



Market Research

2024 State of Smart Distribution Study: The Age of Efficiency and Resilience

IN PARTNERSHIP WITH




Why did we do this research?

Verizon and Ericsson have partnered on this research study to understand the transformation of distribution in retail, manufacturing and logistics industries. In this survey we focused on understanding the business challenges, technology priorities and the quality of the core infrastructure that powers these critical operations.

134

 51% Manufacturing and logistics warehouses executives

 49% Retail distribution center executives

Company size

10% < \$100 million

27% \$100 million - \$499 million

22% \$500 million - \$999 million

24% \$1 billion - \$4.9 billion

17% \$5 billion+

Executive title

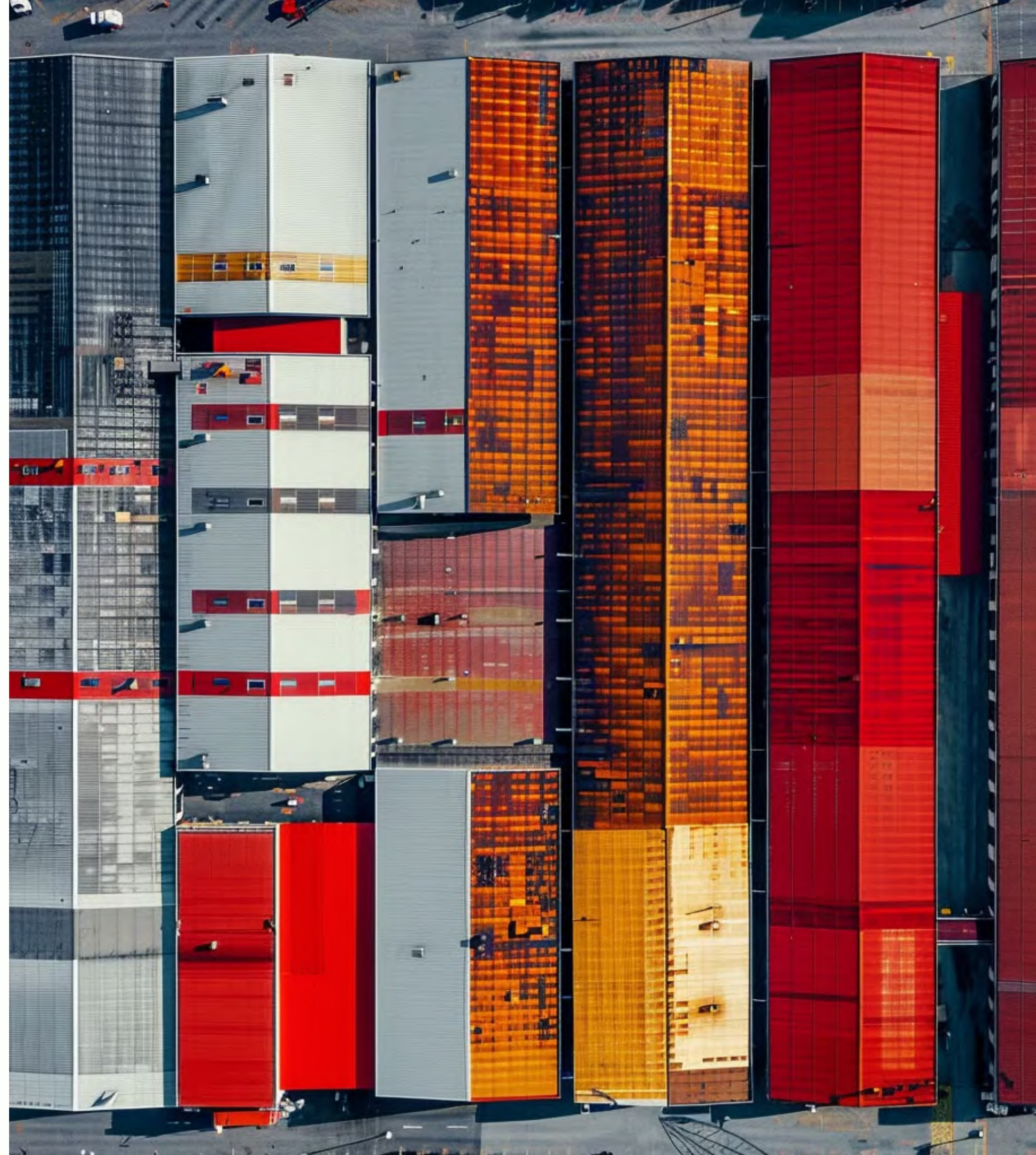
4% SVP/EVP/CXO

20% VP

63% Director

13% Manager

Note: Respondents in the survey were involved in or responsible for distribution operations



Distribution operations have to manage growing throughput more efficiently. Companies will bet on proven solutions that alleviate labor challenges.

Manage Higher Throughput at lower incremental cost



The consistent growth in e-commerce volume and increasing customer expectations for delivery speed are stretching distribution operations.

To stay competitive, companies must manage higher throughput at a lower incremental cost.

78%

of companies rate managing operational costs as a top investment driver

Managing the Workforce is a top priority



Companies are facing a significant talent debt and a host of challenges in managing their workforce such as recruiting skilled workers, competitive compensation pressures and high employee turnover.

To stay competitive, companies must enable their associates to do more and increasingly use automation to mitigate the impact of workforce challenges.

86%

of companies say labor shortages/ workforce management are significant challenges

Proven Technologies are prioritized over hype



Companies are prioritizing investing in technologies that have proven their impact on the business and can deliver a clear ROI (robotics, mobile, etc.).

To stay competitive, companies must scale proven technologies but also invest in precision-driven innovation in areas like AI.

81%

of companies have or plan to deploy mobile devices by 2026 to improve employee productivity

Network Infrastructure needs a significant upgrade



The current network infrastructure has too many 'dead zones' and cannot meet the planned technology deployments over the next 24 months.

To stay competitive, companies must invest in infrastructure that helps them build a faster and more resilient network capable of supporting innovative technologies.

