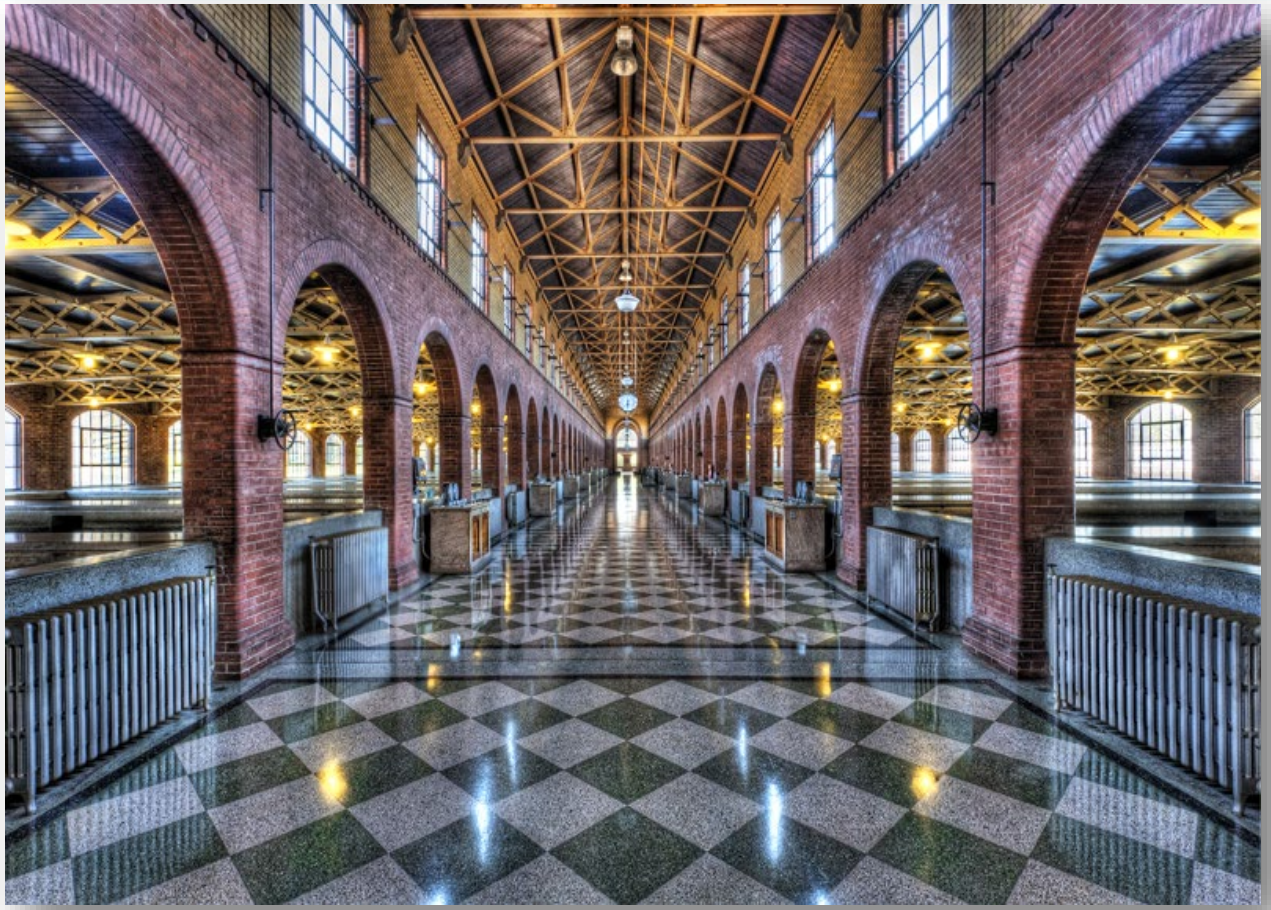
Setting the Standard for Automation™

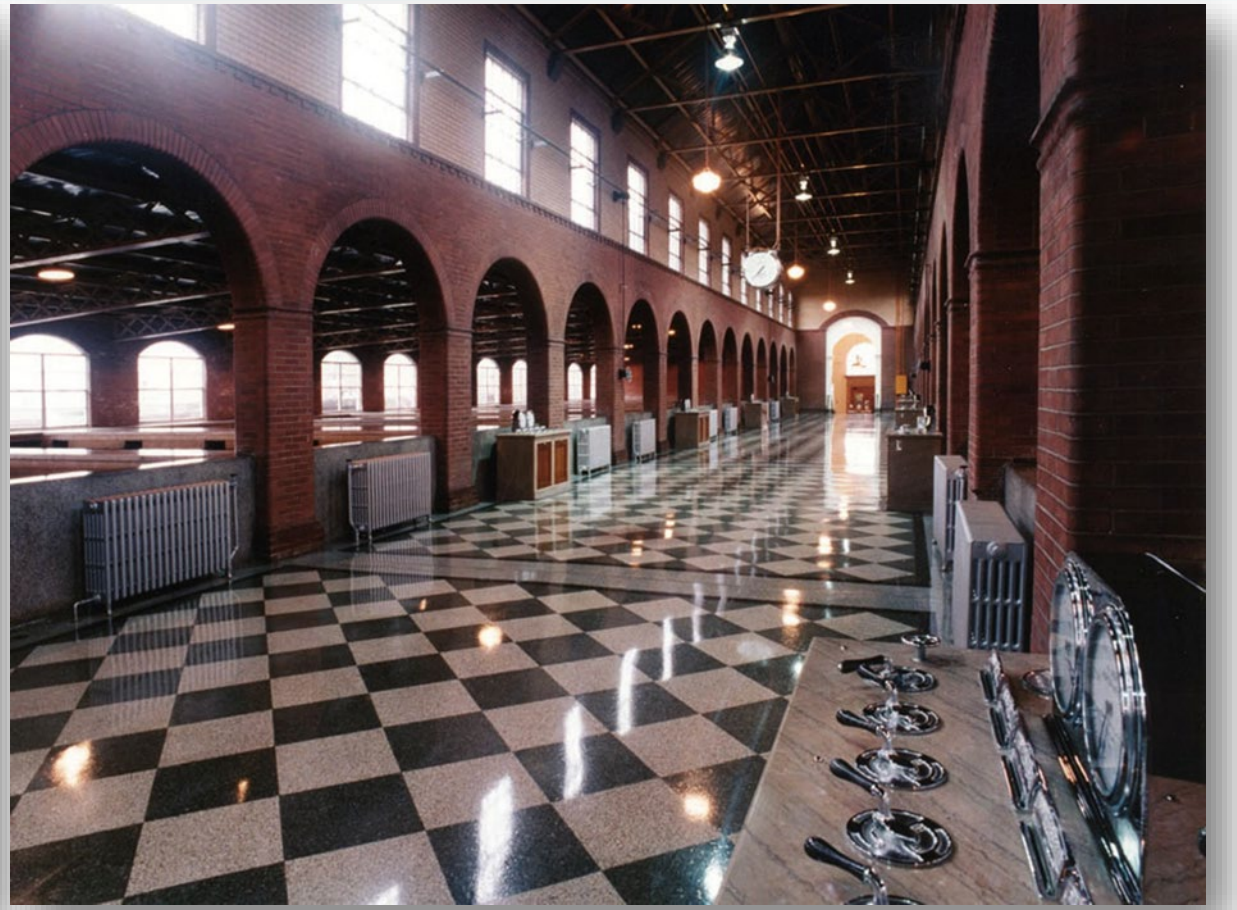
Why you need a Digitization strategy

Mark Delfunt
InSource Solutions

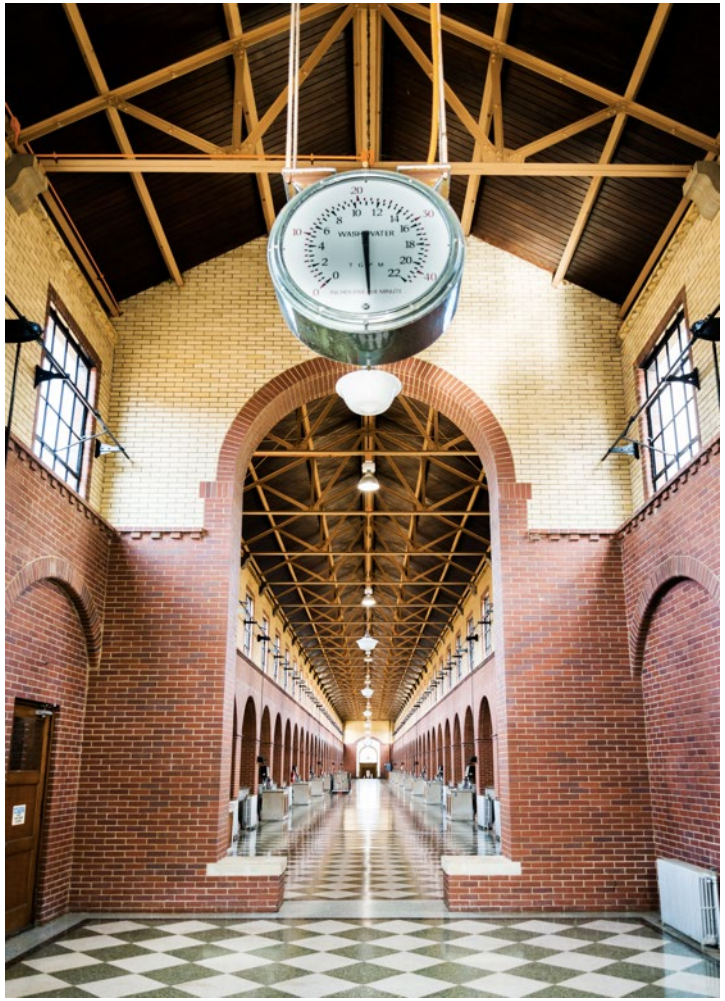
Energy & Water Automation Conference
5–8 August 2019 | Orlando, Florida, USA | OMNI Championsgate Resort

Evolution





Evolution

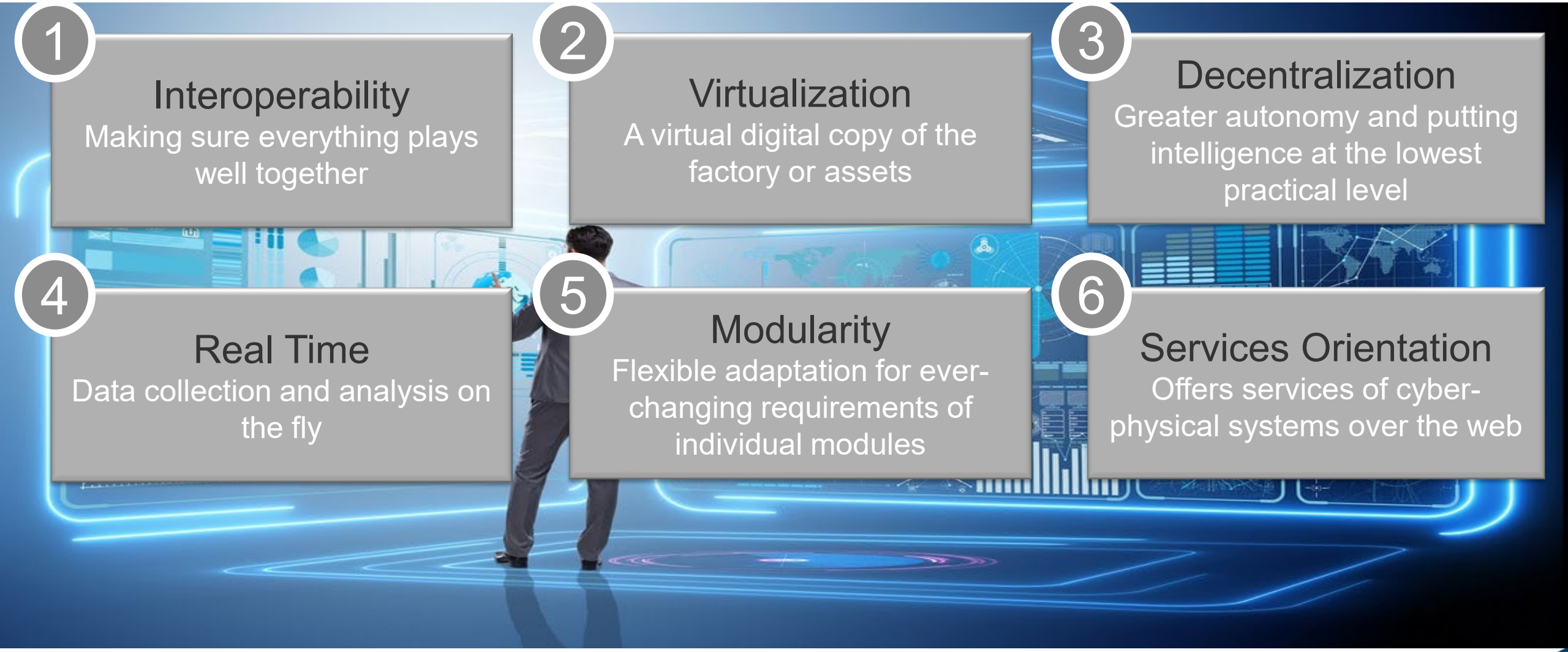


What type of controls operate the filters?

Today's Technology Enablers of Industry X.0 (4/5/6)

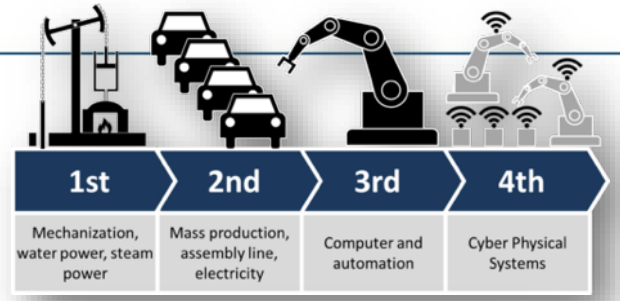
- Computing power & miniaturization
- Cloud Computing, Storage, & Analytics
- Web Speed
- Artificial Intelligence & Machine learning
- Embedded sensor technology
- Low bandwidth, low power, secure communications (IoT)
- 3D printing (Additive manufacturing)
- Robotics (Autonomous)
- Virtualization, Dockers, Containers
- Mobile computing

