



## Solution Overview

# Connected Factories

How integrating manufacturing data and processes with analytics delights customers, enables higher margin products and services and streamlines manufacturing while slashing inventory, rework and maintenance costs.

## Manufacturers face unprecedented challenges from global competition, changing business models, increased regulation and rising customer needs.

They must deliver ever-higher levels of quality and more easily customized products at ever-lower prices, while meeting stricter safety and security requirements.

Sensors, inexpensive network bandwidth, and ever more accessible analytic tools can drive improved visibility into cost, yields, inventory, safety and security across factories. Such connected, agile, intelligent manufacturing is called Industry 4.0. In the short run, it delivers double-digit improvements in cost, efficiency, yields and agility. More strategically, it enables new business models with “digital twins” of physical products that prevent failures, and the monetization of data about how products are performing and how customers use them.

### Lower costs, greater efficiency

Industry 4.0 is already producing benefits such as:

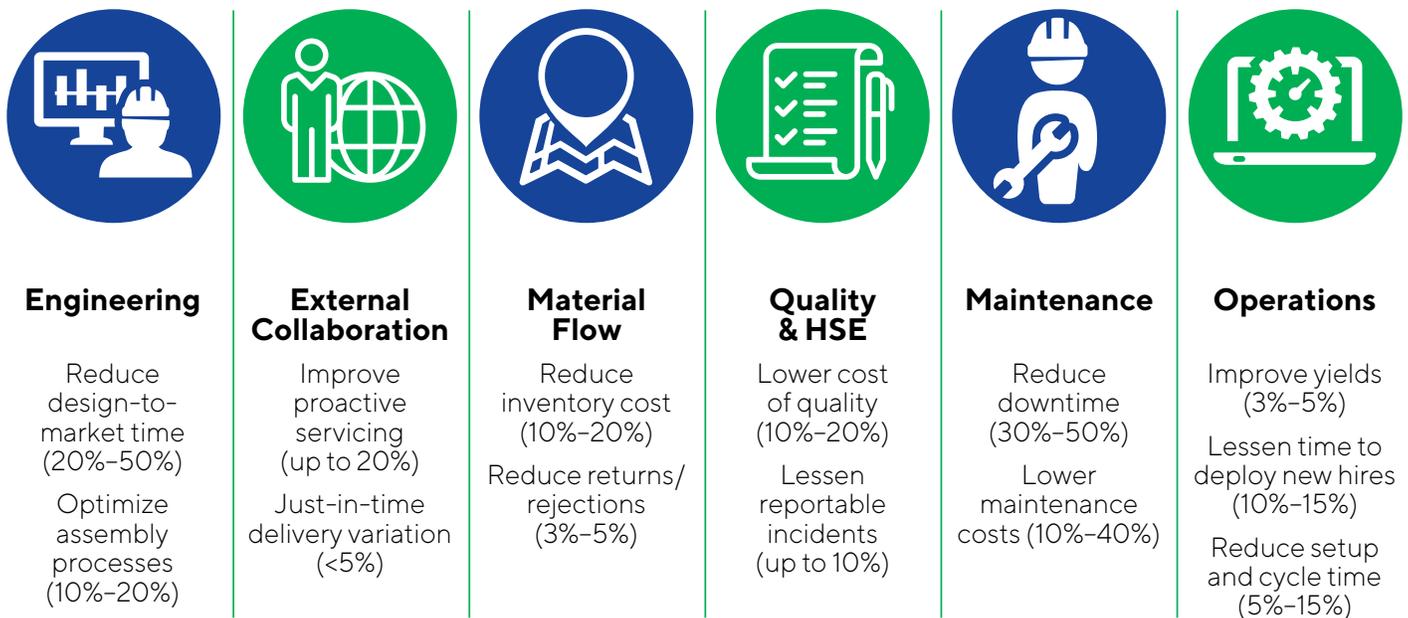


Figure 1

## The building blocks for Industry 4.0 are more available and affordable than ever. But implementing them properly requires executive commitment.

Many manufacturers struggle in their journey to Industry 4.0 because of daily operational pressures, the difficulties of showing tangible business benefits, and the need to integrate legacy operational and analytic systems.

Cognizant has a proven track record speeding our clients' Industry 4.0 transformations with frameworks, reference architectures, roadmaps and services that span business and technology consulting, design, deployment and support across multiple locations, manufacturing systems, product lines and geographies.

