Manufacturing Digital Transformation and Innovation Primer for 2022

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Initiatives: Manufacturing Digital Transformation and Innovation

> Manufacturing and transportation CIOs must help their companies deploy and leverage technology to overcome new challenges and stay competitive. This initiative helps CIOs deliver an enterprise that can pivot faster and capitalize on innovations and technologies before they become mainstream.

Additional Perspectives

- Summary Translation + Localization: Manufacturing Digital Transformation and Innovation Primer for 2022
  (23 March 2022)

Scope

This initiative helps manufacturing and transportation organizations adopt new technologies, metrics, processes and business concepts to transform how they operate, offer products and make money.

Topics in this initiative include:

- **Business Models: Ecosystems, Product Servitization, Equipment as a Service:** Forge new operating models and revenue paths by leveraging ecosystems and partnerships, product servitization, and equipment as a service/mobility as a service.

- **Digital Manufacturing: Transition to a Data-Driven, Smart Factory:** Enable smart or digital operations in manufacturing and transportation by transforming I&T operating models, addressing new interoperability requirements, preparing for forthcoming technology standards (e.g., 5G), and implementing advanced technologies (e.g., digital twins and hyperautomation).

- **Industry Dynamics, Disruption, and Emerging Technologies:** Plan for technology implementation by tracking trends in the following areas: cutting-edge technology adoption; novel and disruptive business methods; sustainability and climate change efforts; and digital skills and industrialization requirements.

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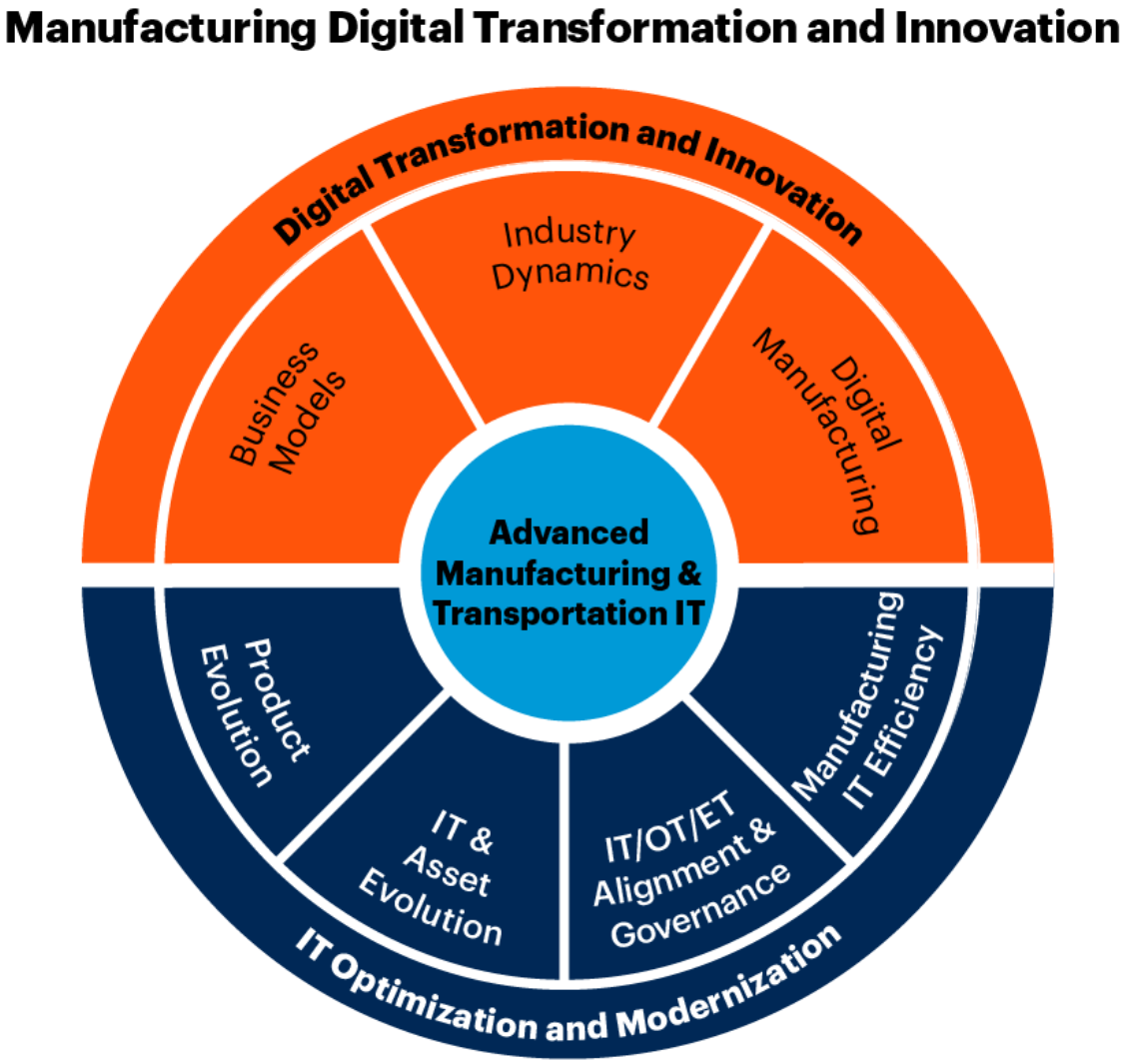
Analysis

