



The call to action for digital transformation

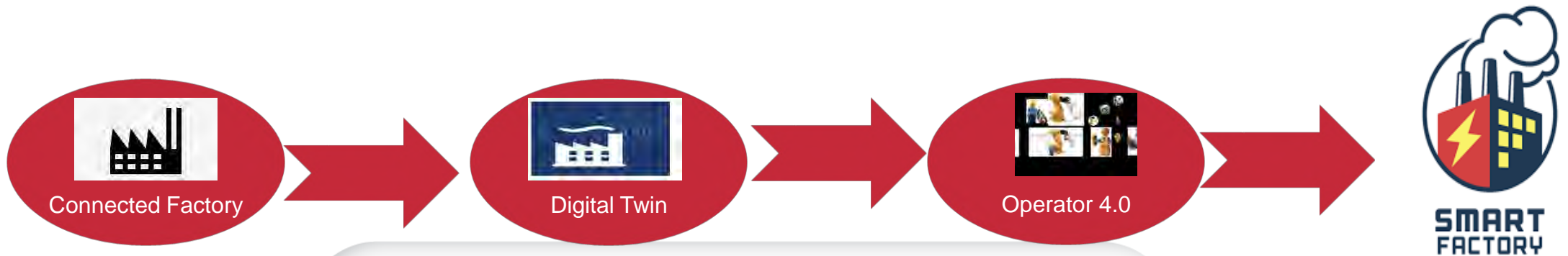
Uwe Kueppers
Senior Business Consultant
Rockwell Automation
Chairman MESA EMEA



**Rockwell
Automation**

What If...

- Teams are dynamic getting together and solve things!
- People are transforming double speed then today!
- Having full visibility on the plant / SC any time and see results!!
- By arriving in the morning see what the main focus should be !!
- Companies could reduce Inventory and production lead time significant
- Smart products are becoming smart systems and are tight integrated in the Supply Chain



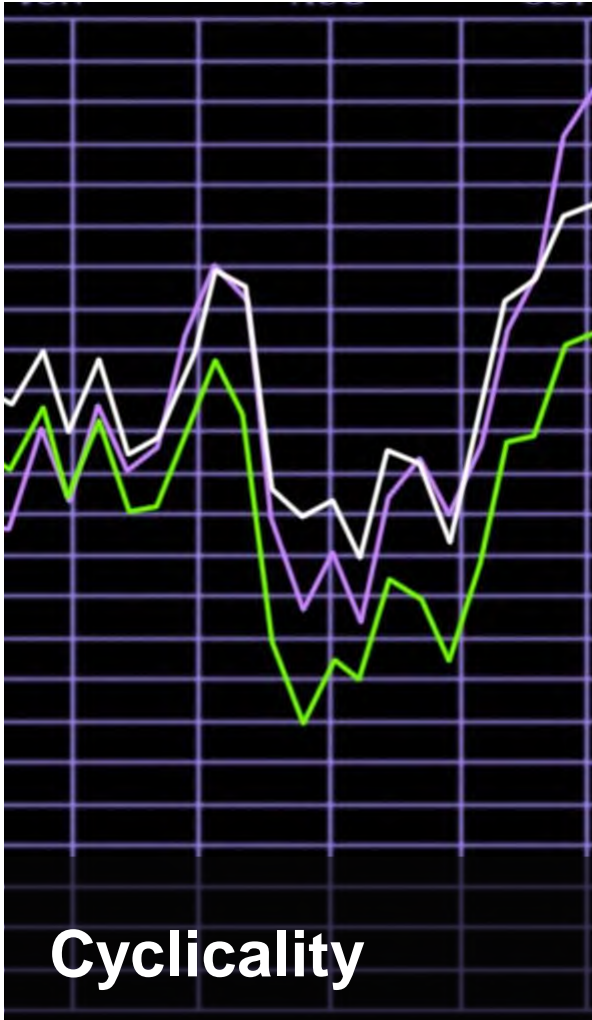
Industry Challenges for the Next Decade



Complexity



**Connectivity
and Security**



Cyclical



Agility

Digital Transformation

\$750bn

Global IOT spending
in 2019

Source: IDC

50%

of companies expect
IIOT to increase
competitiveness

Source: McKinsey

\$2tn

expected
spending by 2022

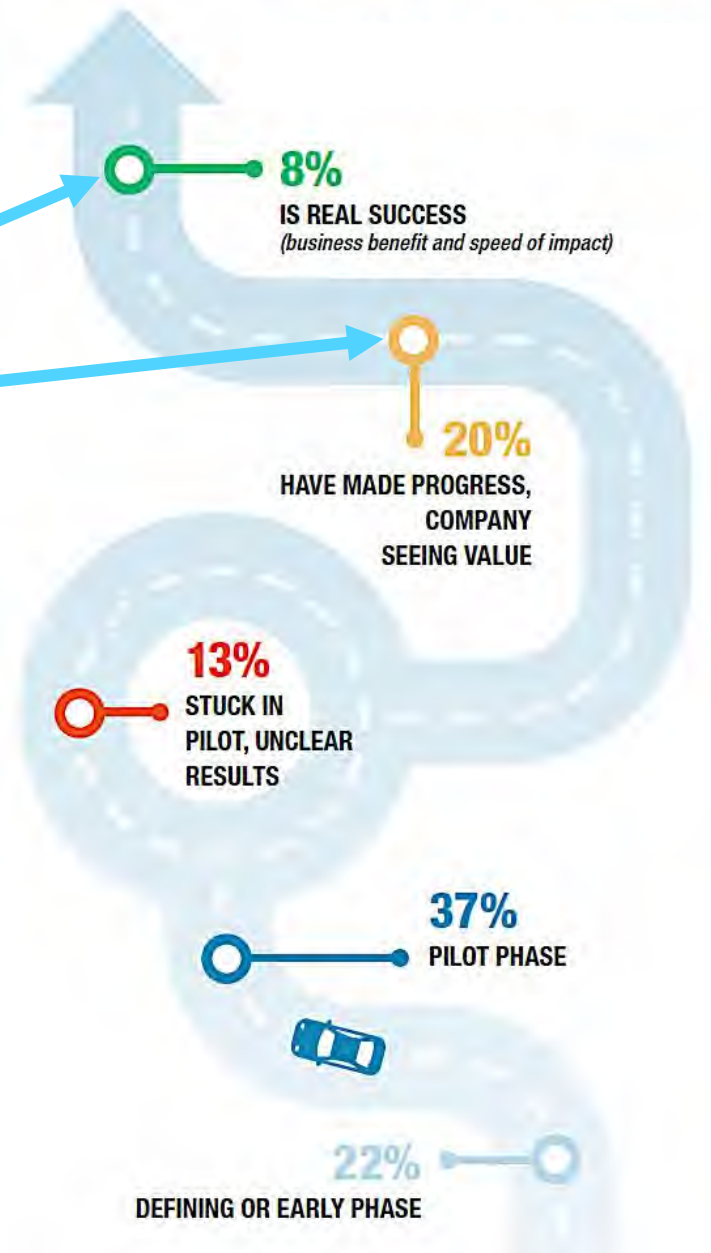
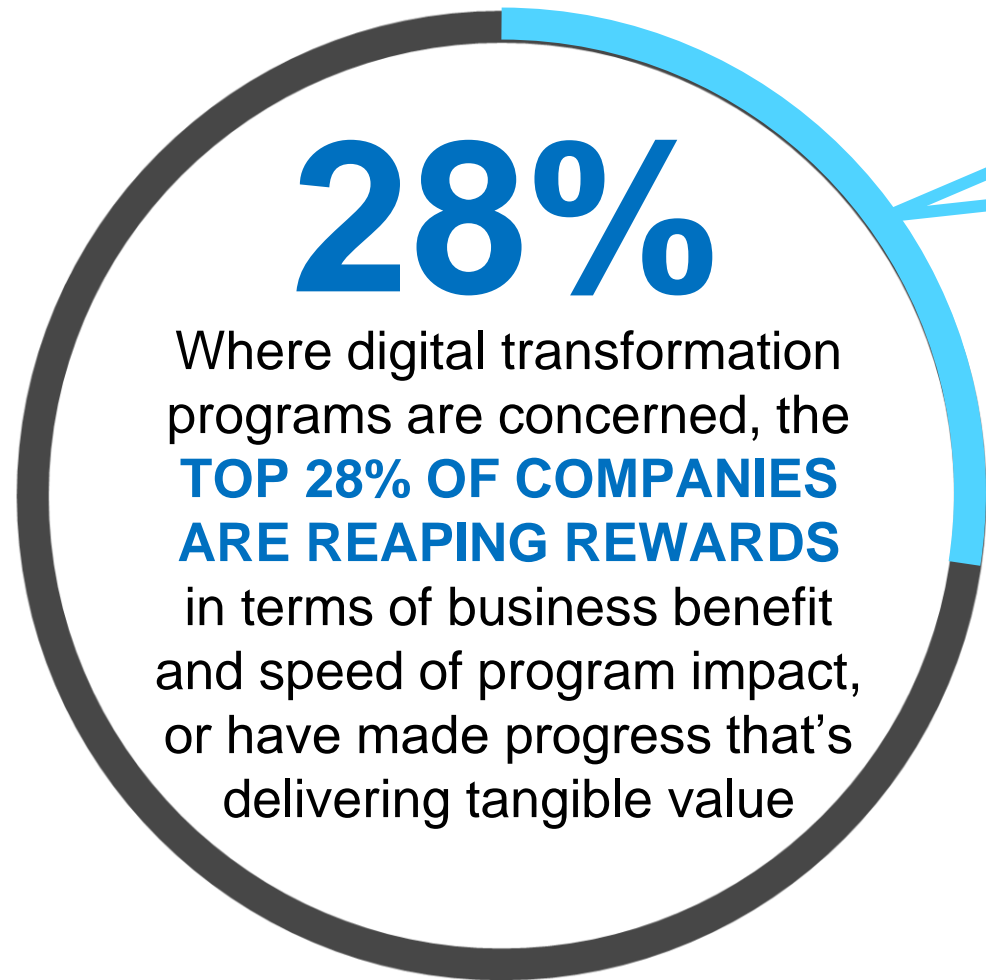
Source: IDC