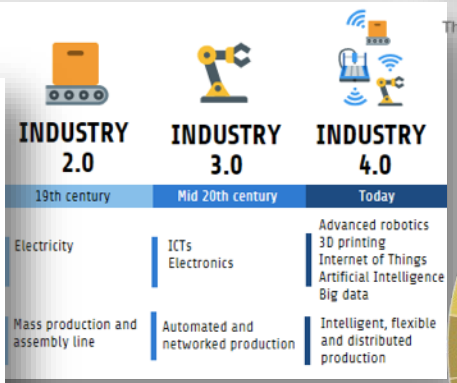
I4.0 design principles

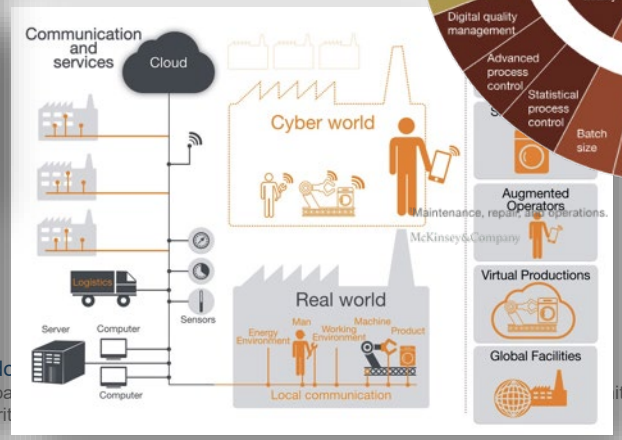


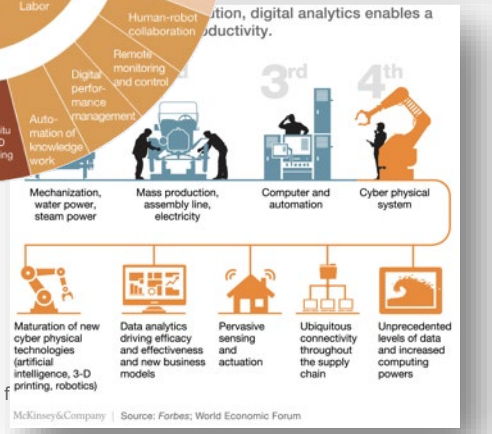
1. **Interoperability**
   Making sure everything plays well together
2. **Virtualization**
   A virtual digital copy of the factory or assets
3. **Decentralization**
   Greater autonomy and putting intelligence at the lowest practical level
4. **Real Time**
   Data collection and analysis on the fly
5. **Modularity**
   Flexible adaptation for ever-changing requirements of individual modules
6. **Services Orientation**
   Offers services of cyber-physical systems over the web