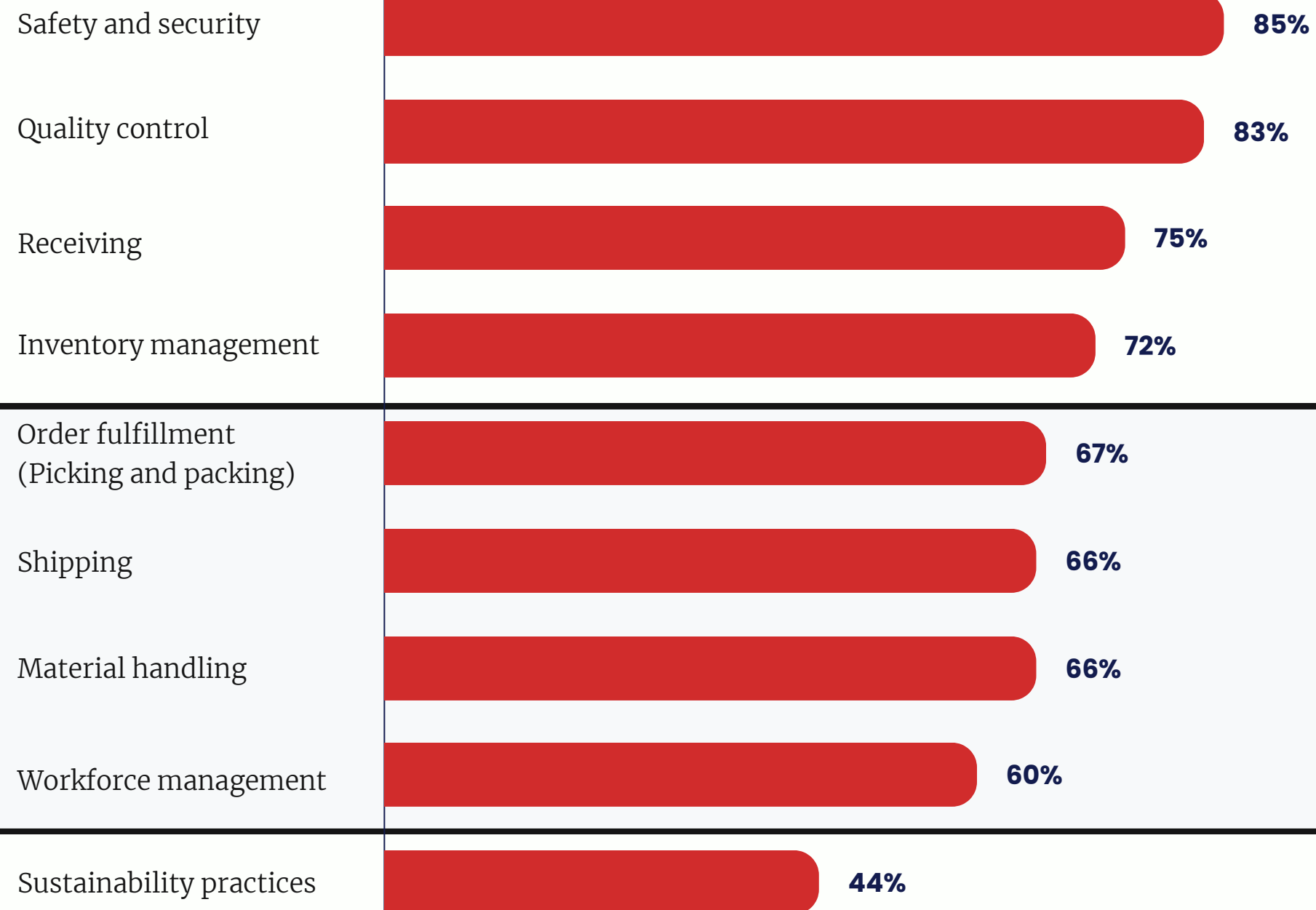
65%

of companies say their current network cannot support their needs of the next 24 months

Workforce management and labor-intensive operations are seen as major areas with room for improvement.

Executive satisfaction with performance

% respondents that were satisfied



LABOR INTENSIVE



Executives express the highest confidence in safety, security, and quality control, reflecting the successful implementation of robust measures to protect assets and ensure operational integrity. This is driven by the need to meet stringent regulatory requirements and the risks of non-compliance. Satisfaction levels for receiving operations and inventory management follow closely.

However, satisfaction levels decline in more complex and labor-intensive operations. Order fulfillment, including "picking and packing," presents challenges due to the intricate coordination required and reliance on manual processes. Similarly, shipping and material handling show lower satisfaction, likely due to their complexity and need for precise execution.

Workforce management, with its ongoing challenges in recruiting, training, and retaining skilled labor, is a significant concern. The lowest area of satisfaction is found in sustainability practices, as companies struggle to integrate sustainable practices due to high initial costs and the complexity of incorporating them into existing systems.

Distribution operations are being stretched to meet increased throughput.

Top 5 drivers of investment in distribution operations

% respondents



HIGHER THROUGHPUT



Companies need to improve efficiency, speed, and transparency to meet consumers' and businesses' growing demands and expectations.

The continued growth in e-commerce volume and increasing customer expectations for delivery speed are stretching distribution operations. To stay competitive, companies must achieve higher throughput while managing operational costs.

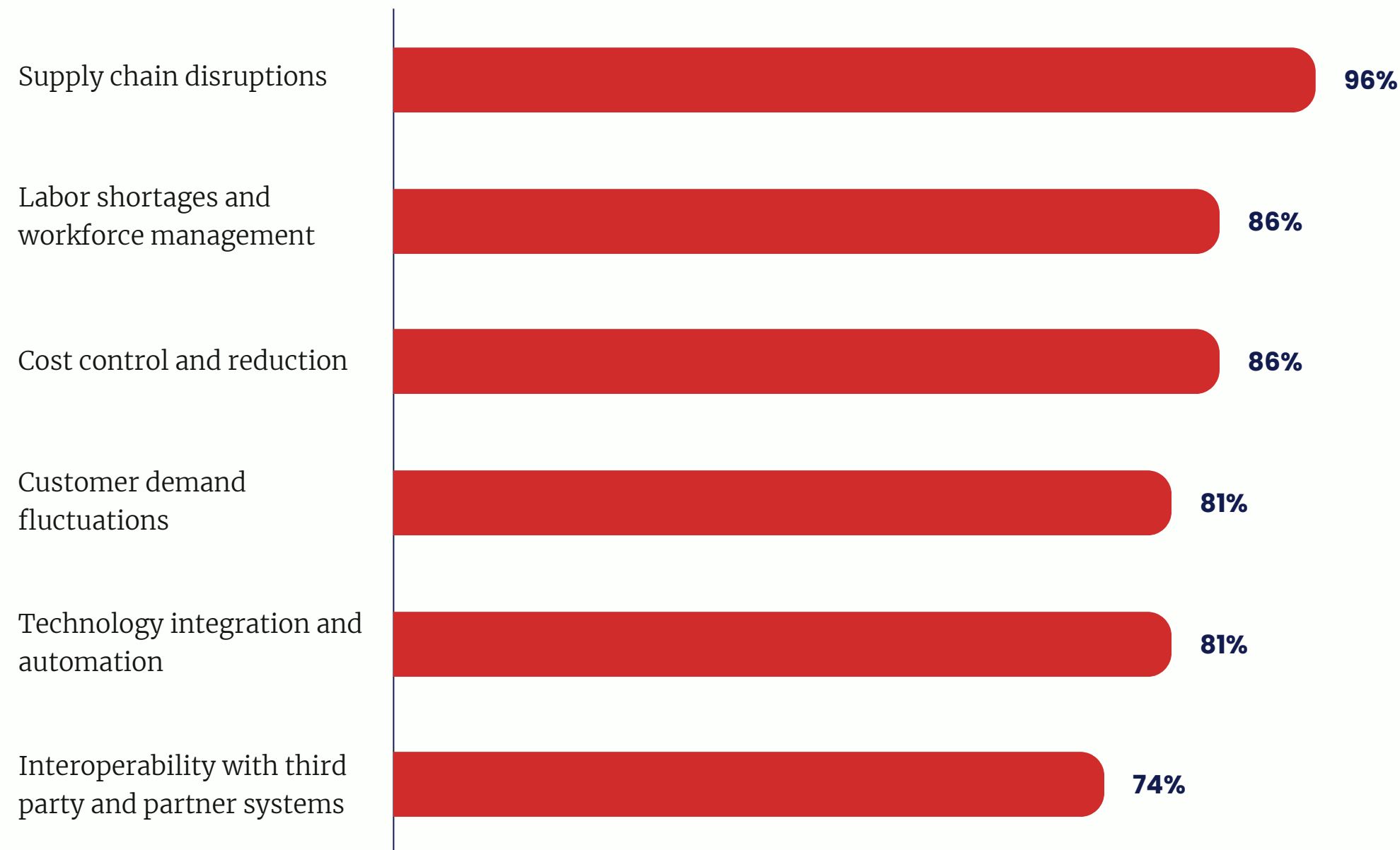
This requires companies to invest in capabilities that can improve workforce productivity and improve operational speed and efficiency. Additionally, maintaining end-to-end visibility in operations is crucial for control and transparency.