40%

Operating income
improvement from
Digital Transformation

Source: McKinsey

The 'haves' and the 'have-nots'

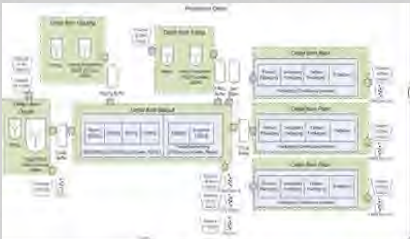


Source: LNS Research

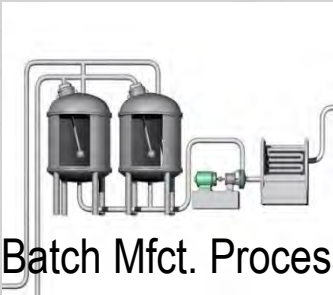
Digital Transformation



Business Process



Logistic / Material Handling Process



Batch Mfgt. Process



Continues Mfgt. Process



Labeling Process



Tank Farm Process



Maintenance Process

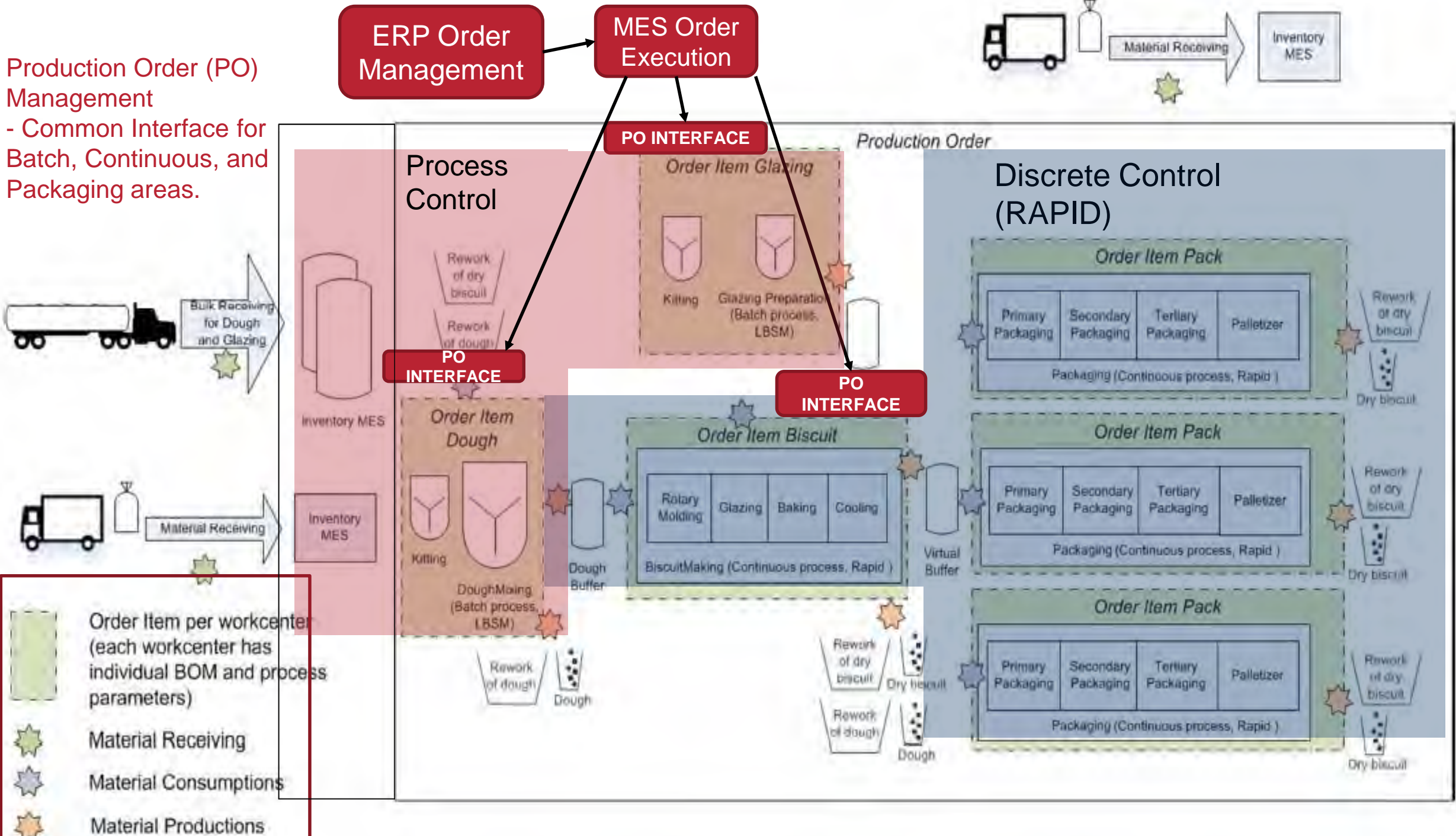


Quality Process



Food Safety Process

Production Order (PO) Management
- Common Interface for Batch, Continuous, and Packaging areas.

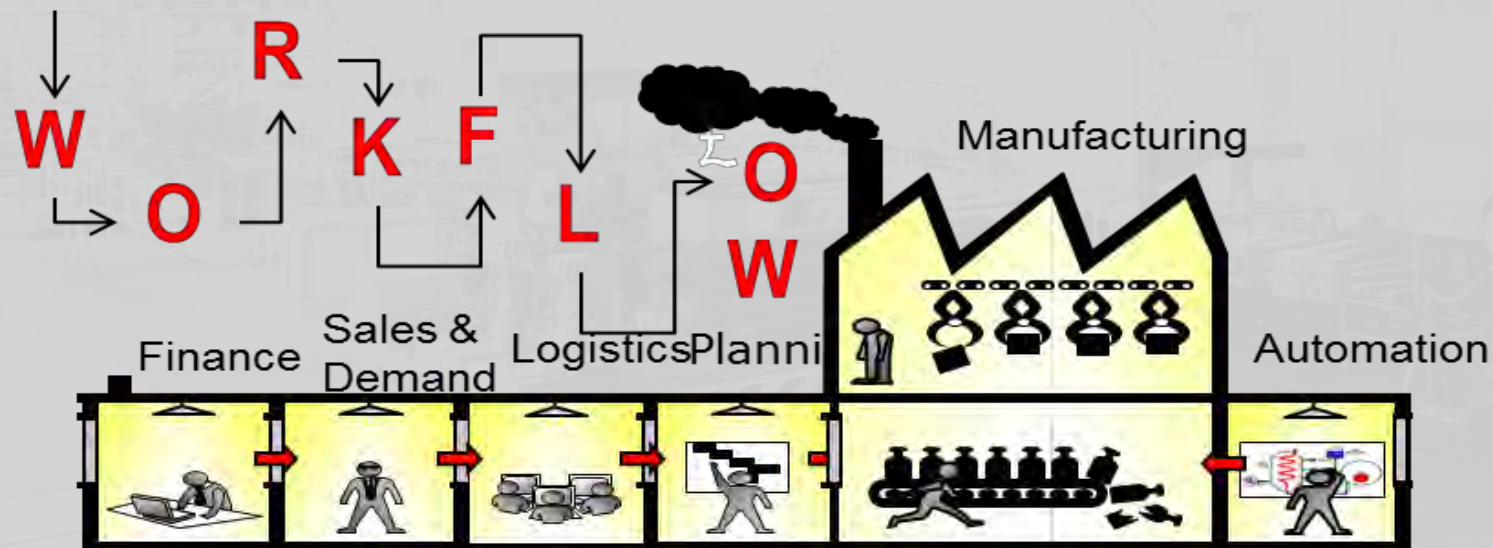


Manufacturing Operations Management

**Controlling the Process
by
Controlling the Workflow**

**Logging every action,
movement and transformation
at every step**

report / analyse
by work order, operator, vessel,
material, genealogy, time period ...