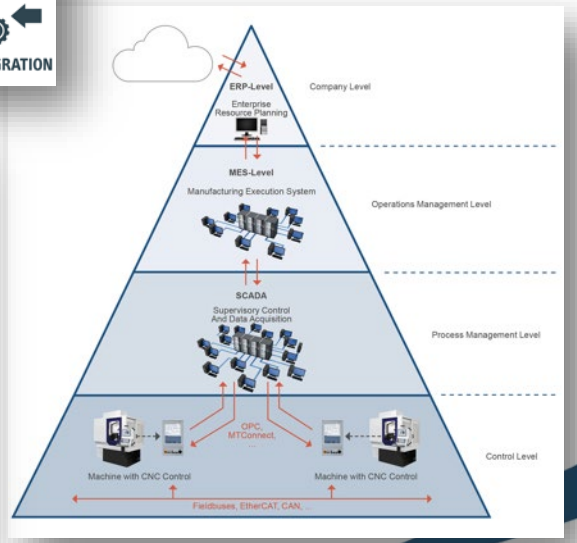
Hundreds of models representing change



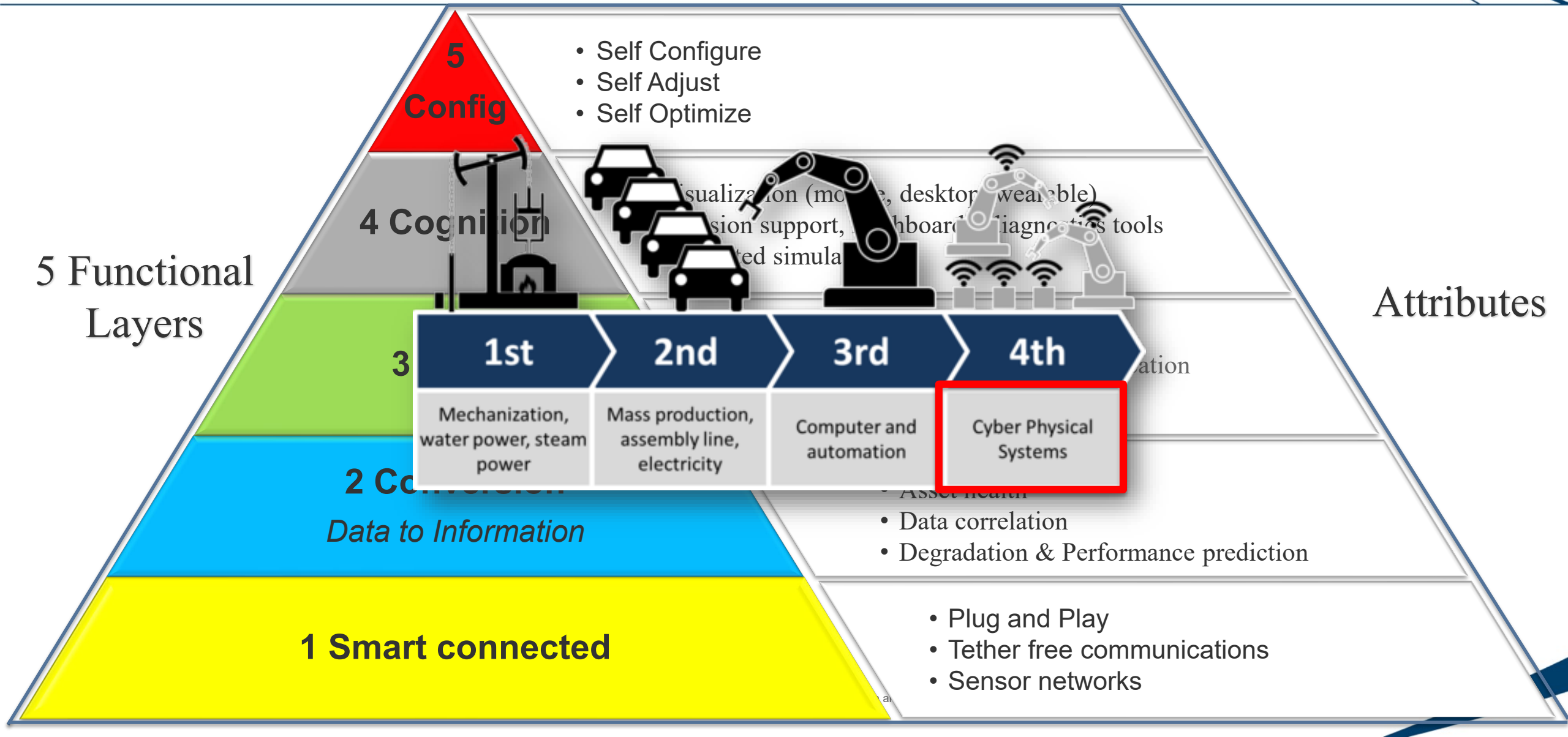




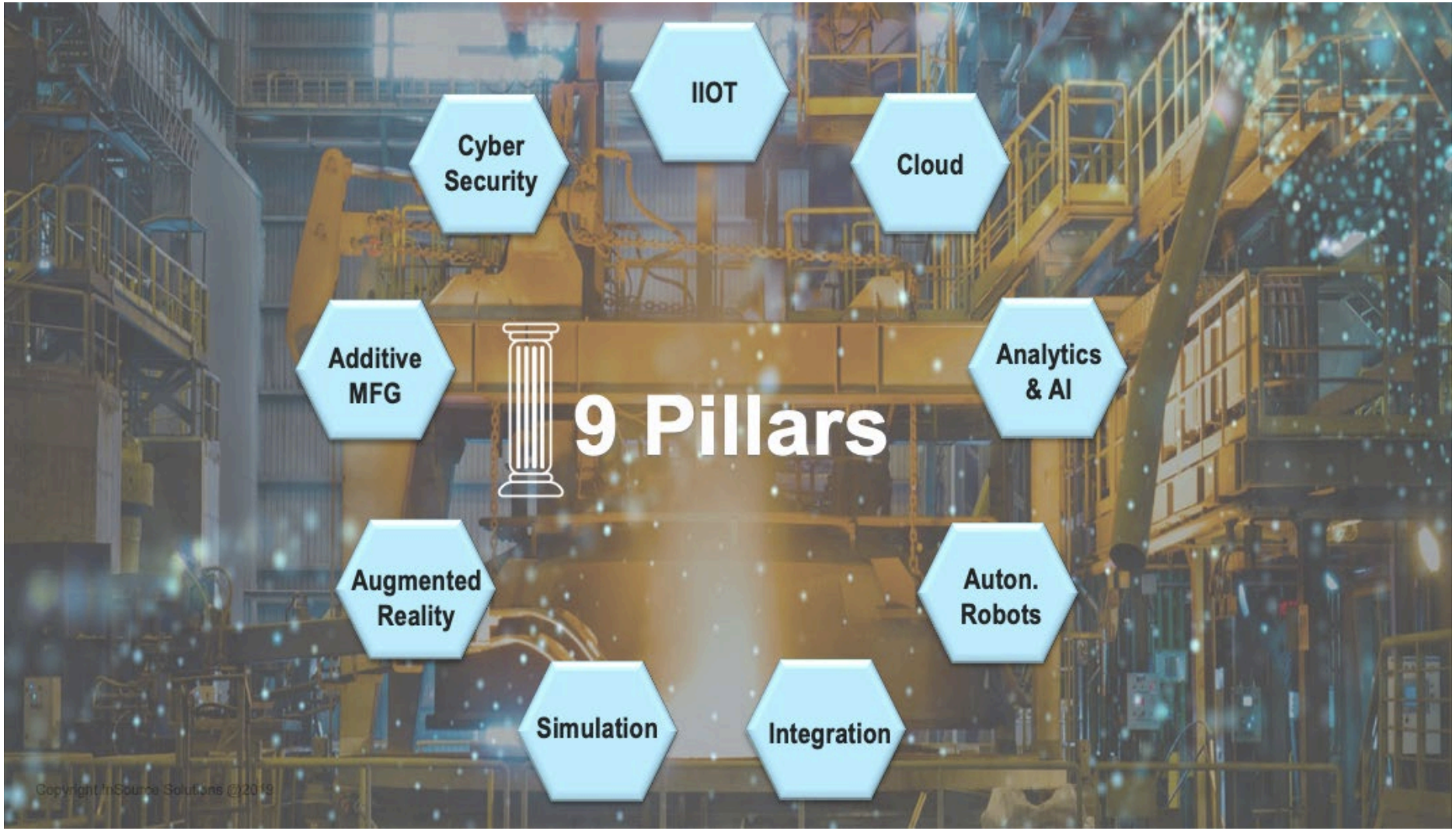




Cyber Physical Systems



9 Pillars of Industry X.0

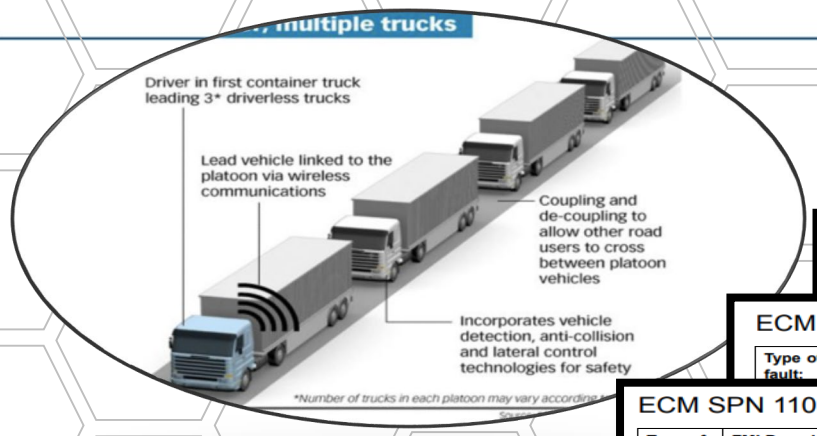


The Digitalization of Transportation

- 65% of the nation's consumable goods are trucked to market
- Driver shortages are totaling 50,000 & expected to reach over 250,000 by 2022.

- New generation doesn't see truck driving as a career option
- Significant deaths due to driver fatigue is increasing regulation
- Of the 700B income annually; 50% goes to the driver

The Digitalization of Transportation
Autonomous Trucking



Platooning

Ra

Ste

Reduc

DDC Code # (Flashed)	PID	SID	FMI	Description

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ECM SPN 100, Engine Oil Pressure – MID 128 PID 100

Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:

ECM SPN 110, Engine Coolant Temperature – MID 128 PID 110

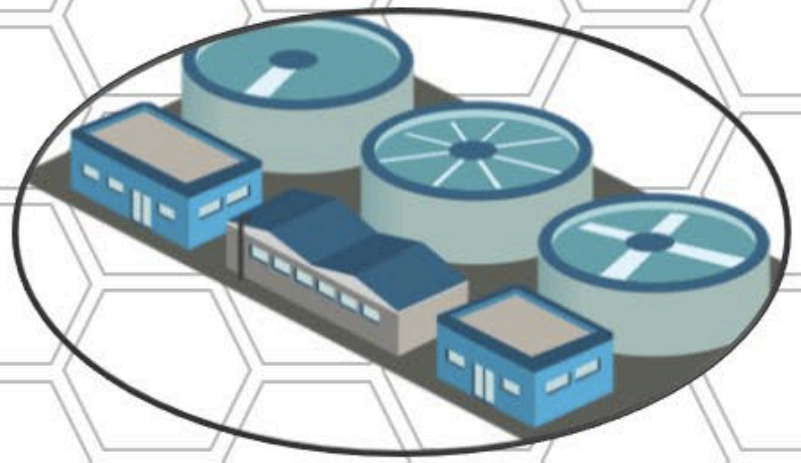
Type of fault:	FMI Description:	Fault Condition:	Possible Symptoms:	Possible Cause:
FMI 0	• Data valid but above normal operational range - Most severe level	• Coolant temperature indicates critical limit	• Engine derate • Red Stop lamp illuminated	• Extreme driving condition • Faulty coolant thermostat • Malfunctioning fan • Blocked radiator
FMI 2	• Data erratic, intermittent or incorrect	• Engine Coolant Temperature sensor output is too high or too low	• May affect driveability in extreme cases • MIL illuminated	• Faulty Sensor • Faulty harness • Faulty coolant thermostat
FMI 4	• Voltage below normal or shorted low	• Engine Coolant Temperature sensor voltage too low	• Difficult to start in cold climates • Idle run regulation is deteriorated • MIL illuminated	• Faulty Sensor • Faulty harness
FMI 5	• Current below normal or open circuit	• N/A	• Difficult to start in cold climates • Idle run regulation is deteriorated • MIL illuminated	• Faulty Sensor • Faulty harness
FMI 10	• Abnormal rate of change	• Engine Coolant Temperature sensor output is showing a constant value	• May affect vehicle driveability • MIL illuminated	• Faulty Sensor • Faulty harness
FMI 13	• Out of Calibration	• Sensor out of range • Sensor indicates a invalid value	• N/A	• Faulty Sensor

85-120B

RT Engineering
Supply chain
Predictive
Maintain
Performance
CTIS
Tire MGT

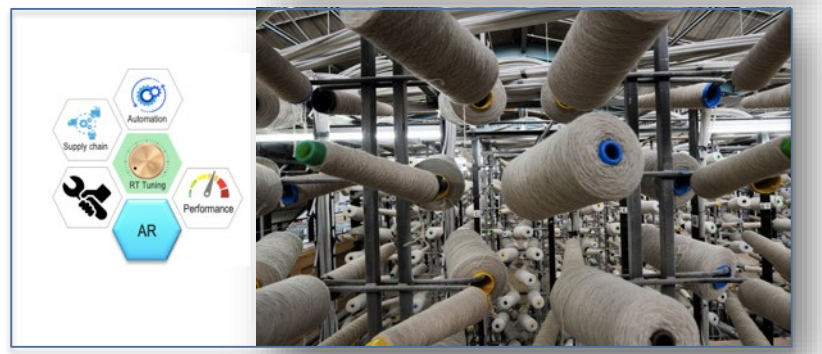
Pay-by-use and subscription-based services

Water Treatment



- Reduce Risk
- Excursion prevention
- Reduce Operating cost
- Increase customer satisfaction