Figure 1: Manufacturing Digital Transformation and Innovation Overview



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The manufacturing sector is massive and diverse, covering durable goods like cars, semidurable consumer goods like clothes and fast-moving consumer goods like processed food. Each sector has its own challenges. For example, a food manufacturer is concerned about totally different things than a jet engine manufacturer. The timelines, market, and product production and compliance issues vary significantly and at every stage. The same is true for transportation companies delivering goods or moving people on trains, cabs and airplanes. In addition, the issues for small and midsize manufacturers and transportation companies are different. Yet, some truths cut across all market segments. These companies are always looking for ways to:

- Innovate and make better products and services
- Increase the efficiency of production and operations
- Create products and services and product portfolios across generations
- Reduce operating costs
- Speed up development and rollout of products and services
- Raise prices on products and services
- Optimize how products are sold
- Exploit sustainability contributions of products and processes
- Ensure quality and regulatory compliance
- Ensure availability and safe operation of critical manufacturing assets and autonomous things
- Facilitate collaboration across siloed business functions and with external parties
- Improve customer experience

Our research focuses on driving fundamental business and technology changes to fulfill the objectives above. Coverage across the value chain at manufacturers and transportation companies can be simplified to three categories: smart factories and operations; smart products and services; and smart customers and passengers.

Transformation isn't a singular path, and it isn't as simple as looking at a list of new technologies and checking boxes to adopt them. Implementing technology is not synonymous with enabling the business through technology. Thus, manufacturing and transportation CIOs need to look at how adopting new technologies can support changes to their business models and priorities and adapt to evolving market conditions and requirements. Acting as the orchestrators/coordinators of digitalization initiatives, CIOs must work with business functions such as R&D, manufacturing operations, sales, marketing and finance to change, or even renew, operations and business models.

Topics

Each sector of advanced manufacturing and transportation has unique characteristics, and faces specific challenges. In all sectors, transformation goes hand in hand with innovation. New technologies and practices — sometimes borrowed from other industries — bring competitive advantages or create market opportunities that require, or benefit from, more-extensive IT involvement.

Our research in this area addresses the following topics:

Business Models: Ecosystems, Product Servitization, Equipment as a Service

The digitalization of manufacturing and transportation has opened doors to different ways of operating and generating revenue and profits. Ecosystems and partnerships amplify product offerings and extend reach to new customers. Product servitization combines a physical product and the service that goes with it. Equipment as a service (manufacturing) and mobility as a service (transportation) shift the business model from selling the machines themselves to offering the output of the machines, metered by time, usage or other metrics.

Questions Your Peers Are Asking

- How can I enable mobility as a service/equipment as a service to drive revenue?
- How can I leverage or monetize manufacturing and product data assets to reduce risk, increase efficiency and drive revenue?
- What are the emerging opportunities to participate in transportation or manufacturing ecosystems to drive new revenue sources?

Recommended Content

Some recommended content may not be available as part of your current Gartner subscription.

- How ‘Total Experience’ Can Be Applied to Improve the Connected Car
- Innovation Insight for Composable Business for Manufacturers
- 3 Data Monetization Misconceptions in Manufacturing
- Consumer Goods Trend: Ecosystem Partnerships

Planned Research

- Advice on how to drive success with ecosystem partnerships
- An analysis of new business models for sharing technology innovations
- An exploration of the impact of total experience (TX) in industrial manufacturing, automotive and consumer goods
- Guidance on building the digital twin of the customer in manufacturing
- A review of manufacturing trends for 2022

Digital Manufacturing: Transition to a Data-Driven, Smart Factory

To better support smart or digital manufacturing and transportation operations, IT must act on behalf of the operational areas. These actions can range from enhancing internal information and technology (I&T) operating model capabilities, to supporting more-extensive interoperability requirements, to preparing for upcoming standards (e.g., 5G), to implementing advanced technologies like digital twins and hyperautomation. Concepts like operational technology (OT)/IT convergence and the future of manufacturing objects fall into this category, along with Industrie 4.0.

