Article

Smart distribution

How robotics and 5G networks are revolutionizing distribution

verizon business

Leveraging robotics to improve distribution efficiency

With supply lines stretching across the world and a fast-growing digital marketplace dependent on them, distribution has never been more complex or more essential for success. To keep pace with innovation and surpass their competition, companies are integrating advanced robotics into their distribution systems. High-performance networks and 5G private wireless technology are essential to this transformation, enabling the productivity, accuracy and safety benefits that robots and automation can deliver.

Delivering solutions with robotics

Integrating robotics and automation includes reimagining your distribution strategy, upgrading your network infrastructure and retraining your workforce.

“Initial startup can be daunting,” said Katie Riddle, Global Retail Strategy Leader for Verizon Business. She believes that identifying qualified, experienced vendors to implement a roboticized distribution process is critical. “A robotics initiative is complex by design. Expert partnership is the essential prerequisite for converting a challenging deployment into a functioning, long-term asset.”

Adopting greater automation within your distribution operations has its challenges, but robotics can deliver outsized returns in efficiency, labor costs, safety and competitive advantage.

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> **Katie Riddle**
> Global Retail Strategy Leader, Verizon Business
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> Katie connects business strategy across Verizon’s consumer retail business, global enterprise clients and retail product development teams to bring digital transformations into reality. She’s also a trusted voice in the industry, sharing keen insights on today’s most pressing technology challenges.

Benefits of robotics in distribution

Alleviated labor shortages
Repetition, physically demanding tasks and safety issues can lead to high turnover rates in warehouse positions. Robots can assume a wide range of these roles, allowing employees to focus on more complex, high-value work.

Enhanced efficiency and throughput
Robots can significantly increase the speed of picking, packing, sorting and other standard operations. They can handle single- and multi-caseloads, optimize movement, and work around the clock.

Improved accuracy and inventory management
Robots can help reduce the number of human errors in picking and packing for more accurate order fulfillment. They can also scan aisles and shelves in near real time to validate inventory management system records.

Improved safety
Robots can handle heavy loads and operate in hazardous environments, helping reduce the risk of accidents and employee injuries.

Cost efficiency and return on investment
The investment in distribution robotics can be offset by reduced costs for labor, overtime and insurance. Robots can reduce indirect costs, as well, such as training, workers' compensation and expenses related to injuries.

Increased customer satisfaction
Providing faster and more accurate order fulfillment may lead to higher customer satisfaction and a stronger market position.

22%↓
of total costs saved by companies that invested at least 20% of their IT budget in automation[1]

The robotic workforce

After decades of development and refinement, robots are critical assets in distribution, manufacturing and other sectors. However, while the automated revolution continues to advance, the human element will remain an important part of automated distribution.

“Robotics can perform at speeds that humans can’t match,” Katie said, but there are some tasks better left to humans. “In a grocery distribution center, it makes sense to manually choose produce because the human eye can easily distinguish good and spoiled food. Also, humans can be gentler than robots with delicate items like eggs.”

Additionally, by assigning robots to do most repetitive tasks, employees are free to focus on more complex jobs, such as problem-solving and operational oversight.

Automated guided vehicles (AGVs)

AGVs follow preset paths within warehouses to transport products for picking, packing and shipping.

Autonomous mobile robots (AMRs)

AMRs use sensors to navigate dynamically within distribution centers, transporting products for picking, packing and shipping.

Robotic arms

Equipped with sensors and advanced grippers, robotic arms are used for picking, packing and palletizing products with speed and precision.

Automated storage and retrieval systems (AS/RSs)

Using stacker cranes and shuttles, AS/RSs automate the storage and retrieval of items within densely packed shelving systems that optimize vertical space.

Drones

These unmanned aerial vehicles can conduct surveillance and inventory checks by flying over warehouse shelves.

Specialized robots

Specialized robots automate repetitive tasks such as sorting, packaging and cleaning. For moving larger items, automated forklifts can take on the work.

