



Bringing Manufacturing Home

A New Era Empowered by
Humanoid Robots

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Introduction

For years, what once was the Gilded Age for American manufacturing faded as global supply chains stretched across continents. But the tide is turning yet again. Since 2021, a powerful wave of reshoring manufacturing has seen over half a trillion dollars invested by private manufacturing companies eager to bring production back to U.S. soil. From the roar of automotive plants to the precision of electronics, the threads of apparel to the critical care of pharmaceuticals – industries are recognizing the strategic imperative of domestic manufacturing. This isn't just about bringing jobs home; it's a fundamental rethink of how we build things and what that means for our Supply Chain Industry as a whole.

This homecoming arrives at a critical juncture. While the desire to strengthen our domestic capabilities is strong, the realities of modern manufacturing and logistics in the U.S. present significant hurdles: a persistent and widening labor shortage, the urgent need to strategically invest in the right automation and technology for maximum efficiency, and the constant pressure to adapt to global demand and evolving trends, all while ensuring the safety and well-being of our workforce.

But here's the exciting part: the challenges we face are being met head-on by a new generation of technological advancements. Leading the charge are humanoid robots, the cutting edge of automation. These aren't your traditional automation solutions, not even in robotics as we've known them so far; they're intelligent, adaptable partners poised to redefine how we work.

In this eBook, we'll dive into:

The Golden Opportunity of Reshoring

Discover how companies bringing manufacturing back to the U.S. can seize a unique chance to build smarter, more agile operations with the help of versatile automation and flexible financing solutions.

Revamping the Factory Floor

Explore the transformative shift from traditional automotive manufacturing to the electric vehicle revolution and understand the critical safety implications for the workforce – and how intelligent automation can pave the way for a safer transition.

Tackling the Labor Crisis

Uncover the stark realities of the manufacturing labor shortage and learn how humanoids can be strategically deployed to alleviate pressure on the existing workforce, freeing them up for higher-value tasks.

Building the Future

Automation Opportunities in Onshore
Greenfield & Brownfield Sites

The past five years have been a stark reminder of the fragility of globally stretched supply chains. The pandemic's ripple effects have spurred a significant shift in thinking, with a growing number of companies prioritizing nearshoring and onshoring, particularly within the vital manufacturing sector. We're seeing concrete action, with numerous businesses announcing plans to bring production back to the U.S. or establish new facilities in neighboring countries. This isn't just a relocation; it's a once-in-a-generation opportunity to architect more resilient and automated operations, reducing our reliance on distant suppliers for essential goods and technologies.

When these companies consider where to plant their manufacturing roots, the choice between brownfield (repurposing existing industrial sites) and greenfield (building on previously undeveloped land) presents distinct pathways. Greenfield sites offer a "blank slate," providing unparalleled flexibility to design facilities from the ground up around cutting-edge automation.

However, the exciting news is that the newest wave of robotic automation, spearheaded by humanoid robots, isn't limited to pristine new environments. Their unique capabilities make them incredibly valuable in brownfield sites as well. These robots are designed to navigate and operate in spaces built for people, offering a powerful solution for integrating advanced automation even within existing infrastructure.



Let's take a closer look at how humanoids are making a real impact in both types of manufacturing facilities today...

Brownfield Manufacturing Facilities: New Life Into Existing Spaces

Think of brownfield manufacturing facilities as industrial veterans – sites with history, buildings already standing. The challenge here is often working with what's already there: existing layouts, infrastructure limitations, and perhaps even older machinery. Integrating new technology requires careful planning and customization.

This is where humanoid robots like Digit define what a truly flexible automation solution is. Their human-like dexterity and adaptability allow them to seamlessly work within existing infrastructure, performing a diverse range of tasks that traditional, fixed automation might struggle with. Imagine a robot that can not only navigate complex, human-centric layouts but also interact with legacy equipment.

Humanoid's mobility capabilities are a game-changer. Its ability to walk, even tackle ramps, and nimbly maneuver around obstacles allows it to reach areas that were previously difficult or impossible for AMRs or AGVs. Think of those hard-to-access corners or confined spaces common in older factories – Digit can go there.

But it's not just about getting around. Humanoid robots are also designed to be safe and effective collaborators with human workers. They can augment human capabilities, boosting productivity and efficiency by taking on the often-strenuous work of material handling. Combined with an easy-to-use cloud automation platform that gives you the tools to control your robots and equipment. You can deploy your fleet, fully integrated in a wide range of automated workflows as well as provide real-time updates, and adapt to the ever-changing demands of the production line.