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### **Real time visibility = agility, efficiency and quality**

With every passing year, manufacturers must respond more quickly and efficiently to unexpected machine breakdowns, interruptions in supply or rush orders from customers. Consumers demand more personalized products and services, reliable connectivity, continuously updated features, smarter products, intuitive user interfaces and compelling user experiences. Amidst skills shortages and increased cyber-attacks, manufacturers must meet these needs while controlling costs, meeting delivery schedules and meeting quality, safety and other requirements.

Success requires complete and current insights into everything from inventory levels to the status of production machines to yield levels at manufacturing facilities. With this knowledge, production managers can best shift production among machines or manufacturing facilities, order raw materials from new suppliers and prioritize production runs.

Such enhanced visibility and seamless collaboration is more feasible than ever, thanks to data from the Internet of Things and low cost, accessible cloud-based compute, storage and Big Data tools. Integrated properly, these capabilities create "digital twins" of physical assets, processes and systems that can monitor and predict product performance and improve design and production processes. The insights from such digital twins can even become valuable products and services manufacturers can sell to business partners.

But reaching this real-time, intelligent awareness is not easy. It requires integrating an alphabet's soup of new and existing systems from ERP (enterprise resource planning) to MES (manufacturing execution systems) to QMS (quality management software) EAM (enterprise asset management) and more. It also requires changes to roles and workflows, and new tools and skillsets.

For such reasons, we recommend the move towards Industry 4.0 be led from the highest levels of the enterprise. Otherwise, the lack of alignment among isolated initiatives delivers only incremental success or lackluster outcomes, robbing future initiatives of support and funding.

## Cognizant Connected Factories

Cognizant Connected Factories creates a platform-agnostic blueprint to drive convergence between information technology and operational technology systems, with seamless integration between physical world of machines, environment, products and the enterprise system layers. This enables smart workers to collaborate effectively throughout the manufacturing cycle, utilizing smarter processes and smarter assets to build smarter products while achieving greater efficiency, quality and savings.

### Cognizant’s vision for Connected Factories

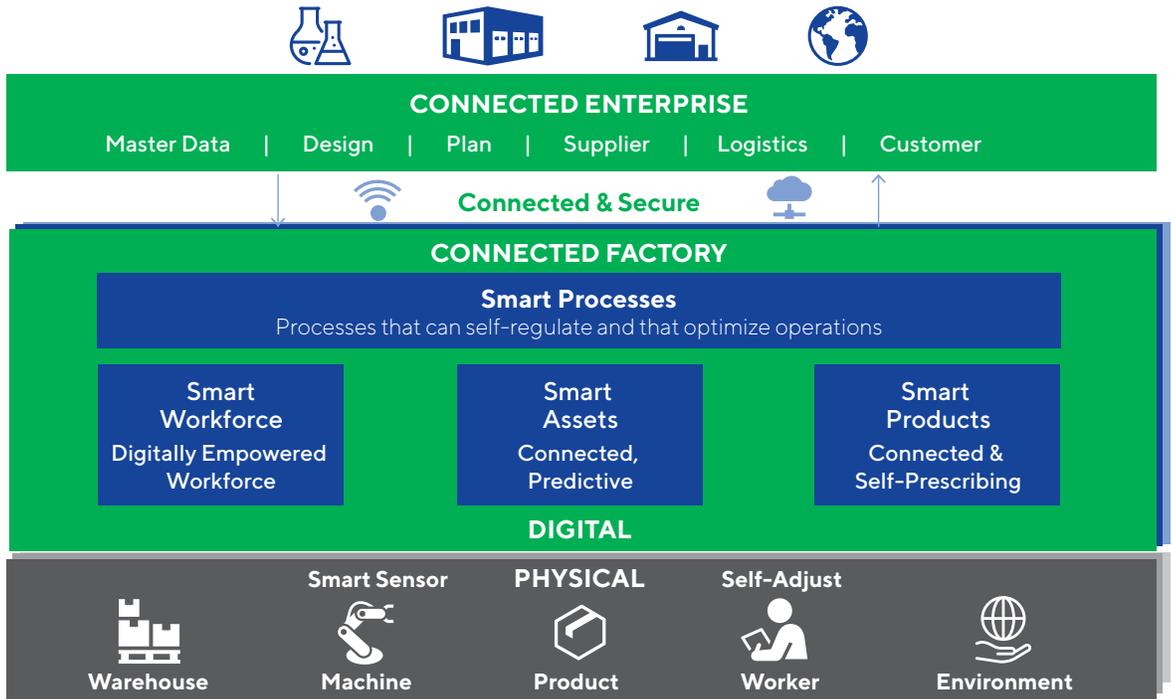


Figure 2

Among the benefits are:

