

Power the future of manufacturing

How to build resilient
manufacturing operations

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What's driving your Industry 4.0 journey?



In the face of supply chain disruptions, inflation, a changing workforce and rapid advancements in technology, manufacturers still need to push forward on their Industry 4.0 journey. While there is comfort in maintaining the status quo, holding on to legacy structures and processes is the inverse of innovation in manufacturing.

Keeping up with the competition isn't enough in the face of rapid change in the manufacturing industry. To outpace and outperform your competitors, you need to plan for the future. Specifically, you need to build resilient manufacturing operations that will accelerate your Industry 4.0 transformation.

97% of senior executives deem business resilience as very or somewhat important.

47% of senior executives believe their organizations are resilient.

78% of manufacturing companies don't prioritize planning for disruption in the next two years.**

Manufacturers can build resilient operations by planning for a future in which:



Digital transformation is a thing of the past because digital dexterity has become universal.



Business resilience is inextricably tied to an organization's overall digital dexterity.



All business leaders — not just IT leaders — can intuitively assess the capabilities and performance of their technologies as well as they do that of their employees.

What's negatively impacting manufacturing and automotive companies**:

38% Economic factors

28% Geopolitical factors

22% Supply chain and competitive threats

Defy disruption with operational resilience

Resilience in manufacturing operations enhances your business' ability to overcome the effects of adverse business scenarios. It also enables you to respond seamlessly to rapid change within the industry. Without clear plans and roadmaps for the future, manufacturers can find themselves susceptible to supply chain disruptions, inflation and rising costs — among other key issues.

Manufacturers that place business resiliency at the core of their operations can:

- Plan for scale in transformation.
- Reduce operational costs.
- Accelerate speed to market.
- Meet the consumer demand for improved customer experiences.
- Continue to meet market and customer demands for products and services.
- Stay ahead of the trend toward servitization as commoditization grows (where customers pay for a service rather than buying the equipment themselves).

Almost all senior executives (97%) in global organizations consider business resilience as very or somewhat important. However, less than half (47%) believe their organizations are sufficiently resilient today.* Top executives point to evolving technology and the lack of much-needed talent as the leading sources of insufficient resilience.

Serving up Savings

NTT DATA helped a global nutrition company save \$22 million in annual supply chain savings by building up resilient operations and planning for the future. [Discover how the company saved millions without eroding customer service levels.](#)

*NTT DATA Perspective — Digital dexterity and the coming business resilience paradigm shift: And what manufacturers should do to prepare.

** NTT DATA — Innovation Index: How North American organizations are achieving growth, value and high performance.



Case study

Delivering transformation for Clarios

Clarios, a global leader in low-voltage advanced battery technologies for mobility, faced a daunting task. They needed to design and deliver a new IT infrastructure within a tight deadline. Their parent company, Johnson Controls, had given them just 30 months to transition and transform their entire IT infrastructure. Recognizing that speed could not come at the expense of resilience or security, Clarios partnered with NTT DATA to forge a shared vision for a tailored, scalable and resilient technology platform.

The transformation journey involved building a completely new infrastructure and implementing robust security measures. Over 800 applications had to be migrated. New services had to be launched and thousands of e-mail accounts, PCs and phones had to be moved. Through the collaboration with NTT DATA, Clarios was able to successfully implement modernized IT services, including hybrid infrastructure, Microsoft Azure and device-as-a-service deployments. Remarkably, all of this was accomplished ahead of schedule and under budget.

The partnership with NTT DATA also yielded significant improvements in resiliency, particularly in the areas of

infrastructure and security. NTT DATA's automation efforts played a crucial role in expediting server delivery, ensuring that servers were customized to meet specific requirements. Additionally, the implementation of enhanced security tool stacks bolstered cyber resilience. Clarios gained a stronger defense against potential threats.

Overall, the partnership between Clarios and NTT DATA enabled the successful completion of the IT infrastructure transformation. At the same time, it paved the way for a more resilient and secure technological foundation for Clarios' future endeavors.

