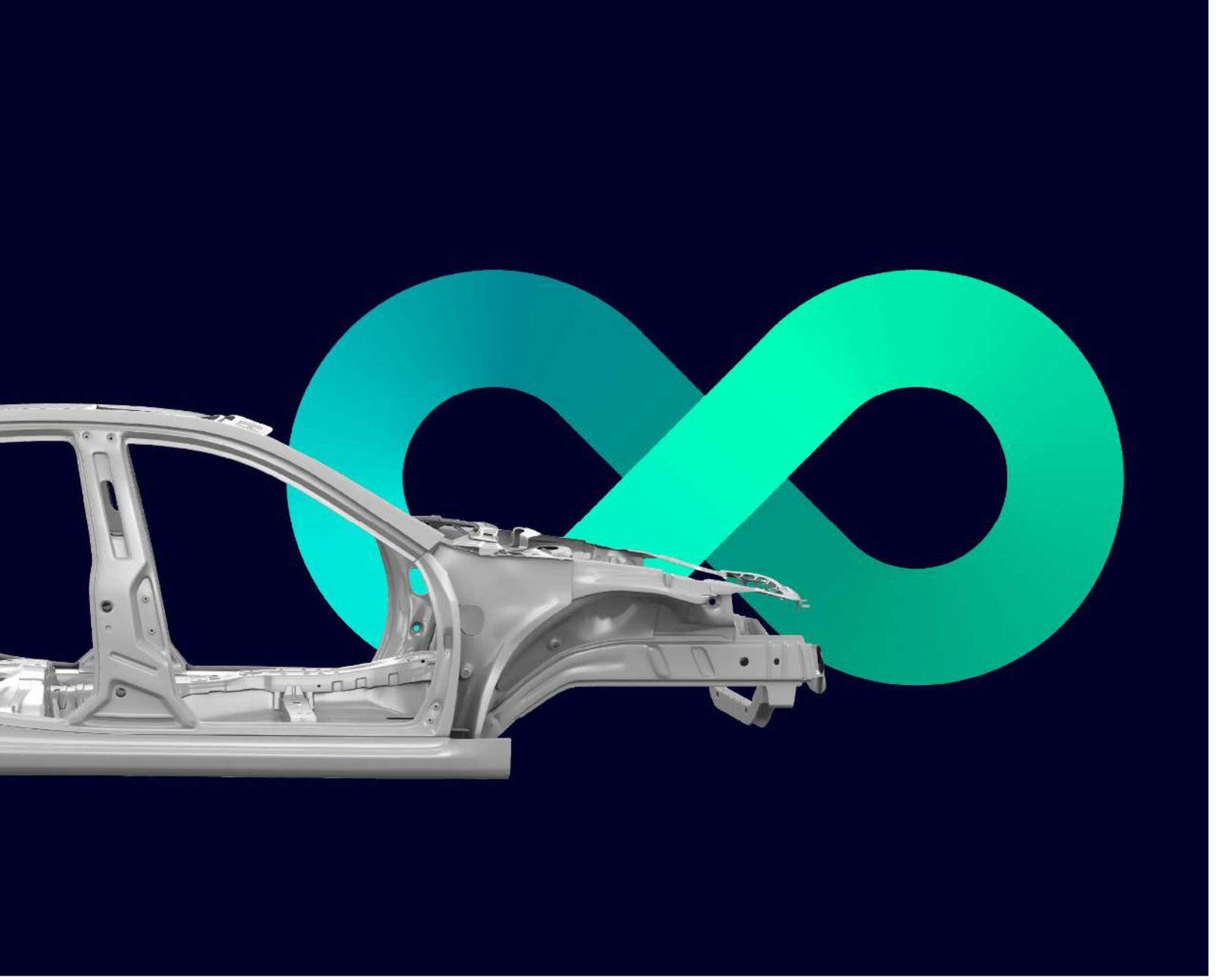

**SIEMENS SMART MANUFACTURING**

# Revolutionize with intelligent manufacturing

Use state-of-the-art manufacturing hardware and software to intelligently turn your production lines into autonomous, self-organizing operational environments with Siemens Smart Manufacturing.



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# Introduction

## Bringing the future into the factory with efficient production, intelligent automation, and virtual manufacturing development

The automotive industry is being reshaped faster than ever before. Technology advancements are redefining transportation from traditional mechanics to complex sustainable, entertaining, and connected mobility enabled by electronics and software. To stay relevant in this fast-changing market, automakers must revisit how they approach all aspects of product design, development, and manufacturing. With significant investments in research and development for new technologies like vehicle electrification and autonomous driving, some automotive manufacturers have tried to carry on with traditional manufacturing processes and outmoded equipment.

When continuing to do so, they will jeopardize their very existence by risking production line disruptions, failed launches, cyberattacks, and penalties for noncompliance to increasingly strict environmental regulations. To succeed, automakers must find the keys to becoming more agile and resilient while accelerating innovation, managing increased complexity, evolving manufacturing facilities to ensure they meet all sustainability and regulatory targets faster than the competition.

