



ロボット革命・産業IoTイニシアティブ協議会
Robot Revolution & Industrial IoT Initiative



Partnering to Drive Interoperability and Harmonization

John Dyck, CEO
CESMII – The Smart Manufacturing Institute
October, 2022



mission. strategy. role.

Driving the **next wave** of manufacturing productivity, energy productivity, sustainability and competitiveness through smart manufacturing innovation.



2017

Founded by
the D.O.E.



\$140M+

Private/public
partnership



Improve Manufacturing
Competitiveness through
Sensing, Control, Modeling,
Analytics & Platform
Technologies

How.

Fund the Innovation necessary to **dramatically** reduce the **cost & complexity** of Smart Manufacturing, and create a more competitive manufacturing environment

*CESMII represents the
voice of manufacturing;
engaging the smart
manufacturing ecosystem
through a membership model*



MANUFACTURER



SYSTEM INTEGRATOR



SW APP VENDOR



ACADEMIA, LABS

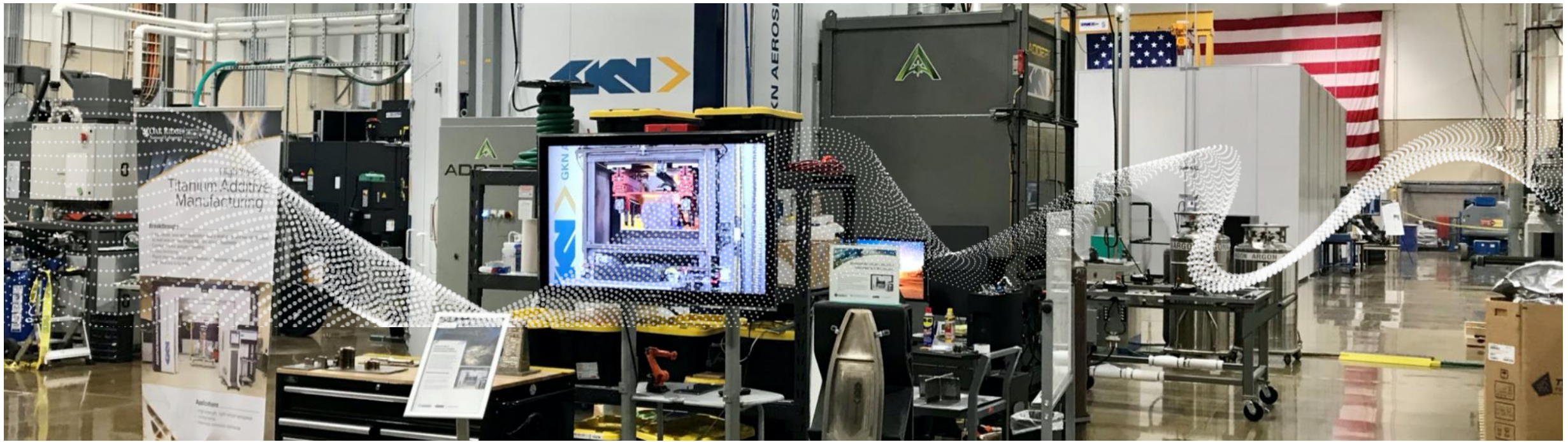


MACHINE BUILDER



An ecosystem of ~160 Collaborating Members





Accelerate the Democratization of Smart Manufacturing

“...making Smart Manufacturing Accessible to Every Manufacturer”



Technology

Enabling Technologies that
Decrease SM Cost & Complexity;
Standards Advocacy



Knowledge

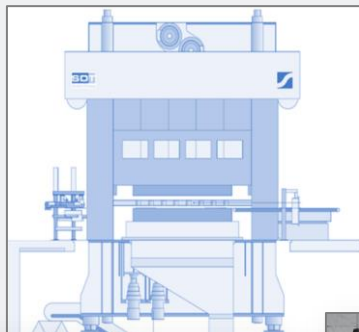
Empower a Data-driven Culture
and SM-Enabled Ecosystem;
Facilitate OT/IT Convergence



Innovation

Enable Manufacturing
Ecosystem to Embrace
Openness & Interoperability





Data Required for Press Performance & Predictive Maintenance Profile

Asset Performance

Press State
Production Count (pcs)
Scrap Count (pcs)
Setup Cycles (pcs)
Running Time (min)
Faulted Time (min)
Starved Time (min)
Blocked Time (min)
Setup Time (min)
Out of Auto (min)
Transfer Cycling (min)
Transfer in Auto and Faulted (min)
Transfer Not in Auto (min)
Setup Time (min)
Total Time (min)
Production Efficiency (%)
OEE (%)
Loader Cycle time (sec)
Overall Cycle time (sec)
Unloader Cycle time (sec)
+Fault Description
MTBR
MTBF
Etc.