Questions Your Peers Are Asking

- How can I support the implementation of robotics to improve workplace safety and workforce productivity and quality?
- Which technologies can increase efficiency and drive down costs in manufacturing, and what is the roadmap?
- What technologies can I implement that will allow the organization to develop, build, configure, sell and maintain products faster and more cost-effectively in the future?

Recommended Content

Some recommended content may not be available as part of your current Gartner subscription.

- When Does a CIO Need to Be Involved in OT?
- 3 Data Monetization Misconceptions in Manufacturing
- Proving the Value of a Digital PLM Ecosystem: Discrete Manufactured Consumer Goods
- Evolving Business KPIs of Consumer Goods and Industrial Manufacturers
- Innovation Insight for the Digital Thread

Planned Research

- Prerequisites and best practices for digital twins
- Guidance on getting started with hyperautomation in manufacturing
- Market Guide for Enterprise Asset Management Software
- Magic Quadrant for Industrial IoT Platforms
- Market Guide for PLM Software in Discrete Manufacturing Industries

Industry Dynamics, Disruption, and Emerging Technologies

The changing nature of technology, business and society impacts how companies should plan investments. Understanding current trends in cutting-edge technology and disruptive business methods is vital to planning technology implementations. Organizations must leverage technology and innovation by learning from other manufacturers and industries and using available data to discover customer or product niches.

Questions Your Peers Are Asking

- What are the emerging trends and technologies in manufacturing and transportation, and how can I respond to them to drive revenue, cost or risk levers?
- How can I leverage emerging trends and technologies in other industries to grow revenue, reduce cost or mitigate risk in manufacturing and transportation?
- How can I develop more of a software company mindset to increase agility in manufacturing or transportation?

Recommended Content

Some recommended content may not be available as part of your current Gartner subscription.

- 2022 CIO and Technology Executive Agenda: An Automotive Perspective
- 2022 CIO and Technology Executive Agenda: An Asset-Intensive Manufacturing Perspective
- Autonomous Things Deployment: 5 Best-Practice Stages That Require Manufacturing CIO Leadership
- Predicts 2021: Consumer Goods Manufacturers Compete in the Brave New World
- Predicts 2021: Manufacturing Digitalization Roadmap for Agility and Revenue Generation

Planned Research

- Hype Cycles covering transportation, automotive, consumer goods and manufacturing transformation
- Predictions on automotive, consumer goods and manufacturing trends in 2022 and beyond
- CIO survey analyses for the transportation, automotive, consumer goods and asset-intensive manufacturing perspectives
- Advice for manufacturers on reinventing customer engagement with the Gartner CX CORE model
- Updates to the Digital Citizen Equity Index

Suggested First Steps

- Top 5 Strategic Business Trends in Manufacturing Industries for 2021
- Top 5 Strategic Technology Trends in Manufacturing Industries for 2021
- Hype Cycle for Manufacturing Digital Transformation and Innovation, 2021
- Hype Cycle for Transportation and Smart Mobility, 2021
- Hype Cycle for Manufacturing Digital Optimization and Modernization, 2021

Essential Reading

- Digital-Outcome-Driven Metrics for Automotive
- Digital-Outcome-Driven Metrics for Mass Transit
- Toolkit: Reset Scenarios in Manufacturing for Innovation and Growth

Tools and Toolkits

- Toolkit: Reset Scenarios in Manufacturing for Innovation and Growth
- Toolkit: Stop Firefighting and Start Trailblazing Digital Initiatives — Virtual Edition

Acronym Key and Glossary Terms

Gartner CX Core model	Gartner Customer Experience Customers, Organization, Relationships, Experience model

Document Revision History

Manufacturing Digital Transformation and Innovation Primer for 2021 - 4 February 2021

Manufacturing Digital Transformation and Innovation Primer for 2020 - 24 January 2020

Related Priorities

Initiative Name	Description
Manufacturing IT Optimization & Modernization	This initiative helps foster digitalization efforts in manufacturing/transportation value chains. It aims to increase excellence and customer engagement, managing risks by modernizing and governance.

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