This visibility ensures that all stakeholders and systems have real-time access to information, enabling better decision-making and faster response times.

Unexpected supply chain disruptions, labor shortages and technology integration are the biggest hurdles to distribution operations.

Top 5 challenges executing distribution operations

% respondents that rate this as critical or moderately difficult



Distribution operations face significant challenges that impede execution. The most pressing issue is unanticipated supply chain disruptions. These disruptions can be demand or supply, such as unexpected shocks such as natural disasters, geopolitical events, etc. Customer demand fluctuations complicate planning and inventory management, leading to inefficiencies and potential stockouts or overstock situations.

Labor shortages and workforce management also present a major hurdle for 86% of operators. Finding and retaining skilled workers is challenging, which has a negative impact on productivity and efficiency.

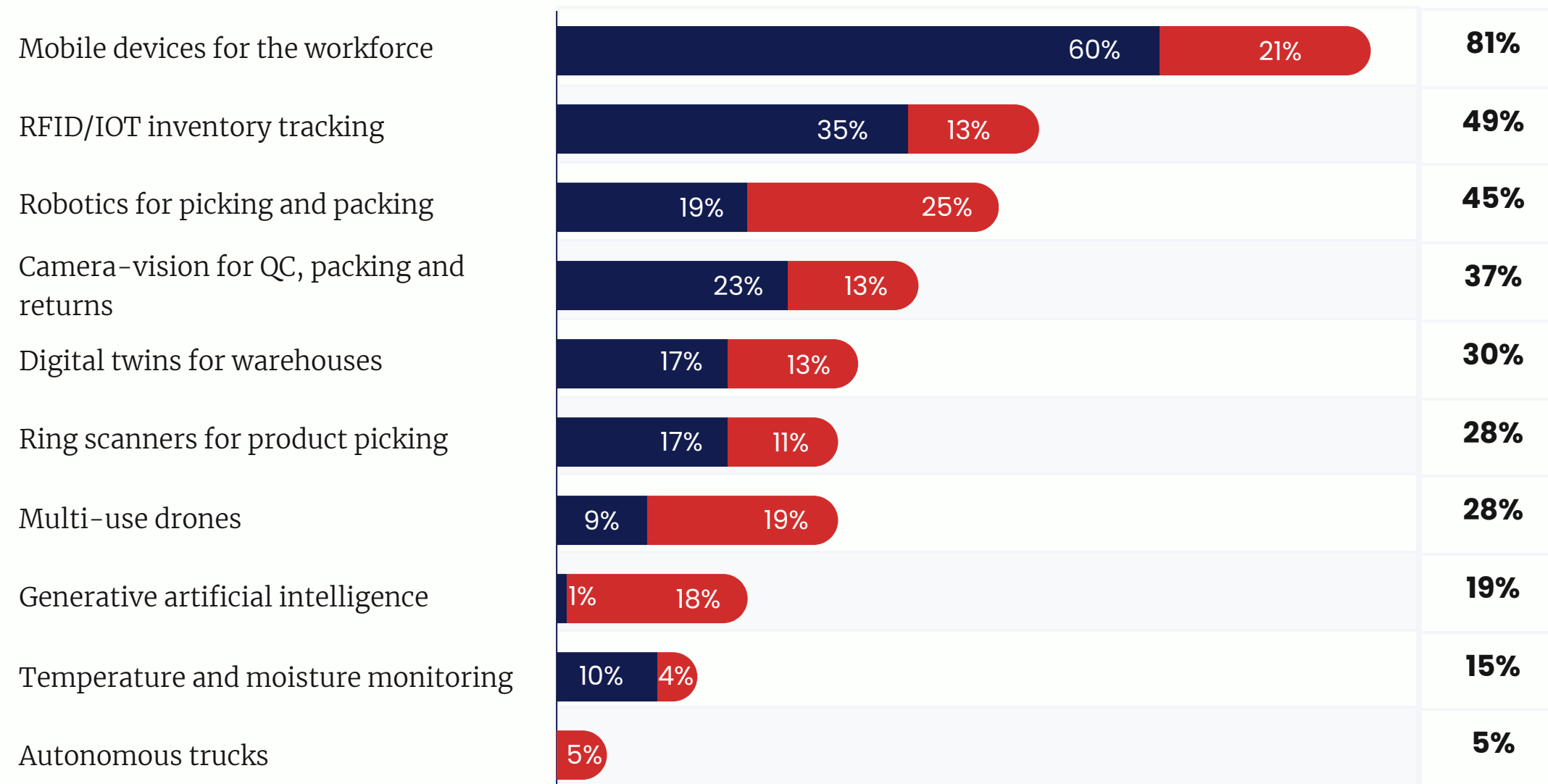
86% of companies find cost control and reduction equally challenging as they strive to balance operational expenses with maintaining service quality.

Technology integration within and outside the enterprise is also a concern, highlighting the importance of seamless execution and data sharing across the supply chain network.

Workforce mobile devices and process automation will drive technology investments in the next 24 months.

Current and planned technology deployment

% respondents



● Deployed ● Plan to deploy in next 24 months



The planned deployment of new technologies indicates a strategic move towards automation, real-time data access, and advanced analytics to meet the demands of improving operational efficiency.

Most companies have or plan to deploy mobile devices for associates, indicating a focus on improving real-time communication, task management, and data access.