Outcomes:

- Deployed 75% of enterprise applications to Microsoft Azure
- Created Device as a Service fulfillment for 16,000 global employees
- Rehoused and refactored 200 applications on Azure

Clarios is now operating at \$10 million per year under their planned budget. [Learn more about how NTT DATA helped Clarios transform their business.](#)



Clarios is a global market leader in battery manufacturing, making over 150 million advanced, low-voltage batteries each year.

Manifesting your manufacturing vision

Manufacturers face several challenges on their Industry 4.0 journey — but these challenges are not insurmountable with the right plan in place.

By planning for resiliency, manufacturers can better prepare for the changes to come with Industry 4.0 and beyond. These three tenets are key to building resilient manufacturing operations:

- 01 Transform digital infrastructure and outdated processes**
- 02 Leverage digital dexterity to drive data-driven, automated operations**
- 03 Embrace the changing workforce**

Transform digital infrastructure and outdated processes

Transforming production processes to boost yields

Greene-Tweed — a specialty parts manufacturer — partnered with NTT DATA to transform their global operations. Manual, paper-based processes were slowing efficiency, reducing yields, driving up costs and hindering competitiveness. NTT DATA implemented an SAP solution to provide real-time insight across 144 work centers via automated workflows and custom dashboards. [Learn more about how we helped](#) reduce production costs, boost yield and drive revenue.

45% say that integrating new and modern technologies into processes is a priority in the next two years*

Smart manufacturers are replacing disconnected, manual systems with automated enterprise systems connected across facilities via the cloud. Embracing automation leads to increased productivity, decreased operational costs and a wide range of benefits spanning their entire business.

Leaving behind legacy systems and outdated processes opens a world of possibilities for your manufacturing operations. Most importantly, investing in digital transformation and your Industry 4.0 journey allows for greater operational visibility

Decrease:

- Equipment downtime with predictive maintenance
- Operational cost by optimizing asset utilization
- Time to market through improved automation and efficiency

Increase:

- Competitive advantage by increasing product go-to-market agility
- Revenue and profitability by serving customers with new products and business models
- Productivity with better supply chain and operations management

How to transform digital infrastructure and outdated processes

- 01** Replace disconnected, manual systems
- 02** Embrace automation
- 03** Invest in operational visibility

Case study

Digitizing work instructions to reduce errors

A major manufacturing company with more than 200K employees across 100 locations spanning 30 countries struggled to maintain error-free manufacturing processes. The company partnered with NTT DATA to assess and address highly variable assemblies prone to mistakes.

The company operated with manual, paper-based processes — which were also prone to errors. As their trusted partner, NTT DATA implemented digital work instructions. The new instructions guided operators through high-mix assemblies while automatically collecting production data.

Outcomes:

- 10% increase in production yield
- 25% faster build time
- 60% fewer errors



Leverage digital dexterity to drive data-driven, automated operations

It's not enough for manufacturers to only adopt digital transformation strategies. The next step in digital transformation involves connecting smart systems to provide powerful insights and data-driven decision-making. To become a truly insight-driven organization, manufacturers need to implement digital systems that unlock the necessary intelligence to become a future-forward business.

Digital twins connect rich data to deliver a dynamic, digital replica of a manufacturing asset. The twin gives you actionable insights needed to reduce downtime, track processes and maintain asset health and utilization. Digital twins hold immense potential for manufacturers. They offer a unique opportunity to transform rich data into essential intelligence to improve asset management and performance.

Meeting the moment with cloud data

A worldwide manufacturing and industrial machinery company partnered with NTT DATA to modernize their operations with a cloud data platform. The company sought to improve their data platform's speed, scale and sustainability. Doing so would allow them to respond to evolving business needs and deliver data products faster and more efficiently. [Discover how NTT DATA helped implement a cloud data platform](#), unlocking compelling insights across the value chain for this manufacturer.

Case study

Reducing CO₂ emissions with digital twin technology

A global home appliance company sought out NTT DATA's supply chain consulting experts to help achieve an ambitious sustainability agenda. The company's long-term goal is to achieve a net-zero-emission value chain by 2050, and their short-term goal is to achieve net-zero in their own operations by 2030.