# Fear of disruption leads to poor production

With decades of experience, Automotive Manufacturers have accumulated vast knowledge, allowing them to accurately plan development cycles and produce flawless launches for traditional vehicles. As a result of past achievements, some automakers trust that their current processes and existing manufacturing technology, data management systems, and equipment will continue to lead them to success, subscribing to the cliché, "If it isn't broken, don't fix it." Perceived to be costly, time-consuming, disruptive, and risky, the evolution to smart manufacturing is a step these companies have not yet been willing to take.

However, most automotive manufacturers acknowledge the need for a digital transformation as a necessity to compete in today's evolving automotive landscape. According to the McKinsey Group, seventy percent have started adopting a smart manufacturing approach. By partnering with asolutions provider, these forward-thinkers are already taking steps to decrease downtime, strengthen cybersecurity, make better real-time decisions, and introduce intelligent automation to improve productivity, flexibility, and sustainability.

# Some traditions don't stand up to the test of time

Over about thirty years, automakers introduced manufacturing efficiencies that greatly improved the time and labor required to build a vehicle. According to Maintenance Technology Magazine, per-vehicle build time decreased by an impressive 50% between 1980 and 2009. But now, the industry is changing quickly, and carmakers do not have 30 years to react. By holding onto a traditional production mindset and a siloed approach to manufacturing, carmakers will struggle to produce the next generation of vehicles with the last gen manufacturing technologies.

Under pressure from governments imposing stricter sustainability regulations and consumers who demand the latest innovations now, OEMs are faced with increasingly complex designs and less time to build them. Without the ability to combine realworld data with cloud or edge-based simulation to safely develop, test, and commission virtually, less time leads to more errors, lower quality, launch delays, and dissatisfied customers. Outdated IT practices and dated equipment in the factory will not provide the necessary insight into real-time manufacturing performance and maintenance, slowing down production and preventing the integration of new technologies essential to the survival of today's automakers.

# The virtual development of manufacturing: Merging the physical and virtual worlds

By developing and testing manufacturing processes, configuring assembly line layouts, and training workers in a virtual world before executing them in the physical world, repeatability and fine-tuning can be achieved faster and more accurately.

With a digital twin of manufacturing, globalized automakers have the flexibility to quickly replicate production anywhere in the world. In addition, a centralized, cybersecure source of real-time data made available to the entire cloud-based ecosystem facilitates knowledge sharing, standardization, production


# Intelligent production excellence: Closed loop feedback to make better decisions faster

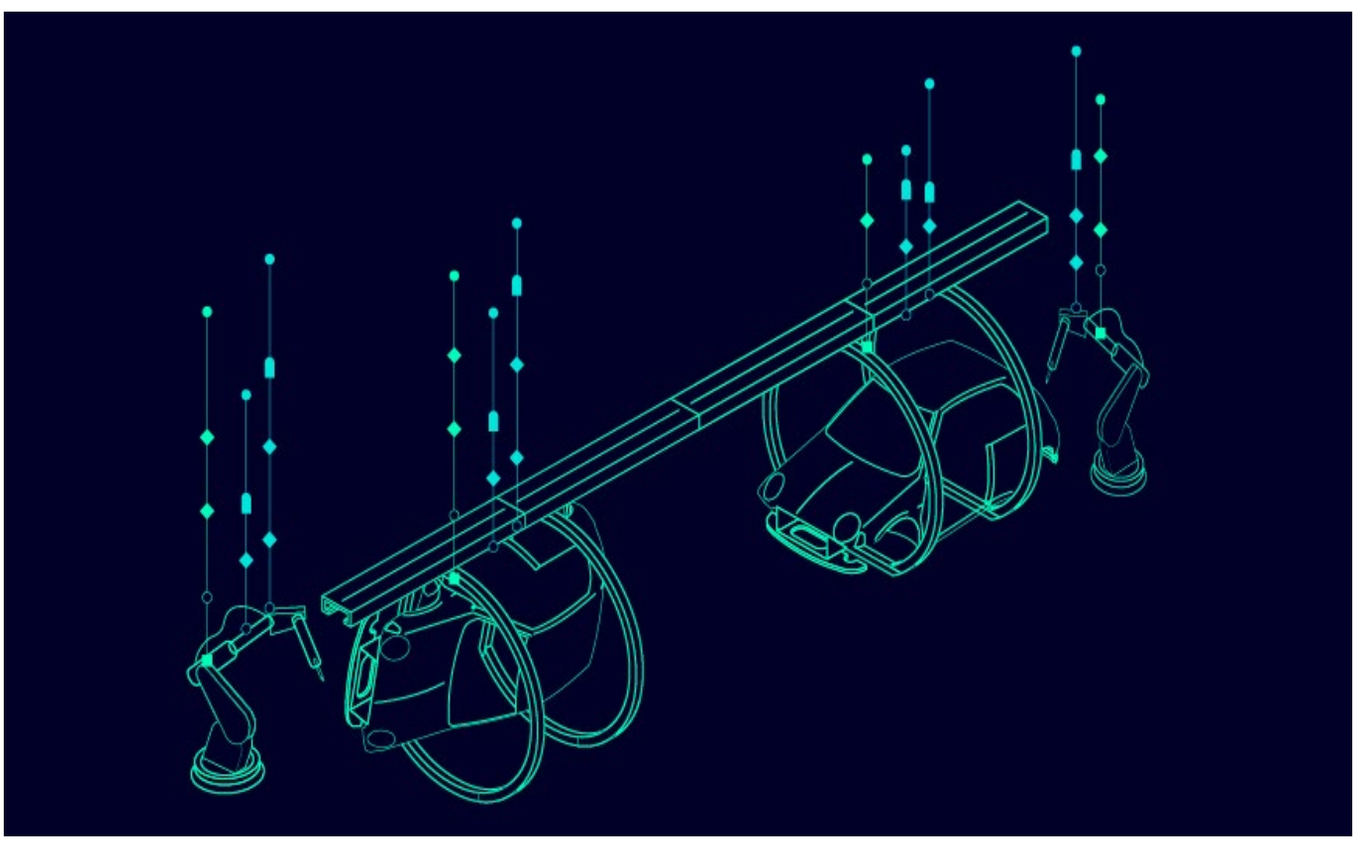
Carmakers and tiered suppliers are faced with rising complexity as they implement new technologies like vehicle electrification and autonomation. Still, the top manufacturers are successfully managing this evolution with digitization and the power of data. Through real-time analysis of data collected by sensors in the factory, they can create a closed loop feedback system to improve quality and efficiency.