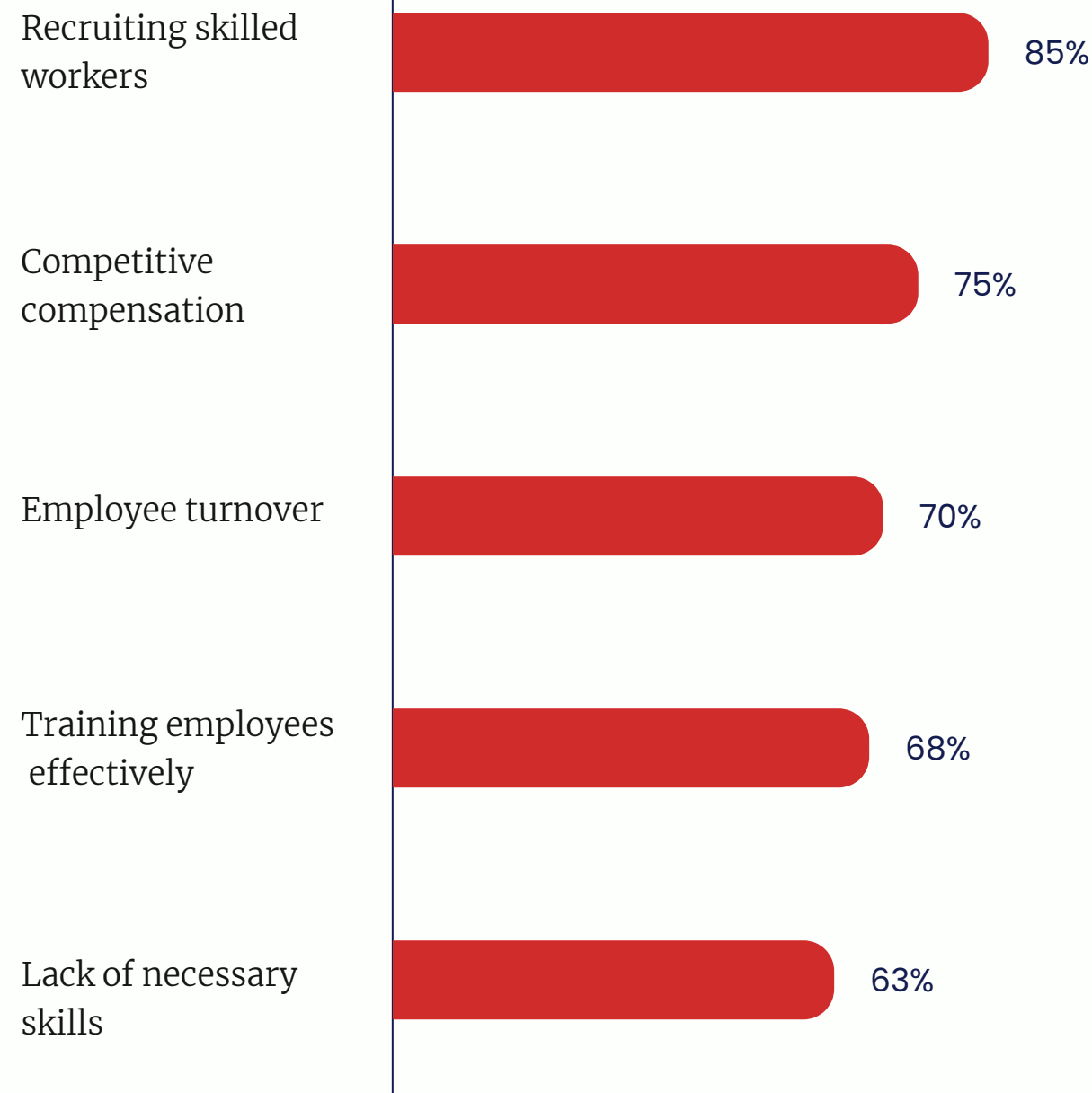
The planned increase in robotics and drones underscores the desire to automate manual, repetitive, and labor-intensive tasks. Robotics can work continuously and with high accuracy, thus speeding up fulfillment. While the deployment of autonomous trucks is minimal, it holds great promise since it addresses multiple challenges (driver shortage, sustainability, efficiency, speed). Clear regulation and public approval will help increase their deployment in the future.

Interest in generative AI is partly driven by the hype associated with it over the last 12 months. We believe traditional AI will soon form the backbone of most new technology deployments.

Challenges in managing the workforce will further increase automation.

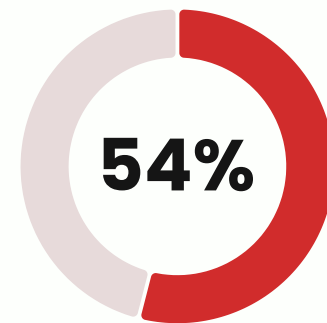
Difficulty in managing the workforce

% respondents



1.7x

increase in the amount of tasks that will be automated over the next 24 months



of all warehouse/ DC tasks will have some level of automation over the next 24 months, up from current level of 31%

Distribution operations face substantial workforce management challenges, driving a significant increase in automation.

Key issues include difficulties in recruiting skilled workers, competitive compensation pressures, high employee turnover, and the need for effective training. Additionally, many workers lack the necessary skills, making maintaining a stable and efficient workforce challenging. This talent debt is greater than the technology debt faced by distribution companies, as existing personnel often lack the expertise to manage and optimize advanced technologies and systems.

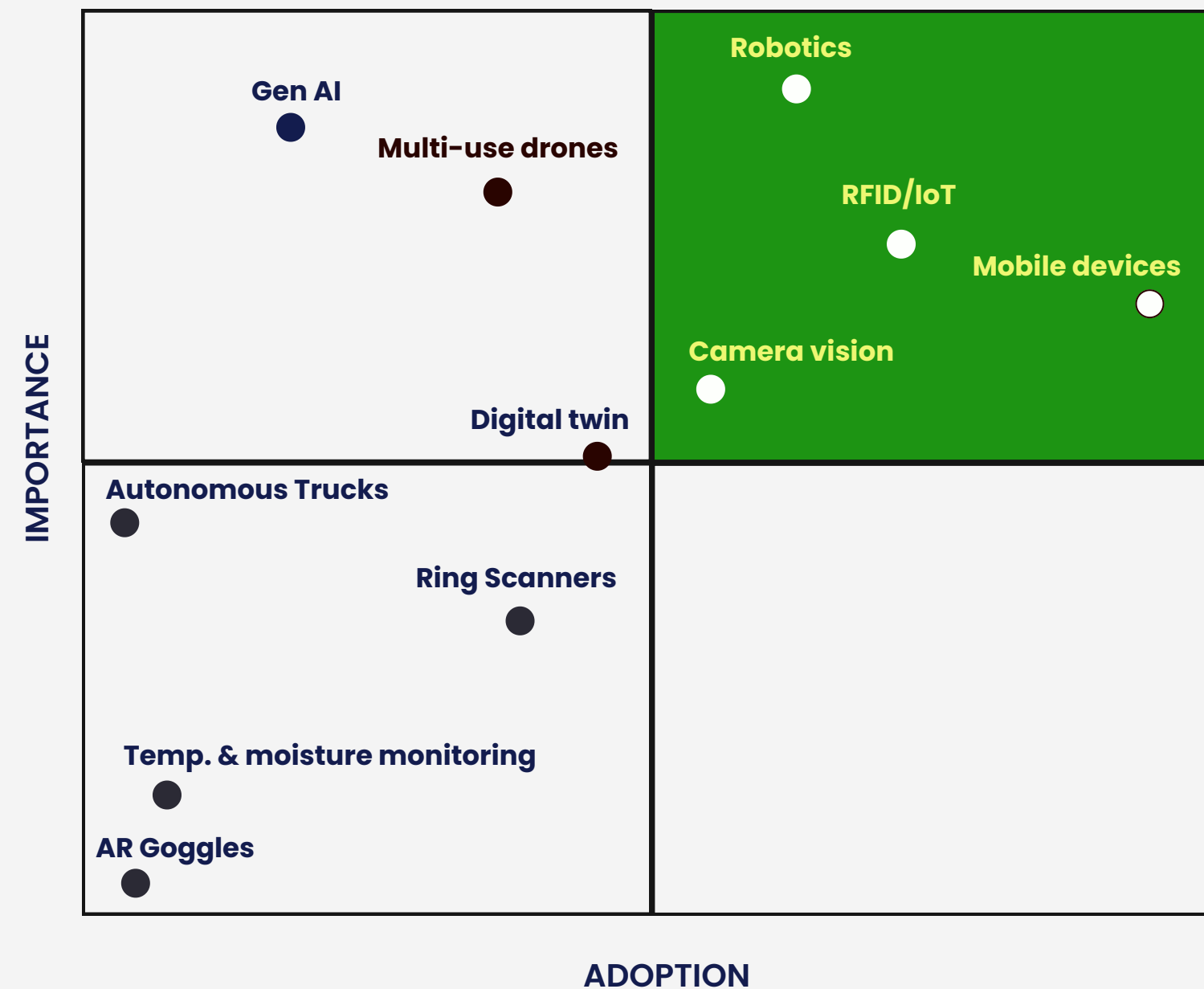
Companies are increasingly turning to automation in response to these workforce management difficulties. The shift towards automation is seen as a solution to mitigate the impact of workforce challenges. About half of warehouse and distribution center tasks are expected to incorporate some level of automation in the near future.

