Chief Robotics Officer: A Top Automation Trend for 2022

> As the use and scope of robotics automation grows, companies will need to add a new role responsible for automation strategy through building and overseeing the emergent organization. Supply chain leaders should use this trend analysis to evaluate this new position.

Overview

Opportunities

- Business conditions across industries are driving companies to increase the use of cyber-physical automation, especially smart robots. A chief robotics officer with technical, business and engineering competencies will be needed to socialize this technology across the business more rapidly and effectively.

- To maximize the value of investing in smart robots, strong leadership will be necessary to create and oversee an organization that will own and manage these technologies.

- Developing an organization responsible for cyber-physical automation and robotics led by a chief robotics officer (CRO) will enable more coordinated and formal management of cyber-physical technologies. The coalescing of skills and competencies will also allow a shift from bottom-up physical automation decisions made by operations to more top-down strategic decision making and oversight led by the chief supply chain officer (CSCO).

Recommendations

Supply chain leaders responsible for strategy realization should commit to:

- Taking full advantage of growing trends in robotics by creating a CRO or equivalent role within their organization.

- Seeking a chief robotics officer candidate who can combine the skills of a communicator, integrator, collaborator, strategic thinker, problem solver and innovator with a working knowledge of the requirements and outcomes of leveraging cyber-physical automation.

- Organizing to maximize the return on robotics investments by building a robotics center of excellence (COE) with multiple functions, including knowledge gathering, education, innovation, problem solving, socialization, organization and coordination, collaboration, and governance and control.

Strategic Planning Assumption

By 2026, 25% of large enterprises in supply-chain-dependent industries will have established a CRO or equivalent.
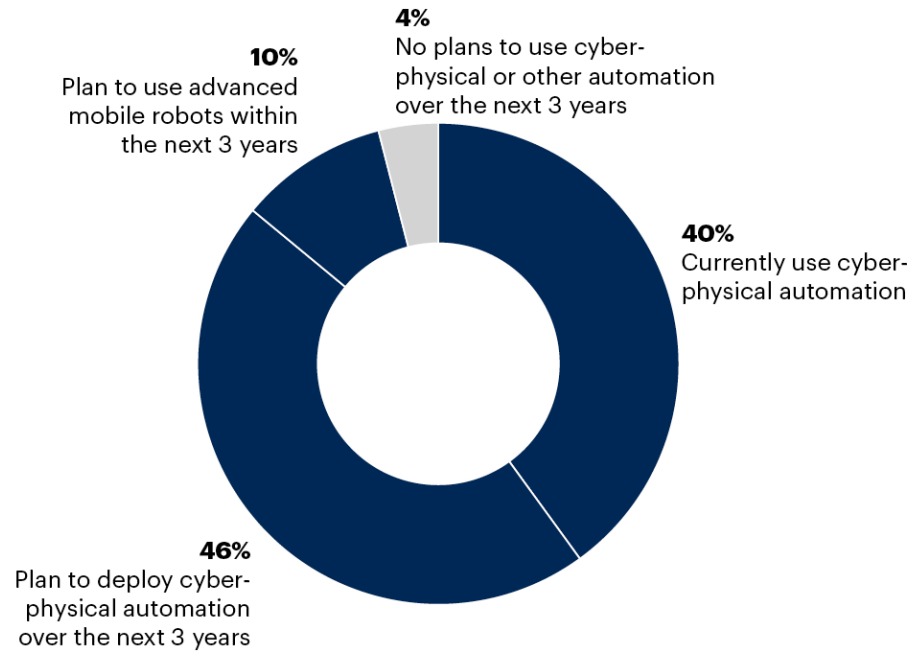
What You Need to Know

Use of robotics across industries and geographies is not a question of if, but of when and how much. This is happening in every industry, including (perhaps surprisingly) large deployments in healthcare. The automotive industry has deployed robots for nearly five decades and many automotive companies have built organizational structures to support them.

