



Warehousing Vision Study 2023

Making Modern Warehousing a Reality

Supply Chain Resiliency & Agility



Warehouse leaders are under pressure to do more in less time without compromising on accuracy. By increasing data visibility and analytics, warehouse operations can dynamically respond to challenges or peaks in demand while optimizing productivity.

Explore new trends in achieving supply chain resiliency.

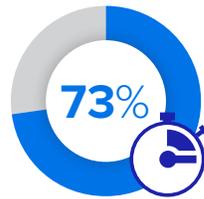
Market Watch

Warehouse leaders anticipate improving their operations through investments in cloud-based systems, end-to-end visibility and labor optimization. As part of their strategic plans, decision-makers have incorporated digital twins into their arsenal. These digital replicas are designed to mimic real-life objects or processes and can be manipulated through simulations, allowing decision-makers to make informed choices based on accurate virtual representations.

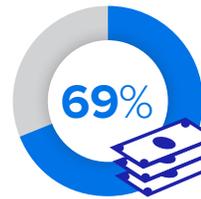
Decision-Makers Reveal Plans for Improvements to Warehouse Operations

Timelines and Funding

Over the next year, global decision-makers plan to:



Accelerate timelines of modernization projects

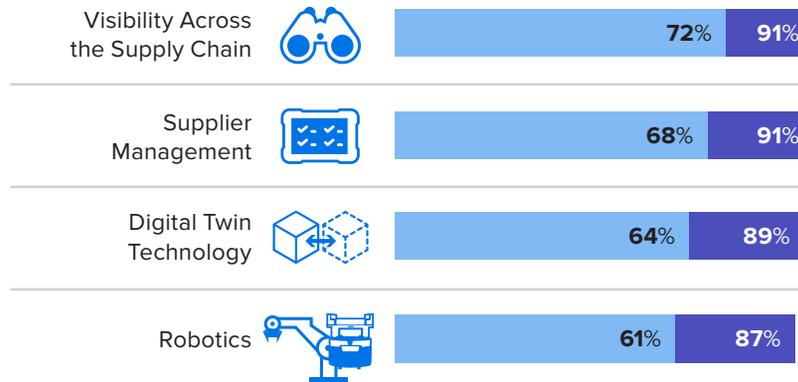


Increase funding for warehouse modernization plans

Priorities



Investing In:



By 2023

By 2024

Top Near-Term Sensor Technology Implementation Plans (By 2024)



81% Passive Radio-Frequency Identification (RFID) Tags and Sensors

71% Passive Radio-Frequency Identification Handheld Reader Devices and Sleds

68% Active Tag Real-Time Location Technology (Bluetooth® Low Energy Devices)

68% Mobile Sensors on Forklifts and Robots

67% Temperature Monitoring Sensors and Smart Labels

Top 3 Workflows for Wearable Devices

Decision-makers rely on the deployment of mobile and wearable devices throughout their facilities to collect the data they need across key workflows.

1 RETURNS

2 RECEIVING

3 PICKING

Putting Supply Chains to the Test

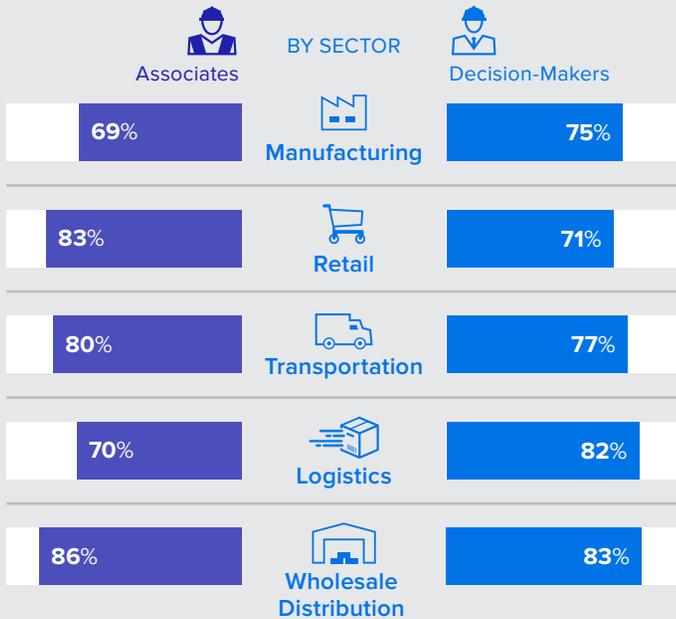
Global disruption has exposed the vulnerabilities of traditional operations and forced businesses of all sizes to embrace change and enhance resiliency. Despite the push for innovation, it's hard to keep up with the speed of transformation. The world continues to move online, accelerating shifts in consumer demand and putting more demands on global distribution networks.

