What if synchronised robots perfected global supply chains?

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Perfect Chains

Within Reach | **Transitional** | Visionary

Collaborative robots reshape industries and global supply chains through intelligent task-sharing, adaptive learning, real-time problem-solving, and continuous optimising and self-improvement across domains.

UNCERTAINTIES

Systems, Technology

MEGATREND (Most significant)

Life with Autonomous Robots and Automation

TRENDS

Automation
Cross-Sectoral Partnerships
Future of Purpose & Work

TECHNOLOGIES

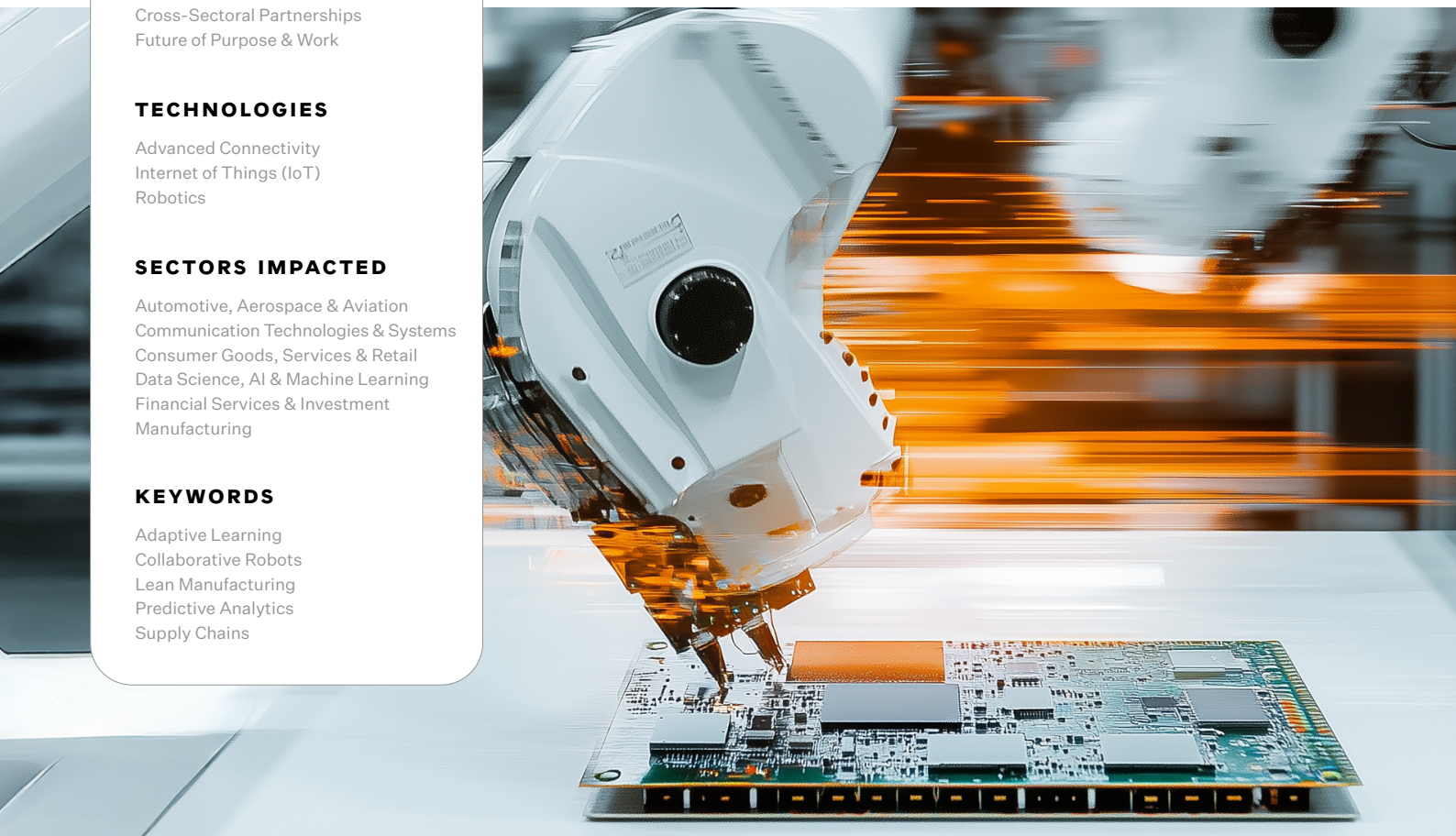
Advanced Connectivity
Internet of Things (IoT)
Robotics

SECTORS IMPACTED

Automotive, Aerospace & Aviation
Communication Technologies & Systems
Consumer Goods, Services & Retail
Data Science, AI & Machine Learning
Financial Services & Investment
Manufacturing

KEYWORDS

Adaptive Learning
Collaborative Robots
Lean Manufacturing
Predictive Analytics
Supply Chains