Quality

+Stroke Wave Capture
+Automated Quality Checks
+SPC

Predictive Maintenance

+PM Model
+Main Motors Head Pressure
+Motor Cooling System Water
+Press. Force Head Pressure

Events

+Notifications
+Enterprise Integration

Energy

+Energy Targets
+Air
+Water
+Electricity
Etc.

Workflows

+Workflows

Production

Operator ID
Part Number
Description
Work Order #
Target Quantity
Target Start Time
Actual Start Time
Target Completion Time
Actual Completion Time
Max Press Stroke Rate
Priority
Promise Date
Etc.

Hydraulics

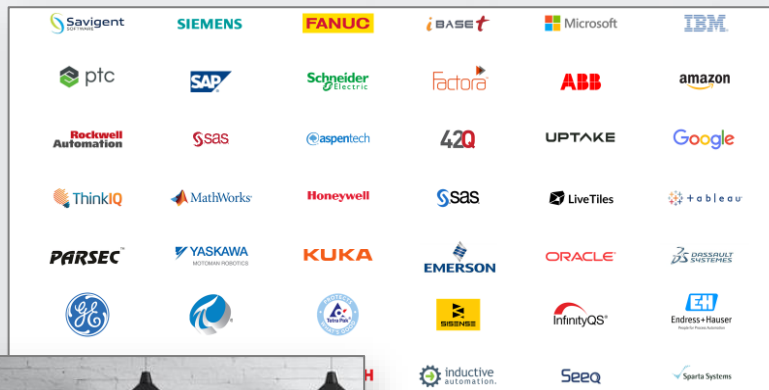
Zone 1 Temperature
Zone 1 Pressure
Zone 2 Temperature
Zone 2 Pressure
Counterbalance Air Pressure
Clutch/Brake Air Pressure
Lube Oil Pressure
Etc.