Digitalized Process – Big Data?

- Focus on 2 topics
 - Digitizing the operation
 - Bill of material
 - Recipe
 - Process Instructions
 - Event capturing
 - Synchronization with
 - Logistic, Material Handling
 - Maintenance processes
 - Quality Processes
 - Utilities
 - Having structured data for Analytics
 - Production
 - Product
 - Quality
 - Any events



Value realization

Significant improvements have been documented by the early adopters of digitalization as reflected in both research and individual use case outcomes

\$\$\$ CAPEX: 20% in Capital Avoidance

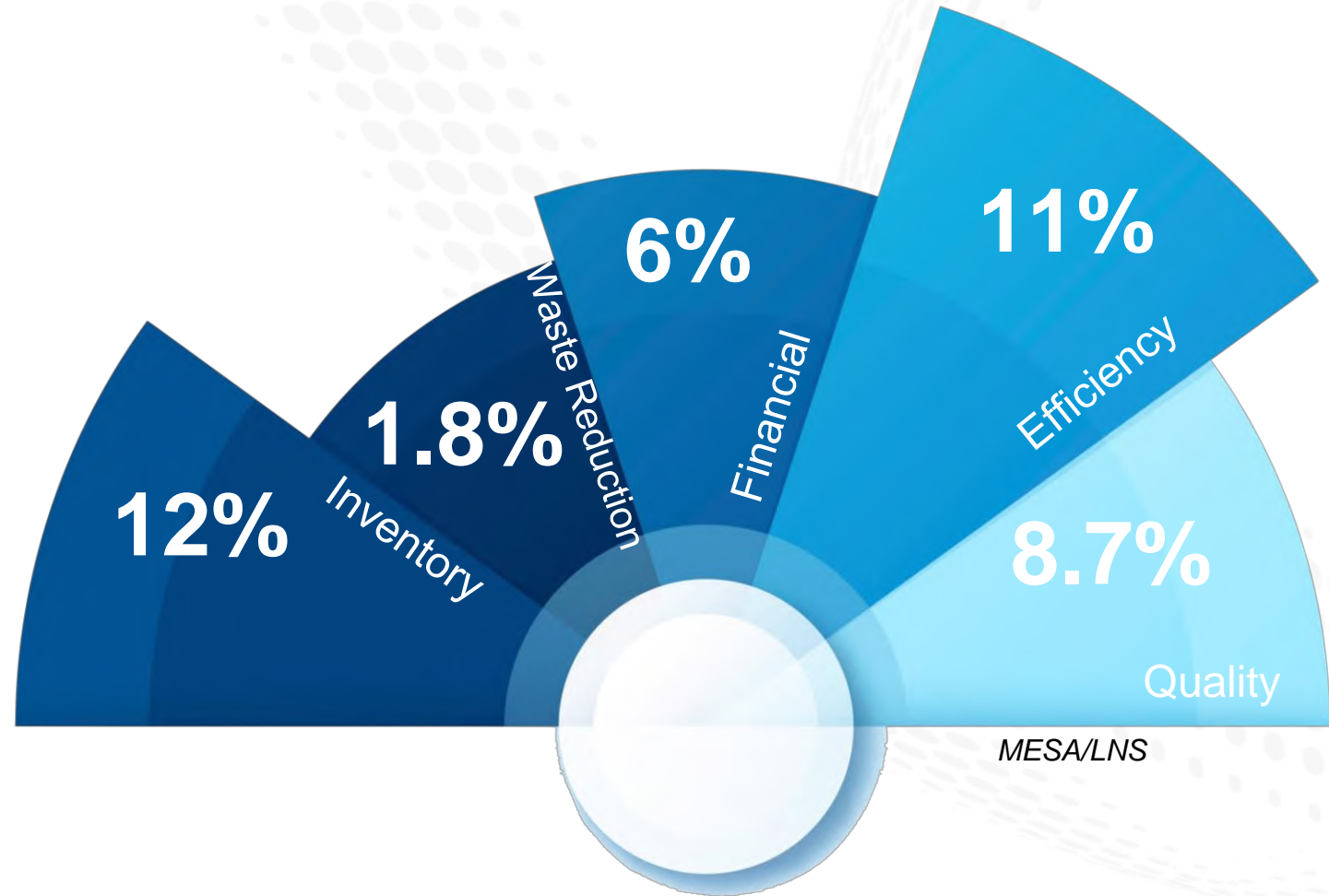
Inventory: Reduction by 3 days

Productivity increase: 11%

Waste: reduced by 50%

Quality: 35% improvement

WAGES : 6 % Reduction



A Major global food company

- Connected Enterprise / Digitalized Process with ERP connection
- Standardized processes
- Embedded quality Procedures
- Full IT / OT Conversion
- Full analytics and automatic synchronization

- Food safety through full genealogy
- Yield optimization
- Waste reduction
- Increase Lean activity
- Faster reaction on compliance
- Real time data analytics, management dashboard and production information

2 days reduction on Inventory
5% productivity increase
30% decrease of compliant cost
40% waste reduction
.....
**25% more available time for
quality, lean & maintenance**





25% INCREASED
Brewing Capacity

50% DECREASED
Brew Cycle Time

5% DECREASED
Annual Raw Material Cost



1 MILLION
Gallons
of Water
Saved
(predicted)



Mesa KPI with Improvement Range

Key Values to achieve

MESA KPI	Description	Improvement Range
MFG Expense per Unit	How much it costs in total to make a standard unit. (ingredients, energy, & labor)	10% reduction on average
Adherence to Schedule	When scheduled to make an order how well did plant do in meeting the deadline.	3.5% improvement on average
Materials per Standard Unit	How much of each ingredient was necessary to create a standard unit of finished good	Upwards of 7.5% decrease
Volume	Compared to design capacity, how close was production to the maximum.	Range of 7-17% improvement
Yield	What % of the raw ingredients were used in the finished good	Reduce Extract losses by 3-10%
Inventory	A measure of on hand raw, WIP, and finished good inventory	10-20% reduction in inventory
Process Variability	How repeatable is the process	5-10% Reduction in Process Variability
Quality	Was the product made to specification the first time	Improve First Time Right by 5-15%
Productivity	When the assets were available to run, were they fully utilized?	Improves productivity by 8-18%
Sustainability	How much energy was utilized to support manufacturing	Decrease WAGES consumption 5-25%

Industry standards extracted from www.MESA.org

The on-premise impact of becoming digitally transformed



Challenges

Real Time Production Monitoring
Real Time Alerts & Fault Identification
Paperless (Quality, Maintenance...)
Knowledge Transfer & People Engagement
OEE
Sustainability Management
Advanced Analytics
Predictive Maintenance / Quality
Predictive Production / Energy
Inventory Management
Cyber Security / Network Infrastructure
Waste / Losses / Overdosing
Traceability
Batch Size of one
HSE



