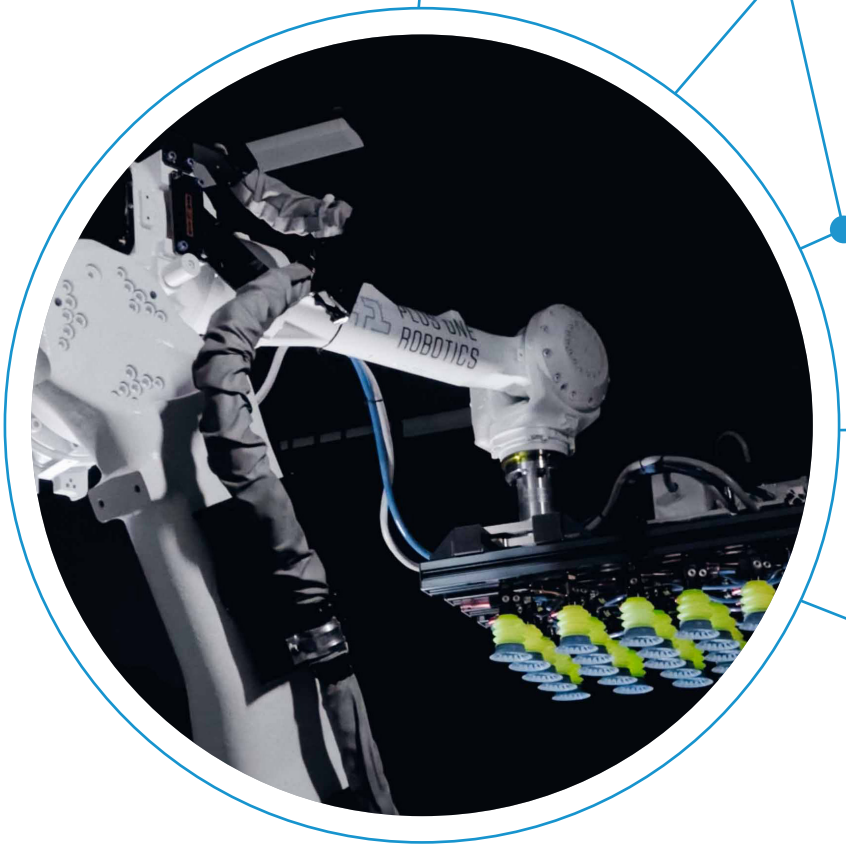
PLUS ONE ROBOTICS



PLUSONEROBOTICS.COM

Upskilling Employees with Robotics

Workforce Development in the Age of Automation Hypergrowth

Contents

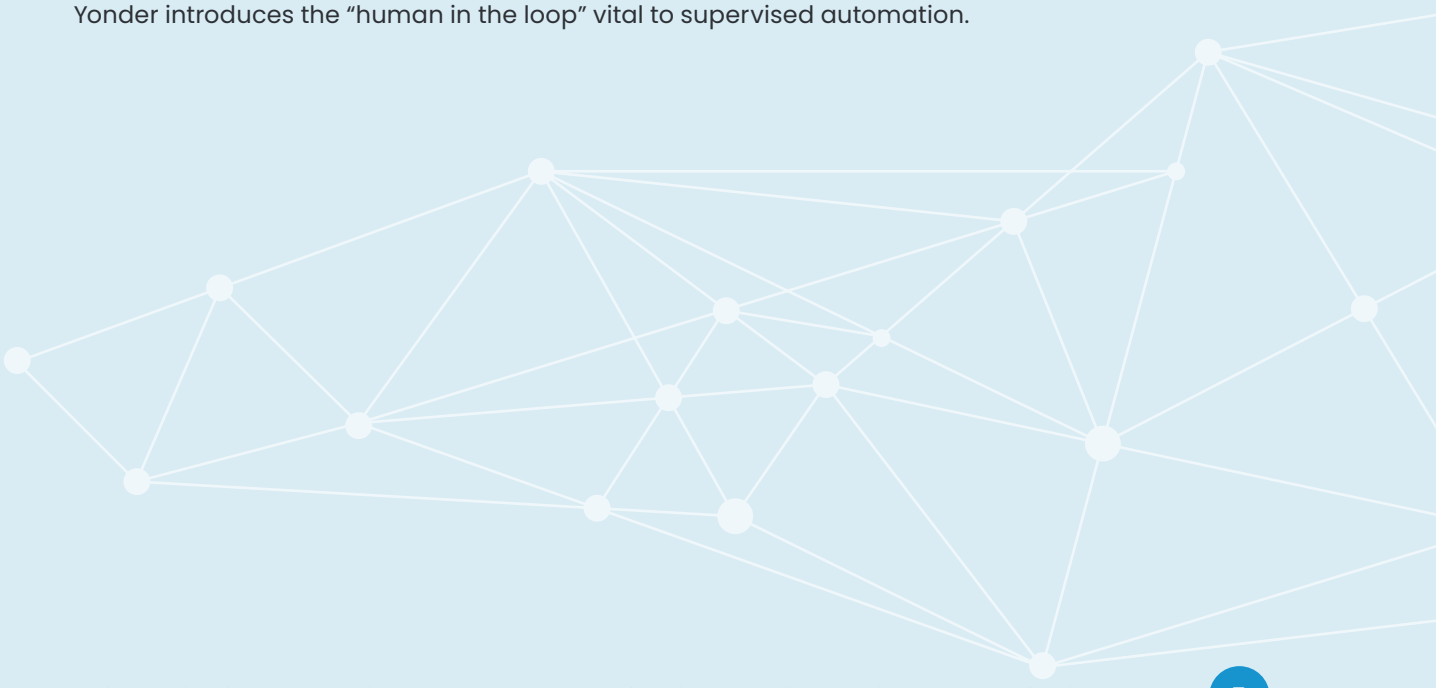
INTRODUCTION:

The Power of Robots isn't Automation, it's Leverage

One of the greatest myths surrounding automation is that bringing in robotics is going to inhibit jobs and opportunities for employees — especially in labor-intensive roles at factories, warehouses, and distribution centers. The truth is that robots can make people more successful at their jobs and vice versa.

In addition to providing greater throughput, the use of robotics can assist employees in performing their jobs safer and more effectively, as well as create an entirely new career category in which employees have greater responsibility and less monotony. This new category, focused on robot supervision and management, is poised for exceptional growth due to the proliferation of specialized automation and the immense expansion of robotic vocational programs and higher education opportunities.

This whitepaper explains the positive benefits of industrial robotics related to employment opportunities, employee happiness, and overall throughput. Specific types of tasks and automation solutions will be discussed, including **PickOne vision software** and **Yonder remote supervision sofware** from Plus One Robotics. PickOne will be highlighted because it can offer employees relief from physically demanding, repetitive tasks, such as depalletization, and Yonder introduces the "human in the loop" vital to supervised automation.



ROBOTICS CREATES JOB EVOLUTION, Not Elimination

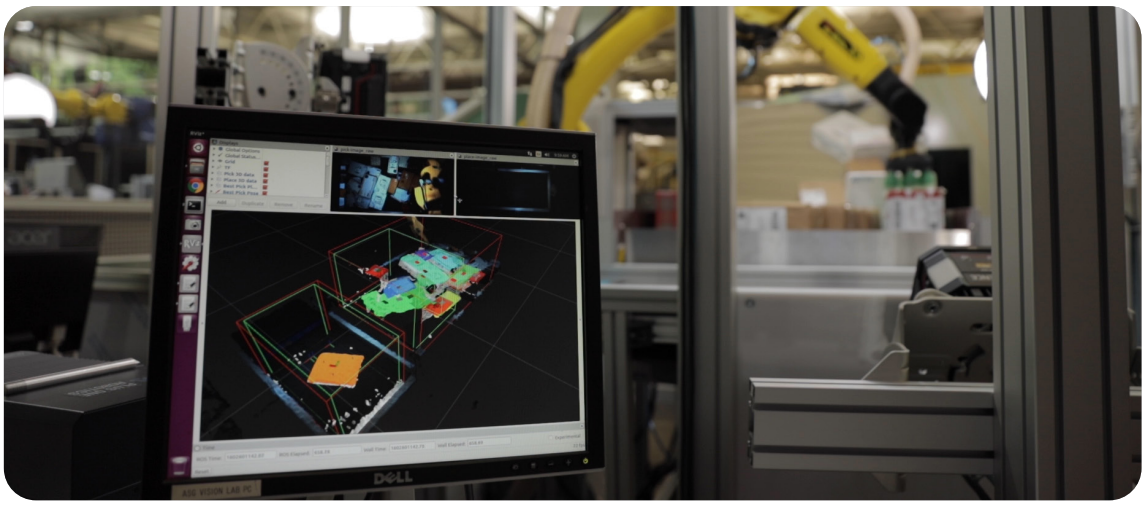
There are several myths around warehouse automation related to how it will affect employees. The primary one is that automating a warehouse will inherently cost employees their jobs. Though it seems counterintuitive, robotics actually has the potential to create more jobs.