Automation not only addresses the immediate challenges of recruiting and retaining skilled workers but also positions companies for long-term competitiveness and resilience.



Proven technologies lead the pack. Gen AI is trending high, but we need to separate the current hype from the reality.

Technology importance vs Technology adoption



The 2x2 matrix shows the importance and planned deployment of various technologies. It highlights that companies seek a strategic balance, prioritizing proven technologies while recognizing the potential of emerging innovations.

The value drivers (upper right quadrant) represents technologies that have proven their impact on the business and can deliver a clear ROI. Robotics and multi-use drones signify a push towards automation; RFID/IOT and camera vision are crucial for improving inventory accuracy and operational precision. Mobile devices are essential for real-time communication and task management, boosting workforce productivity.

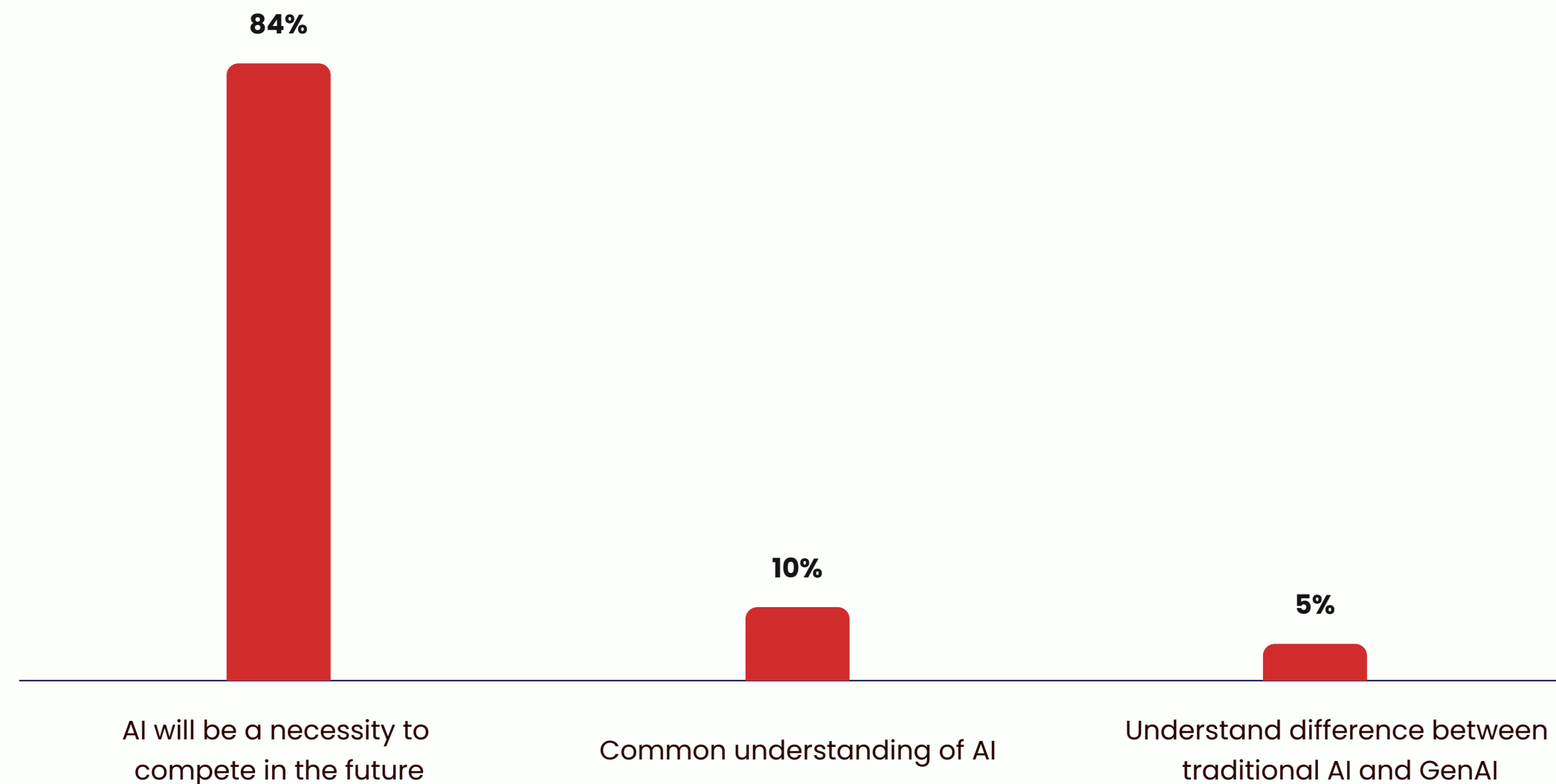
Despite its high potential, Gen AI's slower adoption may be attributed to its nascent status and failure to deliver (yet) on the market hype accompanying it. As the technology matures and becomes more accessible, its adoption will likely increase, unlocking substantial benefits for the distribution sector.

Note: The technology importance scale is based on the % of respondents that rated a technology as important or extremely important. The technology adoption scale is based on the % of respondents that have or will adopt the technology over the next 24 months.

Most companies believe AI will be critical to compete in the future, yet few understand the nuance.

Agreement with AI status at their company

% respondents



While most companies recognize that AI will be essential for future competitiveness, there is a significant knowledge gap within these organizations.

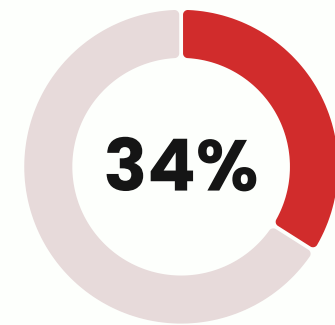
Only 10% have a common understanding of AI across the enterprise, and a mere 5% understand the differences between traditional AI and generative AI (Gen AI). The lack of understanding and clarity about AI's nuances is a current challenge to its full potential and adoption.

AI holds substantial promise for distribution operations, particularly in optimization and automation. Traditional AI is already used to enhance supply chain management, improve inventory accuracy, and optimize delivery routes.

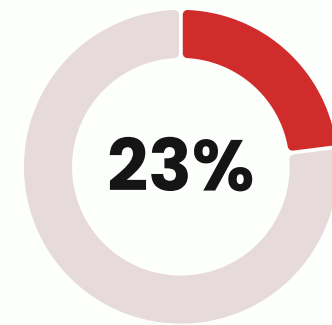
Gen AI allows for greater analytic scale and democratizes data analysis and actions through natural language. This allows anyone, from operations directors to warehouse workers, to tap into the power of AI.

