

# THE STATE OF US MANUFACTURING REPORT

By The US Center for Advanced Manufacturing

2024

*Executive Preview*

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# INTRODUCTION

A Message From Our CEO

## Revealing the Core of US Manufacturing: A Preview of Strategic Insights

In the realm of US manufacturing, the pursuit of insight transcends the surface-level metrics that often dominate discussions. As we prepare to unveil our State of US Manufacturing Report for Fall 2024, we invite you to glimpse into the strategic foundations that underpin our analysis.

Guided by the sobering realities and nuanced perspectives of industry and academic leadership, this Report will examine the digital transformation shaping the manufacturing landscape and how humans must adapt in an era defined by technological disruption, cybersecurity challenges and a growing need for informed decision-making.

Drawing upon the expertise of leading academic institutions and insights from industry pioneers, our Report will offer a pragmatic lens through which to understand the complexities of US manufacturing. Together, these voices provide a comprehensive view of the challenges and opportunities that lie ahead.

As we prepare to share these insights with heads of state and global manufacturing leaders, we invite you to join us in this journey of exploration.

Together, let us uncover the core of US manufacturing, forging a path towards sustainable growth, innovation, and global competitiveness.



**Cynthia Hutchison**

CEO, US Center for  
Advanced Manufacturing

# FIRST LOOK: THE STATE OF US MANUFACTURING REPORT

Presented by the US Center for Advanced Manufacturing

Despite advancements in digital transformation technologies led by major manufacturers, small manufacturers, comprising over 90% of the value chain, are in dire need to evolve to keep up with the rest of the world. Understanding the challenges manufacturers encounter daily requires context, underscoring the need for nationally recognized voices to inform policymakers and industry leaders.

For this Report, we are seeking them out; from leading academic voices on the forefront of industrial development to industry professionals with an international reach and a proven track record for digital integration.

The US Center for Advanced Manufacturing is proud to announce its inaugural State of US Manufacturing Report, featuring expert contributors from every corner of the nation. This Report will tackle the most pressing challenges in manufacturing, including:

- Smart Factory Journey: A Roadmap for SMEs (Purdue University)
- Industrial Artificial Intelligence and Smart Manufacturing (University of Maryland)
- Cybersecurity Resilience for Advanced Manufacturing (New York University/University of California, Los Angeles)
- Creating a Healthy Environment for SMEs in the Digital Supply Chain Transformation (Massachusetts Institute of Technology)
- Blockchain Revolution: Transforming Supply Chain Management (Michigan State University)

**The State of US Manufacturing Report will also feature in-depth case studies from national leaders in industry. We look forward to publishing the full State of US Manufacturing Report in Fall 2024.**

# MEET THE TEAM

Our team members are at the forefront of advancing American Manufacturing into the future through technology adoption, business model innovation, and workforce development.



**CYNTHIA HUTCHISON**  
Chief Executive Officer



**STEPHANIE WRIGHT**  
Chief Operating Officer



**SHREE PARIKH**  
Business Development  
Manager



## We Are Innovation Catalysts

Learn how we stimulate tech adoption and integration, champion adaptive and resilient business models and enhance workforce proficiency and inclusivity.



## We Ignite Thought Leadership

Delve into our speaking engagements and articles for critical perspectives and valuable industry insights.



