Driving Growth and Staying Relevant in the Era of Industry 4.0

Jeff Winter
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Adapting to the **Changing Manufacturing Landscape**

HITACHI
Inspire the Next

8th

Largest technology company in the world

24th

Largest manufacturing company in the world

140,000+
Manufacturing Employees

400+
Manufacturing Facilities

20+
Countries with Manufacturing Facilities

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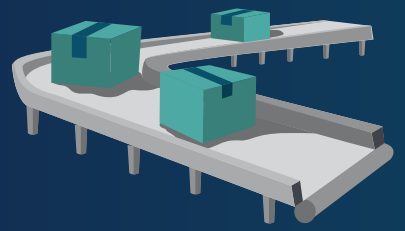
END OF THE 18TH CENTURY

INDUSTRY 1.0
Mechanization

Introduced mechanization of production by using water and steam to increase production capacity and productivity, versus manual craft work

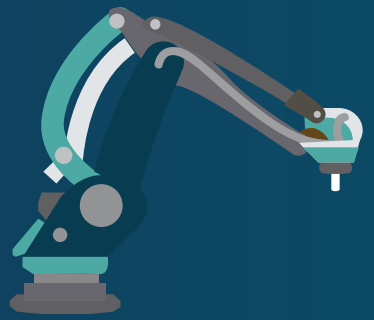
START OF THE 20TH CENTURY



INDUSTRY 2.0
Electrification

Introduced labor-based mass production (assembly lines) powered by electrical energy

START OF THE 1970S



INDUSTRY 3.0
Automatization

Introduced electronics and computers to replace manual work by stand-alone robotic systems

PRESENT

INDUSTRY 4.0
Cyber-Physical Systems

The convergence of physical, digital, and virtual environments through **Cyber-Physical Systems (CPS)** and the **Internet of Things (IoT)**

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Global Lighthouse Network

WORLD ECONOMIC FORUM | McKinsey & Company

10-30%

lead time reduction

30-90%

speed to market time reduction

Up to 200%

factory output increase

Source: McKinsey/World Economic Forum partnership findings February 2020, identifying value captured at top 44 lighthouses where specific KPI was targeted

Manufacturing & Supply Chain **Framework**

Worker Enablement & Transformation

- Learning & Knowledge Management
- Connected Frontline Workers
- Remote Work & Collaboration
- Personalized Messaging
- Skills Training & Development

Enhanced Customer Experience

- Always On-Service
- Chatbots & Virtual Assistants
- Social & Digital Selling
- Personalized Messaging
- Predictive Response Resolution

Digital Innovation

- New Business Models
- Digital Services
- Advanced Customization
- Connected Products
- As-A-Service

Digital Operations

- Smart Manufacturing
- Resilient Supply Chain
- Digital Engineering
- Going Paperless
- Predictive Maintenance

Sustainability

- Energy Optimization
- Waste Reduction
- Carbon Management
- Reporting
- Recording

Digital Thread

Digital Thread

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IoT Fuels **Digital Transformation**…

Source: DOMO- Data Never Sleeps

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IoT and Digital Twins **Enable Digital Feedback Loops**