A third of companies will adopt AMRs over the next 24 months, replacing 1 in 5 manual forklifts.

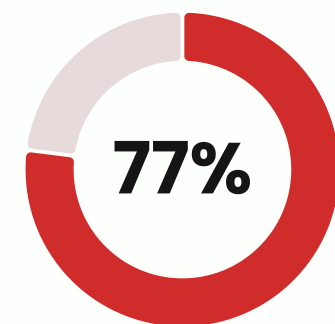
This will test the network infrastructure.



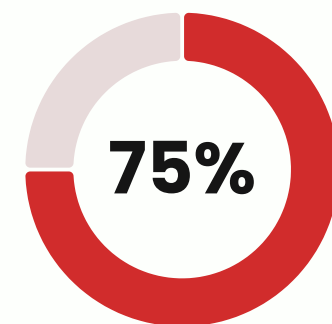
of companies plan to replace their manual forklifts with automated forklifts over the next 24 months



of current manual forklifts will be replaced by automated forklifts over the next 24 months



of companies will need real-time seamless communications between AMRs and other systems



of companies will need to improve network connectivity to ensure coverage throughout the facility



The adoption of automated mobile robots (AMRs) is set to revolutionize the distribution industry by replacing manual forklifts, improving efficiency, and reducing costs. This transition marks a pivotal move towards automation to enhance operational efficiency, reduce human error, and minimize labor costs. Forklift manufacturers believe that manual forklifts will be automated while maintaining the same form factor.

However, this shift to automated forklifts presents significant challenges concerning network infrastructure.

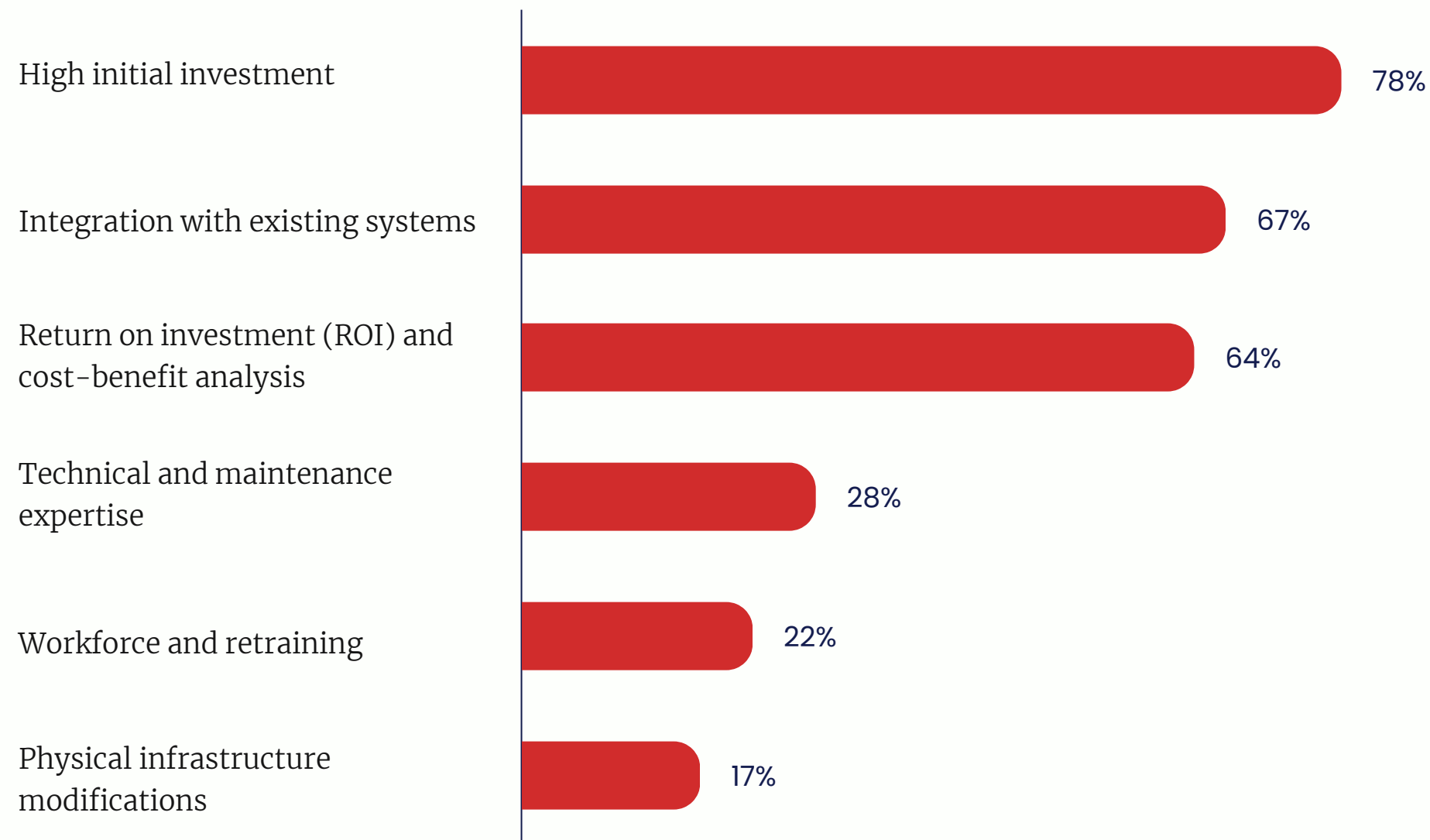
Automated forklifts require robust and reliable network coverage to communicate effectively with central control systems and other connected devices. Any lapses in connectivity can lead to operational disruptions, inefficiencies, and potential downtime. Effective deployment of AMRs require 100% continuous network availability across the entire area of operation. No dead zones are tolerated.

Companies recognize that the need to scale their network infrastructure to handle the increased data traffic and ensure uninterrupted communication.

Investment hurdles are the biggest impediments to adopting AMRs.

Top 3 challenges in adopting autonomous mobile robots

% respondents



Adopting AMRs comes with several significant challenges.

The high initial investment required for purchasing the robots and necessary supporting technologies is a significant barrier, especially for smaller companies. This substantial upfront cost necessitates a thorough cost-benefit analysis, as companies must justify these expenses with clear long-term benefits. Proving the return on investment (ROI) can be difficult, as the long-term savings and efficiency gains need to be quantified against the high initial outlay.

Seamlessly incorporating these robots into current operations and IT infrastructures requires substantial workflow and system changes. Technical and maintenance expertise presents another concern, as AMRs require specialized knowledge for operation and upkeep, necessitating hiring new talent or retraining existing staff. Additionally, adapting the workforce to new roles and workflows can be a significant shift, requiring retraining efforts.

The current network infrastructure will not scale to meet the future needs. Most companies experience significant 'zombie zones'.