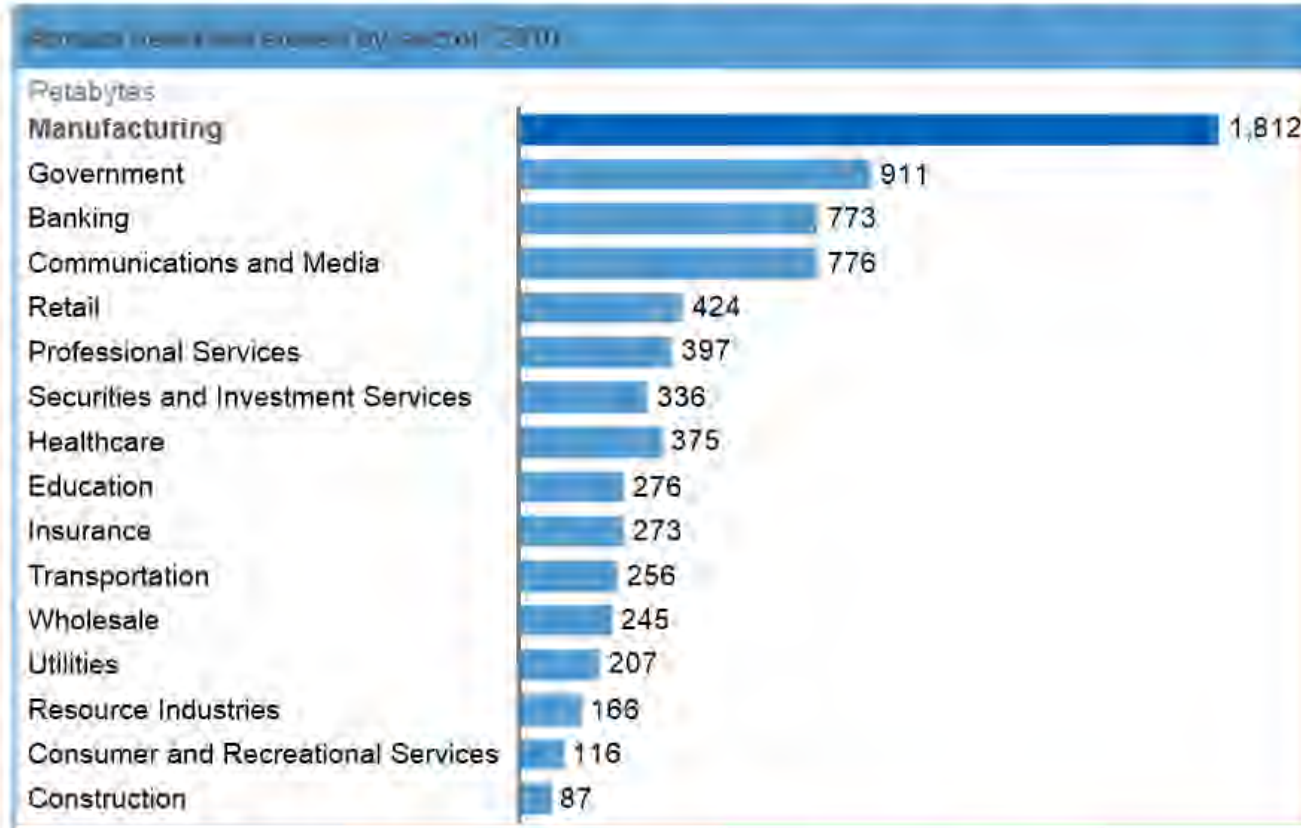
A smartphone is shown at the bottom of the frame, angled slightly. The background is a dark, abstract composition with vibrant, out-of-focus circular light spots in shades of blue, green, orange, and purple. A grid of white dots is overlaid on the right side of the image, creating a sense of depth and data flow.

Data exists
everywhere
throughout our
operations

Are we getting the most out of it?

Manufacturing is a Big Data generator

Manufacturing already generates more data than any other sector

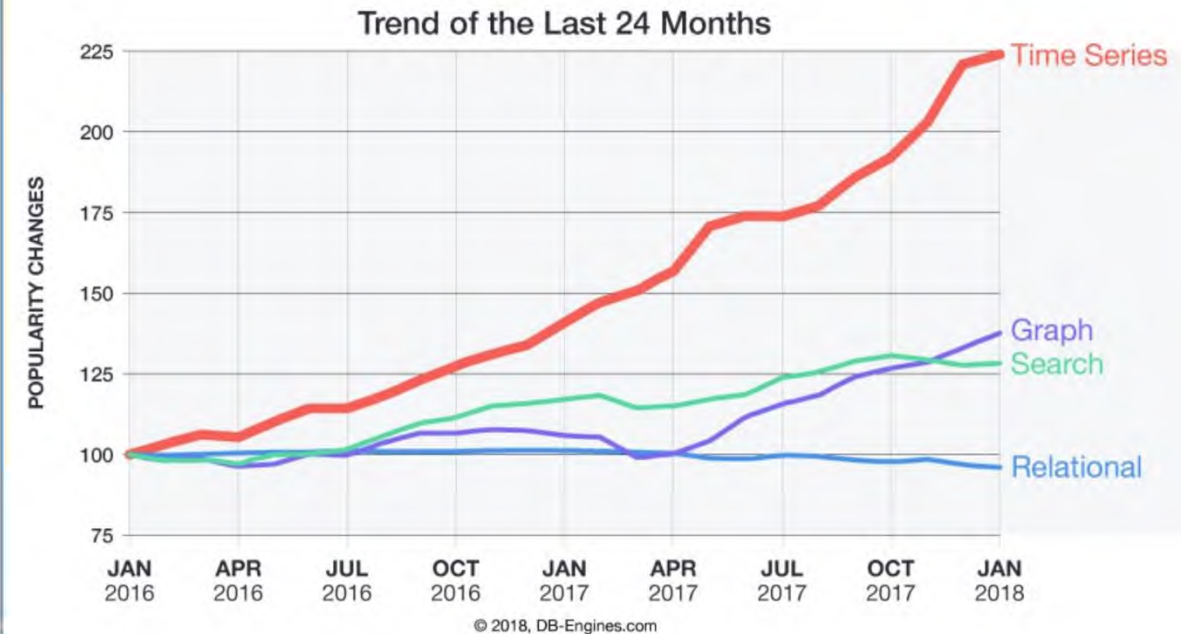


† Discrete manufacturing constitutes 1072 petabytes, Process manufacturing 740 petabytes

SOURCE: IDC, McKinsey Global Institute analysis

Time Series – the Fastest Growing Database

DB-Engines also ranks time series database management systems (Time Series DBMS) according to their popularity. Time Series Databases are the **fastest growing segment** of the database industry over the past year.

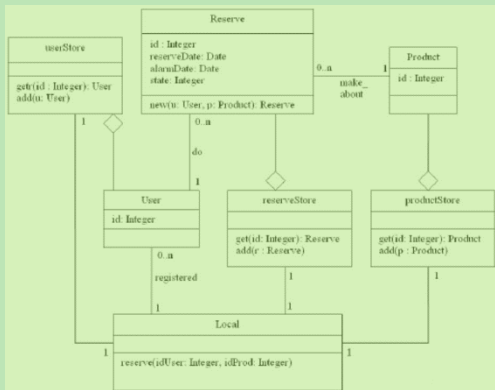


Build

Unified Data Model

OT

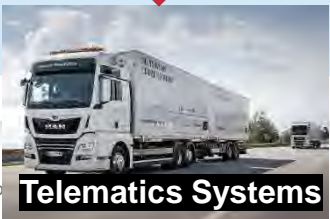
IT



Unified Data Model



Building Control Systems



Telematics Systems

The products and suppliers are a selection to emphasize the capabilities to connect.

HOW DO PEOPLE DO

ADVANCED ANALYTICS TODAY?

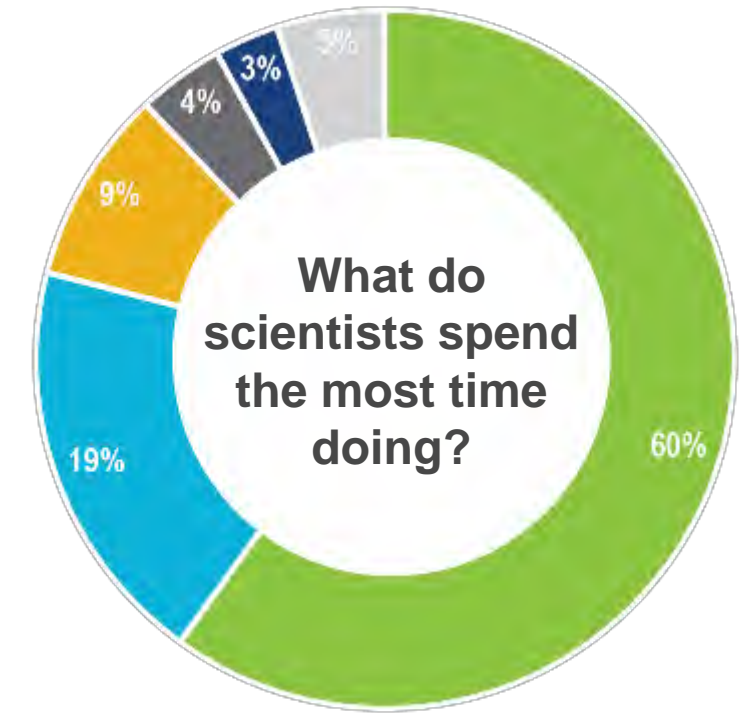
- Bring on team of data scientists, a data architect and IT.
- Execute an expensive data science project
- Do it again (and again)!