When automation is introduced into a factory, warehouse, or distribution center, there is a need for new roles and responsibilities that involve robot supervision. Though robots are outstanding at performing repetitive tasks, they lag far behind human intelligence in terms of problem-solving.

Today's warehouse logistics are rife with "exceptions" that cause robots to stall or stop when they're unsure what steps to take next. These exceptions often include scenarios such as recognizing an imbalanced box, grabbing an oddly angled envelope, or moving items to get a better vantage point. For humans, these don't pose much of a problem. For robots, they do. And until the problem is solved, the automation stops.

To keep the systems running smoothly, people can oversee a number of robots at once and correct exceptions as they arise. This form of supervised automation (SA) requires the engagement of human employees in order to work effectively. Roles like this are more mentally stimulating and usually less physically demanding than manual labor tasks such as picking, depalletizing, and conveyor induction that the supervised robots can now perform.

One example of this can be understood with our **PickOne vision software** operating on a fleet of robotic picking arms. PickOne uses AI over time to learn how to handle exceptions, eventually reaching accuracy levels of 99 percent when picking items to pack. This impressive level of accuracy is made possible by keeping "humans in the loop" via **Yonder**.



PickOne uses AI over time, eventually reaching accuracy levels of 99 percent when picking items to pack.

Top supply chain challenges

rated extremely or very challenging by companies*

54%

HIRING & RETAINING QUALIFIED WORKERS

*2022 MHI Annual Industry Report

Yonder is our remote supervision software that leverages a human Crew Chief to instantly fix exceptions, train the AI to avoid future exceptions, and manage the work of a robot crew.

The Crew Chief helps deal with exceptions that derail automated solutions and slow warehouse operations down. When the robot reaches the point that it can't determine the correct action, a Yonder message is sent to the Crew Chief with an image of the scene the robot is processing. The Crew Chief reviews the scene, selects the appropriate item and action, and effectively tells the robot what to do next and the exception is solved.

Workers who previously performed repetitive and often dangerous tasks are freed by automation to upskill into other areas within the warehouse, like a Crew Chief, that can be more mentally challenging and fulfilling.

Engaged workforces see lower rates of turnover — something critical to the warehouse and supply chain space where labor shortages and soaring rates of turnover have been ongoing issues.

Yonder is our remote supervision software that leverages a human Crew Chief to instantly fix exceptions.

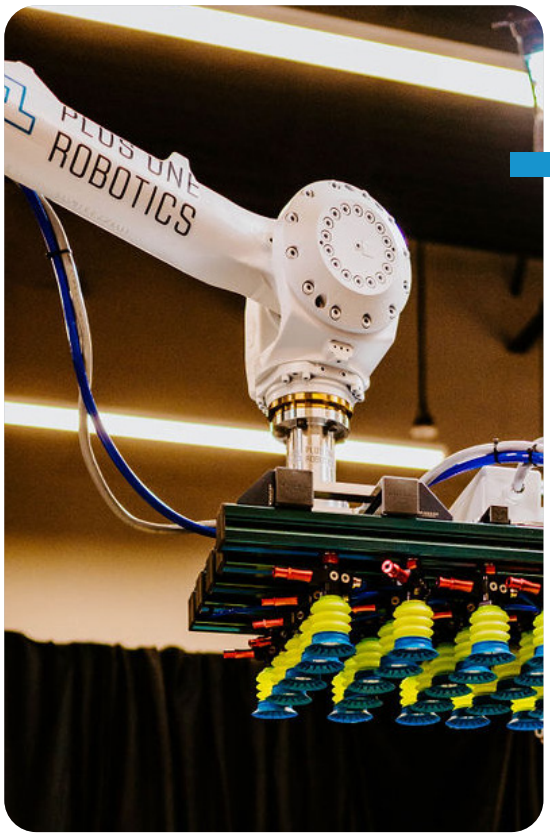
SPECIALIZED AUTOMATION REQUIRES

Special Supervision

A vital aspect of the growing robotic management workforce is the range of specialized robots in need of supervision. Just a few decades ago, the predominant type of automation was fixed articulated arms used on assembly lines for cars and other manufactured goods. Management of that automation required engineers who could fine-tune the robots to make sure they did their singular tasks well. Today, automation is much more flexible, scalable, and approachable (literally and financially).

In 2015, Dr. Gill Pratt hypothesized that automation was on the cusp of a Robotics Cambrian Explosion due primarily to cloud robotics and deep learning. By "Cambrian Explosion" Dr. Pratt was referring to the similar emergence and rapid expansion of new and diverse organisms roughly half a billion years ago. Of particular relevance to his analogy, organisms at that time began to develop much greater degrees of adaptation to their particular environments causing them to be much more specialized.