Engage Customers

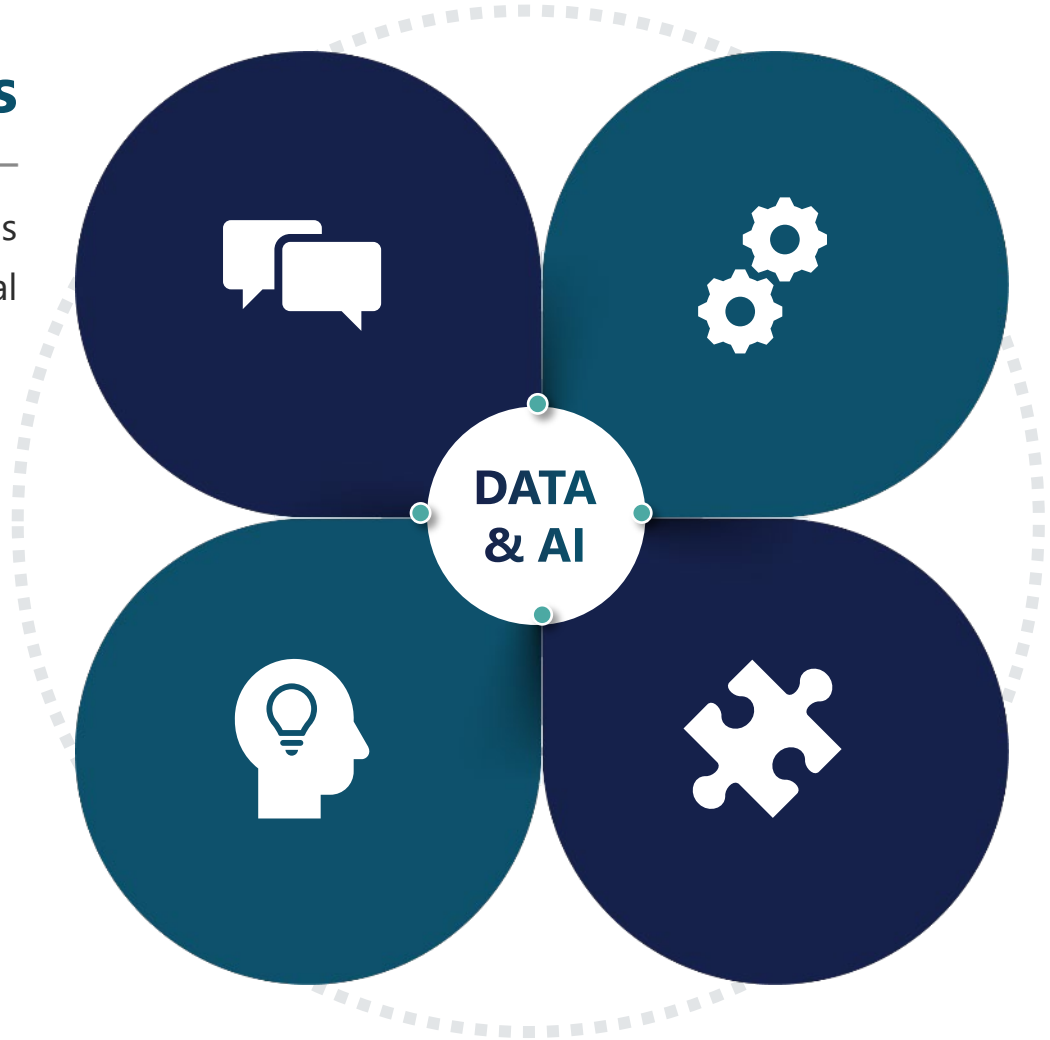
Deeper Relationships

Customer Signal

Optimize Operations

More Efficient Ops

Operational Data



Empower People

Employee Signal

More Effective Employees

Transform Products

Product Telemetry

Better Products

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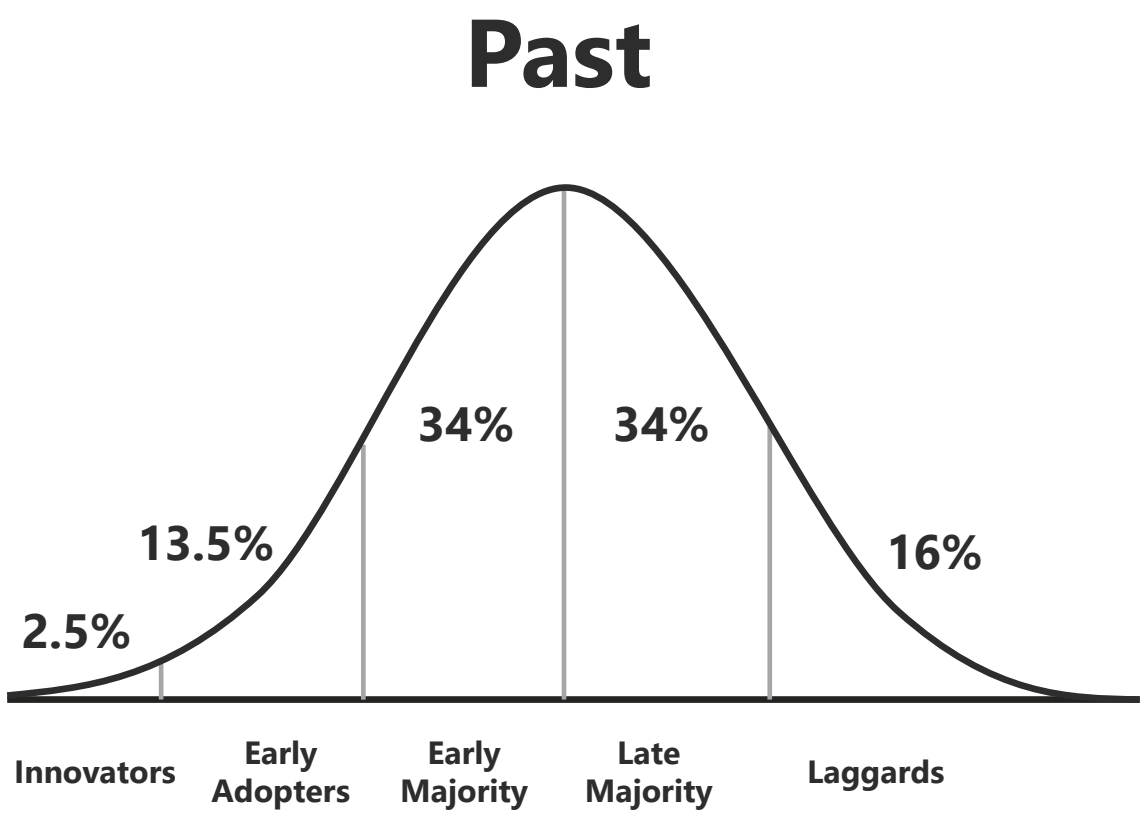
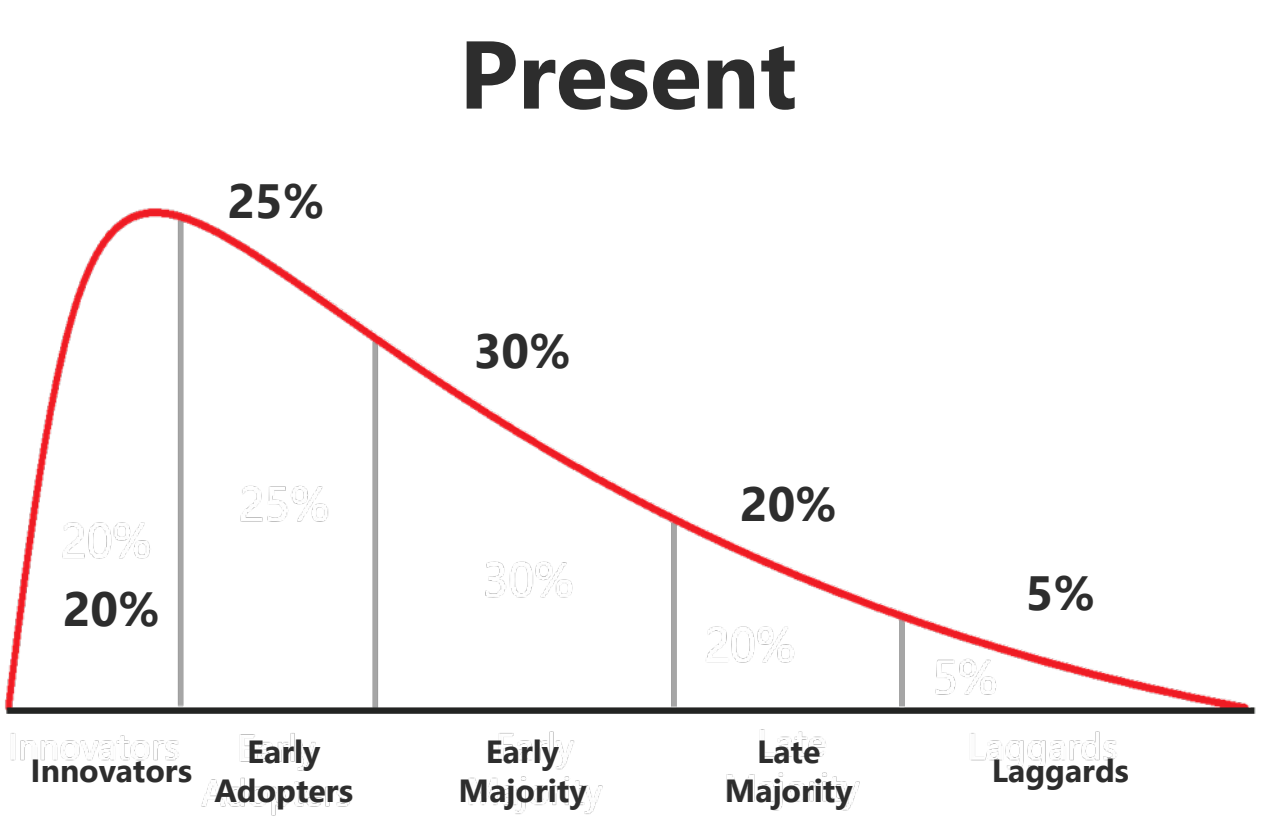
Components of the **Metaverse**

Image source: Microsoft

Technology **Adoption Shift**





Source: Journal of the Midwest Association for Information Systems, Technology Adoption and Disruption – Organizational Implications for the Future of Work

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Trends Driving **Digital Engineering**

All of them impacting your digital transformation journey

Industry 3.0:	Industry 4.0:
1 **Designing ~~Products~~**	enhanced customer experience
2 **Product lifecycle ~~ending at point of sale~~**	maintaining continuous customer connectivity
3 **Capturing profit via ~~hardware/products~~**	software and digital services
4 **Integrating with the ~~Supply Chain~~**	entire value chain