As e-commerce grows, so too does the demand for inventory traceability and reverse logistics. These changes put even more pressure on warehousing operations to move from siloed and reactionary to more predictive and adaptive. Forward-thinking enterprises are investing in solutions that enable real-time visibility and traceability in warehouses, recognizing the importance of having accurate and up-to-date information about their assets and inventory to operate efficiently and tackle future disruption. Warehousing operations are confronted with intense demands to modernize, beginning with advancements in supply chain technology.

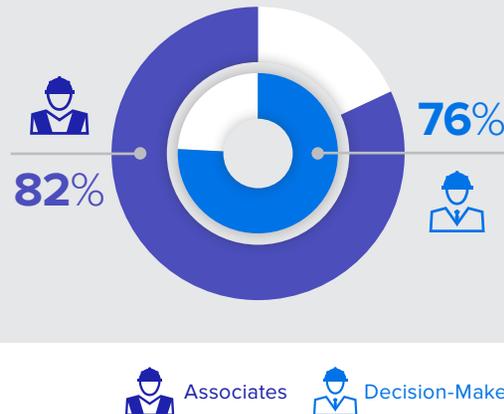


Overcoming Inventory Issues

77% of warehouse decision-makers and associates agree that out-of-stocks and inventory inaccuracy challenge productivity.



The consensus among decision-makers and associates is that reliable inventory management tools are crucial for maintaining accuracy and accessibility in inventory management.



Leading Supply Chain Challenges According to Warehousing Decision-Makers

- 37% Innovating with technology and intelligent automation
- 33% Achieving end-to-end-visibility
- 32% Forecasting the right level of inventory

Accelerating Warehouse Visibility

Operational maturity continues advancing, with more warehousing decision-makers augmenting workers with mobility and automation. While solutions, including RFID, 3D sensors and machine vision, have revolutionized the way warehouses capture data, operations need advanced analytics to make the most of intelligence gathered across the supply chain.

With real-time data analytics, warehouse managers can gain instant insights into inventory levels, demand patterns and operational performance, empowering swift decision-making and enabling agile responses to unforeseen disruptions.



71%

of executives are investing in software and automating analytics and decision-making.

Goals Powering Investment in Operational Visibility

Greater individual worker productivity

All associates are connected to warehouse or enterprise systems and are capturing every inventory move.

Increased team productivity and workforce compliance

All associates comply with standards and procedures, regardless of tenure, with the right technology for their individual tasks and workflows.

Expanded asset visibility and insights

Assets and inventory can be seen or tracked automatically in targeted areas for more efficient utilization.

Operating with real-time guidance and decision-making

The ability to locate assets, people and robots and analyze data for best-next-move automated alerts.

Operating with a data-driven approach for proactive performance management

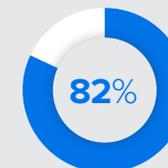
Utilize multiple data sets wall-to-wall to enable predictive, self-optimizing and adaptive workflows.



Most warehousing decision-makers expect to operate with even more visibility, real-time guidance and data-driven performance over the next five years.



Agree they are under high pressure to implement new technologies



Concur improvements in operational visibility lead to better staff and asset utilization