NTT DATA examined the company's European transportation operations to assess the feasibility and potential environmental impact of increasing the use of sustainable modes of transportation, like rail and intermodal, to help achieve these goals. Rail and intermodal transportation emit, on average, 70–80% less CO₂ compared to truck transportation.

With the need to evaluate several different scenarios, it was necessary to build an accurate digital representation, or digital twin, of the European transportation network. NTT DATA's supply chain design methods helped the manufacturer use the digital twin to compare various what-if scenarios. The digital twin helped identify and quantify opportunities and strategies for the company to achieve their sustainability goals.

It's important to note that a digital twin model is not a one-time use. The model needs to be continuously refreshed and improved to add continuous value to the organization. Having an interactive model that allows the business to react to unexpected events affecting the supply chain is crucial going forward.

Outcomes:

- 40% expected reduction in CO₂ emissions by 2025
- 50%+ anticipated increase in intermodal and rail use
- Maintained logistics costs at ±2% despite the transition
- Improved forecast accuracy and production reliability

Learn more about how digital twins helped this home appliance company achieve their sustainability goals.





Embrace the changing workforce

Just as the industry is evolving rapidly, the way manufacturers engage with and manage the workforce is changing just as quickly. It's becoming harder to find the right talent with the right skills — and even more difficult to retain talent with in-demand skills and experience.

Furthermore, an aging workforce means that more knowledge-based workers are leaving and taking their knowledge with them. Successful businesses across all industries are making it a high priority to retain institutional knowledge to mitigate the effects of the changing workforce.

Smart manufacturers seek partners that can upskill and train their workforce for the changes to come. If top talent is hard to secure, partners like NTT DATA can bring existing talent up to the modern standards demanded by Industry 4.0.

When you work with a partner like NTT DATA, you unlock strategic organizational leadership to re-skill and train your talent to face the challenges of Industry 4.0 head-on. When systems and processes begin to change through modernization and digitization, you need a partner that can bring your workforce into tomorrow, today.

“I think there’s a lot of things that can happen to really support how the workforce is changing in manufacturing, and I think one of those is a great evolution in technological changes. What we really see, true in manufacturing as well as other industries, is a significant demand for upskilling and reskilling the workforce.”

Kim Curley, NTT DATA



Case study

Trinity Industries, transformation and business resiliency

Embracing resiliency doesn't just mean shoring up existing business routes. Sometimes, planning for the future involves a total transformation. Such is the case for Trinity Industries. Trinity Industries, which owns market-leading railcar products and service-related businesses in North America under the trade name TrinityRail®, used customer engagement and technology to enhance their product and service offerings.

TrinityRail evolved from a manufacturing and maintenance company into a full-service rail transportation company. By enabling next-gen technology solutions and services, Trinity Industries transformed rail services with modern infrastructure and real-time railcar intelligence.

Trinity partnered with NTT DATA to implement technology that touched nearly every facet of their business operations. With a keen focus on customer service, Trinity has established initiatives to adopt digital and analytics services that keep them focused future-forward.

Outcomes:

- 70K first-call service desk resolutions annually
- \$1.7 billion company stands up an infrastructure from the ground up
- Integrated telemetry and machine learning-enabled analytics
- Modernized secure cloud servers and edge computations to process and stream data with no business interruption

Learn how Trinity Industries transformed into a full-service, customer-centric rail transportation company to maintain longevity as a resilient manufacturing operation.



Ignite tomorrow, today.

