



**White Paper Series**

# **The 5 Catalysts for Automation Transformation in Manufacturing and Distribution**

**Topic 5: Operations Transformation**



# Supply Chain Transformers: Why Flexible Automation Should Be the Backbone of an Operations Transformation Strategy

Material handling has undergone significant stress over the last few years, but the current crisis predates the pandemic. Most operations are still heavily-reliant on labor-intensive technology from the last century. With warehousing footprint expanding exponentially, now is the time to explore modern, flexible material handling automation to help respond to industry headwinds. This five-part white paper series explores each major catalyst for change in manufacturing and distribution, details their operations challenges, and covers how automation can help you overcome those headwinds and turn your response into a competitive advantage.

**Managing** a global supply chain has never been more critical than in recent years, thanks to multiple supply shocks due to global events such as the COVID-19 pandemic, the Russian invasion of Ukraine, rising energy costs and changing demographics and attitudes of a global workforce.

For many enterprises, investing in new supply chain and manufacturing technologies was unnecessary, due to low labor costs, high availability of resources, just-in-time manufacturing strategies to avoid excess inventory, and decades of offshoring strategies made possible by lower energy costs. Those global events revealed cracks in the foundation of the modern supply chain, creating massive supply chain shortages around the world that countries are still recovering from.

As companies look ahead, they are presented with many different technology choices to help them digitally transform their supply chain management to address not only shortages of the past but also to future-proof their supply chain to avoid new disruptions. The journey of digital transformation has the potential for massive long-term efficiency gains and sustainable growth but competing technologies and unclear priorities for

enterprises can create a minefield along this path, with one wrong step making the difference between success and losing competitive advantage.

For example, Gartner recently highlighted the [eight top supply chain technology themes](#) for 2022, with seemingly equal weight attached to each trend. These trends included:

- Hyperautomation 2.0 which is the need to automate as many business and IT processes as possible.
- Next-generation robots which are more flexible and adaptive than previous generations.
- Autonomous things including vehicles or drones that augment traditional manually intensive physical tasks.
- Digital supply chain twin, a digital representation of the physical that helps ensure that decisions are aligned horizontally and vertically throughout the supply chain.
- Analytics everywhere which delivers reports, visualizations and analytics from multiple data sources.
- Security mesh a structured framework of governance, collaboration and applications to ensure that supply chains are safe and secure at all times.

- Ecosystem collaboration which include services and technologies that create a collaborative work environment for people.
- Sustainability tools which include services and applications to support sustainability and environmental impact strategies.

We believe companies should prioritize their supply chain management digital transformation around flexible automation as a foundation, from which all other strategies can be built from.

Flexible automation in material handling processes solves many of today's most critical modern supply chain challenges, including: a proven return on investment, addressing critical labor shortages, providing actionable insights through data analytics, working collaboratively with human co-workers, operating sustainability through electrification, and offering secured systems to guarantee that any data running through the platform is safe. Companies that utilize a flexible automation approach as the foundation can then expand on those features through other initiatives across the enterprise.



## Not Your Father's Automation

Understandably, companies could be hesitant when it comes to investing in a flexible automation system, especially if they have tried automation before through the purchase of a large industrial robot arm or other warehouse automation system such as conveyors. There are many stories of industrial robots that are sitting in the corner of a factory because the company could not reliably deploy the systems correctly, or it got too expensive to manage.

Flexible automation, specifically through autonomous mobile robots (AMR), is not the same as traditional automation approaches which use capital-intensive hardware and infrastructure such as conveyors or other stationary equipment. AMRs even differ from automated guided vehicles (AGVs), which require additional installation through either guidewires or electronic tags such as RFID to enable navigation. New AMR systems rely on lidar- or advanced vision-based camera systems to perform autonomous navigation through a facility, able to avoid obstacles and optimize their path as efficiently as possible. No additional caging or hardware is generally

needed when companies deploy an AMR system for material handling or order fulfillment tasks.

In addition, new operating models for the purchase and operation of flexible operations take away much of the risk for companies today. Instead of purchasing a fleet of robots outright using capital expenses (CAPEX), many robot manufacturers are offering subscription-based or leasing options for companies. Sometimes called robots as a service, this new model allows companies to pay for robots through an operating expense (OPEX) account, with monthly or yearly subscription offerings. These models also include maintenance and monitoring services, which means companies do not have to hire someone to maintain, upgrade, or fix a robot during the course of operations thereby removing the risk of obsolescence due to the fast pace of technological change.

Many robot companies have solid partnerships with other systems integrators to make sure that when a deployment occurs, the fleet of AMRs or other robotic equipment can be integrated completely into a company's existing operations. New robots can be placed in both new (greenfield) or existing (brownfield) warehouse operations, providing additional flexibility.

## Alleviating Labor Issues, Retaining Employees

One of the big reasons that companies are deploying flexible automation systems is that they can solve several challenges at the same time. When it comes to labor, companies are struggling with not only finding new workers, but they have a difficult time retaining workers as well.

The old arguments about automation being used to replace human workers has not come to fruition, especially in a post-COVID era where workers have found other ways to earn a living rather than work a manual, dangerous or dull job. In this case, more automation is needed to help make up for the loss of labor productivity by these human labor shortages.