WHAT IS A BETTER WAY TO

LEVERAGE ADVANCED ANALYTICS?

- Simplified data cleaning
- Access to multiple model engines
- User support toolsets (software guidance)
- Fast data ingestion
- Large data management
- Smart data context/ID
- User driven presentation
- Multi-layered security

<https://www.forbes.com/sites/gilpress/2017/03/23/data-preparation-most-time-consuming-least-enjoyable-data-science-task-survey-says/#3a1b18826f63>



- BUILDING TRAINING SETS – 3%
- CLEANING & ORGANIZING DATA – 60%
- COLLECTING DATA SETS – 19%
- MINING DATA FOR PATTERNS – 9%
- REFINING ALGORITHMS – 4%
- OTHER – 5%

Challenges

Real Time Production Monitoring

Real Time Alerts & Fault Identification

Paperless (Quality, Maintenance...)

Knowledge Transfer & People Engagement

OEE

Sustainability Management

Advanced Analytics

Predictive Maintenance / Quality

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Inventory Management

Cyber Security / Network Infrastructure

Waste / Losses / Overdosing

Traceability

Batch Size of one

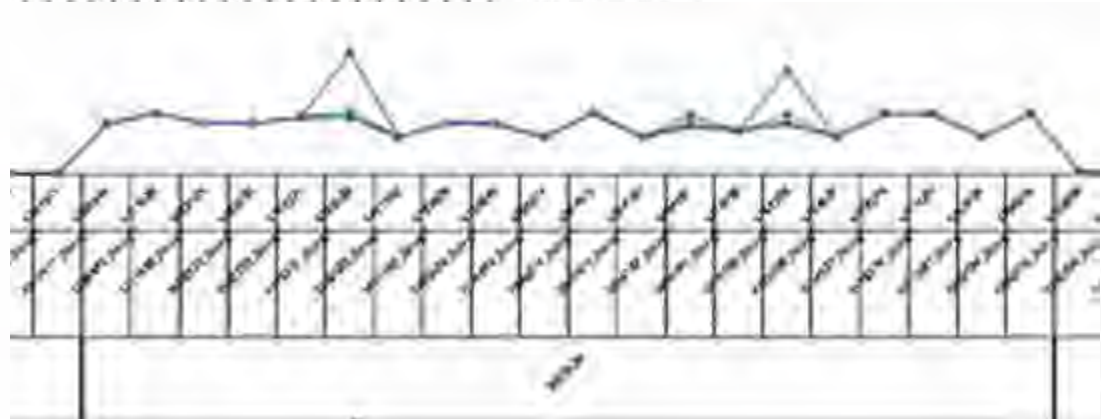
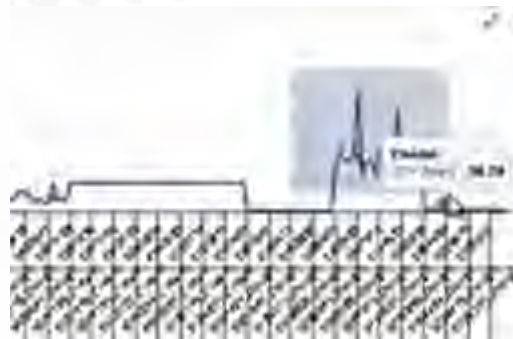
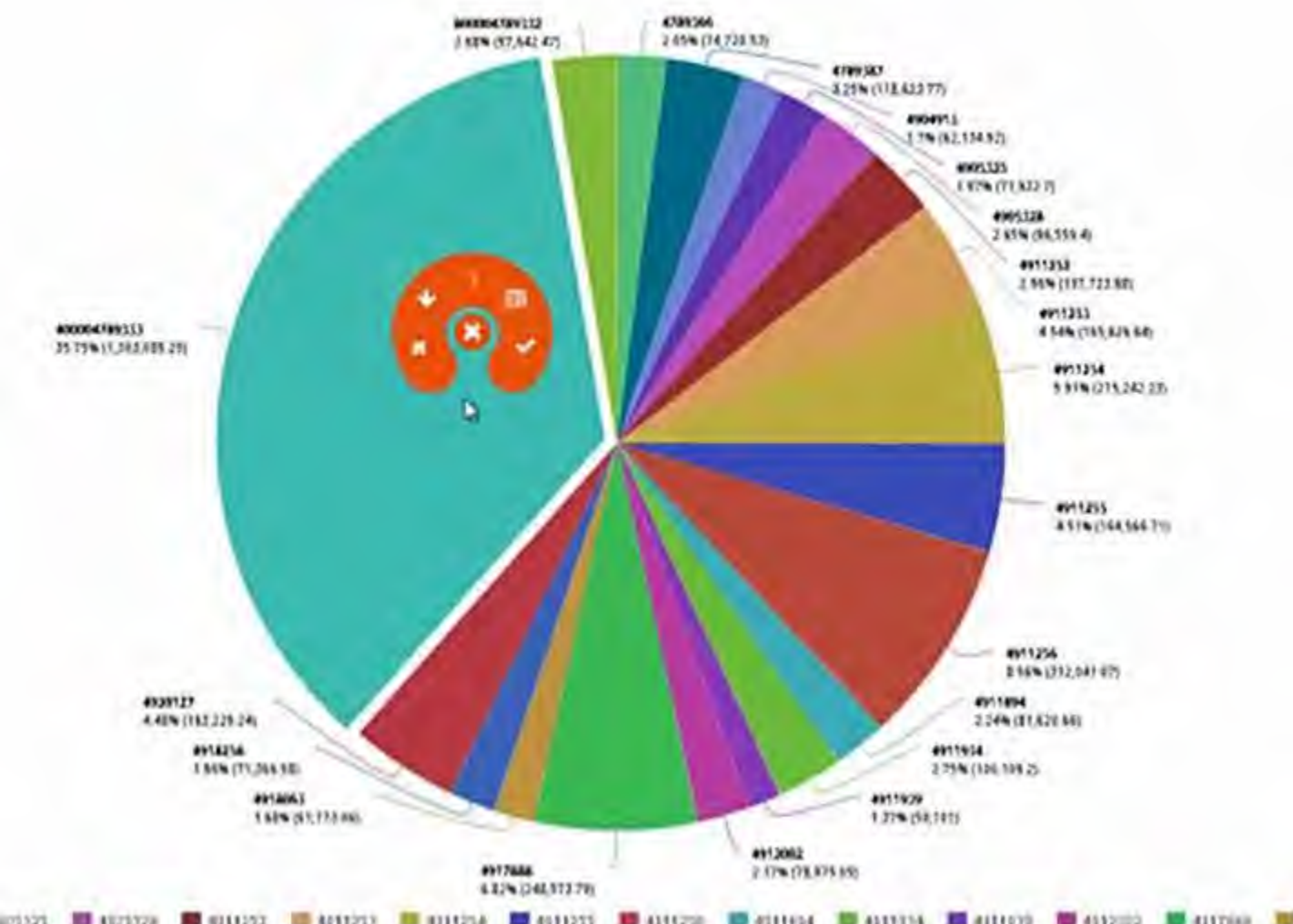
HSE



Solution with IOT Platform - First fast steps



Fast step in a Cookie plant (Investigate, Analyze, Dependencies..)