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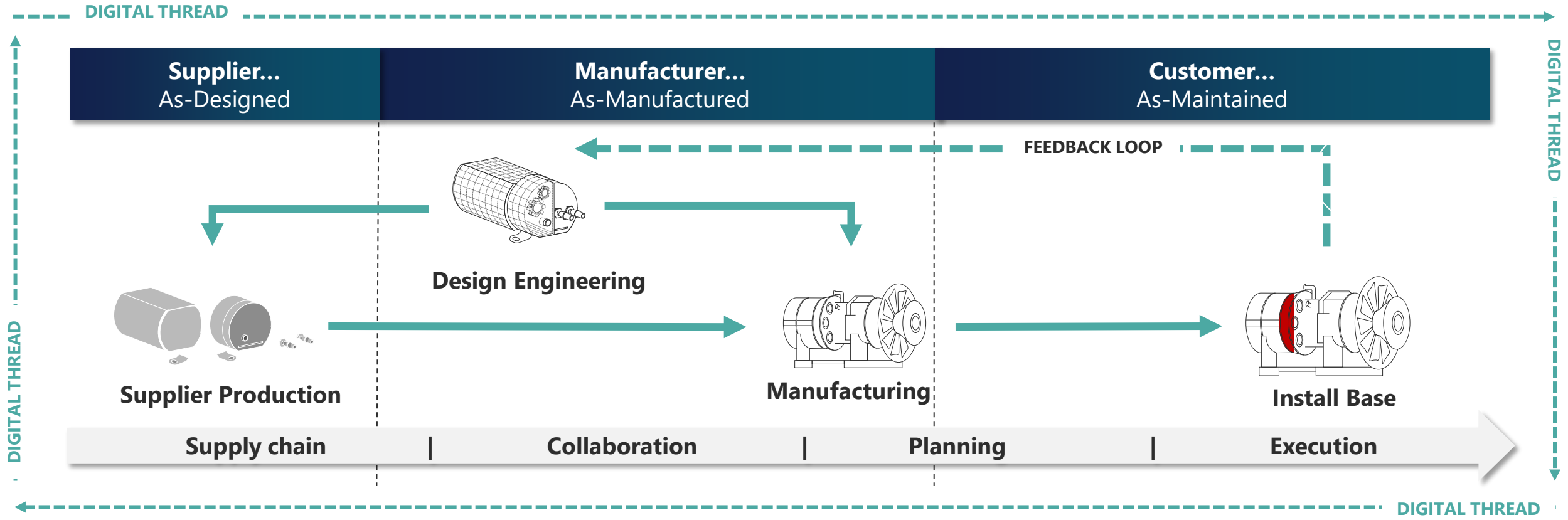
Digital Product **Innovation**



KEY OUTCOMES: ☑ Cost Savings ☑ Safety ☑ Efficiency ☑ Performance ☑ Quality ☑ Traceability ☑ Product As a Service

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Rolls-Royce®

Winning through Digital Engineering Transformation and Continuous Innovation

- All digital presentation of B-52 CERP proposals
- Digitally engineered the wing, pylon, nacelle, engine integration, gearboxes, fuel flow, electrical systems, thrust, weight, circumference of the engine and nacelle diameter
- $2.6B contract win based on digital engineering verification and validation driving down maintenance, sustainment costs and improving efficiency

> The digital model approach is exciting in that it becomes the collaboration tool that unlocks the clock and unlocks the speed with which we can bring these products to market."
>
> **– John Bell**
> Rolls-Royce North America President and CEO

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Connected Products Provide the Foundation For…

Connectivity

- Remote Monitoring
- Asset Health
- Remote Diagnostics
- OTA Updates
- Geofencing & Security

Analytics & Insights

- Customer Usage Analytics
- Design & Engineering insights
- Remaining Useful Life
- Predictive Maintenance
- Connected Field Service

New Business Models

- Digital Services
- Upsell & Cross sell opportunities
- Product-as-a-Service

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The **Journey** to **Product as a Service**

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CELLI group
The sustainable drinking experience

ptc

Business model transformation with connected drinks dispensers and integrated engineering, design & digital twins

- Implemented a model–based system integrating PLM & IoT
- Reduced equipment failures by 13%, Improved product quality by 27%, predictive maintenance reduced service costs by 10%
- Integrating PLM & engineering added benefits: 5% in Capex reallocation, 20% increase in remote monitoring and diagnostics resolution, 8% increase in planned interventions

> Our goal was to change the way we serve customers in our industry, and our long-term vision was to create services around our equipment. IoT was a key pillar to support our strategy.
>
> **– Paolo Cavalsassi,**
> Global Commercial Director, Celli Group

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Thank You.

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