Simulation/Design

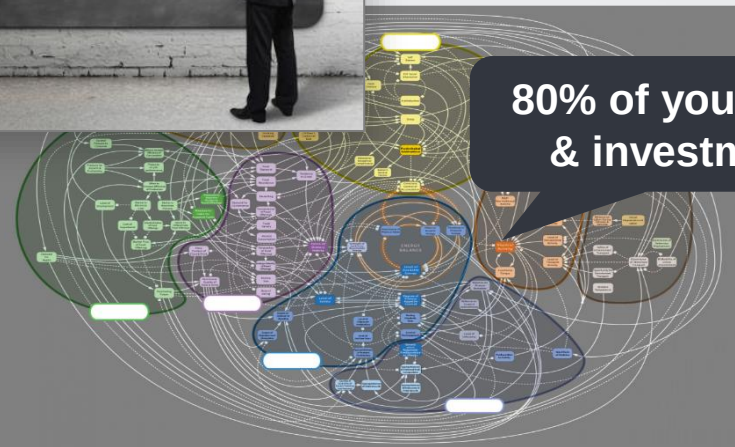
+Design

Documentation

+Documents



Expensive
SME



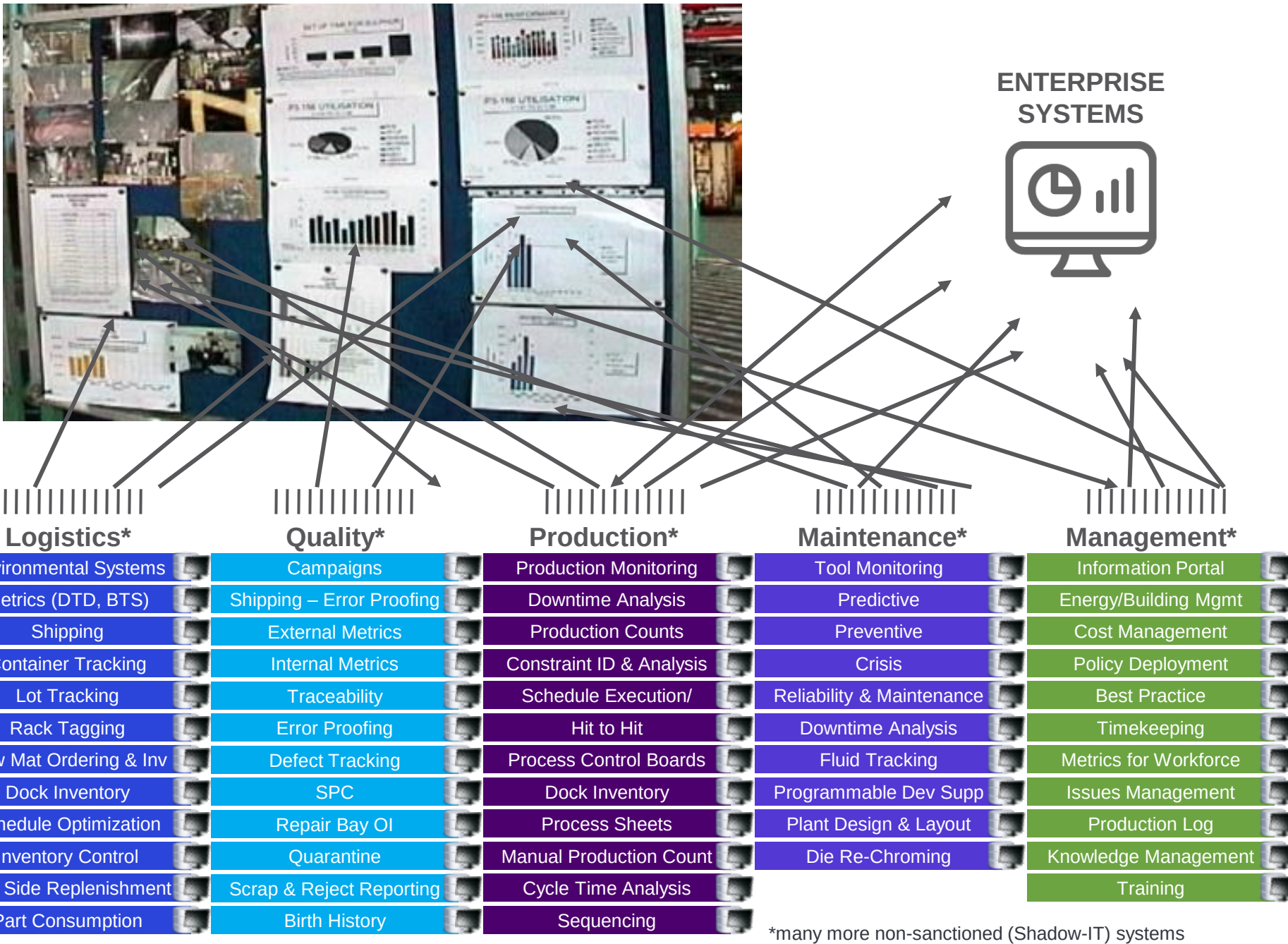
80% of your time
& investment

- Proprietary Information Model (Not Portable)
- Information Model (and Application) Limited to Specified Use Case
- Application Hard-wired to the Proprietary Info Model (Also Not Portable)
- Yet Another Data Silo
- Vendor Lock-in

The Legacy of Industry 3.0

...significant headwinds for SM

Islands of Information, enormous complexity preventing manufacturers from innovating...