## We Tap Into Robust, Professional Networks

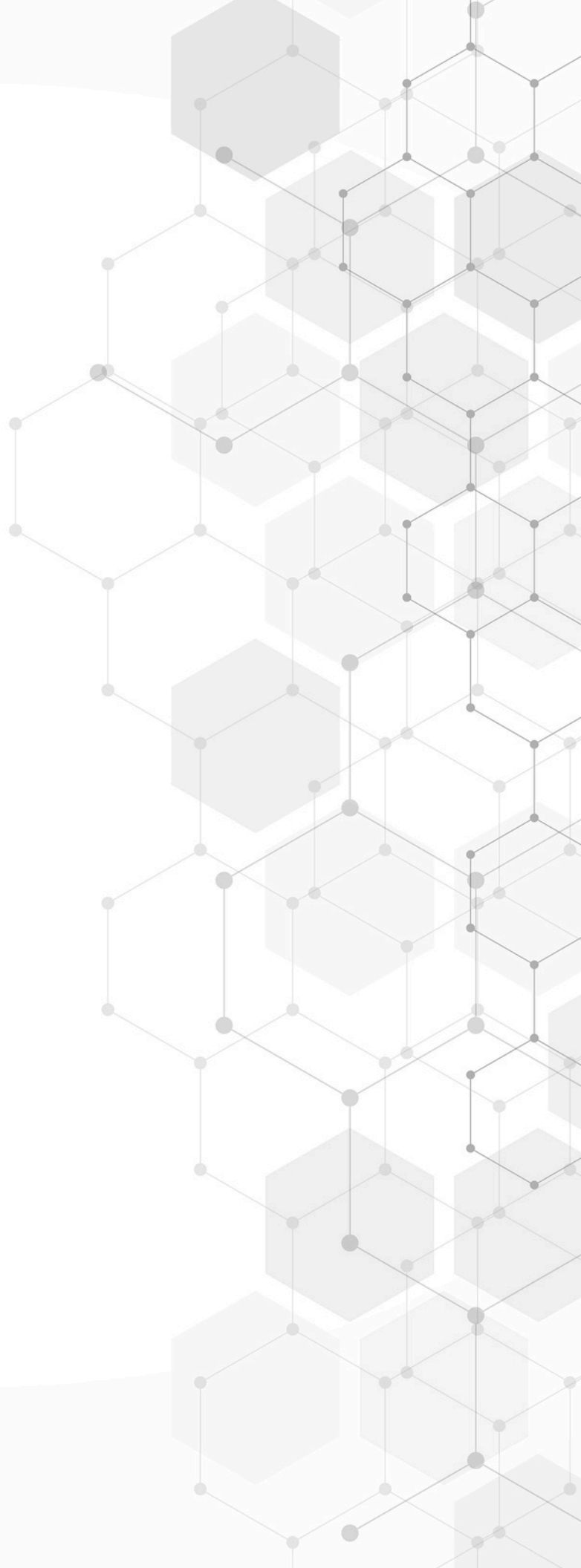
Gain an understanding of our strong ties with the World Economic Forum and the Fourth Industrial Revolution Center Network.

# A PEEK INSIDE

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The US Center for Advanced Manufacturing enlisted academics from leading universities across the nation to take on key topics in industry.

Read the abstracts of their full comprehensive reports below.



# SMART FACTORY JOURNEY: A ROADMAP FOR SMES (PURDUE UNIVERSITY)

Unlocking the potential of manufacturing SMEs, this chapter offers a comprehensive roadmap for transitioning towards Smart Factories. Delving into the process, it emphasizes that the journey towards full integration of smart technologies is both gradual and multidimensional, requiring years of commitment. Recognizing the significance of this transformation amidst a backdrop of evolving global manufacturing paradigms, this curated insight will serve as a resource for manufacturers, government bodies, and technology firms, particularly in light of efforts to fortify the US manufacturing landscape and supply chains.

While the main focus lies on business processes and technological advancements, there is also the parallel necessity of fostering smart people skills across all organizational tiers. From equipping the workforce with adeptness in utilizing smart technologies to cultivating leadership qualities among supervisors, the imperative of workforce development cannot be forsaken in the digital transformation journey of manufacturing SMEs.

# INDUSTRIAL ARTIFICIAL INTELLIGENCE AND SMART MANUFACTURING (UNIVERSITY OF MARYLAND)

This forthcoming chapter takes on the transformative power of Industrial Artificial Intelligence (AI)—a disciplined approach poised to revolutionize smart manufacturing and maintenance. Delving into the intricacies of AI application within industrial settings, this well-researched piece illustrates the capabilities of this new technology through compelling case studies involving CNC machines, bandsaw systems, and wind farms. Through these examples, the tangible benefits of Industrial AI are showcased, ranging from heightened operational efficiency to bolstered reliability and productivity, all achieved through systematically engineered AI algorithms.

Central to the discourse is the exploration of multidimensional learning and transfer learning, pivotal in advancing Industrial AI to address the nuanced challenges inherent in industrial contexts. Furthermore, the chapter underscores the imperative of collaborative efforts between academia and industry to surmount obstacles related to data management, cybersecurity, and model interpretability. By advocating for a concerted approach, this chapter sets the stage for the secure and effective deployment of Industrial AI technologies, heralding a new era of innovation in the manufacturing landscape.