Every Vertical industry will benefit differently

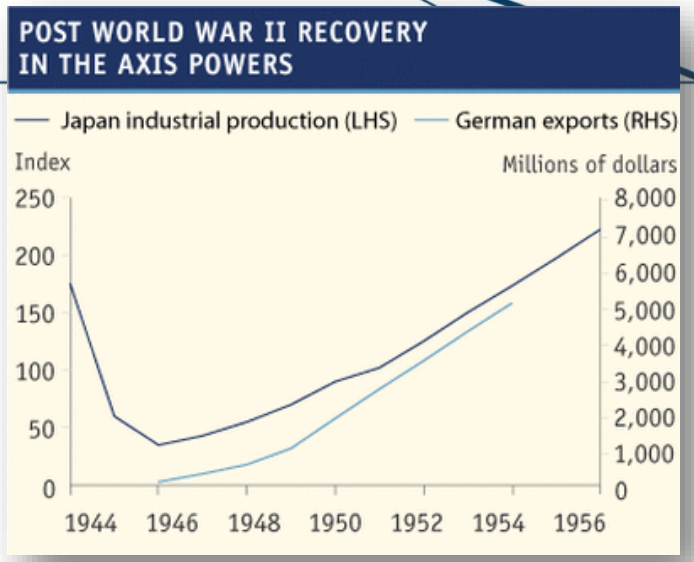


Why all the “revving up” over I4.0?

The Miracle recovery

Leading up to WWII

Down to 27%



Today

2nd Largest Economy
In 10 years

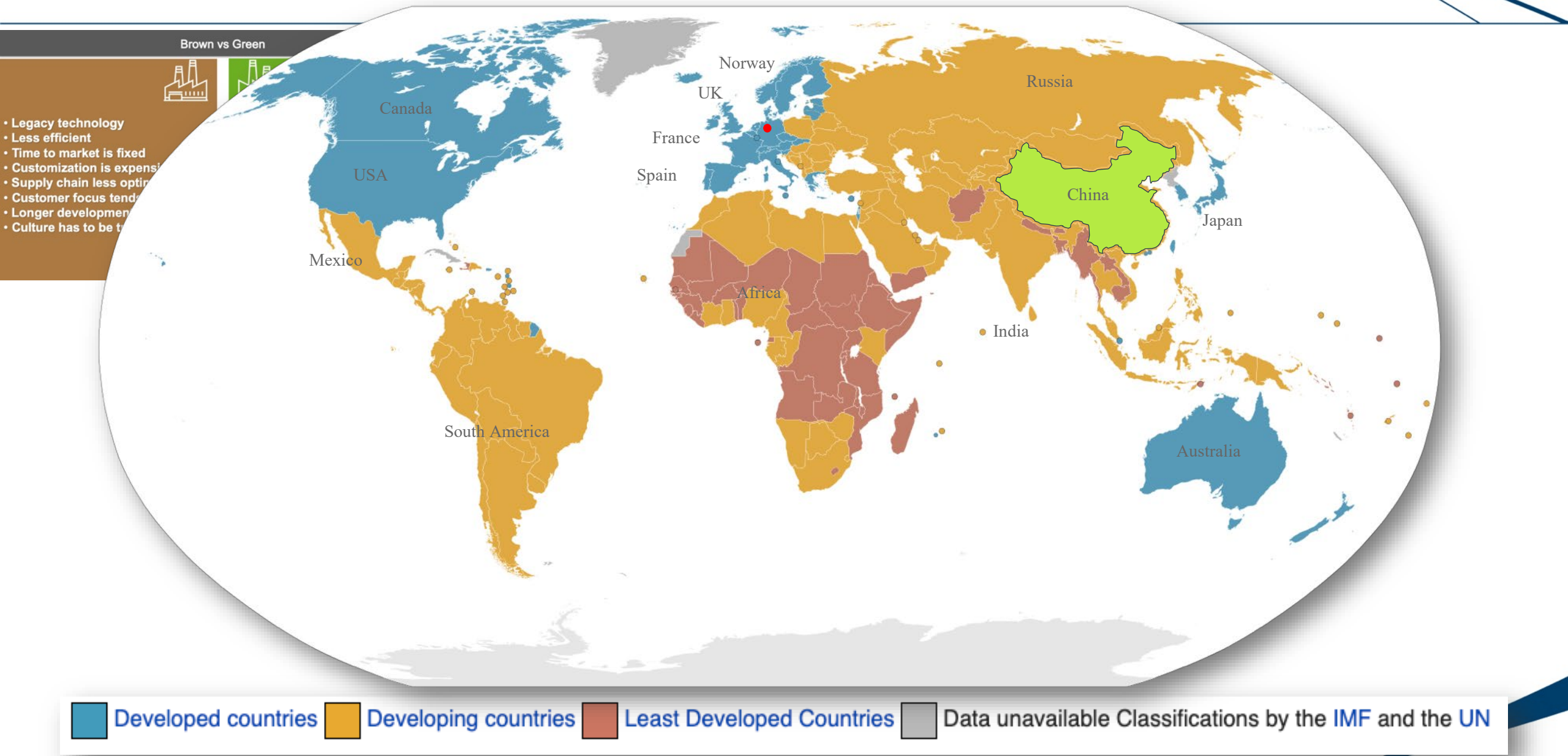
- ✓ Resilience of the Japanese people
- ✓ Highly disciplined culture
- ✓ Edward Deming
- ✓ *US offered the latest technology to help rebuild*

Brownfield vs Greenfield

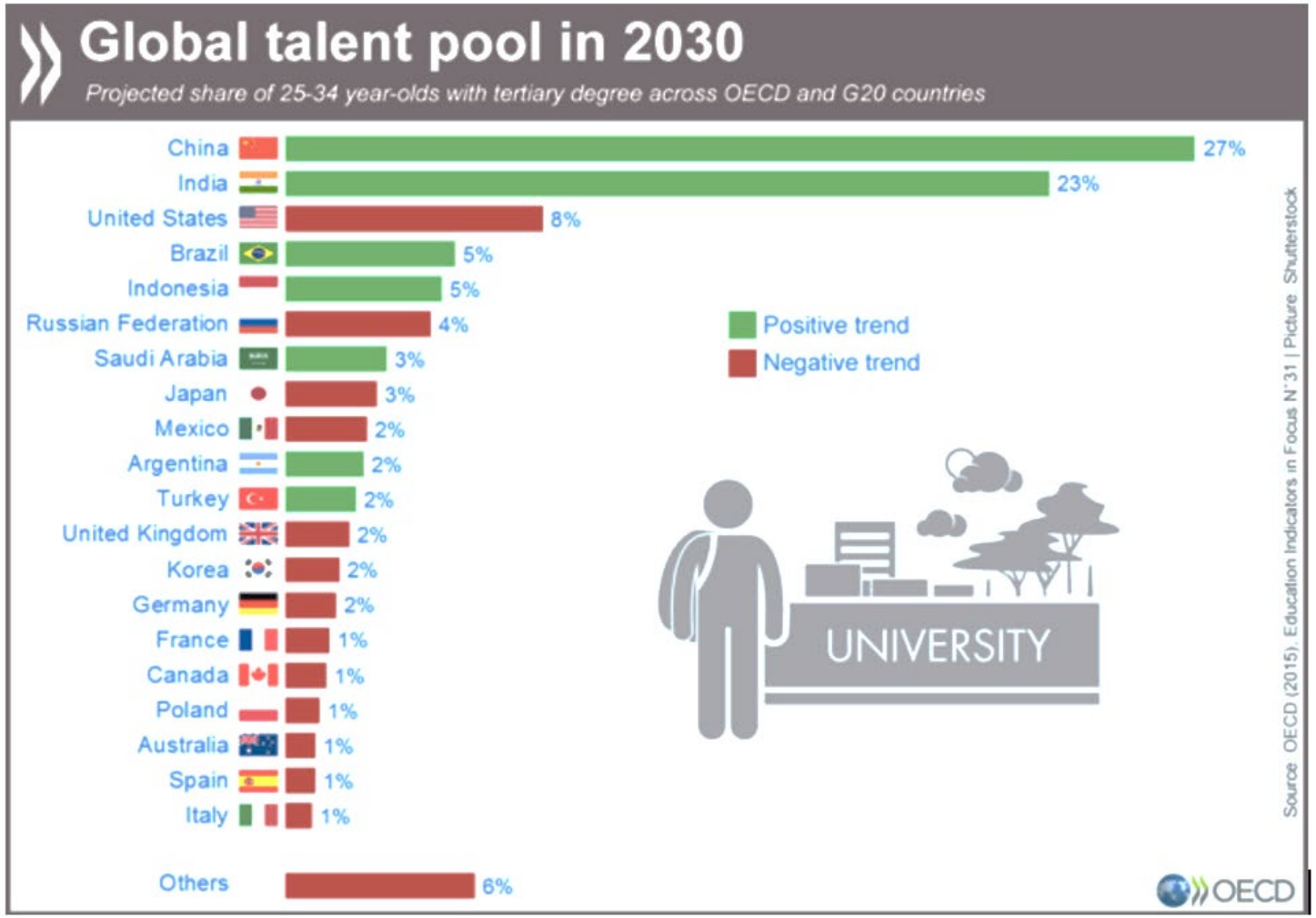
- Legacy technology
  - Not Cyber Physical
- Less efficient
- Time to market is fixed
- Customization is expensive
- Supply chain less optimized
- Longer development life cycle
- Culture has to be transformed

