Driving Growth and Staying Relevant in the Era of Industry 4.0

Jeff Winter
Industry Strategy Director: Manufacturing, Hitachi Solutions
Adapting to the **Changing Manufacturing Landscape**

**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
**INTRODUCED MECHANIZATION OF PRODUCTION BY USING WATER AND STEAM TO INCREASE PRODUCTION CAPACITY AND PRODUCTIVITY, versus manual craft work**

**INDUSTRY 1.0**

**Mechanization**

**END OF THE 18TH CENTURY**

**INTRODUCED LABOR-BASED MASS PRODUCTION (ASSEMBLY LINES) POWERED BY ELECTRICAL ENERGY**

**INDUSTRY 2.0**

**Electrification**

**START OF THE 20TH CENTURY**

**INTRODUCED ELECTRONICS AND COMPUTERS TO REPLACE MANUAL WORK BY STAND-ALONE ROBOTIC SYSTEMS**

**INDUSTRY 3.0**

**Automatization**

**START OF THE 1970S**

**THE CONVERGENCE OF PHYSICAL, DIGITAL, AND VIRTUAL ENVIRONMENTS THROUGH CYBER-PHYSICAL SYSTEMS (CPS) AND THE INTERNET OF THINGS (IoT)**

**INDUSTRY 4.0**

**Cyber-Physical Systems**

**PRESENT**
Global Lighthouse Network

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
IoT Fuels **Digital Transformation**...

**500 Hours**
- Video uploaded on YouTube

**1.7 Million**
- Pieces of content shared on Facebook

**347 Thousand**
- Tweets posted

**EVERY minute of the day...**

**16 Million**
- Text Messages sent

**231. Million**
- Emails sent

**5.9 Million**
- Google Searches

Source: DOMO - Data Never Sleeps
IoT and Digital Twins **Enable Digital Feedback Loops**

**Engage Customers**
- Deeper Relationships
- Customer Signal

**Empower People**
- Employee Signal
- More Effective Employees

**Optimize Operations**
- More Efficient Ops
- Operational Data

**Transform Products**
- Product Telemetry
- Better Products

DATA & AI
Components of the **Metaverse**

Image source: Microsoft
Technology Adoption Shift

**Past**

Innovators: 2.5%
Early Adopters: 13.5%
Early Majority: 34%
Late Majority: 34%
Laggards: 16%

**Present**

Innovators: 25%
Early Adopters: 20%
Early Majority: 30%
Late Majority: 20%
Laggards: 5%

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

All of them impacting your digital transformation journey

<table>
<thead>
<tr>
<th>Industry 3.0:</th>
<th>Industry 4.0:</th>
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<tbody>
<tr>
<td>1. Designing <strong>Products</strong></td>
<td>enhanced customer experience</td>
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<tr>
<td>2. Product lifecycle <strong>ending at point of sale</strong></td>
<td>maintaining continuous customer connectivity</td>
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<td>3. Capturing profit via <strong>hardware/products</strong></td>
<td>software and digital services</td>
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<tr>
<td>4. Integrating with the <strong>Supply Chain</strong></td>
<td>entire value chain</td>
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Digital Product Innovation

Key Outcomes:
- Cost Savings
- Safety
- Efficiency
- Performance
- Quality
- Traceability
- Product As a Service

Supplier... As-Designed
Manufacturer... As-Manufactured
Customer... As-Maintained

Design Engineering
Supplier Production
Manufacturing
Install Base

Supply chain | Collaboration | Planning | Execution

Feedback Loop
Digital Thread
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
**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
The **Journey to Product as a Service**

**Outcome based Contracts**

- **Commitment**
  - By charging for the outcome, the revenue models can benefit from customer’s business upside.

**Subscription Model**

- **OPEX**
  - Subscription models allow customers to switch from CAPEX to OPEX. They also provide an opportunity to stay connected with the customer and their use of your assets.

**Digital Services**

- **Goods + Digital**
  - Gain customer insights through connectivity to your products. Create new business opportunities and models.
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
What are YOU doing to unlock innovation?
Thank You.