Gartner projects that over the next decade, 75% of indoor material handling will be done by mobile robots. According to our 2021 Gartner Supply Chain User Wants and Needs survey, [1] a staggering 96% of supply chain professionals say they either have invested, or plan to invest, in cyber-physical automation in warehousing and manufacturing operations over the next three years (see Figure 1). In the same survey, 65% of respondents say it is very important for them to have automation and robotics engineers as part of their supply chain organization (see Figure 2). That shows the importance of technical roles and competencies to supply chain organizations over the next five years.

Figure 1. Use of and Plans for Cyber-Physical Automation in Warehouses and/or Manufacturing Operations

96% of Respondents Say They Use or Plan to Use Cyber-Physical Automation in Their Warehousing and/or Manufacturing Operations

4%
No plans to use cyber-physical or other automation over the next 3 years

10%
Plan to use advanced mobile robots within the next 3 years

40%
Currently use cyber-physical automation

46%
Plan to deploy cyber-physical automation over the next 3 years

n = 517 supply chain professionals, excluding "don't know"

Q. Does your organization currently utilize or plan to use cyber-physical automation (e.g., industrial robots, mobile robots, material handling, conveyor/sortation, storage and retrieval, automated guide vehicles) in its warehouses and/or manufacturing operations?
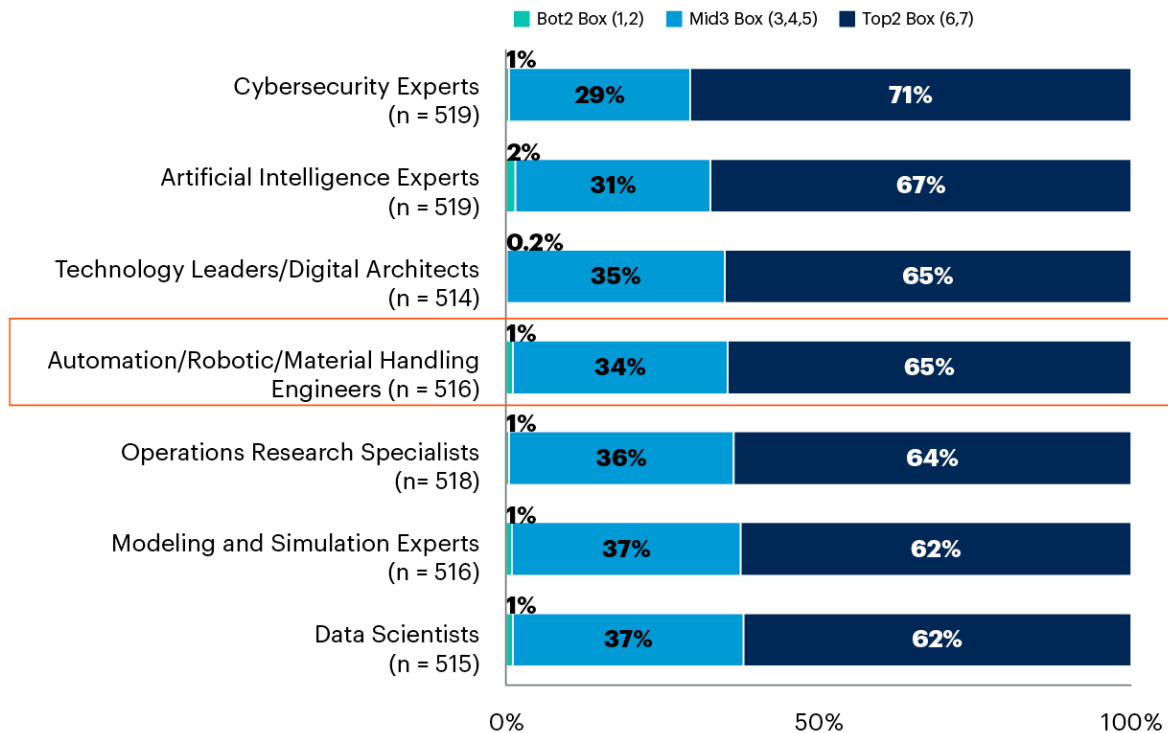
Source: 2020 Gartner Supply Chain Technology User Wants and Needs Survey