- Latest technology advancements
  - More likely Cyber Physical
- Greater operational efficiency
- Faster time to market
- Easier customization
- Optimized supply chain
- Shorter development life cycle
- Culturally prepared

Brown vs Green - What's the big deal?



STEM Graduates



By 2030, China and India will account for more than 60% of the OECD and G20 STEM graduates

Including BRIICS countries as a whole (Brazil, the Russian Federation, India, Indonesia, China and South Africa)

all STEM graduates

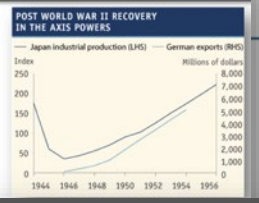
(Organization for Economic Co-operation and Development (OECD)

Connecting the dots….

"The Miracle Recovery"

Leading up to WWII

Down to 27%



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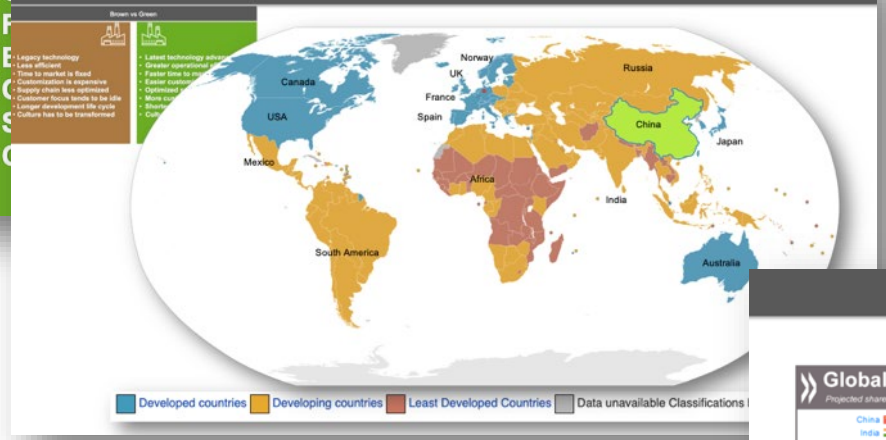
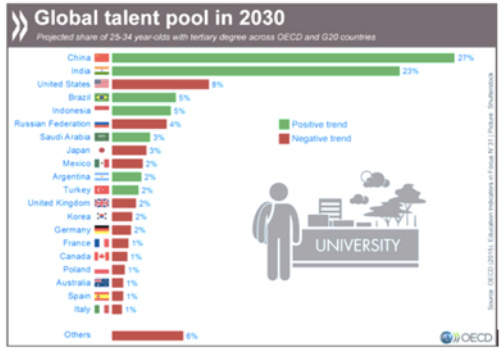
- Latest technology advancements

Green vs Brown….what's the big deal?



STEM graduate projections



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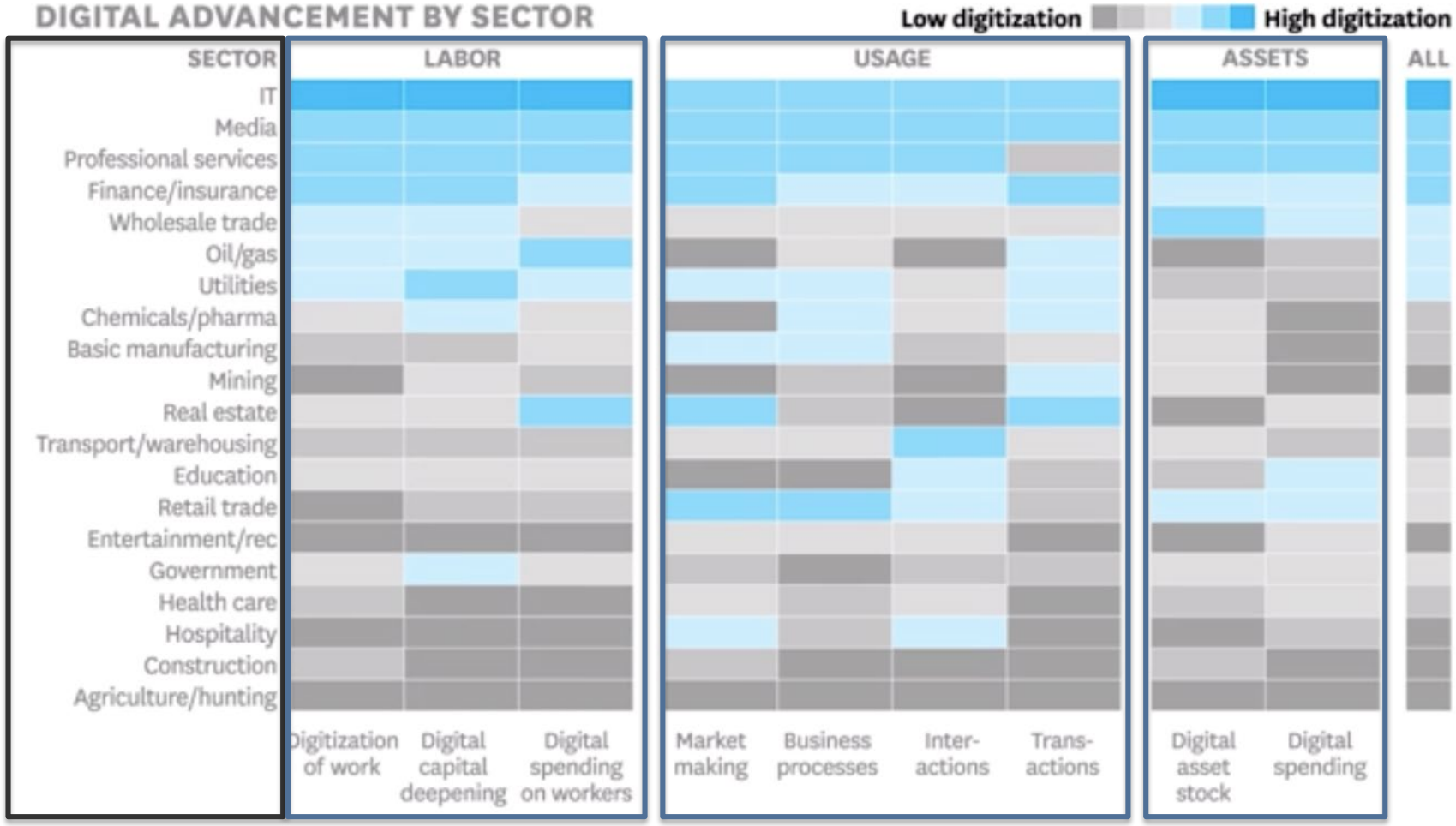
Including BRIICS countries as a whole (Brazil, the Russian Federation, India, Indonesia, China and South Africa)

3/4 all STEM graduates

(Organization for Economic Co-operation and Development (OECD)

Who’s prepared for digital?