Roadblocks to automated distribution

All the advanced automation hardware in the world can't build results if the individual robots can't communicate with each other or their human coworkers. Wired solutions, the traditional communication method, are expensive and time-consuming to install. Even more problematic, wired solutions are unusable by AGVs, AMRs and drones.

Wi-Fi, the default wireless technology in many distribution centers, is not suitable for demanding automated robotic workflows. Its coverage is inconsistent in expansive, complex environments. Large machinery, racks, walls and other physical obstructions can cause interference, unreliability and connectivity dead spots. To overcome Wi-Fi range limitations, it would require the installation of an enormous number of access points.

"Using robotics on Wi-Fi is not recommended. When you have handoffs from different Wi-Fi access points, a signal could be lost for a second or two," Katie said. "That could end up damaging merchandise."

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Private 5G networks: **Enabling smart distribution**

With faster speeds, greater throughput and lower latency, private 5G networks are ideally suited to address the limitations of industrial Wi-Fi. Private 5G networks offer near-seamless, continuous coverage over large areas, inside and out. Because they can operate on dedicated spectrum, private 5G networks also provide enhanced interference mitigation and quality of service.

Distribution centers that use advanced robotics and automation will not only operate differently, but they will also look different. Fewer hardwires hanging from the rafters. Robots that work with an impressive degree of synchronicity and interaction. Humans will be present, too, working in highly skilled roles that bring more value to the organizations.

5G advanced robotic network requirements

Low latency and high throughput
Robots and control systems must be able to communicate in near real time to function effectively. This consistent flow of information can help build safe and efficient routing.

Edge computing
On the warehouse floor, autonomous systems such as AGVs and AMRs execute split-second decisions to navigate around obstacles. To help improve safety, edge computing processes data closer to its source, supporting low-latency applications instead of waiting for a distant, centralized system to process the information.

Network resiliency
The network must be able to maintain performance under heavy data loads to strengthen uptime and other important metrics for your distribution.

Scalability
As the pace of technology continues to accelerate, a high-capacity distribution network must be able to support additional devices and evolving demands without compromising performance.

Network optionality
The ability to seamlessly integrate legacy equipment and existing networks into new systems can significantly reduce upgrade costs and lower disruptions to daily operations.

The foundation of robotics in distribution

With investments in advanced robotics, distribution centers can achieve a high degree of efficiency, safety and productivity. It's the kind of competitive advantage every company needs.

