Industrial IoT & Big Data Analytics: Capturing Value in the PLM Environment
Agenda

- About LNS Research
- What is the IoT and Digital Transformation?
- A New Model for System Architecture
- Closing the Data Science Divide
- Actionable Recommendations
We are thought leaders and trusted advisors for Business, IT, and Automation executives

Our differentiators:

- Experienced analysts
- Primary social research
- Deep industry contacts
- Interactive data visualizations
LNS Research’s Council Members Include
300+ executives and senior leaders took LNS Research’s MtM Survey in 2015 & 2016
What is the IoT and Digital Transformation?
In 2011 we saw the emergence of Industry 4.0 as a concept.

- Governments of U.S. and Germany have invested $1B+
  - Smart Manufacturing Leadership Coalition
- Industry 4.0 (Steam, Division of Labor, Automation, Cyber-Physical Systems)
- Industry Associations
  - Industrial Internet Consortia
  - IoT World Forum
IT-OT Convergence

OT is new name for Industrial Automation.

Three ongoing and accelerating trends.

- Automation and Industrial Software on Windows/Linus
- Automation on Standard unmodified Ethernet
- Devices on Internet

Also refers to enterprise organization – hybrid IT and automation groups.
• IoT refers to network of networks enabling new cyber-physical systems

• By 2020, over 50 billion devices expected to be connected via IoT (Cisco)

• Digital Transformation refers to the social and business disruption
Digital Transformation Framework
Setting Strategic Objectives: Role of PLM = V+R

Internal
- Smart Connected Enterprise: Real Time->Predictive->Autonomous

External
- Smart Connected Products: Product->Service->Experience
Enabling Tech: Industrial Internet of Things Platform

- Starting in 2014 a battle of the platforms started.
- Still an ecosystem play today.
- Space still needs definition.
The Impact of IIoT Today

- Lack of education is diminishing rapidly
- Strong correlation between lack of education and adoption plan
• 3/4 of market is eventually expecting to Invest in IIoT

• 51% of market making investment in next 12 months
• We are at the tipping point of IIoT adoption

• Early adopters are spread across industries
Traditional Enterprise Architecture (ERP) View

- Enterprise Architecture has traditionally been managed by IT
- No room for IoT or cyber-physical systems
Traditional Enterprise Architecture (Automation) View

Purdue/ISA95 Model

- No Value Chain View
- Limited integration and adoption across hierarchy
Enabling the Digital Thread and Digital Twin

Bring together the virtual and real across the value chain.

Limited view of business and transactions
Operational Architecture: Managing IT/OT Convergence

Operational Architecture broadens scope for IT-OT Convergence

Aligns automation, engineering, business
Next-Generation Manufacturing Systems Architecture

- No Value Chain View
- Limited integration and adoption across architecture
Trends in Big Data and Analytics
The Data Science Divide: Engineers and Data Scientists

- Analytics are understood in terms questions answered
- Predictive and prescriptive analytics traditionally delivered as physics based by engineers with PLM.
- Big Data and Machine Learning is delivered by Data Scientists and driving technical feasibility shifts
**BIG DATA** is most simply understood not just in terms of size, but in terms of the ability to manage volume, velocity, and variety of data, including structured, semi-structured, and unstructured.

**MACHINE LEARNING** is most simply understood as the set of models and algorithms that don’t rely on the analyst to presuppose relationships between variables and different data elements.
A Different View of the Questions to be Answered

• Crossing the Data Science divide is about being open to new tools and methodologies

• Think about traditional FMEA for a product and how this will change with IIoT?

• But is it happening today?
Companies include very little unstructured data in corporate analytics programs.
Most adoption is for structured data and Descriptive or Diagnostic analytics

Adoption of Big Data analytics is still woefully low
Sharing Data Outside the Enterprise

- Data is largely shared outside the enterprise for supply chain collaboration.

- Business model transformation and enabling new strategic objectives is still a long way off.
• Quality is by far the number one use of collected product data.

• Analytics and closing the loop on quality for new experiences will drive success.
• Many Companies already feel mature with current analytics capabilities.

• Limited scope and definition of analytics

• Engineering and Data Scientists collaboration still coming
Recommended Actions
Institute a formal Digital Transformation framework that ties together all levels of the organization with a strategic vision.

Deployed an IoT enabled Big Data architecture that shares data outside of the enterprise and breaks down internal hierarchy and silo's.

Enable Digital Transformation by bringing together engineers and data scientists for prescriptive and predictive PLM analytics.

View the business case as a journey that delivers value across the product lifecycle.
Thank You!!