*many more non-sanctioned (Shadow-IT) systems

CESMII – Accelerating Adoption of SM

Adoption of Digital Transformation in Manufacturing Operations Still In Its Infancy

Current State of Manufacturing Systems

US Investment in Digital Transformation Lagging
Vendors Proliferating Legacy Architectures
OT / IT Convergence Stagnant

Smart Manufacturing 2030

Broad Ecosystem Engagement & Adoption
Technology Foundations and Standards Advocacy
Knowledge & Education Enable Cultural Transformation



DIGITAL DIVIDE

1970

1980

1990

2000

2010

2020

2030

2040

2050

The 3rd Industrial Revolution

- Proprietary, Closed
- No Interoperability
- Data Silos
- Stovepipe Architecture
- Vendor Lock-in
- No Application Portability
- Difficult to Scale – Up or Down

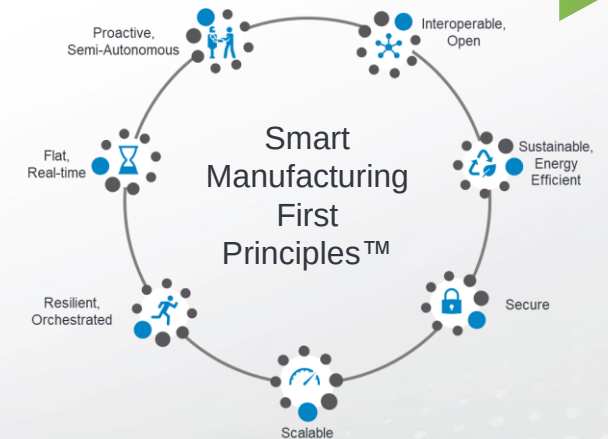
= High Complexity & Cost

2011
Fourth Industrial
Revolution

The 4th Industrial Revolution

- Interoperable & Open
- Sustainable & Energy Efficient
- Secure
- Scalable
- Resilient & Orchestrated
- Flat & Real Time
- Proactive & Semi-Autonomous

= Democratization of SM



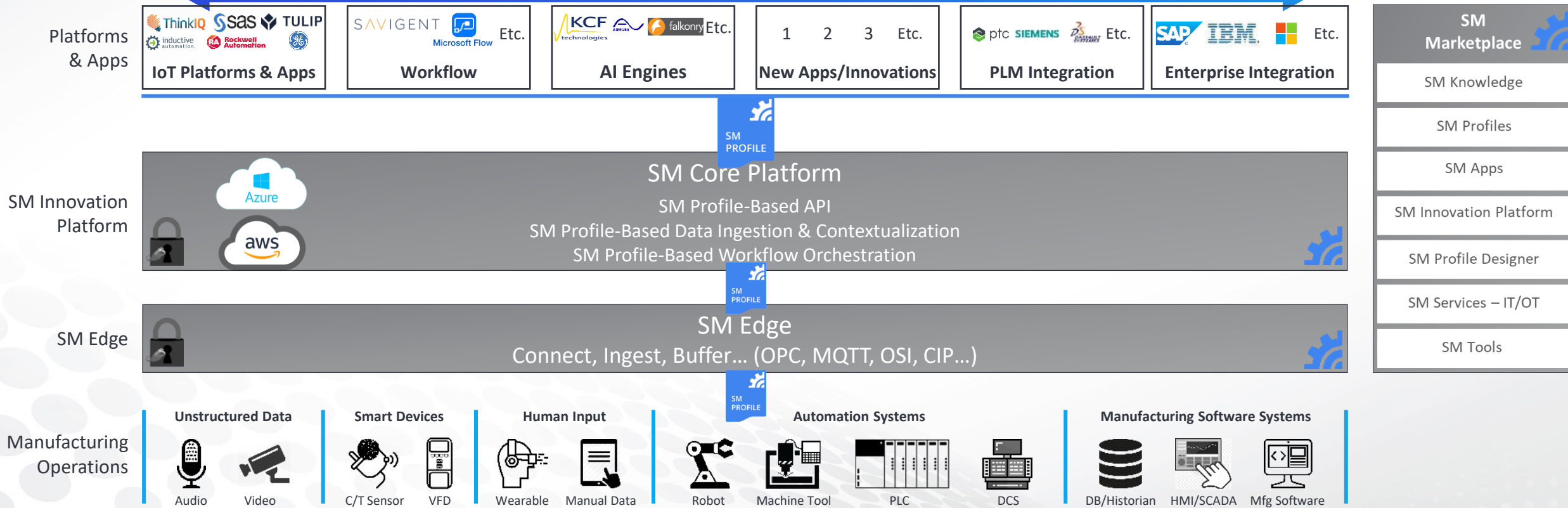
Where is Smart Manufacturing Innovation Happening?