Harvard Business Review

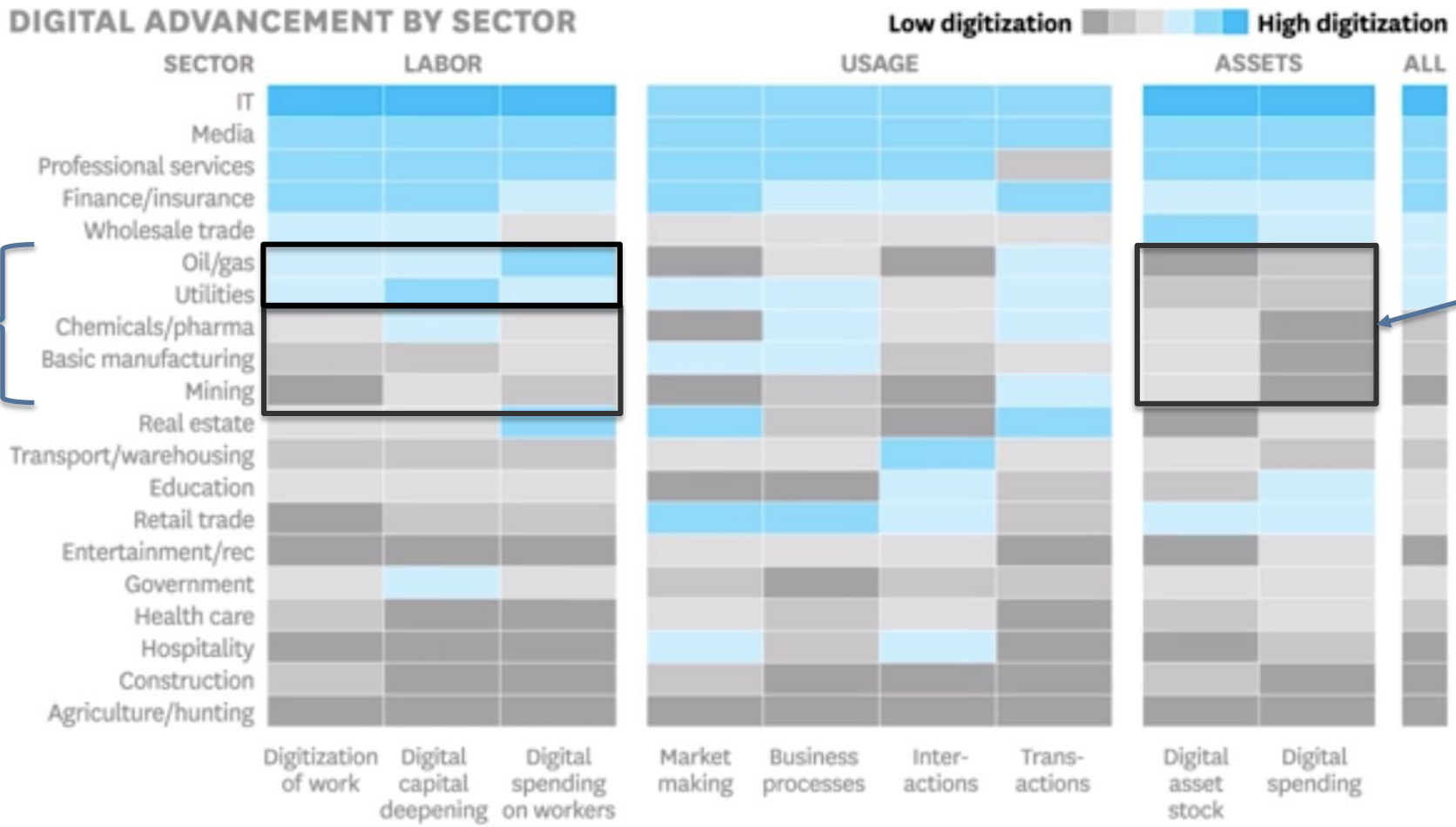
McKinsey & Company

Who's prepared for digital?

Harvard Business Review

McKinsey & Company

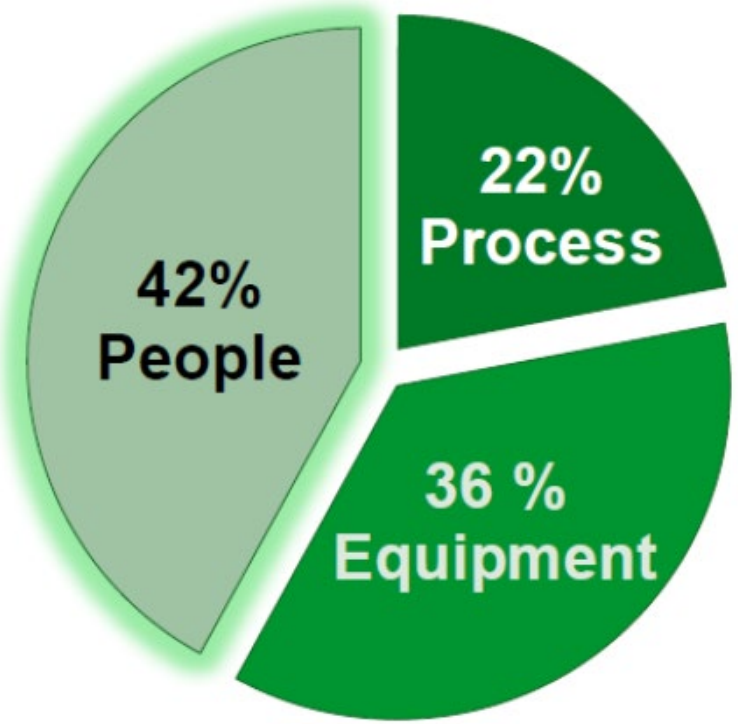
Lagging… Digitization of Work



Asset intensive but low in digital maturity

Reducing workforce errors

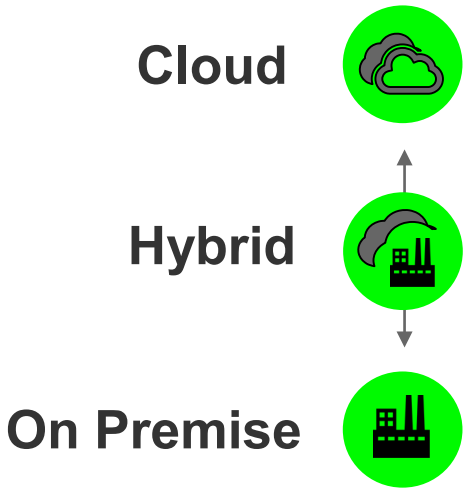
Distribution of unscheduled Shutdowns and Slowdowns