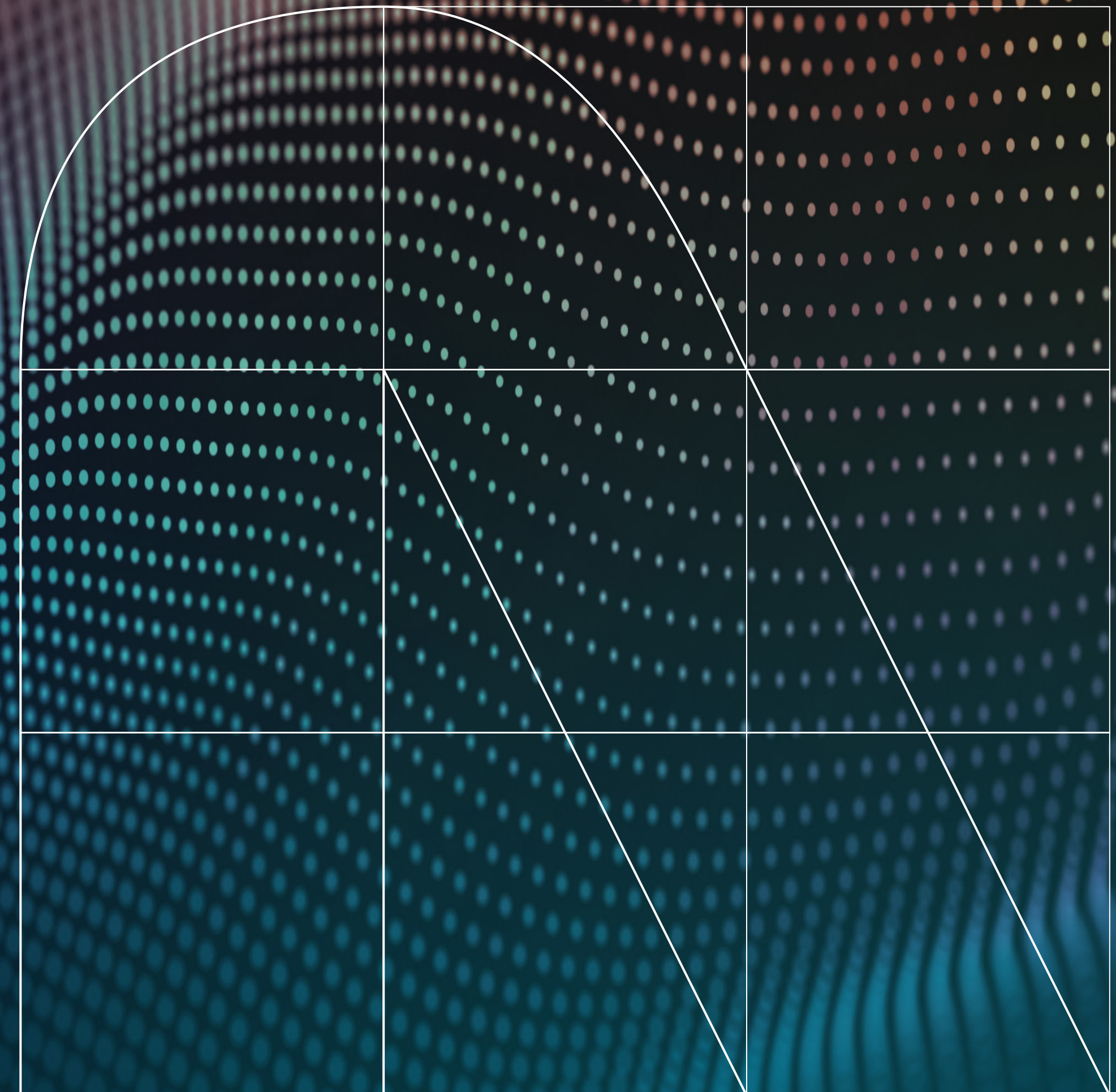
Tomorrow's manufacturers aren't just considering the journey to Industry 4.0; they're preparing for a world beyond the current technological advancements in front of them. By planning for what's waiting on the horizon, resilient manufacturers will be much more equipped to face the challenges to come.

Transform digital infrastructure and outdated processes, developing data-driven operations for trusted business and operational insights and reskilling the workforce will build up your resilience to changes and challenges you have yet to encounter.



Ready to build resilient manufacturing operations and accelerate your Industry 4.0 journey?

[Learn more about our solutions](#)





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