WHY IT MATTERS TODAY

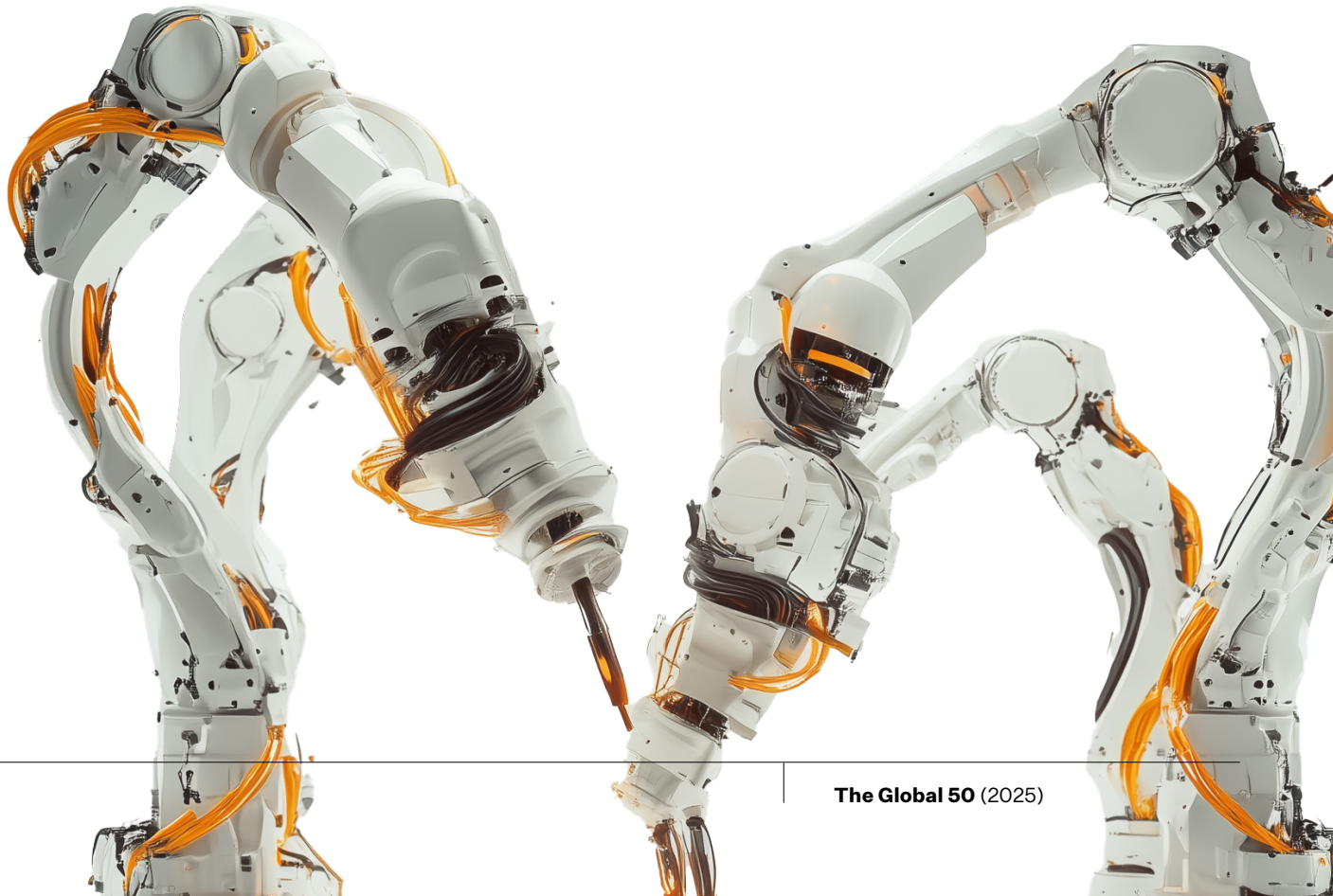
The manufacturing sector in the United States will require approximately

3.8 million

workers **between 2024 and 2033**

Both high- and low-income countries are dealing with labour shortages. Cultural perceptions prioritising academic degrees over vocational careers, persistent stereotypes about manufacturing jobs, and a growing mismatch between available skills and industry needs[1059] have had an impact on labour in the manufacturing sector. In the United States, this sector will require approximately 3.8 million workers between 2024 and 2033.[1060] Without effective strategies to bridge these skills and applicant gaps, around 1.9 million positions could remain unfilled, posing a significant challenge to the industry's growth and productivity.[1061]

Automation supports more resilient supply chains. It enables the optimisation of resources and enhances efficiency while aligning with Sustainable Development Goal 9, which focuses on infrastructure, technology, sustainability and societal well-being within a resilient global industrial framework.[1062] The Internet of Things (IoT) and AI can predict equipment failures by monitoring various parameters, reducing downtime and cutting maintenance costs by up to 15%.[1063] They can also reduce waste and improve product quality while cutting energy use by 20%, lowering operational costs and supporting sustainable manufacturing.[1064]



THE OPPORTUNITY

BENEFITS

Enhanced efficiency in global supply chains; optimised resource use; improved problem-solving.

RISKS

Job displacement; increased cyber-physical threats; overdependence on advanced technology; increased system complexity and ambiguity.

Ushering in a new era in industry,[1065] a network of collaborative robots reshapes value chains and industries to create a more interconnected global supply chain that functions as an ecosystem autonomously engaged in continuous self-improvement. They seamlessly work alongside humans, enhancing efficiency and productivity through intelligent task-sharing.[1066] Together, robots evolve into systems capable of learning, adapting, and collaborating across tasks and sectors.

Advanced machine intelligence (particularly quantum computing), edge computing, and neuroplastic AI algorithms[1067] enable them to process complex datasets in real time and dynamically share their performance and skill 'datasets' to enable adaptive learning and cross-domain problem-solving. Through predictive analytics, context-aware computing,[1068] and real-time anomaly detection, robots continuously refine their capabilities, adjust their performance, learn from collective experiences, and optimise operations across domains.

AI and the Internet of Things (IoT) **reduce manufacturing costs by**

15%

through predictive maintenance

while **cutting energy use by**

20%