UNIVERSITY OF  
MARYLAND



# CYBERSECURITY RESILIENCE FOR ADVANCED MANUFACTURING (NEW YORK UNIVERSITY/UNIVERSITY OF CALIFORNIA, LOS ANGELES)

The intersection of data management and cybersecurity is critical to the success of advanced manufacturing and national security. This chapter aims to examine best practices and provide a way to safeguard industry as it evolves through technological trends. The narrative weaves together threads of resilience, transformation, and adaptation, demonstrated through compelling case studies. From the remarkable strides in AI-driven material discovery within autonomous labs to groundbreaking advancements in tissue fabrication techniques, these examples serve as poignant reminders of the profound shifts reshaping the manufacturing landscape.

However, the scope goes beyond cybersecurity and into the world of global security as well.

As we peer into the future, the trajectory of our digital economy hinges upon our collective ability to embed sustainable practices within the fabric of Industry 4.0. In this epoch of unprecedented technological velocity, cybersecurity resilience emerges not just as a requisite for industry advancement, but as a cornerstone of national security itself.



NEW YORK UNIVERSITY

UCLA

# CREATING A HEALTHY ENVIRONMENT FOR SMES IN THE DIGITAL SUPPLY CHAIN TRANSFORMATION (MASSACHUSETTS INSTITUTE OF TECHNOLOGY)

In the midst of a burgeoning era of real-time data and computation, the global supply chain is undergoing a seismic transformation propelled by unprecedented levels of transparency. This chapter will focus on how small and medium-sized enterprises (SMEs) will emerge as linchpins in major manufacturing supply chains, offering resilience, agility, and creativity. However, they face mounting pressure from larger partners, risking erosion of the very capabilities essential for a robust supply chain.

The advent of new technologies also underscores a concerning trend: large entities view these innovations as tools to extract concessions from SME partners, rather than as catalysts for building truly resilient supply chains. This shortsighted approach not only undermines long-term interests but also inflicts substantial damage on SMEs and the economies reliant on them. The trajectory of the US supply chain's overall health hinges not solely on technological advancements, but on the collective policies, objectives, and mental models embraced by supply chain stakeholders. This chapter will focus on identifying collaborative efforts among participants to thwart the pitfalls of a "negative sum game" and foster the development of a vibrant and resilient supply chain ecosystem.



**Massachusetts  
Institute of  
Technology**

# BLOCKCHAIN REVOLUTION: TRANSFORMING SUPPLY CHAIN MANAGEMENT (MICHIGAN STATE UNIVERSITY)

Blockchain technology is a game-changer in the realm of supply chain management, promising unparalleled levels of transparency, traceability, and operational efficiency in industry. This chapter will focus on how organizations can leverage a decentralized digital ledger to ensure the immutability of transactions, thereby combating fraud and errors while fostering trust among stakeholders. Within complex supply chain contexts such as manufacturing, blockchain finds particular resonance in addressing persistent challenges such as counterfeit goods and inefficient workflows, offering a transformative solution through real-time tracking and provenance verification.

Despite its immense potential, blockchain's widespread adoption faces hurdles such as scalability, interoperability, and regulatory concerns. This chapter focuses on solutions to these concerns through substantial investment in infrastructure, talent, and education. The synergy between blockchain and the internet of things (IoT) offers promising avenues for seamless integration and automation, further bolstering the efficiency and effectiveness of supply chain operations.



**MICHIGAN STATE**  
UNIVERSITY

# US Center for Advanced Manufacturing

## **About the US Center for Advanced Manufacturing**

The US Center for Advanced Manufacturing is a non-profit organization founded in 2022 and headquartered in Troy, Michigan. We are a primary source and host for industry insights – particularly in the Fourth Industrial Revolution – and diverse voices and collaborations focused on Advanced Manufacturing in the US.

The Center is the first US entity to operate in partnership with the World Economic Forum to advance and strengthen its global manufacturing initiatives and is one of 16 World Economic Forum Centres for the Fourth Industrial Revolution.

If interested in membership or further initiatives within the US Center for Advanced Manufacturing, visit [www.usc4am.org](http://www.usc4am.org).



**WE IGNITE POTENTIAL  
BY HARNESSING THE  
POWER OF PEOPLE  
AND TECHNOLOGY.**

**US**  
Center for  
Advanced  
Manufacturing

**Looking to get involved?**  
Contact us: [www.usc4am.org](http://www.usc4am.org)