Warehousing Modernization in Action

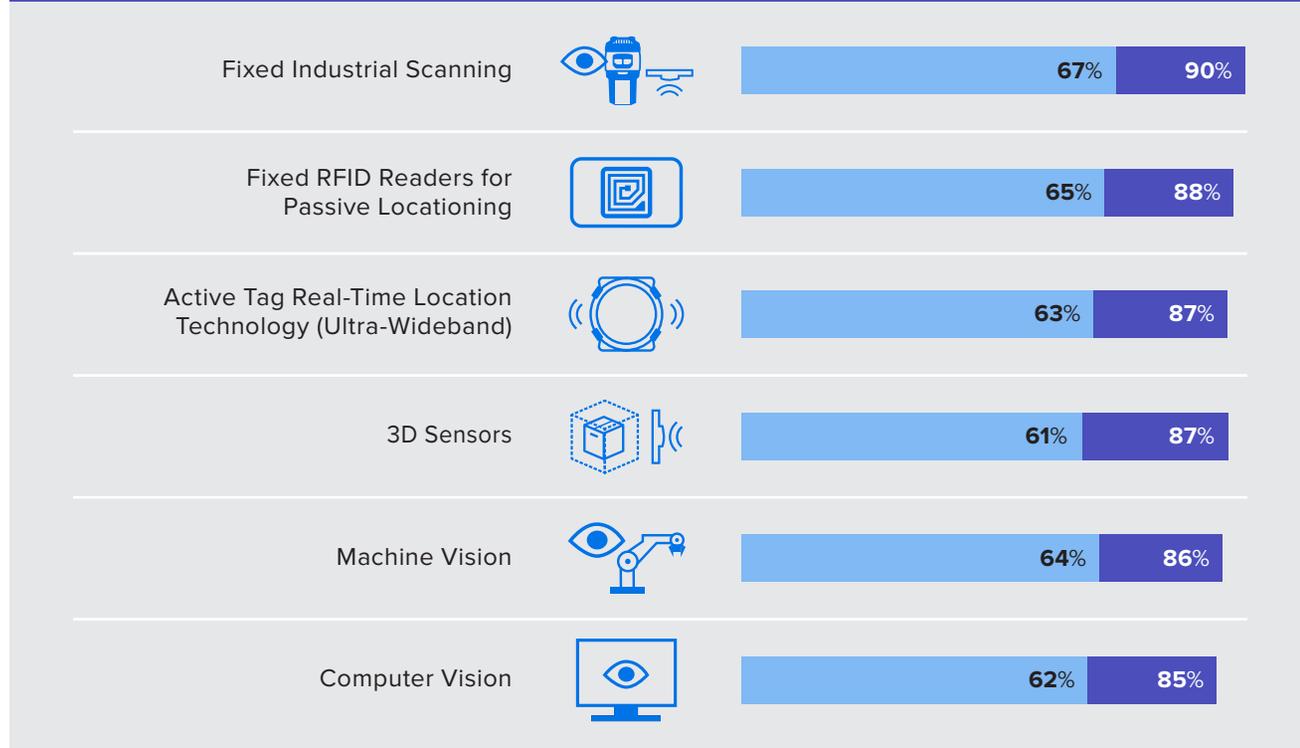
Inventory visibility plays a pivotal role in determining the maturity of a warehouse. As a warehouse reaches higher maturity levels, integrating inventory visibility with other supply chain processes becomes a cornerstone of success, enabling seamless coordination and collaboration with suppliers, distributors and customers. Customer expectations for real-time updates and transparent delivery experiences make visibility indispensable for meeting evolving demands.

Warehouse decision-makers are increasingly turning to sensor technology. By next year, most plan to deploy RFID tags and sensors with strong growth expected for RFID printers and encoders. Over the next five years, however, the highest growth is seen in 3D sensors, active RFID tags, computer vision, fixed RFID readers, machine vision and fixed industrial scanning.



Sensor Technology Implementation Plans

Highest expected deployment over the next five years according to warehouse decision-makers



By 2024 By 2028



Software Technology Implementation Plans

By 2028, machine learning, predictive analytics and mobile dimensioning stand out as the most prominent technologies warehouses plan to deploy.

94% Machine Learning

92% Predictive Analytics

91% Mobile Dimensioning

Transforming Tomorrow's Supply Chain

Warehouse visibility remains an essential component for a thriving supply chain ecosystem. The demand for efficiency and cost reduction in today's competitive landscape motivates warehouses to optimize operations, identify bottlenecks and streamline processes. As warehouse technology and automation continue to evolve and standards of operational excellence also rise, businesses will lean on solutions that enable them to track the real-time location of all assets and inventory through each step of the supply chain.

About the Study

Zebra Technologies commissioned a global research study among decision-makers and associates to analyze the latest trends and technologies transforming warehouse operations. Administered online by Azure Knowledge Corporation, this year's study includes over 1,400 respondents across manufacturing, retail, transportation, logistics and wholesale distribution organizations. Zebra's 2023 Warehouse Vision Study reports on how organizations are utilizing technologies to modernize the warehouse and prepare for future challenges. The series focuses on three key themes:



Supply Chain Resiliency and Agility

Investigates modern warehouses' adaptation to market changes, unforeseen challenges, and the integration of technologies for enhanced flexibility in the global supply chain.



Perfect Order Profitability

Zeros in on the intricacies of achieving and optimizing order profitability, examining strategies and tools warehouses use to ensure accuracy, timeliness, and maximized profit margins amid rising costs and customer expectations.



Automation, Augmentation and Labor Planning

Sheds light on how warehouses are leveraging advanced automation, integrating technology with human tasks, and strategizing workforce planning to boost efficiency and address evolving challenges.

To view the entire 2023 Warehouse Vision Study series, visit zebra.com/warehousingvisionstudy

To learn how Zebra can help your warehouse operations achieve a performance edge, visit zebra.com/warehouse

About Zebra Technologies

Zebra (NASDAQ: ZBRA) empowers organizations to thrive in the on-demand economy by making every front-line worker and asset at the edge visible, connected and fully optimized. With an ecosystem of more than 10,000 partners across more than 100 countries, Zebra serves customers of all sizes, including 94% of the Fortune 100, with an award-winning portfolio of hardware, software, services and solutions that digitize and automate workflows.



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