Setting a Roadmap for Manufacturers on the Journey to a Smart Manufacturing Future

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Advancing. Manufacturing. IT.
What if you would leave in a disconnected world??

- Are we able to continue working as we do today?
- What means Industry 4.0 / Smart Mfct. for your company today?
- How many companies do have a vision?
  - Vision ➞ Strategy ➞ Roadmap
- How do you get visibility and thoughts in your company about Industry 4.0 / Smart Mfct?
- What are the main challenges you have today?
- Who is using the data you already have today and for what?
We live in a connected world…

“We are in major turning point in human history”  
Brian Kranich

“We will make machines that can reason, think and do things better than we can”  
Sergei Brin

“It is urgent to put microprocessors in our brain”  
Elon Musk
Smart Industry Dutch Industry for the future view

Industrial is changing faster

From Industry 1.0 to Industry 4.0

1600 Saw Mill
180 years, 6 generations

1780 Steam Engine
110 years, 4 generations

1890 Conveyor belt Mass prod.
70 years, 3 generations

1960 Mainframe, PLC, Robots
40 years, 1 generation

2000 Internet (of Things)
?? 25 years, < 1 generation

2025 Servitization/Sustainability
Agile/Metropolitan Manuf
Time to Impact Industries' business model

Impact felt already

- Rising Geopolitical volatility
- Mobile Internet and cloud technology
- Processing power, Big Data
- Sharing economy, crowdsourcing
- Young demographics in emerging markets
- Rapid urbanization
- Changing nature of work, flexible work
- Climate change, natural resources

2015-2017

- The Internet of Things
- Advanced manufacturing and 3D printing
- New energy supplies and technologies
- Longevity and ageing societies
- New consumer ethics, privacy issues
- Women’s economic power, aspiration

2018-2020

- Artificial Intelligence
- Robotics, autonomous transport
- Adv. Materials', biotechnology

Source: World Economic Forum
Use the digital Tailwind!

Value Creation...

$4T value driven by manufacturing IIoT by 2025

40% Operating income improvement from digital transformations

2x Stock performance improvement

12% EU economy currently operates only at 12% of its digital potential

50% Of companies expect IIoT to increase competitiveness

Digital Tailwinds...

Why IoT is Important to Manufacturing?
Smart Manufacturing is fueled by a convergence of technologies and process improvement initiatives.
Smart at Home...
We want Smart at work too!
IoT applications advancing faster in Industry than Consumer market

## What stops us to move faster?

<table>
<thead>
<tr>
<th>Factor</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of digital culture and training</td>
<td>55%</td>
</tr>
<tr>
<td>Lack of a clear digital operations vision and support/leadership from top management</td>
<td>54%</td>
</tr>
<tr>
<td>Lack of digital standards, norms and certification</td>
<td>37%</td>
</tr>
<tr>
<td>Unclear economic benefit of investment</td>
<td>35%</td>
</tr>
<tr>
<td>Slow expansion of basic infrastructure technologies/legacy IT &amp; OT complexity</td>
<td>33%</td>
</tr>
<tr>
<td>Talent/skills shortage</td>
<td>25%</td>
</tr>
<tr>
<td>Data Security</td>
<td>21%</td>
</tr>
<tr>
<td>High financial investment requirements</td>
<td>14%</td>
</tr>
<tr>
<td>Sharing data with the supply chain</td>
<td>10%</td>
</tr>
<tr>
<td>Loss of Intellectual Property</td>
<td>8%</td>
</tr>
</tbody>
</table>

Source: PWC 2016 survey of A&D Manufacturers
The five layers of the Smart Manufacturing roadmap...
Potential influence in the organization and in the performance of my supply chain

Required alignment:

- People
- Structure
- Process
- IT

Business scope

Support

Enterprise & Manufacturing Operation Excellence
Lifecycle Excellence
Value chain Excellence

Collaborative Manufacturing Model (ARC)

Potential influence in the organization and in the performance of my supply chain
# The IIoT is an enabler for Smart Manufacturing

## Smart Manufacturing

Smart Manufacturing umbrella includes multiple consortium efforts to modernize industrial practices with more open connectivity in the entire value chain between smarter equipment, facilities, products and processes.