Furthermore, the argument about “job-killing robots” has been proven false. In 2018, the Association for Advancing Automation (A3) said the period between 2010 through the start of the pandemic in 2020 saw the greatest expansion of robot usage, yet unemployment dropped from almost 10% to under 4%. Over a 22-year period, in every period where robot sales went up, unemployment in the U.S. went down, the A3 reports.

New studies around the effectiveness of automation in terms of keeping employees engaged and making their jobs more valuable. For example:

- A survey of executives showed that **85% said they believe automation will help them retain workers** by letting them focus on less mundane work and improving overall engagement and safety. Because of this, 70% said they plan to increase automation investments.
- **A survey by Zebra Technologies** showed 73% of executives said the optimal automated processes are a combination of human and robots, evidenced by the rapid growth of co-bot purchases representing **35% of all robot sales in 2019 to 56.5% in 2021**.
- With the right applications, **human-robot teams are up to 85% more efficient** than humans or robots working alone.

With continuous labor shortages across the supply chain, it makes more sense for companies to focus on keeping the employees they have and make them more productive through flexible automation, rather than spending money on trying to find new labor.

In addition to keeping employees engaged and productive, flexible automation practices would allow labor to be continually working on new lines and new products in a manufacturing scenario, instead of waiting around doing nothing, or potentially avoiding a furlough should key supplies not arrive due to supply chain disruptions.

## Doing More With Less

The third challenge that flexible automation systems can solve is the ability for robots to achieve operational efficiency through automation. While robots are not replacing workers, it is true that they can be operated 24 hours a day, seven days a week; they don't call in sick or need to take a coffee break. In many cases, robots can perform their tasks at the same level of productivity (if not more in some dull and manual tasks) than human counterparts.

Research has shown that increases in robot density correlate to increases in productivity – a less than \$1 million per year investment in automation is associated with a 7% increase in productivity (BoFA Security Global Research). The International Federation of Robotics has reported that a **1% increase in robot density correlated with an increase in productivity of 0.8%**.

A bonus side effect of flexible automation systems is that many of these systems improve over time through deployments. Many software-driven automation systems combine the experiences of every connected robot within the system to provide more data for improved performance and capabilities over time. Through artificial intelligence and machine learning algorithms, many systems get more intelligent through the course of their lifespans, with the additional benefit of receiving over-the-air updates that improve their software further. In essence, the more robots a company has over time, the more output they can provide.

## Flexible Automation Quickly Adapts

In traditional industrial automation settings, large machinery and robotics are purpose-built for specific tasks, with processes that are engineered to fit the equipment, rather than the equipment serving the process. If there are any changes to a product's design, processes often need to undergo lengthy changeover times for the assembly line.

Flexible automation, however, is defined by the ability to adapt to changing processes and situations. As workflows and layouts change, the automation system changes along with it. For example, a factory employing autonomous mobile robots (AMRs) to help deliver parts and finished products can quickly change their routes should the plant layout change or new lines come online. This includes obstacle detection and dynamic route planning that helps the AMRs more efficiently perform their tasks in an ever-changing environment. In order-fulfillment scenarios, if a company decides to change the layout of the warehouse to support more products, or they move storage areas to be closer to packing station due to seasonal orders, the AMRs can flexibly adapt and change their routes almost immediately, instead of having to be reprogrammed or redesigned to fit the new warehouse layout.

Having automation that can adapt to changing operations allows companies to switch gears quickly should supply chain disruptions occur. For example, an operation that produces parts for others can quickly scale up new lines more easily with flexible automation, providing an opportunity for new revenue from companies looking to address the part shortage.

## Data Time: Improving Visibility to Drive Continuous Improvement

It's no secret that having more data is precious for today's digital enterprise. Flexible automation systems provide a level of transparency of inventory flow that many companies currently don't have within their warehouses or supply chain. For example, automated systems can help track parts and assemblies down to the individual component and process step or flow level. In addition, advanced sensors can flag any quality assurance issues, and then pull out the defective part for rework or re-routing, or reprioritizing tasks to still execute the mission.

Advanced analytics and the vast amounts of data produced through a flexible automation platform can be used to assist with factory layout optimization, as well as provide further operational and process insights. Examples here include designing for more efficiency, new slotting strategies, how to better use resources, identifying traffic bottlenecks, finding quality issues (such as when a robot gets stuck on a broken pallet), visibility into safety issues, and forecasting data for future projects.



## It's Time to Get Started

Many enterprises are well on their way to transforming their supply chain management through flexible automation. Mass adoption of flexible automation is expected to explode within the next five years, and 96% of supply chain executives said they plan to invest in the systems in the next 2-3 years. While many companies are in the planning or evaluation stage, this also means that those companies sitting on the sidelines or not getting started are about to fall behind.

Fortunately, the flexible automation train has not yet completely left the station – there is still time for enterprises as long as they have the right plan. This includes developing a core robotics team or Center of Excellence, led by a Chief Robotics Officer or Chief Automation Officer. In addition, enterprises getting started should work with partners or integrators to establish the most scalable opportunities for flexible automation – companies can start with a small project, but they should identify the project with the greatest chance for success – the “low-hanging fruit” per se, to obtain fast results.

The longer a company takes to transition to autonomous operations, the harder it will be to catch up, especially as competitors begin their own flexible automation journey. Most, if not all, of the old methods of automation deployment have been upgraded, and the risks and costs have been greatly reduced by improved technology, cloud adoption, and innovative pricing models, making automation a much easier decision to top your list of transformation initiatives in the years to come.



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