By adopting humanoid robotics, brownfield facilities can unlock hidden potential, optimize their existing operations, enhance safety, and stay competitive in today's fast-paced manufacturing world.

It's about making the most of what you have, powered by the intelligence and adaptability of humanoid robots.

Greenfield Manufacturing Facilities: Designing the Future from the Ground Up

Greenfield manufacturing facilities represent an unparalleled opportunity: a chance to build the factory of tomorrow, today. Starting with a clean slate – undeveloped land – allows manufacturing companies to design and construct facilities entirely around the principles of efficiency and cutting-edge automation. When you're not constrained by existing infrastructure, the possibilities are truly limitless.

For these new ventures, incorporating the latest and most efficient automation technology from the very beginning is not just an option – it's a necessity. By strategically integrating state-of-the-art automation systems from day one, greenfield facilities can achieve remarkable levels of operational performance.

This isn't just about speed; it's about smarter workflows, reduced production cycle times, and unwavering quality control. The result? Higher product quality, happier employees, and a significant competitive edge. Moreover, embracing new automation technologies ensures that greenfield facilities are not just keeping up but actively leading the charge in a rapidly evolving industrial landscape where robotics, AI, and data analytics are constantly reshaping manufacturing. By building automation into their very foundation, these facilities are positioning themselves for long-term success, the ability to scale rapidly, and the resilience to weather future market shifts.

Humanoid robots like Digit are not just a nice-to-have for greenfield sites – they are crucial. Their inherent flexibility, efficiency, and adaptability make them instrumental in designing streamlined future workflows and assembly processes from the outset. In fact, Agility Robotics' Digit is currently the only humanoid on the market already integrated into real-world manufacturing workflows, expertly handling material handling tasks with impressive precision and accuracy.

Digit's "legs" provide a significant advantage, allowing it to navigate diverse environments and adapt to evolving site conditions with ease. Furthermore, deploying humanoid robots in greenfield facilities allows manufacturers to strategically assign them to tasks that are dangerous or physically demanding, directly contributing to the safety and well-being of their human workforce.

Now, let's address a common concern: cost. Perceived high costs commonly hinder companies from considering humanoid robotic automation. While this is true for many companies in this industry that are still in the R&D phase, working with a humanoid company like Agility Robotics, which already has an active customer base, provides more affordable financing options, including the Robots as a Service (Raas) and CapEx models.

By embracing humanoid robotics technology from the ground up in greenfield sites, manufacturers can not only reduce long-term operational costs but also establish manufacturing operations that are inherently efficient, safe, and built for a sustainable future. It's about building the factory of tomorrow, today, with intelligent, effective automation at its core.

Industry Transformation

Electrification of Automotive
Manufacturing

The automotive world is undergoing a massive transformation. The demand for electric vehicles (EVs) isn't just a trend; it's in full worldwide adoption, fueled by environmental concerns, government regulations, and technological advancements. Within the U.S., California's landmark mandate to end sales of new gasoline-powered cars by 2035 has spurred changes on a countrywide level.

Although the current US administration is scaling back on the necessity of ramping up on EV production nationwide, CNN Business reported, "the Alliance for Automotive Innovation has pushed to continue the EV tax credit and other support, arguing that US automakers seeking to build and sell EVs need the help to compete with Chinese automakers who make far more vehicles than any other country, thanks to China's focus on EV sales.". For the US to stay competitive, the pressure is still on for the entire industry to electrify, and fast. This rapid shift, though challenging, presents a significant opportunity. U.S. federal financial incentives have boosted funding for onshoring advanced manufacturing construction, providing \$450 billion in tax credits. Companies can take advantage of this sea change and invest heavily in technology, reducing costs and accelerating bringing their automanufacturing facilities back to the US.

Due to the differences in technology, materials, and processes involved, this opportunity comes with new safety concerns. These range from short-term to long-term effects, including the risk of death. Shifting some tasks to humanoid robot automation can help by minimizing worker exposure to hazardous conditions and allowing the reduced staff to focus on safer, higher-value tasks.

High-risk areas where humanoid robots can be deployed include:

Battery Handling

The production and assembly of lithium-ion batteries present unique safety challenges due to the risk of thermal runaway and fire. Workers must follow strict protocols for handling, charging, and storing batteries to mitigate the risk of thermal events and chemical exposure.