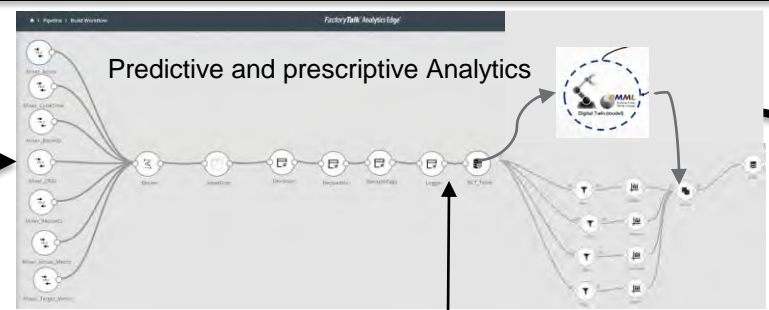
Solution with Industrie 4.0



Enable plant & enterprise analytics by the IOT platform

Real-time integration and abstraction of systems & Things
Simplified data cleaning, Access to multiple model engines

Fast data ingestion, Graphical integration of ML (PMML)



IOT Plattform
REST API to all data in your factory

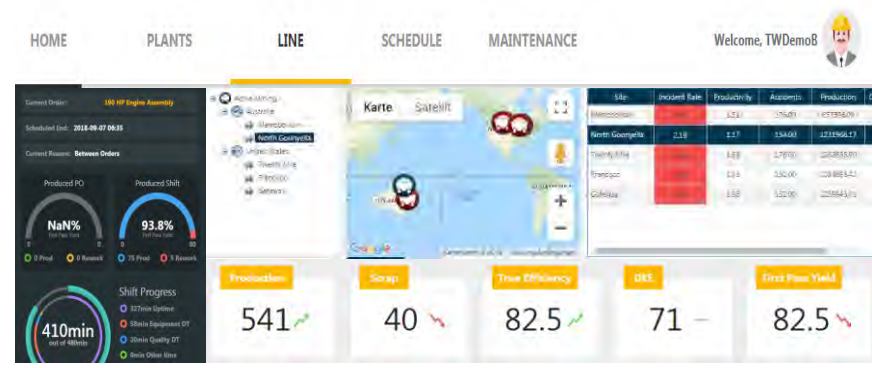
Third Party PLC / I/O / db

Gateway + SmartTags

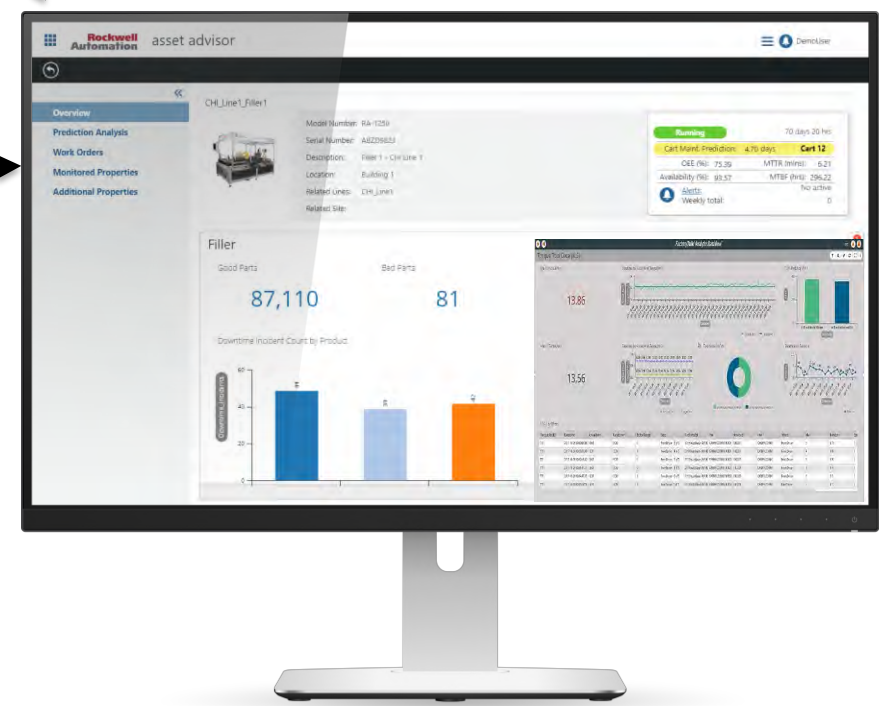
MOM / PLM Modules



AI for Energy Optimization
AI for Quality
AI for Real-time Diagnostics



Common Mashup of all information

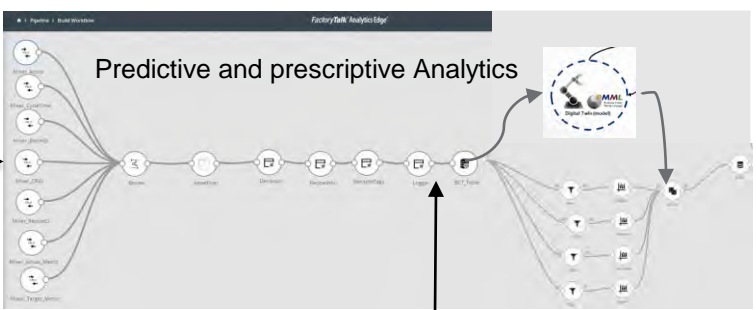


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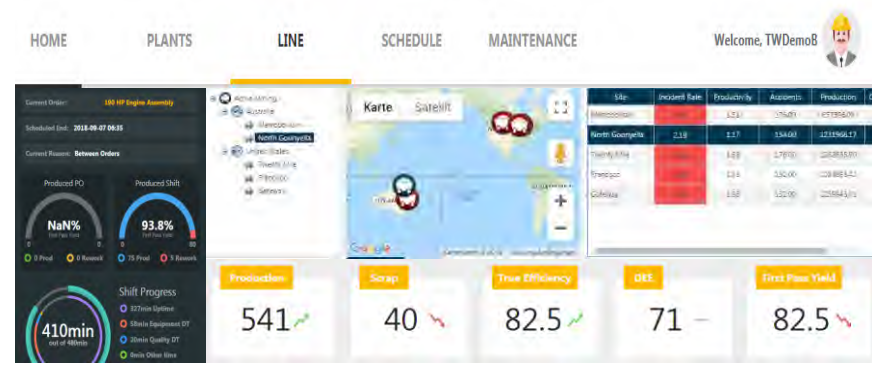
MOM Modules



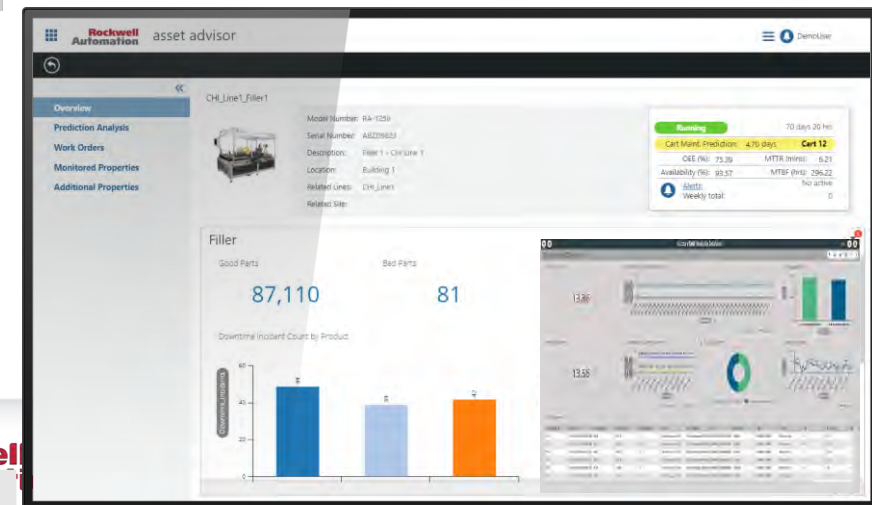
AI for Energy Optimization

AI for Quality

AI for Real-time Diagnostics



Common Mashup of all information



Manufacturing is going digital

Current

Industrial Innovation Platform

ISA-95

L4/
L5

Business Systems
(ERP, SCM, PLM)
Governance & planning

L3

Production Execution
(MES / MOM)

L2

Process Monitoring
(HMI-SCADA)

L1

Process Sensing,
Manipulating
(PLC)

Innovation Platform

Engage

Orchestrate

Synthesize

Contextualize

Source

Break-Thru
Innovation



PLANT & CORP.
MANAGEMENT



MAINTENANCE



QUALITY



OPERATORS

- **Connected**
- **Real-time**
- **Role-based**
- **Predictive / Prescriptive**
- **Mobile & augmented**
- *Wrap and extend Innovation*