- I Improving transparency** through integration of data from the shop floor to the enterprise layer, and implementation of visualization and reporting that helps shop floor leaders and business executives gain and share relevant insights.
- I Harmonizing business processes** across the organization with end-to-end workflow automation to increase productivity and efficiency.
- I Seamless collaboration with extended ecosystems** of supply chain partners to enable flexible manufacturing networks.

Cognizant Connected Factories provides services for every phase of the Industry 4.0 journey, from advisory engagements to technology, integration, long-term support and maintenance.

## Cognizant supports every stage in the Industry 4.0 journey

ADVISORY	TECHNOLOGY & INTEGRATION		SUPPORT
Maturity Assessment	Digitalization of end-to-end processes (Production, Quality, Inventory, Asset, EHS)	Industrial IoT Implementation	IT-OT Support Services and Portfolio Rationalization
Roadmap and ROI	Seamless Data Integration	Production Workflow Implementation	
Reference Architecture and Product Fit	Monitoring and Edge Control	Plant Performance Visualization and Decision Support	

Figure 3

### Advisory

Our advisory services assess a business’ Industry 4.0 maturity, build a blueprint/roadmap for a Connected Factories strategy and help build the business case.

### Technology & Integration

**Technology and integration services** focus on piloting prioritized industry use cases to quickly drive key performance indicator results, followed by end-to-end deployment.

**Digitalization of end-to-end processes** enables end-to-end automation of core functions. Seamless data integration helps clients share information leveraging the Manufacturing Service Bus (MSB) framework linking sensors, machines and controllers with enterprise systems.

**Plant performance visualization and decision support services** help clients implement Operational Performance Analytics and Reporting that aids decision making through greater visibility into factory floor operations.

**Industrial IoT design and implementation services** help with everything from sensor deployment and integration with IoT platforms to delivering capabilities such as cold chain monitoring, field maintenance services and inventory tracking.

**Data to insights with advanced analytics** helps improve efficiency and quality through simulations, event correlation and faster, more accurate diagnoses of issues with products, machines and processes. Predictive monitoring and control is especially useful in helping reduce costs and increase efficiency for companies in asset intensive industries.

## Support

**Our support services** not only assure the performance of existing services, but drive synergies across the IT-OT stack and optimize our clients' application portfolios.

## Cognizant Connected Factories portfolio speed Industry 4.0 transformation

ACCELERATORS	CAPABILITIES TO ADVANCE	OUTCOMES
<b>Manufacturing Transformation Roadmap</b>	<p>Framework to process a maturity assessment and 1-3 year roadmap.</p> <p>Technology selection.</p> <p>Benchmarking governance and definition of an Industry 4.0 organizational structure.</p> <p>Branding and communication to drive support for an adoption of Industry 4.0 solutions.</p>	<ul style="list-style-type: none"> <li>■ Reduced project cost and risk.</li> <li>■ Reduced cost and effort of change management.</li> <li>■ Increased adoption and accelerate ROI.</li> </ul>
<b>Cognizant OnePlant™ Framework</b>	<p>Advisory services help define the maturity roadmap, choose the right technology and develop a process blueprint.</p> <p>A maturity framework to help decision makers develop an organized and systematic approach and quantify value.</p>	<ul style="list-style-type: none"> <li>■ Improved project planning.</li> <li>■ Closer monitoring of benefits.</li> <li>■ Proper technology choice cuts implementation costs, speeds and increases ROI.</li> </ul>
<b>Manufacturing Service Bus</b>	<p>Unifies the architectural framework for a seamless shop-floor (OT) to top-floor (IT/ERP) systems integration.</p> <p>Power on new capabilities to build advanced analytics and increase agility and efficiencies at scale with real-time supply chain visibility.</p>	<ul style="list-style-type: none"> <li>■ Event driven and service oriented integration.</li> <li>■ Real-time visibility and analytics for proactive and predictive control.</li> <li>■ Accelerate value realization with end-to-end ERP integration on the shop floor.</li> </ul>
<b>Asset Performance Excellence (APEX) Framework</b>	<p>Meet needs such as optimizing production and using data from connected assets to understand how, when and where to improve key performance indicators across operations.</p>	<ul style="list-style-type: none"> <li>■ Improved asset health and uptime.</li> <li>■ Reduced need for spares and extra inventory and lower equipment costs.</li> <li>■ Improved first pass yields.</li> <li>■ Reduced waste and operational bottlenecks and improved quality.</li> <li>■ Improved service and delivery.</li> <li>■ Enhanced worker experience and safety.</li> </ul>

