Quick Answer: Manufacturing CIOs Are Using Intralogistics Smart Robots to Proliferate Smart Factories

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> Intralogistics smart robots are replacing conventional automated robots in both manufacturing and warehousing. Manufacturing CIOs should take advantage of their easier implementation and varying use cases now available to not only solve key business problems but also create new opportunities.

Quick Answer

How can manufacturing CIOs use intralogistics smart robots (ISRs)?

■   Attract the next generation of talent to manufacturing to not only satisfy the labor shortage gap but also increase factory productivity with the latest innovative technologies.

■   Implement flexible automation using ISRs' more than 29 automation use cases to better manage extremes in peaks and troughs of demand exacerbated by growing pressures to become a smart factory and the future of work.

More Detail

Over the years, manufacturers have increased their level of automation, with the evolution of robotics in the factory going from expensive, traditional, bolted-to-the-floor materials handling equipment to affordable, flexible, automated intralogistics smart robots (see Figure 1). This has been driven by changing market dynamics:

■   Lower price of entry and faster time to value, which opens the market to more companies that can justify and afford automation through ISRs

- Increasing need to improve productivity and waste reduction, which is leading manufacturing CIOs to implement smart factory technologies to accelerate yield production

- A labor shortage that is straining manufacturers in hiring and retaining new and younger talent

Figure 1: Automation Continuum
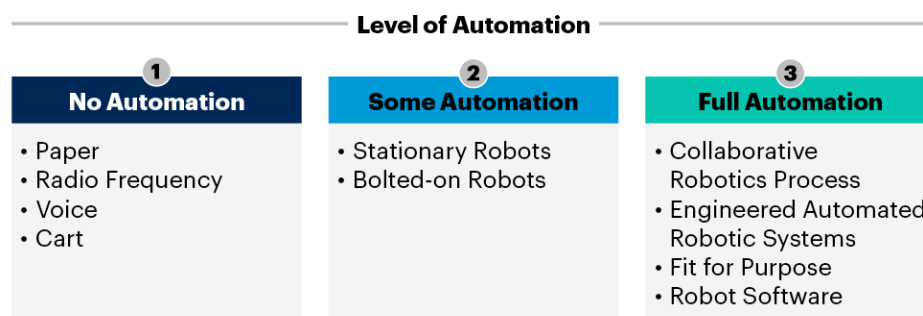
Source: Gartner
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Results from the 2020 Gartner Smart Manufacturing Strategy and Implementation Trends Survey [1] illustrate the changing landscape:

- 71% of manufacturers piloting, implementing or using **autonomous things** (e.g., robotics, automated guided vehicles [AGVs] and autonomous mobile robots [AMRs]) as a crucial part of their smart factory initiative.

- 77% of manufacturers piloting, implementing or using **Internet of Things (IoT)** because it is the underlying platform that interconnects ISRs to production applications.

- 71% of manufacturers are piloting, implementing or using **artificial intelligence** (AI). By 2025, 65% of global manufacturers will invest in edge AI as a part of their IoT-enabled hyperautomation strategy, up from fewer than 10% in 2022 (see Predicts 2022: Manufacturing CIOs Increase Responsibilities for Sustainability and Operations).

Intralogistics smart robots can also create new opportunities:

- **Addressing the labor shortage** by reducing or eliminating low-value tasks like moving goods.

- **Removing safety hazards from humans** working in manufacturing

- **Addressing quality and/or regulation control** by enabling manufacturing plants to implement advanced computer-vision technologies to ISRs for agile-inspection analysis

Attracting the Next Generation of Talent to Manufacturing With ISRs

ISRs are appealing to the next generation of talent that is considering a career in manufacturing. The older generation working in manufacturing is nearing retirement. [2] To potentially off-set the labor shortage among global manufacturers, ISRs can help attract younger talent that would be interested in working with innovative technologies like ISRs.

Innovative ISR examples include:

- Collaborative robotic processes and/or engineered automated robotic systems — eliminating the repetitive human touches to increase automation and production

- Transport robotics — accelerating pallet movement for delivery and inspection, and transport to different workstations of the production line

- Robot software (such as AWS IoT RoboRunner and SVT Robotics) — interconnecting heterogeneous fleets of robots (e.g., FANUC, Universal Robots, Boston Dynamics) all under a ubiquitous software platform for integration, orchestration and device management (These types of emerging solutions bring condition-based monitoring and asset tracking of inventory.)