As it turns out, Dr. Pratt's comparison was an accurate representation. There are now AMRs, AGVs, cobots, humanoids, articulated robots, and hybrids — all of which have myriad forms, sizes, and uses.



A vital aspect of the growing robotic management workforce is the range of specialized robots in need of supervision.

Additionally, each robot can perform several combinations of tasks, depending on the environment in which it is deployed.

However, with great robotic power comes great robotic responsibility. These robots have an ever-increasing range of possible applications, requiring human managers who understand the goal of the task more than the intricacies of the robots themselves.

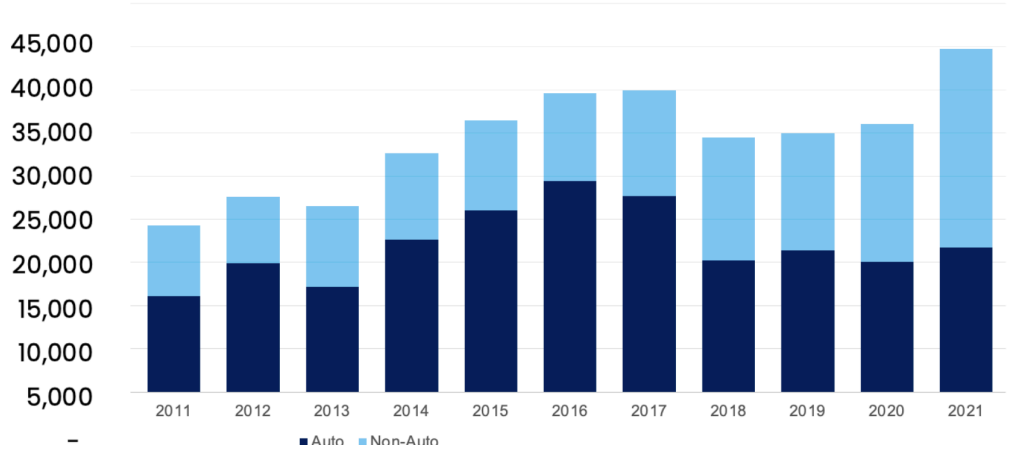
AUTOMATION IS MORE

Accessible Than Ever

Just a few years ago, adopting new automation solutions for warehouses and distribution centers required massive capital investment and more than a year to properly integrate and deploy. That's not the case any more. Today, robotics companies are designing hardware and software solutions for wider ranges of applications and budgets. For example, the initial investment is much lower with RaaS and SaaS options, and pilot programs and integration timelines are much faster and less expensive. All in all, it's never been easier for companies large and small to adopt automation, **and the data shows it.**

Auto vs. Non-Auto Orders

(Units, Annual, North America)



A3 Business Forum, Auto vs. Non-Auto Robot Units Ordered in North America,
Alex Shikany, Vice President – Membership & Business Intelligence, Association for Advancing Automation (A3)

In 2021,

the number of robots sold in North America rose 28% to 39,708 units, according to the Association for Advancing Automation, beating the previous high set in 2017.

Likewise, 2021 was the first time robot sales were greater outside of the automotive industry than in it. It was a watershed moment driven in no small part by automation in warehouses and distribution centers.

A NEW TYPE OF CAREER Is Emerging

Workforce development related to automation involves more than shifting employees into a new role. With the continually expanding use of robotics, these opportunities comprise an entirely new career path around supervised automation.

Traditionally, automation and the management of robots haven't found an easy home in a facility. It usually falls on the Operations (or Production) department or the Maintenance department. It's not an ideal fit for either. Operations is focused on ensuring orders hit the dock on time and Maintenance can often be stuck in a perpetual break-fix cycle dealing with the equipment already on hand. In both departments, robot technicians and the responsibilities they carry are not a natural fit.

One option that opens new career avenues for employees and recognizes the unique role human/robot collaboration can play in a warehouse is to have something akin to Toyota's Production Engineering (PE) department. Rather than concentrating primarily on throughput, like Operations, or on machine function, like Maintenance, this department shoulders the responsibility of the performance of robots as they relate to achieving goals. For example, a robot technician could be brought in to run an automated line to produce 2,000 pieces a day. If the line produces only 1,800 pieces one day, their job is to tune the process parameters to increase yield. Nothing is broken (which would require Maintenance) and there is no question on the timing or goal of the yield (which would require Operations). It's an issue related solely to how the robot or robots are being utilized.