## Connected Factories cut costs, drive efficiencies

The road ahead is clear for our manufacturing clients. Heads of individual lines of business, VPs of Manufacturing or Operations, now face a mandate to initiate and drive digital transformation initiatives.

Cognizant has partnered with global leaders to enable the convergence of IT and OT, adopt digital technologies, build smarter products, create agile manufacturing setups, and reduce time-to-market.

### Cognizant Connected Factories portfolio speed Industry 4.0 transformation

CHALLENGE / SOLUTION	OUTCOMES
 <p>The <b>Global Pharmaceutical Manufacturer</b> needed to reduce the complexity of their enterprise systems to increase visibility of multiple plant floor systems and lower operations costs. The client chose to partner with Cognizant to unify its processes and systems while charting a roadmap to improve operational efficiencies across 70 global locations.</p>	<ul style="list-style-type: none"> <li>■ 30 of the 70 sites are live with unified MES integrated to the ERP.</li> <li>■ 20% increase in throughput.</li> <li>■ 50% decrease in batch review efforts.</li> <li>■ 10% decrease in inventory costs.</li> <li>■ 15% decrease in rework.</li> <li>■ Saved over 4,000 man hours.</li> <li>■ Client realized ROI within six months of rollout.</li> </ul>
 <p>A <b>Large Auto Parts Manufacturer</b> worked with Cognizant to design a solution to improve productivity by increasing the data flow between ERP systems and production systems. We used simulation tools and Cognizant's OnePlant framework to help the manufacturer understand the cause of the inefficiencies, create improved data flows and choose a Manufacturing Execution System (MES) to implement new production flows.</p>	<ul style="list-style-type: none"> <li>■ The manufacturer is gaining an improved understanding of its needs and tools to better assess potential MES vendors.</li> <li>■ The client has begun the journey towards the Industry 4.0 vision to drive competitiveness and agility.</li> <li>■ Data provided by the new MES solution will also allow analytics to streamline the production process.</li> </ul>
 <p>Cognizant is helping a <b>Top U.S. Manufacturer</b> to modernize its factory floor operations — providing increased visibility into production flows and efficiency while optimizing management control and collaboration across the enterprise and through its supply chain.</p>	<ul style="list-style-type: none"> <li>■ Achieved a 75% reduction in time; by using Cognizant's OnePlant™ blueprint manufacturing execution system, the client's planned multi-year digital migration strategy was completed in only months.</li> <li>■ Analyzed 800 separate manufacturing systems at multiple facilities and drafted scores of user cases to inform a single global manufacturing implementation system.</li> <li>■ Designed a single platform for our client's dispersed applications to operate and provide complete management analytics on current production workflows.</li> </ul>

## Learn more

Cognizant Connected Factories solutions speed your journey to Industry 4.0, using our unique frameworks, industry reference architectures, roadmaps and leading practices to accelerate every step from assessment to deployment at scale and support. Learn more about how Cognizant Connected Factories can streamline operations, reduce costs and speed innovative products and services to the market. Visit us at [www.cognizant.com/enterprise-iiot-solutions](http://www.cognizant.com/enterprise-iiot-solutions).

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### About Cognizant

Cognizant (Nasdaq-100: CTSI) is one of the world's leading professional services companies, transforming clients' business, operating and technology models for the digital era. Our unique industry-based, consultative approach helps clients envision, build and run more innovative and efficient businesses. Headquartered in the U.S., Cognizant is ranked 195 on the Fortune 500 and is consistently listed among the most admired companies in the world. Learn how Cognizant helps clients lead with digital at [www.cognizant.com](http://www.cognizant.com) or follow us @Cognizant.

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