61%

of companies are dissatisfied with the reliability of their indoor network/connectivity

65%

of companies say their current network cannot support their needs over the next 24 months

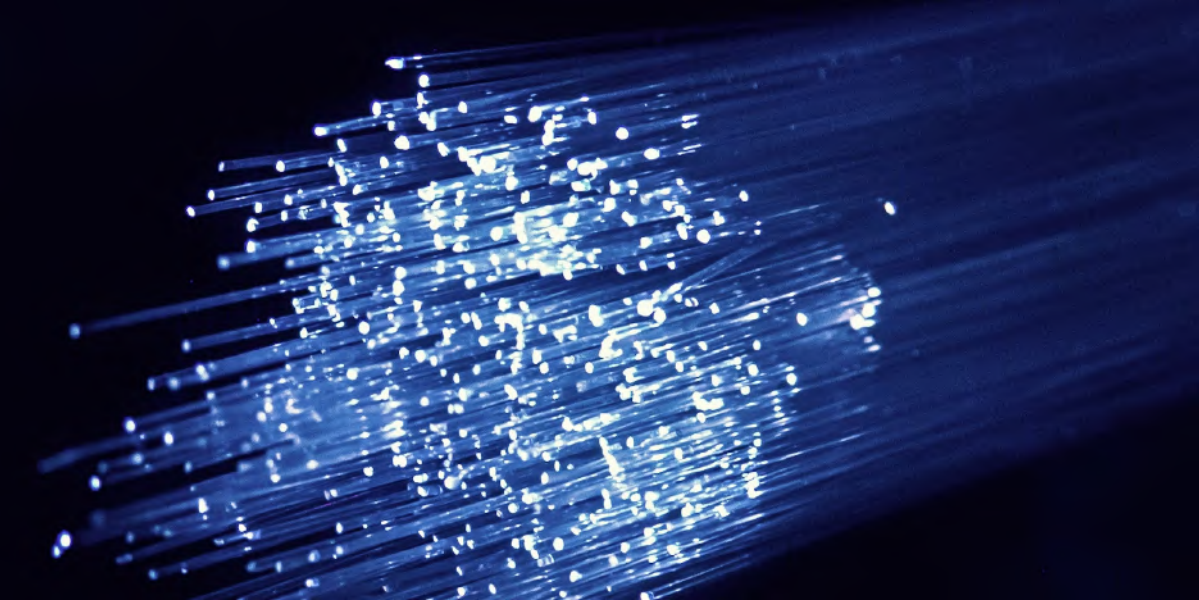


The current network infrastructure will not meet future needs, indicating a need to upgrade distribution center network connectivity to handle increased technology deployments. This issue is exacerbated by widespread dissatisfaction with the reliability of the indoor network connectivity.

A critical problem is the presence of 'zombie zones,' areas with no or poor connectivity. In warehouses, inadequate connectivity can severely impact real-time operations like robotics, inventory management, order processing, and communication between automated systems and personnel.

For instance, personnel frequently have to redo tasks conducted in aisles with poor connectivity because the data didn't go through. The situation is even more problematic in yard areas, where poor connectivity affects logistics operations such as loading, unloading, and vehicle coordination.

These connectivity issues can lead to operational disruptions, reduced productivity, and increased downtime, undermining the benefits of automation and digitalization.



KEY TAKEAWAYS

A one-size-fits-all solution cannot service the growing connectivity needs of the industry. Building a robust and scalable solution requires network optionality and expert implementation.

Facility Connectivity needs to be seamless and robust



Distribution businesses need to operate in diverse indoor and outdoor environments. 'Zombie' connectivity zones lead to significant rework and productivity loss.

Ensuring seamless connectivity across all these spaces is crucial to maintaining smooth operations, as business operations increasingly rely on technologies that need robust connectivity.

It also serves as a platform for scaling existing technologies and adopting new ones, ultimately driving productivity and growth.

A Multi-network Approach may provide the best solution



Operational environments and the intensity of technology deployed differs by company and each distribution center. Therefore, the network requirements vary as well. The best approach may be a combination of Wi-Fi, private wireless and public wireless, depending on network requirements.

Businesses must deploy cost-effective, adaptable network solutions that offer redundancy and cater to unique operational requirements.

Such solutions should provide seamless integration with existing infrastructure while offering the flexibility to scale and adapt to future needs.

Private Networks Are Key to a robust solution



Private wireless networks offer a tailored approach to connectivity, ensuring consistent and predictable coverage and bandwidth.

By providing dedicated network infrastructure, private wireless networks eliminate issues associated with traditional WiFi, such as interference and congestion, while providing redundancy.

This customized solution is designed to meet the specific needs of each facility, supporting critical business applications and facilitating the adoption of innovative technologies.

Implementation Expertise is a key to success



Deploying an effective network involves overcoming physical obstacles, interference, and coverage issues.

Common errors include inadequate site surveys, poor access point placement, ignoring interference, and underestimating bandwidth needs, leading to congestion and weak signals. Misconfigured equipment and neglected software updates further degrade performance and security.

Addressing these challenges requires thorough planning, expert knowledge, and a tailored network design and deployment approach.



Executive Perspective



Michael Weller

Practice Leader – Manufacturing,
Energy and Utilities
Verizon Business

From increasing order customization, challenging worker shortages compounded by technical skill gaps, and growing supply chain costs, distribution organizations need to leverage innovative solutions to help them increase productivity, operational safety and agility, all while doing it as efficiently as possible. Fortunately, technological advancements have provided powerful solutions for improving warehouse operations.

Mobile devices and applications have emerged as critical tools for distribution center and warehouse workers, enabling them to work smarter, not harder. Distribution operations recognize the importance of mobile tools, as 81% of the survey respondents indicated that they have or plan to deploy mobile devices such as scanners and tablets for the workforce by 2026. Distribution organizations are also focused on achieving real-time inventory tracking by 2026 with the deployment of RFID/IoT technology (49%) and leveraging robotics for picking and packing products (45%).

These connected use cases are heavily dependent upon the availability of reliable wireless connectivity across the entire enterprise facility. This includes indoor/outdoor spaces, the “canyons” of racks and shelves, and sometimes large open spaces. Inconsistent connectivity or dead zones result in technologies and devices that are rendered ineffective, resulting in reduced operational efficiency.

Traditional Wi-Fi in industrial environments too often delivers insufficient coverage, unreliable quality of service, mobility hand-off issues between access points and requires an extremely high density of Wi-Fi access points.

The best connectivity option for distribution centers with bandwidth intensive technology that requires continuous connection is often a private wireless network capable of delivering both 5G and 4G LTE services. 5G and 4G private wireless networks create reliable, secure connectivity environments to support a large number of connected devices, data volume and high-fidelity applications in a variety of operating environments.



Executive Perspective



Sandra Cutrona

Vice President of Sales and Business
Development for Verizon
Ericsson

Warehouses and distribution centers are increasingly adopting the power of advanced technologies to transform into more productive and sustainable logistics hubs, creating the logistics centers of the future.

The study showed us the challenges operations and IT executives are facing today. They are trying to keep business operations resilient to unforeseen demands, labor shortage, rapid shifts in customer behavior and supply chain issues, while maintaining business continuity. They need to improve their efficiency and increase productivity, while enhancing sustainability. They are seeking to make intelligent business decisions and be flexible to grow their business, without additional costly infrastructure investment.

At Ericsson, we believe that connectivity is key to addressing most of these critical challenges and the study confirms that, as 65% of respondents feel that their current network cannot support their needs for a seamless, robust and scalable solution.

