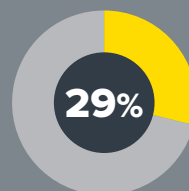
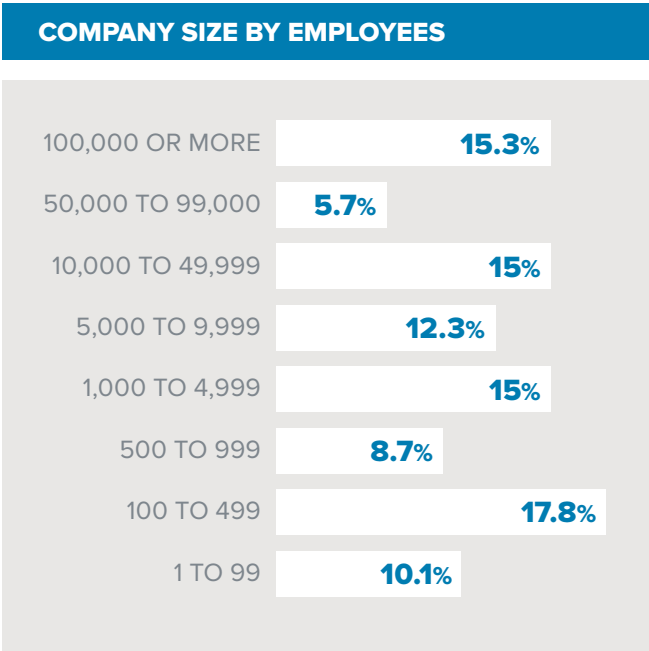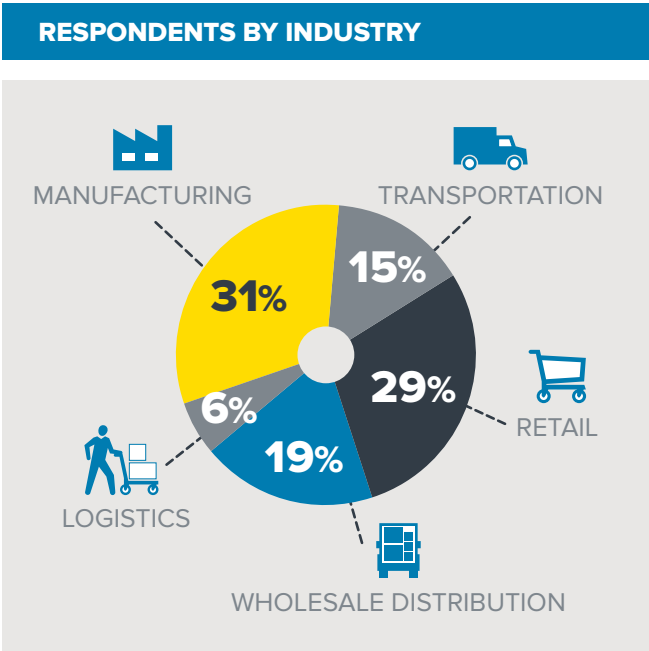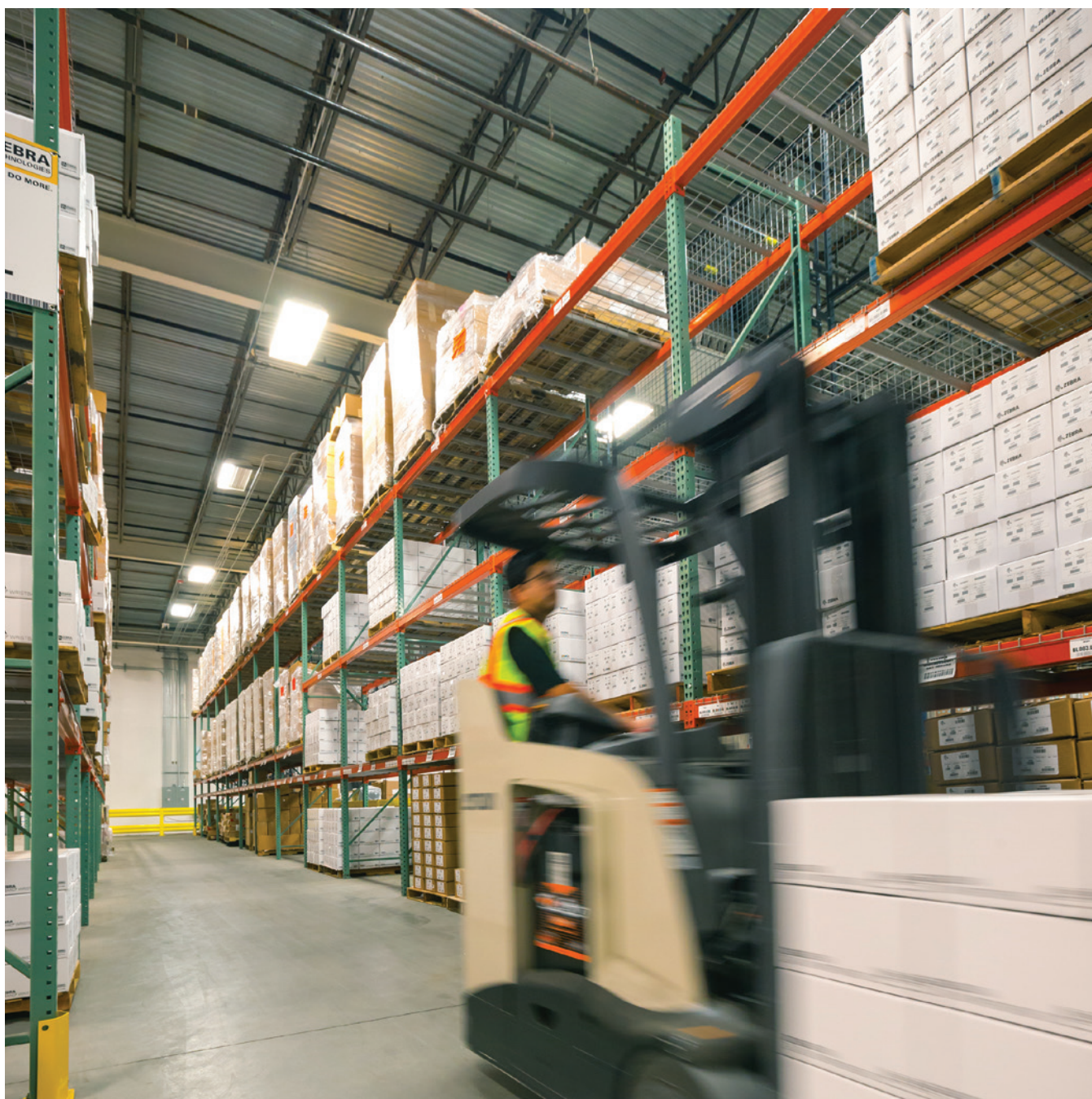**84%** Barcoding
**29%** GDSN
**36%** RFID

# SURVEY METHODOLOGY

The survey was targeted to IT and operations professionals in the logistics, manufacturing, retail, transportation and wholesale market segments. Each survey was designed to reveal current and planned experiences and processes related to respondents' warehouse and/or distribution centers.

The survey was completed by firms in the United States and Canada with at least $15 million in annual revenues. Respondents were not aware of Zebra's sponsorship of the research.

## RESPONDENTS BY INDUSTRY

MANUFACTURING 31%

TRANSPORTATION 15%

RETAIL 29%

WHOLESALE DISTRIBUTION 19%

LOGISTICS 6%

## COMPANY SIZE BY EMPLOYEES

| | |
|---|---|
| 100,000 OR MORE | 15.3% |
| 50,000 TO 99,000 | 5.7% |
| 10,000 TO 49,999 | 15% |
| 5,000 TO 9,999 | 12.3% |
| 1,000 TO 4,999 | 15% |
| 500 TO 999 | 8.7% |
| 100 TO 499 | 17.8% |
| 1 TO 99 | 10.1% |

**FOR MORE INFORMATION, VISIT WWW.ZEBRA.COM/WAREHOUSE**

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