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Figure 2. Importance of Critical Technical Roles and Competencies Over the Next Five Years

Importance of Critical Technical Roles and Competencies Over Next Five Years
1: Not at All Important to 7: Extremely Important

Legend: ■ Bot2 Box (1,2) ■ Mid3 Box (3,4,5) ■ Top2 Box (6,7)

Role	Bot2 Box (1,2)	Mid3 Box (3,4,5)	Top2 Box (6,7)
Cybersecurity Experts (n = 519)	1%	29%	71%
Artificial Intelligence Experts (n = 519)	2%	31%	67%
Technology Leaders/Digital Architects (n = 514)	0.2%	35%	65%
Automation/Robotic/Material Handling Engineers (n = 516)	1%	34%	65%
Operations Research Specialists (n= 518)	1%	36%	64%
Modeling and Simulation Experts (n = 516)	1%	37%	62%
Data Scientists (n = 515)	1%	37%	62%

n = Varies for each role, excluding "don't know"

Q. How important do you see the following roles and competencies being within your supply chain organizations over the next 5 years?
Source: 2020 Gartner Supply Chain Technology User Wants and Needs Survey
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However, most organizations today are not organized to support this growth in demand for and deployment of robots. While they can supplement the lack of skill sets with consultants and vendors in the short term, this is not a viable long-term strategy. Some innovations in automation we originally believed would take place over the next 10 years have arrived after only three. For example, robotic picking systems have matured quicker than expected due to rapid learning of the AI-based pattern recognition technologies at the heart of these systems. This inevitable growth — coming faster than previously imagined — will require the creation of an organization to manage all this new automation.

We believe these technologies will become so pervasive so quickly that organizations will need to move from a traditional bottom-up decision-making process for robots and automation to a top-down strategic approach. This will help to better manage that inevitable process and prevent uncoordinated, inefficient and, perhaps, contradictory and chaotic deployments.

Historically, for example, material-handling automation decisions were driven by warehouse operations teams. They would identify the need, conduct the evaluation and eventually build the investment business case to present to supply chain leadership for approval. Now, conversely, for a grocery retailer considering deploying robotic microfulfillment centers, these decisions are driven, and led, by senior leadership. These changes require a CRO to be the C-level spokesperson and leader for robotics growth. Companies need to recognize this will require blending of business, information technology and cyber-physical engineering skill sets that currently exist in isolation.

Profile: Chief Robotics Officer

Description

We believe the CRO role will emerge because the explosion in robotics use requires a leader with a new, blended skill set who oversees an organization that manages the entire robotic life cycle. This skill set needs to balance business, IT and engineering skills to effectively provide strategic oversight of a new organization to manage the automation. The CRO will require these key competencies:

- Communicator

- Integrator

- Collaborator

- Strategic thinker

- Problem Solver

- Innovator

In the past, the process of automation was functionally led from the bottom up. Someone within the organization saw an opportunity to automate a discrete function and a robot was deployed. Now, however, automation needs to be strategy-led from the top down, with decisions made by executives who understand how robots and automation technologies can help them solve business problems. In fact, all levels of the supply chain leadership will need some understanding of how robotics figure into day-to-day operations.

According to our 2020 Gartner Supply Chain Wants and Needs survey, 82% of respondents say that when it comes to supply chain leaders of the future, technical — or hard — skills will begin to dominate their skill sets as automation, algorithms, smart machines and artificial intelligence become more prevalent.