In essence, this falls between Operations and Maintenance, yet in practice, it provides a more clearly defined range of skill sets centered on the use and management of robots rather than their ROI or mechanical health — a skill set that doesn't require advanced degrees in engineering or logistics to be successful. This role could be filled by a new hire with vocational training in robotics or an employee who had previously performed the manual labor associated with the tasks the robots are now performing.

In the case of an existing employee, they're able to step away from work that is usually extremely repetitive and physically demanding into a tech management role that offers more emotional satisfaction and intellectual stimulation.

In the case of a new hire with vocational training, there is an ever-growing batch of potential candidates each year. Robotics as teaching mechanisms have become commonplace for all students now K-12. In fact, the global educational robot market size is expected to grow from $1.4 billion in 2022 to $3.2 billion by 2027. This means most students wrapping up any post-secondary education or training are likely familiar with robots in the same way that one can be familiar with computers without knowing how to engineer one. That familiarity is critical to making the career path appealing and, if they have received a level of technical education on robots, positions them well for success in this field.

NOW,

You Can Pull Talent From Anywhere

Warehouses aren't built randomly.

They end up being clustered regionally to certain tech hubs, and within those hubs to certain business areas near major transportation routes. This all makes perfect sense logistically but has created a labor-shortage problem with the rapid growth of demand for employees in the last few years. When warehouses are clustered, that means all companies in the area are pulling from the same talent pool, fighting for the same limited number of applicants for manual jobs, and creating non-linearity in the rise of wages within the facility or company.

Conversely, there are areas of the country where good jobs are in short supply and plenty of talented, driven employees are searching for opportunities. Automation and jobs in robotics supervision can help in both of these areas. **How?** Because employees don't have to be on-site to do their jobs well.

Yonder is an example of software that allows for effective management of robots from anywhere in the world. When an image of an exception in a process that has stalled a robot is sent to the Crew Chief, that person can be 10 feet or 1,000 miles away. All that really matters is that their monitor shows exactly what the robot is seeing and they are able to select the appropriate action on screen. They do not need to physically touch the robot or even be in the vicinity. Plus, a single Crew Chief can manage a fleet of robots at a time. That turns into a force multiplier where one remote worker can handle several tasks at once.

"What if all you needed for a career was a strong internet connection?"

Erik Nieves
CEO and co-founder, Plus One Robotics

THE DEMAND IS VERY REAL

And Only Growing

It's well known that COVID accelerated ecommerce to an unheard-of degree, creating incredible demand and strain on warehouses. But this is a path we were already on. We live in a post-Prime world.

Think back to the days before Amazon Prime, when having goods shipped to us was the exception — and if we did, it was much more likely that we would batch orders to avoid shipping charges on inexpensive items. Now, most people order whatever they want, whenever they want, shipping products of all shapes and sizes in corresponding packages of all shapes and sizes. And, of course, we all want it shipped and delivered as soon as possible.

More packages mean more demand. Compounded with consumer demands for fast delivery, it's all an exponentially growing challenge for warehouses to overcome that requires more space, more people, and more technology that can maximize throughput.

> **"The biggest shift that has happened from 2018 to now is that we've literally run out of human beings to do the things that we need to do,"**
>
> - SIDDHARTHA "SIDD" SRINIVASA, ROBOTICIST AND PROFESSOR AT THE UNIVERSITY OF WASHINGTON'S ALLEN SCHOOL OF COMPUTER SCIENCE & ENGINEERING

As companies attempt to keep pace in this market, the answer is only going to be to hire more and more people, or find ways to improve output with fewer people. The latter is the only realistic option for today and the future. However, robotics can allow you to hire good candidates, keep them happy, and help them realize even greater performance in their jobs.

CONCLUSION:

Robots Are Good for Your People and Bottom Line

If you want to thrive in today's market, robotics can play a key role in boosting your warehouse efficiency as well as employee satisfaction and performance.

From the perspective of an employee, they can be promoted away from the back-breaking labor of depalletizing or the monotony of parcel sorting into a tech management role offering new challenges and rewards. For your facility, you introduce processes that can handle much higher rates of throughput, with the added advantage of human oversight and machine learning that will make the processes even better over time.

Increase Employee Engagement

Mentally challenging work is more fulfilling, and employees will see clear data on their impact.

Reduce Employee Turnover

Engaged workforces see lower rates of turnover, lessening the challenges of onboarding and creating a better work environment.

Enhance Workplace Flexibility

Draw from a much larger labor pool, providing more flexibility in how the workforce is structured.

Decrease Workplace Injuries

Less intervention from on-site personnel means fewer potentially hazardous situations.

Robots Work. People Rule.

PLUS ONE ROBOTICS

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