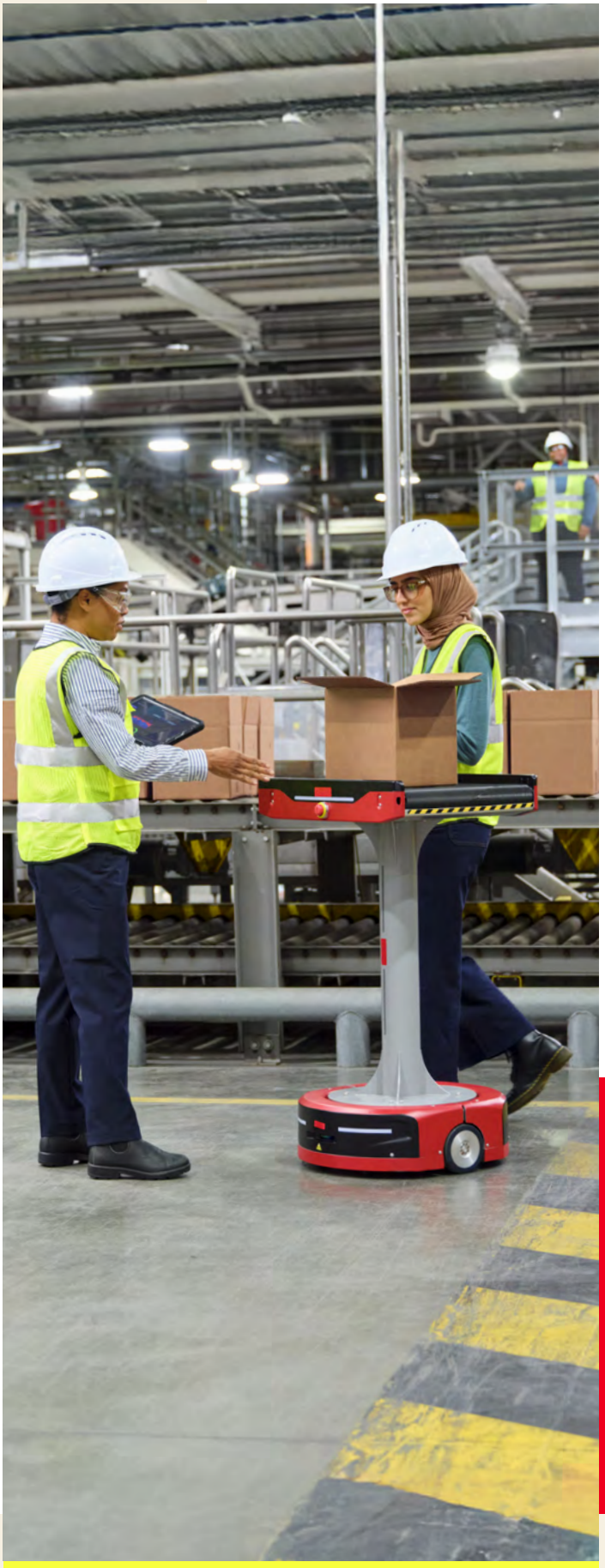
What's more, the future of distribution is much closer than you think. Forward-looking companies are laying the foundation for automation by installing private wireless networks today.

Private 5G Network

Verizon Private 5G Network can help strengthen operations by providing precise and pervasive coverage in even the most challenging environments. Tailored to your exact business requirements and facilities, Private 5G Network includes:

- Built-in security and low latency for critical processes and applications
- Flexible spectrum options to support your connectivity – licensed, dedicated spectrum for dependable performance of critical applications or unlicensed spectrum
- A powerful, single online portal for easy user and device authentication and network performance monitoring and reporting

With Private 5G Network connectivity and managed services from Verizon, companies can focus less time on their networks and more time optimizing their operations to better compete in the marketplace.



Why Verizon Business

We understand that the future of distribution will run on wireless networks. That's why Verizon offers the vision, technology and hard-won experience to help enterprises reimagine how their most important systems work.

We have unique insight into distribution, thanks to our nationwide network of stores.

"As a retailer, we have our own distribution centers and warehouses," Katie said. "We are experienced at doing this for ourselves and many other enterprises."

Verizon Business at a glance

- 4,000+ networks served globally
- Recognized as a Leader in the first-ever Gartner® Magic Quadrant™ for 4G and 5G Private Mobile Network Services[2]
- Recognized as a Leader in the 2025 Gartner® Magic Quadrant™ for Managed IoT Connectivity Services, Worldwide[3]
- Deterministic networks expertise – combining a guaranteed level of network service/bandwidth with tailored solutions

Learn more

Ready to take your distribution to the next level? Verizon Business can help you implement your private wireless network, the future-ready foundation of next-generation distribution. To schedule an innovation session, contact your Verizon Business representative.

1. "Automation Scorecard 2024: Lessons Learned Can Inform Deployment of Generative AI," Bain & Company, Jun 2024. https://www.bain.com/insights/automation-scorecard-2024-lessons-learned-can-inform-deployment-of-generative-ai (Used with permission from Bain & Company)
2. "Magic Quadrant for 4G and 5G Private Mobile Network Services," Gartner, Jan 6, 2025. https://www.gartner.com/doc/reprints?id=1-2J9ZQDL4&ct=241105&st=sb
3. "Magic Quadrant for Managed IoT Connectivity Services, Worldwide," Gartner, Mar 11, 2025. https://www.gartner.com/doc/reprints?id=1-2KJCEEZ2&ct=250314&st=sb

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