## Industrie 4.0

A German hi-tech strategy project that promotes Smart Manufacturing concepts including cyber-physical systems monitoring physical processes and making decentralized decisions.

## Smart Factory

The Smart Manufacturing Leadership Coalition (SMLC) in the US has been spearheading a Smart Manufacturing platform and the Smart Factory. Interoperability, virtualization, real-time capability, service orientation, modularity, connected systems and open standards.

## Digital Manufacturing

Digital Manufacturing is the ability to connect different parts of the manufacturing life-cycle through digital data that carries design intent and process information, and utilizes that information for intelligent automation and smarter, more efficient business decisions.

## IIoT

The Industrial Internet of Things or IIoT is a subset of the IoT that is dedicated to connect things in the manufacturing ecosystem.

## IoT

The Internet of Things (IoT) represents a network of physical objects or “things” embedded with electronics, software, sensors and connectivity to exchange data with business processes.
Six key highlights and takeaways from this year's study (Metrics that Matter)

1. Major progress has been made around IoT awareness.

   While 44% of survey respondents indicated that they didn’t understand IoT in 2016, this number dropped to 19%.

   Do not understand IoT:

   - 2016: 19%
   - 2015: 44%

2. Movements in MOM

   On-premise deployments still dominate the industry, but the move toward Software as a Service (SaaS) is underway. With 26% of respondents already operating MOM functionality from the cloud, 29% of respondents planning a MOM software deployment also listed cloud as their preferred model.

   Actual and Planned MOM Deployment

   - Public cloud hosted by third party: 3% (Planned), 4% (Actual)
   - Public cloud hosted by software vendor: 4% (Planned), 3% (Actual)
   - Private cloud: 25% (Planned), 21% (Actual)
   - On-premise: 71% (Planned), 74% (Actual)
Six key highlights and takeaways from this year's study

3. When it comes to performance measurements “cash is still king”

Which manufacturing metrics does your company rely on for managing your operations?
Financial, Quality, and Efficiency metrics dominate operational concerns.

- Financial: 47%
- Quality: 38%
- Efficiency: 34%

Followed by Customer Responsiveness, Asset & Maintenance, and Inventory Focused metrics.

4. Improvements in Financial Metrics

- Manufacturing cost per unit: 10%
- Revenue per employee: 7%
- Net profit margin: 5%
Six key highlights and takeaways from this year's study

5. Data Analytics Maturity Lagging

Manufacturers have work to do to catch up to current capabilities—only 14% responded that they had a corporate analytics program in place that uses manufacturing data.

14% Only use manufacturing data in analytics
Six key highlights and takeaways from this year's study

How Are Analytics Being Used Inside the Enterprise Today?

The top five use cases are:

- Better production forecasts across multiple plants: 43%
- Continuous asset performance improvement across multiple plants: 27%
- Manufacturing process improvement: 27%
- Better forecasts of a production plant: 27%
- Operational Excellence programs: 23%
How mature are you in your organization?
The CTO Questions and 4 points to consider

Clarity: What does digital means for you in your industry and for your company specifically?

Urgency: And that’s a difficult one for many to understand if a company is still performing well. Why should they change?

Planning: What’s an appropriate plan to do this at scale?

Recognition of your current company setup and how to change it to adapt to the new environment. This includes talent management.

Some considerations:
- Positive company climat (Environment)?
- Strong Governance?
- It is not an IT problem but IT is an enabler!
- Where are the facts that can clearly show an optimization?
- How do i make my world better!?
Four phases of a successful digital transformation program by McKinsey

• Discovering the ambition for the business based on where value is migrating

• Designing a transformation program that targets profitable customer journeys

• Delivering the change through an ecosystem of partners

• De-risking the transformation process to maximize the chances of success
What are your innovation projects?

But there is one guarantee:
To get better you need to change!!!

There is no guarantee that it will be better once you change.
How MESA Delivers

MESA International: Building Bridges-of-Understanding from the Plant to the Enterprise

Peer-to-Peer

Points-of-View

Global Education Program

Speaking with the Voice of Industry’s Practitioners

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Introduction to MESA International
MESA works…

...as a not-for-profit industry association with members in over 40 countries, serving industry since 1992

...by providing safe, noncommercial, professional environments within which companies can address their important business challenges
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