Adding Flexibility With 29 New ISR Smart Factory Use Cases

The 2020 Gartner Smart Manufacturing Strategy and Implementation Trends Survey [1] reveals that, among the manufacturing respondents who participated in the survey and whose organization had a smart manufacturing strategy, 71% were either piloting, implementing and/or using autonomous things (robotics, AGVs, etc). [1] The driver for this growth is the need for greater automation due to factors such as labor constraints and, in some scenarios, cost reduction.

There is also a need for flexible automation that is different from heavily engineered, traditional bolted-to-the-floor materials-handling equipment automation, which is typically unscalable and does not proliferate many connected factory and automation use cases. Flexible automation can more readily be implemented and is also typically more scalable to better manage extremes in peaks and troughs of demand exacerbated by growing pressures and the future of work.

ISR vendors have provided 29 new use cases that can now be attractive to manufacturing CIOs (see Table 1). With a large number of intralogistics smart robot use cases, it is important that manufacturing CIOs and supply chain leaders work jointly. They should evaluate the best fit to fulfill the unique needs based on product types, weights, dimensions, volumes, order types and activities to support.

Manufacturing CIOs should ensure that the underlying architecture (e.g., IoT, edge, AI) is prepared to incorporate ISRs into it. Manufacturing CIOs should be aware of which types of intralogistics smart robot use cases to incorporate that can take full advantage of the architecture. ISR solutions typically add intelligence, guidance and sensory awareness, allowing them to operate independently from and/or around humans.

Table 1: Intralogistics Smart Robot Functions and Use Cases

(Enlarged table in Appendix)

Intralogistics Smart Robot Functions	Use Case
Transport	■ Autonomous lift trucks ■ Smart AGV (carry with fork) ■ AMR-carry-on-top (HP) ■ Tugger ■ Case/tote delivery ■ Manual loading
Collaborative robotics process	■ In-aisle picking or person to goods with robot ■ Goods to person by robot ■ Mobile robot picking delivery to putwall ■ Picking robot (arm) ■ Mobile robot plus robotics arm
Engineered automated robotic systems	■ Engineered robotic goods-to-person (G2P) system ■ Intelligent robotic fulfillment system ■ Automated microfulfillment center ■ Goods to robot to robot ■ Sortation robots
Fit for purpose	■ Inspection robots ■ Exoskeleton ■ Floor-cleaning robots ■ Outdoors (pattern and boundary) ■ Outdoors (point to point) ■ Autonomous yard trucks ■ Load/unload robots ■ Autonomous delivery robots ■ Scanning robots (e.g., RFID) ■ Disinfecting robots
Robot software	■ Multirobot orchestration platforms ■ Fleet management software

Source: Gartner

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Evidence

[1] **2020 Gartner Smart Manufacturing Strategy and Implementation Trends Survey.** This survey was conducted online from 23 October through 3 December 2020 to help develop and ratify roadmaps, assess organizations' strategies against a collective market perspective, and ensure their strategies for recovery and renewal are as future-proof as possible.

In total, 439 respondents were interviewed in their native language across North America (n = 160, including the U.S. and Canada), Western Europe (n = 184, including the U.K., France, Germany and Sweden) and Asia/Pacific (n = 95, including Australia, New Zealand and Singapore). Qualifying organizations operate in the manufacturing industries and report enterprisewide annual revenue for fiscal 2019 of at least $1 billion in the U.S. or $500 million U.S. dollars or equivalent for the rest of the geographies included.

Qualifying organizations had a smart manufacturing strategy or plans to deploy. Qualified participants had a role tied to a supply chain function and were in a director or above role. All respondents were involved in their company's decisions related to manufacturing operations and/or overall manufacturing strategy.

Disclaimer: Results of this survey do not represent global findings or the market as a whole, but reflect the sentiments of the respondents and companies surveyed.

[2] Georgia-Pacific Leverages its Digital Transformation to Bridge the Skills Gap, Automation World.

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