Equally important is using this data to generate automated insights that can help improve industrial output. Predictive maintenance strategies can be optimized to enhance flexibility and control with powerful computing and processing capabilities in the cloud and at the edge.

# Rapid factory evolution: Smart modernization for flexibility and efficiency

Smart manufacturing is a cross-pollination of advanced AI technologies, the industrial internet of things (IIoT), and analytics embedded into traditional automation systems with the goal of increased factory automation, better process optimization, and higher cost savings. It enables systems that are more intuitive and less reliant on human intervention.

A closed-loop simulation environment connects the manufacturing processes to help automakers drive predictive insights, increase uptime, and improve output efficiency. Automakers can also monitor equipment performance using real-time visibility to take corrective actions on the shop floor, optimize production and gain energy efficiencies onsite or remotely.



# Smart manufacturing drives a brighter future

According to the McKinsey Group, production technology and focus on manufacturing process innovation are critical to future profitability in the automotive industry. While many automakers and suppliers recognize that they need to change in order to compete in today's fast-changing automotive landscape, implementing multiple solutions across the disconnected branches of their organizations seems risky.

To feel confident, they should research and adopt an intelligent manufacturing approach that can be seamlessly integrated and scaled to their organization without disrupting production. A comprehensive digital twin of the complete manufacturing process and a digital data backbone that runs through the ecosystem will facilitate flexibility and agility.

# Siemens smart manufacturing solutions

Siemens' smart manufacturing solutions combine technologies and automation to increase factory efficiencies and profitability. They create an intelligent production environment through data analytics, connectivity, and integrated simulations that address situations in real-time to ensure that output targets are achieved. With Siemens as a partner, automakers and suppliers can modernize legacy equipment faster with rapid factory automation, make better real-time decisions with intelligent operations excellence, and achieve cost savings and flexibility with the virtual development of manufacturing.

All of this is made possible as a part of the Siemens Xcelerator platform that speeds the digital transformation cycle and unlocks a powerful industrial network effect. Xcelerator is now available on AWS Cloud and thus more accessible, scalable, and flexible. Xcelerator as a Service (XaaS) further enhances collaboration and cross domain capabilities and delivers key customer benefits focused on:

**1. Comprehensive Digital Twin**

a. Accessible for customers of all sizes

b. Enhanced design, realize &optimize capabilities

c. Secure, formal & ad hoc collaboration

**2. Personalized / Adaptable / Modern**

a. Easily tailored solutions

b. Ramp engineering capabilities on demand

c. Augmented with low-code and cross-platform compatibility

**3. Flexible Open Ecosystem**

a. Secure collaboration anywhere, anytime, on any device

b. Empower engineers to work across domains and sites

c. Access and connect data across domains and solutions

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For additional numbers, click here.

**About Siemens Digital Industries Software**

Siemens Digital Industries Software is driving transformation to enable a digital enterprise where engineering, manufacturing and electronics design meet tomorrow. Xcelerator, the comprehensive and integrated portfolio of software and services from Siemens Digital Industries Software, helps companies of all sizes create and leverage a comprehensive digital twin that provides organizations with new insights, opportunities and levels of automation to drive innovation.

For more information on Siemens Digital Industries Software products and services, visit siemens.com/software or follow us on LinkedIn, Twitter, Facebook and Instagram.

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