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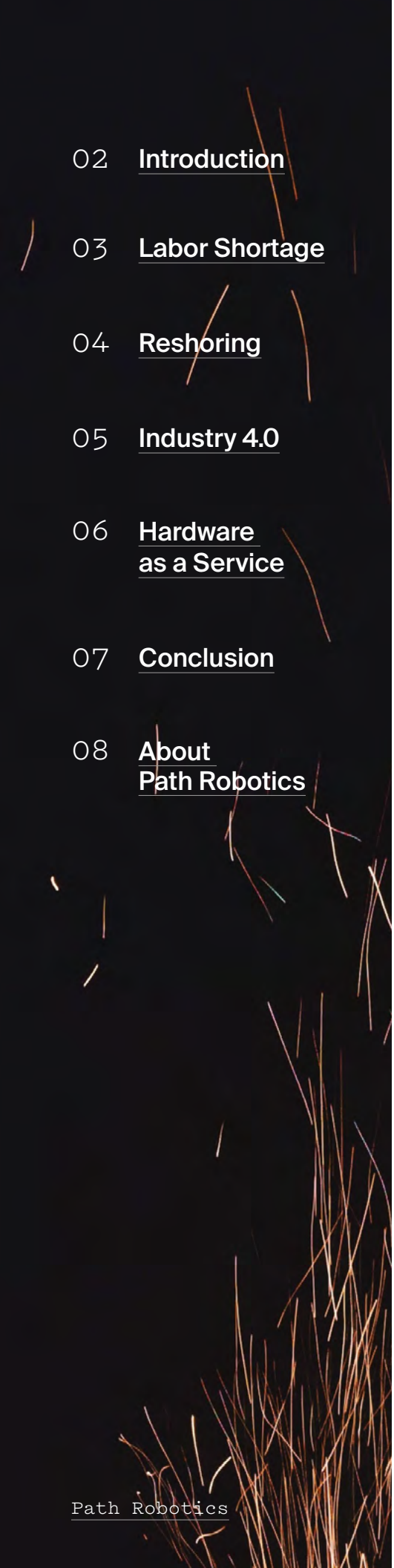
2022 Manufacturing Outlook

American Manufacturing Transforms amid Labor Shortage, Reshoring, Industry 4.0, and Hardware as a Service



INTRODUCTION

Manufacturing is going through a historic transformation that is only likely to accelerate in 2022.

Disruptions caused by the COVID-19 pandemic, reliance on just-in-time processes, geopolitics, and climate change have underscored the importance and fragility of manufacturing and supply chains in our daily lives.

At the same time, private sector employers are hindered by labor shortages and customers are demanding greater customization of products.

Additionally, the Industry 4.0 movement is bringing new technologies into manufacturing and the Hardware-as-a-Service model is taking hold. These evolutions are creating new growth opportunities in today's manufacturing environment.

> "Businesses that fully understand and capture the value of these advantages will be best positioned to take on the challenges that lie ahead."
>
> Source: BCG

The trends matter beyond factory walls: while the manufacturing sector accounts for a sliver of the American workforce (8%), it represents a sizable chunk of the country's productivity growth (35%).

This white paper details key trends in manufacturing as well as expectations for 2022, helping industry leaders to navigate the ever-changing environment.

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LABOR SHORTAGE

American manufacturers are struggling to fill positions and retain talent, as the country's Great Resignation and the industry's aging workforce exacerbate existing labor shortages. Industry employers likely will be dealing with persistent labor shortages well into 2022 and beyond. For example, as the demand for welders grows by 3% per year, the number of welders entering the workforce continues falling as the industry ages.

While there is no silver bullet to fix the labor shortage, efforts range from embracing diversity and investing in technical education to AI and automation.

Robotics are being rapidly deployed amid the ongoing labor shortage. Throughout North America, orders for robots reached 29,000 through the first three quarters of 2021, up 37% from the prior year.

> **"With labor shortages throughout manufacturing, logistics and virtually every industry, companies of all sizes are increasingly turning to robotics and automation to stay productive and competitive."**
>
> Source: Jeff Burnstein, President, Association for Advancing Automation

The embrace of robotics is not about displacing humans, but rather filling gaps in the labor force and repurposing human talent in more efficient, safe, and meaningful ways.

Because many new manufacturing jobs require digital skills, highly specialized labor is an area of particular need. For many employers, the only thing harder to find than welders, painters, and grinders are programmers who can teach robots how to do these tasks.

1.4M

U.S. manufacturing jobs erased by the initial outbreak of COVID-19

400K

Estimated shortage of skilled welders by 2024

77%

Share of manufacturers that expect to have ongoing difficulties attracting and retaining talent

$1 Trillion

Cost to the U.S. economy if the manufacturing skills gap persists and 2.1 million jobs are left unfilled by 2030

Source: American Welding Society, Deloitte

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RESHORING

Exacerbated by the shortage of workers, manufacturing and supply-chain bottlenecks have permeated virtually every aspect of American life. Since the start of the COVID-19 pandemic, companies have struggled to keep pace with demand to reliably produce goods and efficiently get them in the hands of customers.

After decades of moving manufacturing operations outside the U.S., namely to factories in China, companies are responding to the current conditions by reshoring operations for greater reliability. Supply-chain redundancies are proving to be a valuable hedge against the industry's headwinds and producers and shippers of goods won't soon forget the struggles of 2020 and 2021.

> "Increased import dependence has therefore left a range of strategic U.S. manufacturing supply chains exposed to shocks and disruptions. To mitigate risk exposure and the impact of disruptions, manufacturing needs a healthy domestic supplier base and more resilient supply-chain management to thrive."
>
> Source: McKinsey

Production cost is no longer the be-all, end-all as manufacturers put more emphasis on logistics and proximity to key markets.