With our high-performing neutral host 5G private networks operating as one cell, a diverse range of wireless devices can move smoothly inside and outside the warehouse without being interrupted by handovers, dead zones nor network delays. Powered by reliable, seamless connectivity, workers can use hand-held devices such as tablets, personal data assistants to access data, enabling them to make quick decisions and manage inventory precisely. By utilizing advanced real-time data, the connected operations can take the next step into enhanced coordination and enabling swift decision-making and optimized resource allocation.


Our solutions can provide that wireless, mobile and cloud connectivity platform that will create the desired agility to efficiently adapt and respond to market change, and advance operations to become more automated, productive, and sustainable.


Glossary of Key Terms


What is a private wireless network?

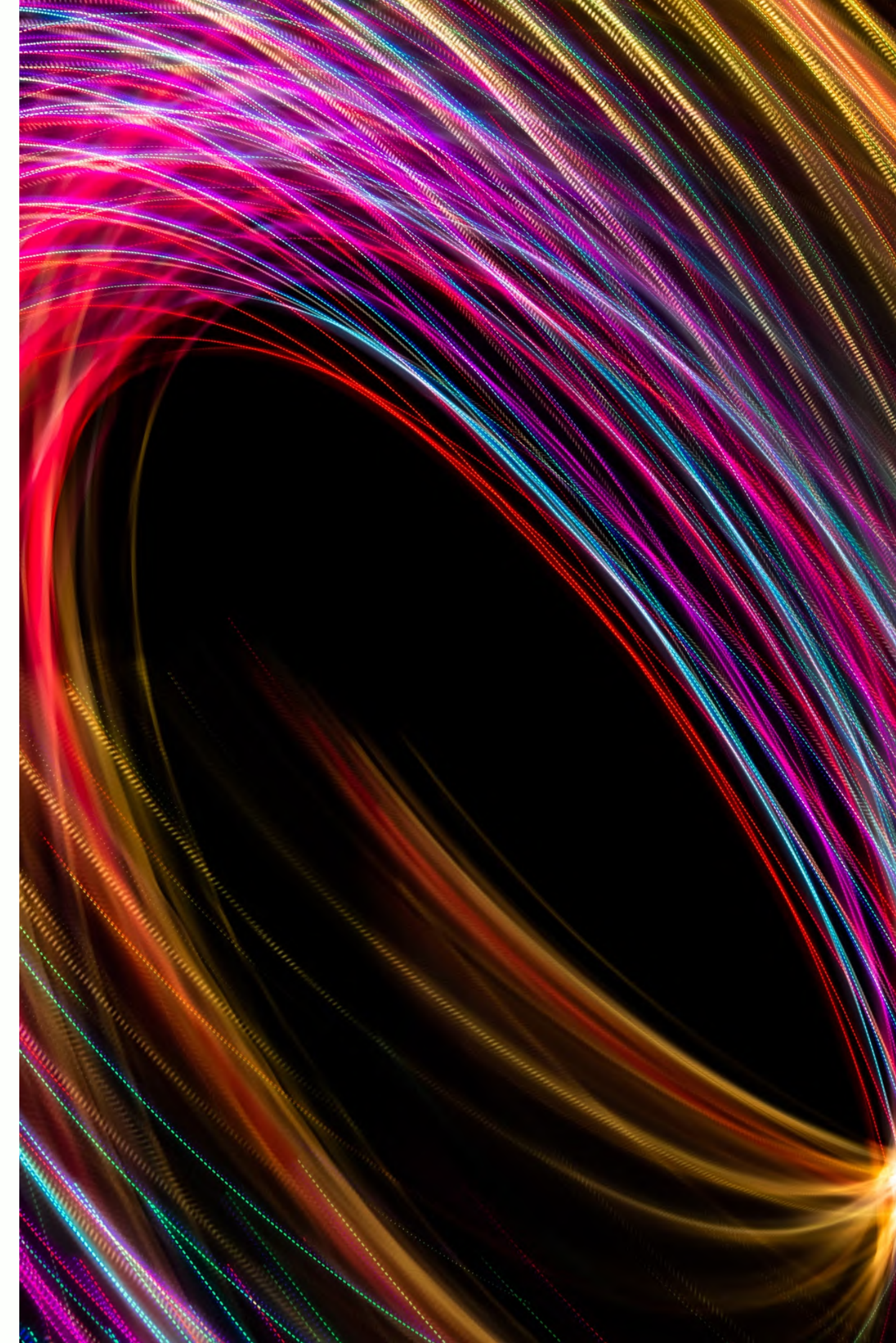
Private wireless networks are enterprise-specific 4G LTE or 5G wireless implementations that can be created for indoor or outdoor environments. Because they are enterprise-specific, they are segregated from public networks – cellular communication stays on premises – and can be configured to the organization’s specific security and performance requirements.

 **Private 5G networks** are considered relatively easy to integrate for organizations that already have 4G LTE connectivity. They enhance organizational capabilities by providing high bandwidth, low latency coverage that can support scaled implementations of artificial intelligence and machine learning, virtual and augmented devices, remote monitoring, IoT devices and other networked devices. Controlled authorized user access and device management and the inherent privacy of on-premises networking help keep the network secure. Private networks can operate on licensed or unlicensed spectrum.

 **Licensed spectrum** is dedicated for the use of the entity that holds the license, for example a telecom provider or the military. By purchasing separate spectrum licenses, Verizon and other wireless providers avoid interfering with each other’s networks.

 **Unlicensed spectrum** (also known as “CBRS,” or Citizens Band Radio Services) comes without some of the regulatory protections that apply to standard, licensed bandwidth. Although unlicensed spectrum can enable some higher performances, the lack of regulatory protections increases the risk of interference and can reduce the overall value proposition of the deployment.

 A **neutral host network** provides cellular coverage for distinct private and public use cases; it can allow employees and the general public, no matter their mobile provider, to achieve a strengthened mobile signal via dedicated network infrastructure on a specific premises or campus. Combined with a private network, enterprises can manage both business-critical connected operations (via the private 5G network) and conventional but strengthened public-network connectivity to phones and tablets (via the neutral host network), where signals might otherwise be weak.





ABOUT INCISIV

Incisiv is a peer-to-peer executive network and industry insights firm for consumer industry executives navigating digital disruption.

Incisiv offers curated executive learning, digital maturity benchmarks, and prescriptive transformation insights to clients across the consumer and technology industry spectrum.

[incisiv.com](https://www.incisiv.com)

SPONSORED BY



ABOUT VERIZON

Verizon Communications Inc. (NYSE, Nasdaq: VZ) powers and empowers how its millions of customers live, work and play, delivering on their demand for mobility, reliable network connectivity and security. Headquartered in New York City, serving countries worldwide and nearly all of the Fortune 500, Verizon generated revenues of \$134.0 billion in 2023. Verizon's world-class team never stops innovating to meet customers where they are today and equip them for the needs of tomorrow.

[verizon.com](https://www.verizon.com)



ABOUT ERICSSON

Ericsson is a leading provider of mobile connectivity solutions to telecom operators as well as enterprises in various sectors. Together with our customers and partners in the ecosystem, we are leading the next wave of digitalization in society. We provide high-performance, differentiated and programmable networks and make advanced network capabilities available to developers around the world. Through world-leading research, we drive new standards and are instrumental in the development of the next-generation mobile communications infrastructure, software, and services.

[ericsson.com](https://www.ericsson.com)