The CESMII Smart Manufacturing Innovation Platform

A Dramatically Simplified Approach to Manufacturing Systems

Interoperability via Smart Manufacturing Profiles - A Global Production Language



Advocating for & Harmonizing Global Standards & Interoperability

Strategic Global Partners

- OPC Foundation & MQTT (Sparkplug B)
- US - Japan Partnership on Smart Manufacturing
- US - German Partnership on Smart Manufacturing
 - Standardization Efforts
 - Skills & Training
 - Testbeds
- Important Advocacy Groups
 - VDMA
 - IIC
 - Digital Twin Consortium

UA Information Model Cloud Library Joint Working Group Charter

Purpose

The following organizations ("Parties") cooperate in the joint working group (JWG) "UA Information Model Cloud Library"

- CESMII - The Smart Manufacturing Innovation Institute
- OPC Foundation

The JWG will develop a specification for an Internet-hosted database containing OPC UA information models. The database can be made publicly accessible through a RESTful interface. User access control will be handled through a separate identity provider. This cloud library can be made available to manufacturers who are looking to leverage industrial assets containing non-standardized information models for their SCADA or analytics systems. Non-standardized information models are meant to describe information models that are not defined through an OPC UA companion specification.

Scope

The output of the working group will be a specification which, at a minimum, define the RESTful interface of the information model database. The query language for the information model database will also be defined. The specification will define the way information models are stored and accessed, in addition to the RESTful interface.



Joint Working Group

- ABB
- Ascolab
- Atlas Copco
- Amazon
- Beeond
- Bitctrl
- Bosch
- Capgemini
- CESMII
- Endress + Hauser
- Equinor
- Google
- Hilscher
- IBM
- Idata
- Inray
- Microsoft
- Prediktor
- Renault
- SAP
- Siemens
- Softing
- VDMA
- Wago
- 4CE Industry



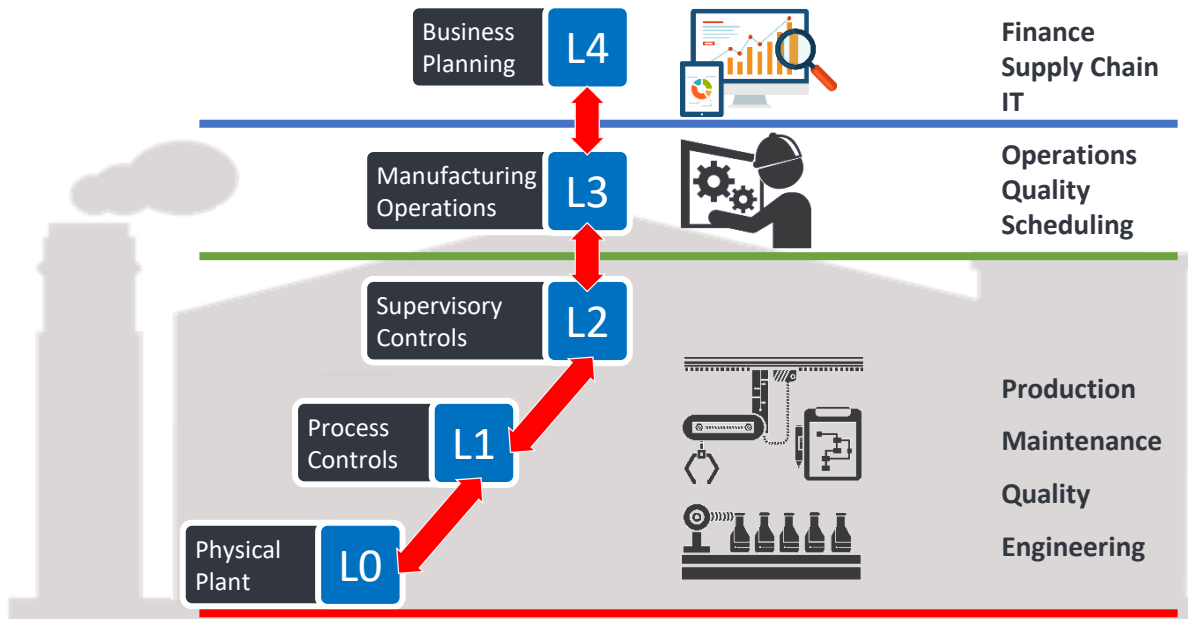
Accelerating Smart Manufacturing for all Manufacturers