Reshoring is likely to continue as manufacturers are asked to create a variety of product models at varying price points and with shorter life cycles.

25%

Reduction in U.S. manufacturing firms and plants from 1997 to 2021

INDUSTRY 4.0

Innovative technologies including digital connectivity, AI and automation, and advanced manufacturing technologies are converging to spur a fourth industrial revolution. Industry 4.0, as the transformation is often called, will make factories smarter, increase efficiency, enhance product customization, and improve speed to market.

Although some investments were paused due to COVID-19, the pandemic should accelerate the movement longer-term as the inability to collaborate in-person spurs further digitization.

The Key Technologies of Industry 4.0

- **Connectivity and Data** (e.g., Internet of Things)
- **Analytics and Intelligence** (e.g., AI)
- **Human-Machine Interaction** (e.g., Robotics)
- **Advanced Engineering** (e.g., Additive Manufacturing)

Source: McKinsey

> "Manufacturing involves market research, demand forecasting, product development, distribution, and services—activities that may take place in multiple locations or involve outside providers. Companies will soon be able to connect their entire value chain, including customers, with a seamless flow of data. This 'digital thread' may lead to new sources of productivity and revenue."

Source: McKinsey

$49.9 Billion

Value of the global robotics market in 2020. It is projected to surpass $60 billion in the next five years

Source: Research and Markets Report

Although human-machine interaction is becoming more common, robots that work alongside humans, called "co-bots," have significant limitations: manufacturers can only handle small parts, must reprogram robots in the case of high variation, and still need programmers.

In response to the growing need, truly autonomous robots are supplementing the human workforce in high-mix, low-volume manufacturing. Cost-effective and highly automated plants are able to produce large volumes of highly customized items.

$530 Billion

How much the U.S. could boost annual manufacturing value added by 2025 by embracing technology to unlock productivity gains, representing a 20% increase over current trends

Source: McKinsey

$15-20 Billion

How much the U.S. needs to invest every year for the next decade to upgrade aging plants and equipment, including by investing in new equipment and Industry 4.0 technologies

Source: McKinsey

20-30%

Productivity increase for machinery by embracing Industry 4.0

Source: BCG

HARDWARE AS A SERVICE

Manufacturing's labor shortage will lead to the automation of some tasks, however, many organizations are not well prepared for the use of robotics.

The cost of robotics systems—or the properly trained humans to work alongside such systems—is often prohibitive for smaller companies.

Alternative pricing models are helping to lower barriers to adoption.

Hardware as a Service (HaaS), also known as Equipment as a Service (EaaS), is an increasingly popular subscription model that allows manufacturers to add state-of-the-art hardware or enhance their technological capabilities in a cost-effective way.

> **"We have been talking about subscription models ever since Rolls-Royce pioneered its power by the hour concept in 1962, but we didn't have the technology to scale XaaS models until now. But in the next decade we will eventually see 'Netflix for Industry 4.0' take off– complementing the traditional sell, lease and rent models."**
>
> Source: Oliver Bendig, Partner and EMEA Machinery Sector Lead, Deloitte

When hardware is installed at a customer's site and a service-level agreement is put in place, the customer can alleviate labor shortages, increase productivity, and lower costs. With HaaS, industrial equipment buyers are opting for flexibility by choosing to invest in operating expenditures rather than capital expenditures.

The HaaS model is moving from a "niche alternative" to a "strategic imperative" for manufacturers.

CONCLUSION

The world of manufacturing is rapidly evolving and companies are forced to navigate an increasingly complex environment.

Many of the trends that took hold during the COVID-19 pandemic are likely to continue. Organizations can adequately prepare by embracing Industry 4.0 and Hardware-as-a-Service models.

> “The stars could be aligning for US manufacturing. There is both public- and private-sector resolve to shore up a sector that has long been an important pillar of the economy. This momentum, combined with technology trends and market opportunities, offers a rare chance to change the existing trajectory—and give the United States a powerful driver for economic recovery, inclusive growth, resilience, and the capabilities of the future.”
>
> Source: McKinsey

Top Manufacturing Trends

Labor Shortage

Creative solutions are needed to combat the Great Resignation. Robotics are not meant to displace humans, but rather fill gaps in the labor force and repurpose human talent in more efficient ways.

Reshoring

Manufacturing needs domestic suppliers and a more resilient supply chain.

Industry 4.0

Connectivity and data, analytics and intelligence, robotics, and advanced engineering will make factories smarter, increase efficiency, enhance product customization, and improve speed to market.

Hardware as a Service

Subscription models allow manufacturers to add state-of-the-art hardware or enhance technological capabilities in a cost-effective way.

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ABOUT PATH ROBOTICS

Few companies can justify the costly and risky purchase of an industrial robot. With Path's subscription pricing model, however, you are guaranteed to achieve an instant return on investment.

Path eliminates all of the programming requirements that come with co-bots and traditional robotics. You do not need weld engineers, weld inspectors, CWS, or programmers.

> "Path Robotics is here to be the labor you cannot find. Offered in a convenient subscription service, our technology represents a tremendous opportunity to bring the future of manufacturing to you. We are enabling robots to build so that humans can create."
>
> Andy Lonsberry, Co-Founder and CEO, Path Robotics

Current industrial robotics have little ability to understand their environment and the task at hand. Most robots merely repeat what they are told and cannot improve themselves, but the future of manufacturing hinges on highly capable robotics.

With state-of-the-art artificial intelligence, machine learning, and computer vision systems, Path provides manufacturers the flexibility and resilience of intelligent industrial robots.

To learn more about an infinitely flexible and scalable approach to manufacturing, visit path-robotics.com

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