LOGISTICS



SUPPLIERS



ENVIRONMENTAL



IOT GATEWAY

Broader supply chain optimization



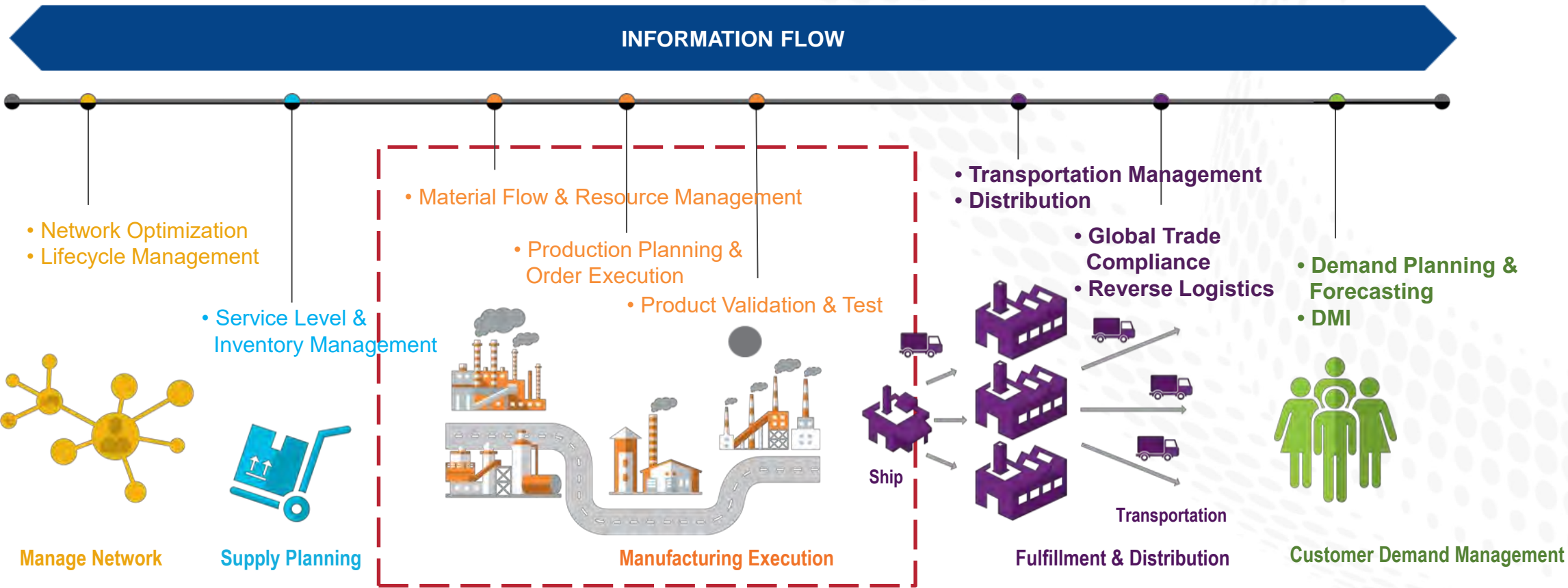
SUPPLY CHAIN
NETWORK OPTIMIZATION



INVENTORY OPTIMIZATION



SUPPLY CHAIN VISIBILITY



Data and analytics leveraged well beyond basic manufacturing control processes

Integrated Interoperability



Smart Suppliers
Smart Logistic
Smart Production
Smart Maintenance
Smart Quality
Smart Distribution

