IIOT & INDUSTRY 4.0
MANUFACTURING TRANSFORMATION

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9th March 2017
The opportunity is out there…

According to McKinsey, 33% (majority) of IoT economic value will come from the ‘factories’ setting.

But organizations are having trouble getting started…

90% of respondents in a Bain survey remain in the planning and proof of concept stage.
A WAVE OF TRANSFORMATION IS COMING TO MANUFACTURING

Smart Manufacturing  Industrie 4.0  Made in China 2025

33% (majority) of IoT economic value will come from the “Factories” setting

McKinsey Global Institute
GE Brilliant Factory

• “Get Connected, Get Insights, Get Optimized”
• 530 plants in total. 75 in 2016

Airbus Factory of the Future

• “Future digital technology will be introduced everywhere in the factory”

DENSO “Dantotsu” Factories

• “Linking 130 factories at home and abroad by 2020”
OVERVIEW OF IMPACT AREAS IN MFG ORG

- Resources
- Information systems
- Organizational structure
- Culture
HISTORICAL MANUFACTURING TECHNOLOGY LANDSCAPE

ISA95 Model

L5
Governance and Planning Systems
(ADOPTION: Moderate) (DECISIONS: Months/Years) (NETWORK: Enterprise)

L4
Business Systems
(ADOPTION: Broad) (DECISIONS: Days/Weeks) (NETWORK: Enterprise)

L3
Manufacturing Operations Management
(ADOPTION: Limited) (DECISIONS: Seconds/Minutes/Hours) (NETWORK: Enterprise/Plant)

L2
Equipment and Process Control
(ADOPTION: Broad) (DECISIONS: Sub-Second) (NETWORK: Plant)

L1
Sensors, Instrumentation, Data Collection
(ADOPTION: Broad) (DECISIONS: Sub-Second) (NETWORK: Plant)

L0
Production Assets and Materials

Source: LNS Research, 2015
IIOT IS TRANSFORMING THE TECHNOLOGY LANDSCAPE

“Rip and replace” gives way to “wrap and extend”

Source: LNS Research, 2015
THREE STAGES OF TRANSFORMATION

Rapidly and continuously improve your operational performance and flexibility through digital manufacturing, real-time intelligence and predictive analytics.

Understand  Advance  Outperform
STAGE ONE: UNDERSTAND

- Enhance existing infrastructure with smart sensors and modern technologies
- Simplify data in up-to-the-minute role-based views of operational performance
- Broadcast real-time alerts about assets and performance anomalies
- Connect diverse and disparate assets, sensors, business systems and external data sources in real time

- Improve information quality & reliability
- Decreased unplanned downtime
- Increase operator efficiency
- Improve maintenance efficiency
- Improve product quality
STAGE TWO: ADVANCE

- Utilize agile methodologies to rapidly create & continuously evolve manufacturing applications
- Digitally design your manufacturing processes & quality plans
- Employ intuitive, in-context 3D and augmented reality to guide workers
- Apply predictive analytics to machine health and quality processes

- Accelerate continuous improvement
- Increased speed and flexibility
- Increased workforce efficiency
- Improved product quality
- Optimized maintenance processes
STAGE THREE: OUTPERFORM

• Deploy physical-digital closed-loop processes to drive continuous improvement

• Implement consistent KPIs and corporate-wide performance benchmarking to identify and implement best practices

• Synchronize resources to ensure flawless execution of production

• Obtain supplier production visibility to gain early status into performance and quality

• Improve and perfect production processes
• Improve profitability
• Reduce unplanned downtime
• Shorten lead times
• Improve agility and responsiveness
# Manufacturing Journey Customer Value Matrix

<table>
<thead>
<tr>
<th>Typical Factory Types</th>
<th>Continuous MFG</th>
<th>Hybrid MFG</th>
<th>Batch Processes</th>
<th>Discrete Low Volume</th>
<th>Discrete High Volume</th>
<th>Discrete High Regulations</th>
<th>Final Assembly</th>
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<th>Average</th>
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2* = Maintenance Only

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<thead>
<tr>
<th>Customer Value Level</th>
<th>High Value - 4</th>
<th>Strong Value - 2</th>
<th>Moderate Value - 2</th>
<th>Low Value - 1</th>
<th>No Value - 0</th>
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<tr>
<td>Averages</td>
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