Material Transfer Hazards

Certain areas within EV facilities pose higher risks to the workforce. Reducing the number of people in these areas also reduces the risk of harm. This includes areas with batteries that might expose workers to chemicals.

Machinery Accidents

Working with heavy machinery and equipment can lead to accidents such as entanglement, crushing, or amputation if safety protocols are not followed.

Ergonomic Hazards

Repetitive tasks, awkward postures, or lifting heavy loads can lead to musculoskeletal disorders. Incorporating humanoid robots in workflow design can help reduce the risk of workplace injuries.



While many safety principles apply to both EV and traditional auto manufacturing, the unique characteristics of EV technology necessitate specific safety protocols, training programs, and risk mitigation measures to protect workers and maintain a safe production environment. It is critical that manufacturing facilities prioritize safety protocols when engaging with solution providers to ensure workforce well-being, operational integrity, and risk mitigation. Robotic automation provides many opportunities to mitigate these risks. Implementing humanoid robots in high-risk areas can create a safer, more efficient workflow and free up workers for other essential tasks within the manufacturing process.

The Human Factor

Addressing the Labor Shortage with
Humanoid Allies

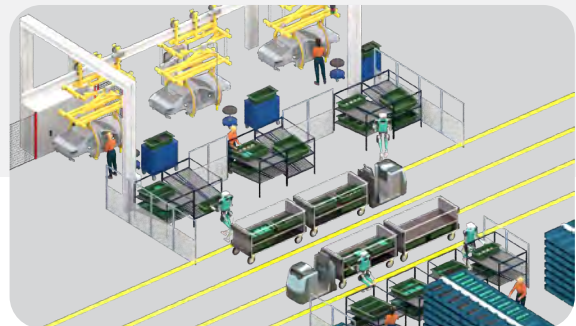
The logistics of reshoring and rebuilding manufacturing facilities are only the tip of the iceberg. In 2022, reshoring operations in the U.S. added an estimated 350,000 unfilled jobs, surpassing the previous high of 265,000 in 2021. This accounts for 38% of the 1.6 million jobs added to the U.S. economy from reshoring since 2010. Jobs in the supply chain and logistics industry have suffered from extreme labor shortages for years, making it a significant problem in the logistics space within the United States. Forbes reported: "Turnover at warehouse sites typically runs at 300% to 400% annually, according to various industry statistics." We're bringing the work back, but the skilled workforce we need isn't always there.

So, how can we bridge this widening gap? Automation offers a powerful solution by taking on the repetitive, low-value, and sometimes even dangerous tasks that often deter workers from pursuing manufacturing careers. But here's a fresh perspective: automations like Digit can and should be viewed as recruitment tools in their own right.

Imagine a workplace where robots handle the most physically demanding or monotonous jobs, freeing up human workers for more engaging and higher-level responsibilities. This isn't a dystopian vision of robots taking over; it's an opportunity to create more attractive and sustainable manufacturing careers. Three examples of manufacturing workflows where Digit and the Agility Solution can be deployed today include:



Palletization & Depalletization



Line Feeding



AMRs, Tuggers, & Carts



Tote Loading, Unloading,
& Recycling

Conclusion

Now more than ever, there is much to consider when thinking about automation options in manufacturing facilities. The industry is undergoing a monumental change that hasn't been experienced in decades. This moment in history has two players: those who will take advantage of the changing times and those who will miss an opportunity. Embracing new automation technologies is not just a matter of staying competitive in today's rapidly evolving landscape; it is also about adopting the newest technology to keep facilities efficient, which in turn substantially reduces operating costs.

Given the growing number of solution providers in this space claiming immediate deployment, ROI, and efficiency, it's hard to distinguish vaporware from true, ready-to-deploy solutions. In an era where workforce dynamics are changing, it's important that solution providers emphasize safety, demonstrate knowledge of the space they're deploying in, and deeply understand their customer needs. By strategically adopting new and proven automation technologies, manufacturing facilities can position themselves as industry leaders and drivers of innovation, empower their workforce, and ultimately achieve sustainable success in a globally competitive market.

To learn more about how humanoid robots like Digit have already been deployed in manufacturing facilities, click below to view our case studies or contact our team here:

Contact
Sales



Digit's
Resume