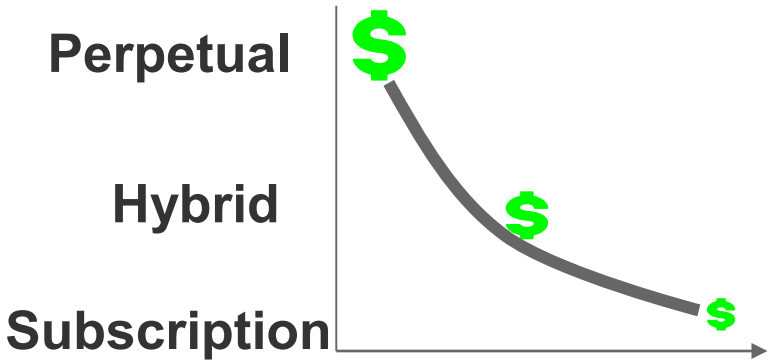


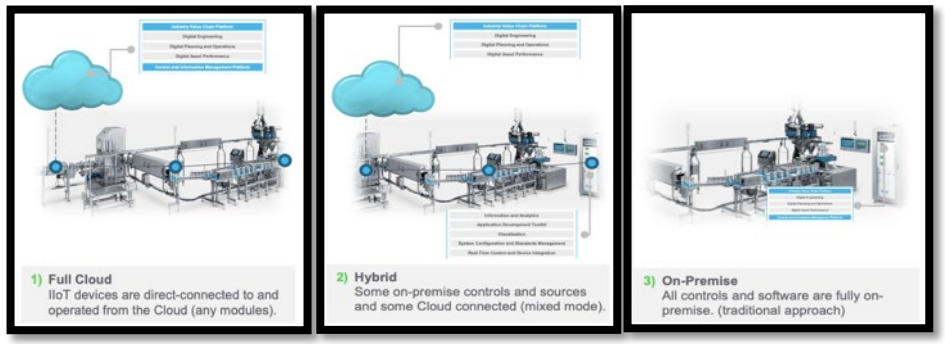
Source: ASM Consortium.
Cited by: ARC "Why we need a better approach to procedural automation" Larry O'Brien, September 2010

Options changing the game

Operating budget friendly – no need to capitalize







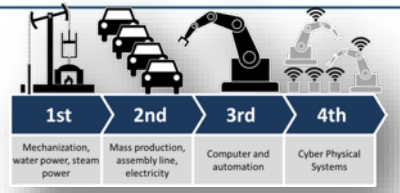
Full Cloud Hybrid On-premise

Subscription Candidates:

- Predictive Analytics
- Condition Management
- Process Historian
- Downtime/OEE
- MES
- Recipe Management
- CMMS/APM

Bottom line…

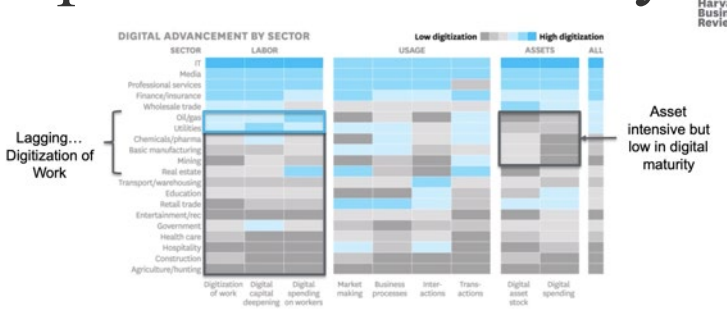
- Change is under way
  - Most industries have to adjust to stay competitive



- It will play out differently in vertical segments

- Green has clear advantages

- Digital focus is trending toward increasing operational efficiency through:
  - Better management of assets
  - Optimization/Digitizing work
  - Lowering cost of ownership



Digitization in Municipalities

National **A**ssociation of **C**lean **W**ater **A**gencies (NACWA)

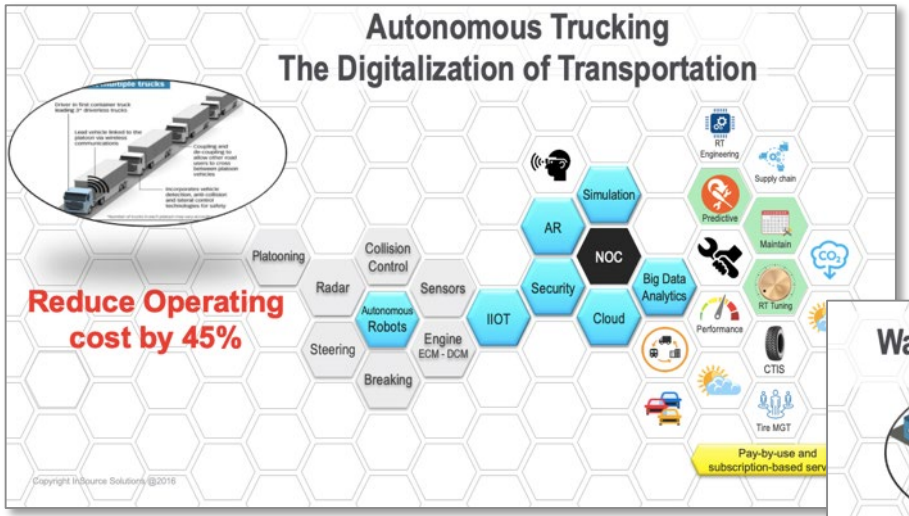
"Digital Utility of the future"

"Technological advances in **Cloud computing** and **communications**, **coupled with analytic** capabilities are enabling clean water utilities to better use the data they already have to:

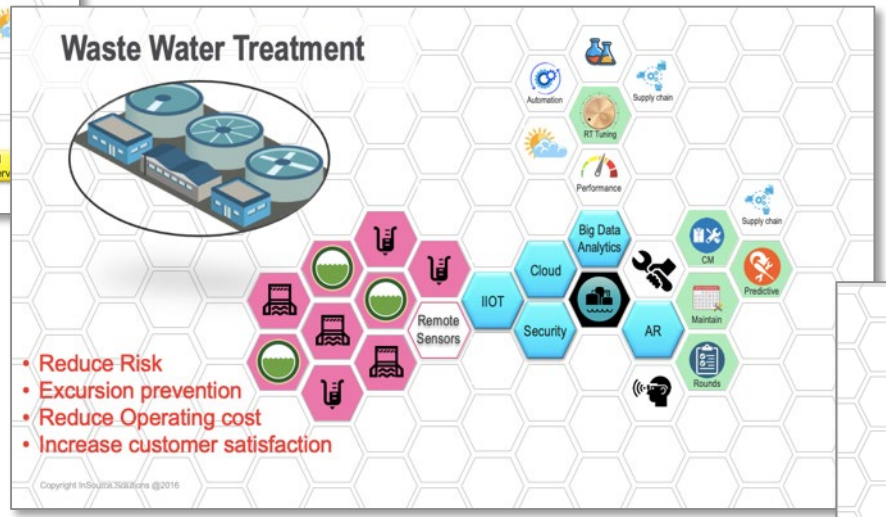
- Reducing Operational Costs
- Managing and Mitigating Risks
- Enhancing the Customer Experience
- Improving Financial Execution
- Optimizing Asset Performance and Uncovering Hidden Value.
- Maximizing the Engagement and Efficiency of Employees
- Integrating Water Quality, Policy and Performance"

Map out potential benefits

Not you?



Could be you…

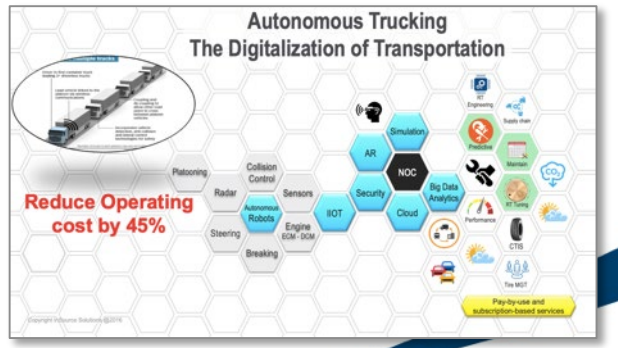


Should be you…

Why map out potential benefits *Get in the game….*

Benefits: ***Expands our thinking***

- Create a vision & purpose for stake holders on a single page
- Establish leadership & strategic thinking
- Align | Prioritize | Focus
- Evaluate benefits & impact ($$ & soft impact)
- Get off the sideline & get in the game…



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Thank you

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