The Smart Manufacturing Journey

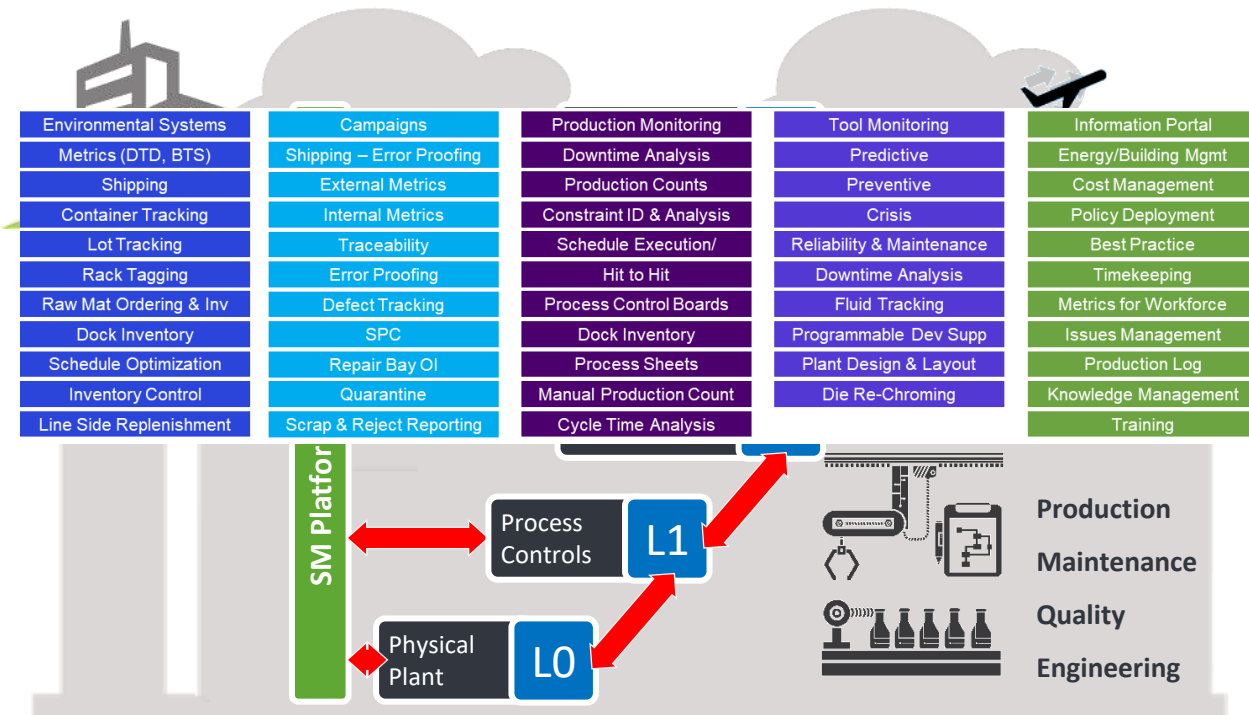
Enabling Digital Transformation at Scale

Purdue Model (Legacy)



40 Years of Industry 3.0 Technical and Implementation Debt

Smart Manufacturing Model



Interoperability via Plant, Enterprise & Supply Chain Information Models

Call to Action

Smart Manufacturing Takes an Ecosystem

Tackling Innovation Barriers That No One Organization Can Address Alone



Manufacturers



Technology Providers



System Integrators



Machine Builders



Academics, Govt. Labs, and
Non-profits

Economic Impact

- Smart, Connected Plants
- Smart, Connected Workforce
- Smart, Connected Supply Chain
- Sustainable Operations & Supply Chain
- Empowered Continuous Improvement
- New business models
- Improved Competitiveness

Innovation Triage

- Immediate Access to World Class SM Education
- Immediate (FREE) Access to Best-in-Class SM Technologies
- Immediate Access to SM Subject Matter Experts
- Immediate Networking with Your Peers





Thank you.