Smart Suppliers

Smart Logistic

Smart Production

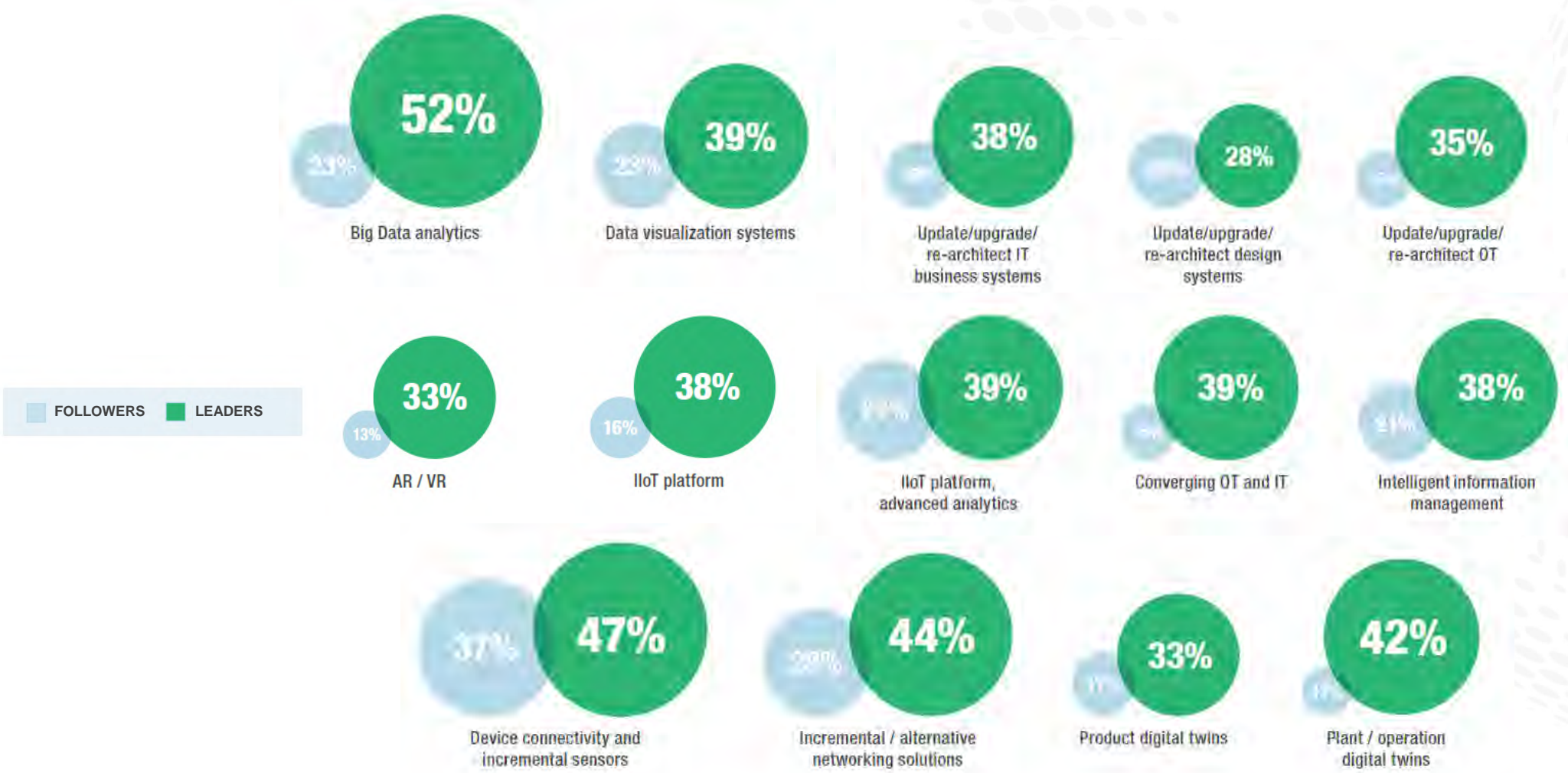
Smart Maintenance

Smart Quality

Smart Distribution

Smart Factory

Industrial transformation leaders versus followers



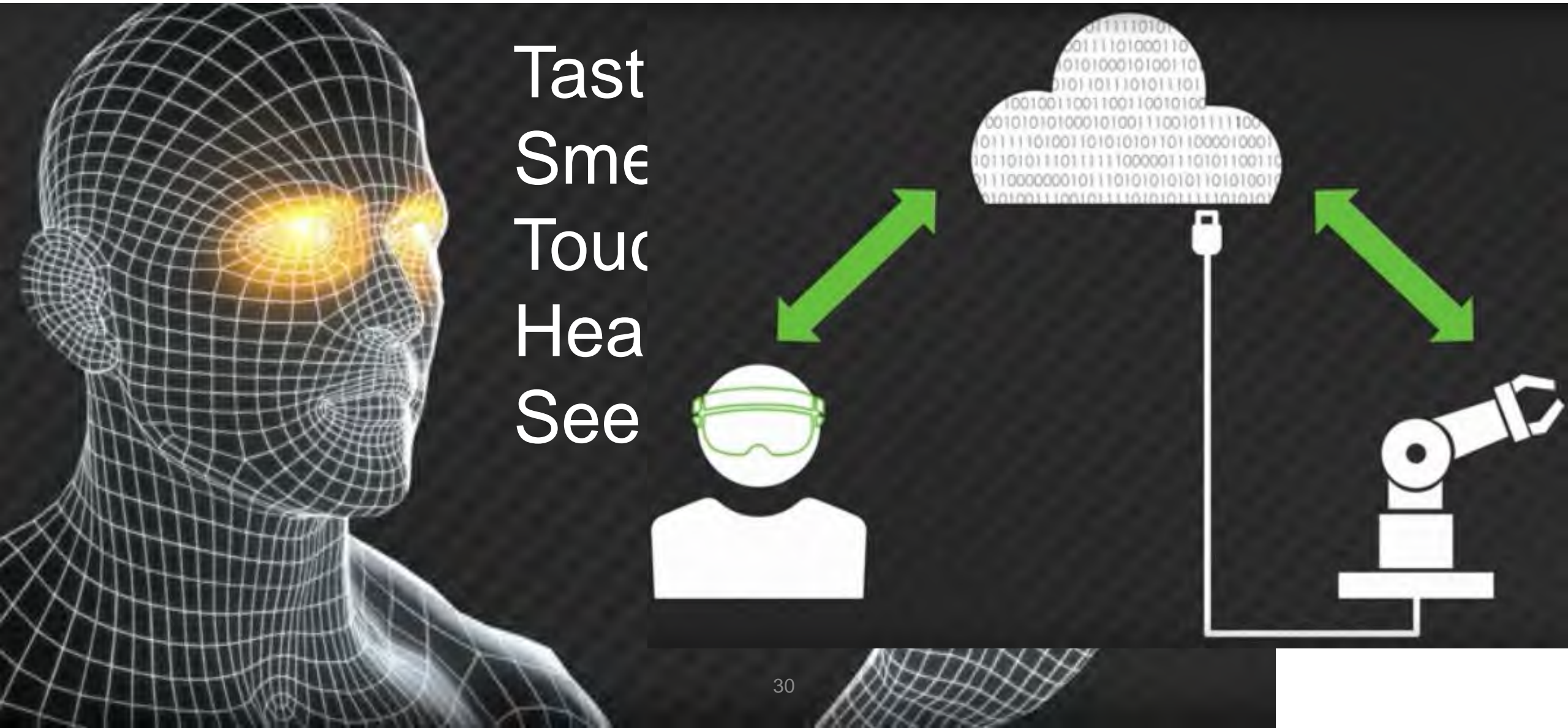
Source: LNS Research

Leaders are actively leveraging these proven technologies or upgrades – now.

By 2025 3.5 Mil people will retire! How
do we capture their knowledge?
How to create an interesting environment?



5 sensors of Human



Analytics in
Augmented Reality

MOM context in
Augmented Reality

Order: 63522
Shift: 3
Running time: 3:30

ARM.01 | 2018-08-01
10:00:00

808

AR and it's future



Visualize

Enhance the user's **view** the physical world with the overlay of **real-world** or **hypothetical** information

Instruct

Train or guide users on how to perform a task through the overlay of **digital instructions** or **real-time expert guidance**

Interact

Manipulate digital graphics or extend a product through an **AR interface**

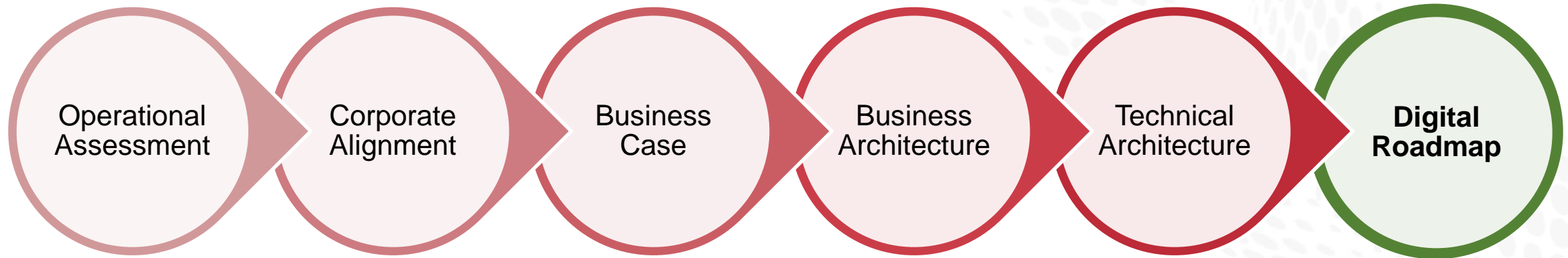
IS YOUR

DIGITAL TRANSFORMATION PROGRAM

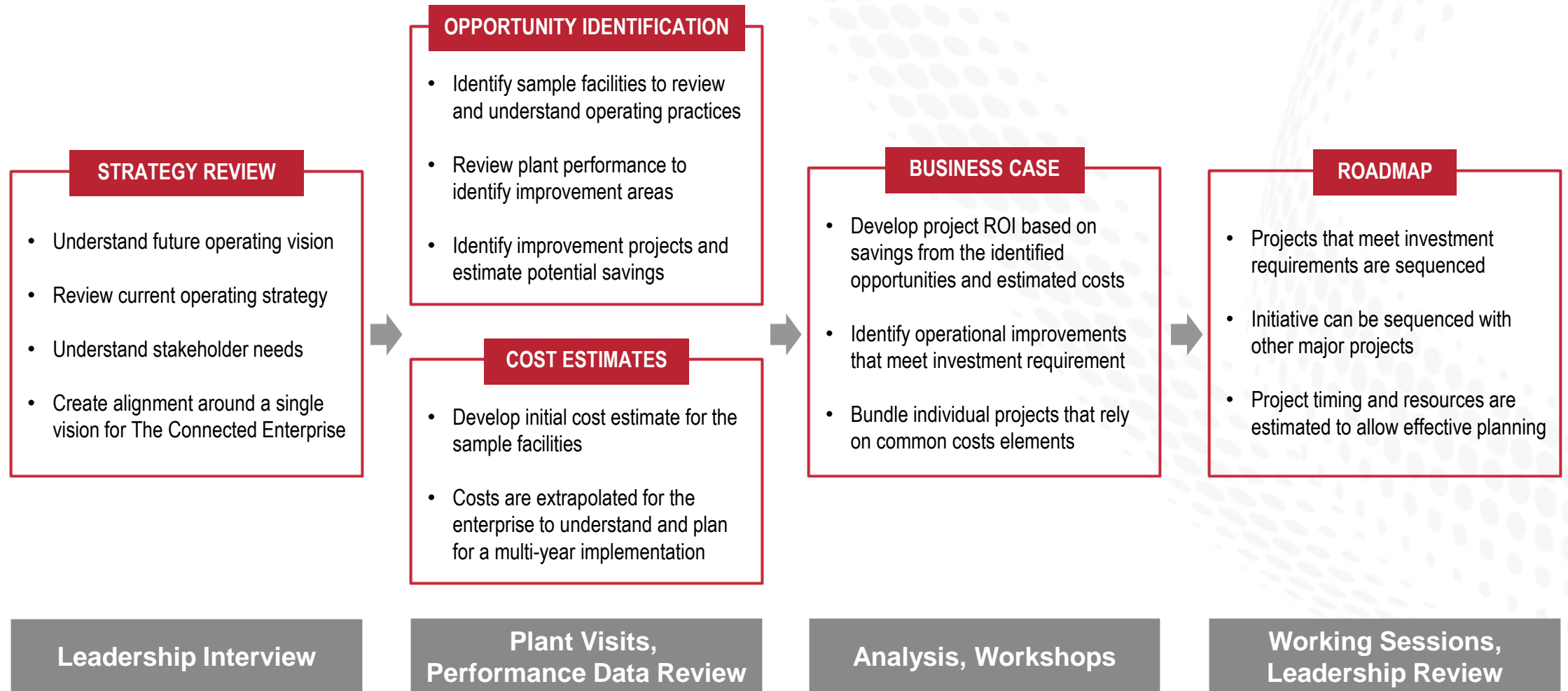
GOING FAST ENOUGH AND FAR ENOUGH TO SUPPORT
YOUR OPERATIONS AND ENTERPRISE GOALS?

It's not rocket science

Enabling smarter manufacturing through digital transformation is a journey that starts with pragmatic strategy development that involves analyzing, planning and understanding business needs, available technologies and commercial opportunities



It's just a process



Actions that will define the winners

A reality check for today's C-Suite on Industry 4.0

Time for experimentation is over – **be bold and strategic**




Pursue value and performance first
– not technology –
for a holistic ecosystem

Recognize today's opportunities – **and the real threats to survival.**

Source: KPMG International



A person wearing a yellow jacket and a black backpack is walking away from the camera across a suspension bridge. The bridge is made of metal cables and a wooden plank deck. Below the bridge is a deep, forested valley. In the background, there are steep, rocky mountains with patches of snow. A bright sun is shining from the top center, creating a large lens flare that spreads across the upper half of the image. On the right side, there is a decorative graphic of a grid of blue dots that tapers towards the top right corner.

**“Start by doing what’s
necessary; then do
what’s possible; and,
suddenly, you’re doing
the impossible.” ***

*** Saint Francis of Assisi**



**Rockwell
Automation**

Thank You !!

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Uwe Kueppers | The Call To Action For Digital Transformation