The CRO and the attendant organization will grow from — and initially operate within — a robotics COE that takes on multiple roles, such as:

- Knowledge gathering (about the market and vendors)

- Education (of the business and leadership)

- Innovation

- Problem solving

- Business-case identification, analysis and development

- Socialization (across the organization)

- Organization and coordination

- Collaboration

- Governance and control

Why Trending

Over the next decade, automation will experience double-digit compound annual growth rates across industry sectors. According to Fortune Business Insights, "The global industrial robots market is projected to grow from $15.60 billion in 2021 to $31.13 billion in 2028 (a CAGR of 10.4% over the forecast period)." [2] Research and Markets states the "global autonomous mobile robots market generated $29.3 billion revenue in 2019, and projects this market will reach $220.6 billion in 2030, representing a CAGR of 18.3% over the forecast period." [3] In its Medical Robots Market, Markets and Markets says, "The global medical robots market is expected to reach $12.7 billion by 2025 from an estimated $5.9 billion in 2020 at a CAGR of 16.5% during the forecast period." [4] With this sort of growth across industry sectors, fundamental changes in how the supply chain manages automation — along with who will manage it — are required merely to keep pace with the marketplace.

While few companies have grown their use of robotics to the point they see the compelling need for a CRO, there are growing examples of companies with this type of organization. For example, the automotive industry is the largest consumer of industrial robots dating back to the 1960s and has built entire organizations dedicated to the robotics life cycle. The leaders of these organizations might not be called CROs, but they fit the role's definition and responsibilities.

Amazon also presents an excellent example. The company's robotics focus goes back to around 2003 when Amazon Robotics was formed, and this was accelerated with its acquisition of Kiva Systems in 2012. Today, Amazon has more than 350,000 mobile robots that collaborate with its million-plus employees. This scale of automation cannot be haphazard and opportunistic, but must be managed — which requires an organization and its senior leadership.

Implications

Demand for, and deployment of, robots is happening, but for most organizations is not yet at the point where their ad hoc, chaotic approach is problematic. Eventually, organizations must take a more formalized approach to exert more control and avoid chaos. As an analogy, an ad hoc approach might work for owning one truck, but not for owning and managing a fleet of 1,500 trucks.

While the value proposition for robotics is very alluring, without a degree of control the return from investments will not live up to expectations. The reason is not that the technology does not work, but that the company would be unable to take advantage of it.

Growth is also fueled by identifying new use cases and repurposing technologies in creative ways. Again, this will require an organization that can help socialize these technologies across the business.

Some organizations have hired creative talent but have struggled to retain that talent because of a lack of career paths.

The creation of the CRO position, and its attendant career track, addresses all three of these issues.

Actions

- Build a robotics/automation COE with the long-term vision of this becoming the emerging organization.

- As the COE matures, create the leadership position to orchestrate this new function.

- Create a skills matrix to determine the skills you have and will need both in leadership and in the underlying organization.

- Create career paths to recruit, retain and grow robotics talent.

Evidence

[1] 2020 Gartner Supply Chain Technology User Wants and Needs survey. This survey was conducted from 2 November through 17 December 2020 to explore the roles digital and technology play in supply chain, how supply chain organizations leverage digital and technology for competitive advantage, how supply chain organizations are organizing to support their digital initiatives, and their changing views on how best to exploit emerging technology in their supply chain management (SCM) organizations.

A sample of 520 supply chain professionals, with their primary workplace located in North America (including the U.S., Canada and Mexico), Western Europe (including the U.K., Germany and France) and Asia/Pacific (including Australia, New Zealand, China, Singapore and India), completed a web-based survey.

Qualifying organizations operate in the manufacturing, retail, wholesale trade, transportation and logistics, healthcare provider, and natural resources industries and report enterprisewide annual revenue for fiscal 2019 of at least $100 million or equivalent.

[2] Automation/Industrial Robots Market, Fortune Business Insights.

[3] Autonomous Mobile Robots Market Research Report: By Offering, End User — Global Industry Size, Share and Trends Analysis, Forecast to 2030, Research and Markets.

[4] Medical Robots Market — Global Forecast to 2025, Markets and Markets.

Recommended by the Author

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