

MANUFACTURING TRANSFORMED: SMART CONNECTED OPERATIONS WITH PTC AND ROCKWELL AUTOMATION

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VP, Global IoT Technical Sales

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PTC Forum Europe



A WAVE OF TRANSFORMATION IS HERE

A stylized, light gray world map serves as the background for the slide. Three dark blue rectangular boxes are overlaid on the map, each containing text. Two white, torn-edge style boxes are also overlaid, containing additional text and citations.

Smart Manufacturing

Industrie 4.0

Made in China 2025

33% (majority) of IoT economic value will come from the “factories” setting

- McKinsey Global Institute, 2016

Manufacturing operations is the IoT use case that will see the largest investment

- IDC, 2017

1

Global competition is forcing manufacturers to embrace Industry 4.0 and digital transformation, or risk becoming irrelevant.

2

Navigating the IT/OT convergence is increasingly critical for manufacturers today.

“IIoT is no longer hype, companies have broadly launched initiatives.”

– Matt Littlefield, LNS

“CIOs have the responsibility to lead their enterprises in exploiting information flows from digital technologies.”

– Kristian Steenstrup, Research VP and Gartner Fellow

30%

of operations...
will be fully integrated
through IoT technologies
by 2019

60%

*of the 2000 largest
manufacturers...*
will rely on digital
platforms as the
foundation for their
industrial ecosystems
by 2020

80%

*of use cases that
require human-to-
machine
interactions...*
will use immersive
interfaces like
augmented reality
by 2030

INDUSTRIALS INVESTING IN IOT – ITS ABOUT VALUE



GE Transportation



**10-20%
Reduction**
IN UNPLANNED
DOWNTIME



**46-75%
REDUCTION**
OF BATCH
RECORD REVIEW
MAN HOURS

Large Automotive
Manufacturer



MORE THAN
2 MILLION
VARIATIONS IN
PRODUCTION
MANAGED IN
REAL TIME



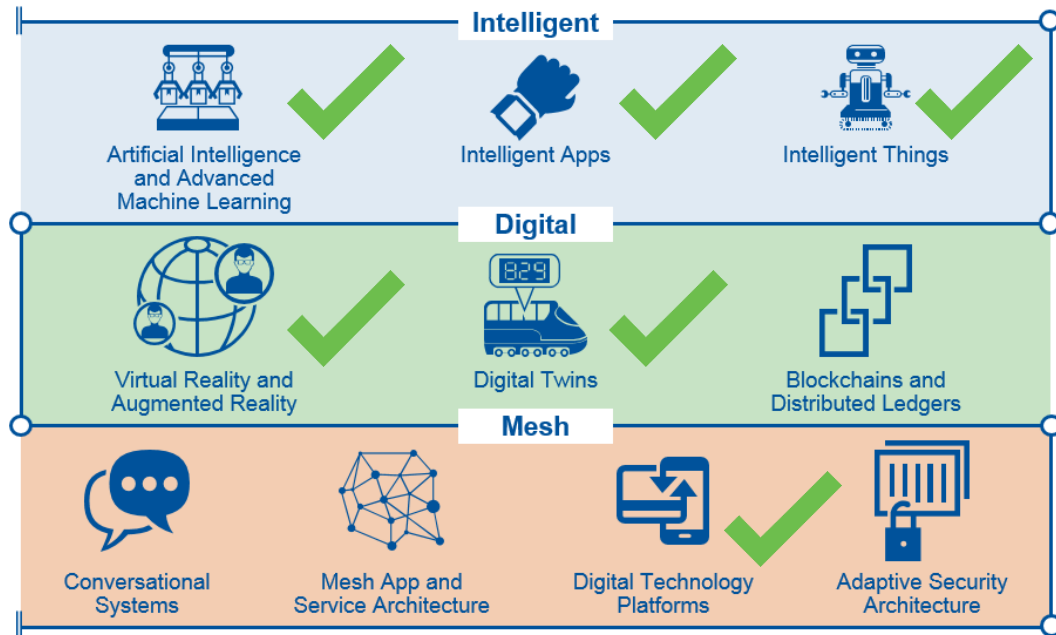
**99%
UPTIME**
ACHIEVED
AT RETAIL
LNG STATIONS
WITH CLOUD
SOLUTION

Tier 1 Automotive
Parts Manufacturer


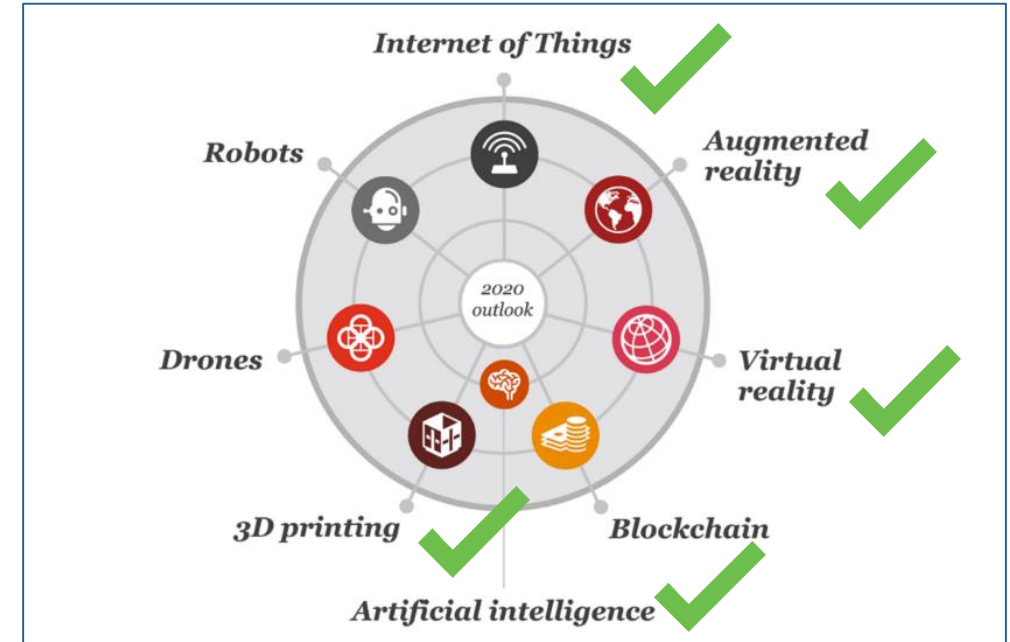


**91%
Accuracy**
PREDICTING
EQUIPMENT
ALARMS 24
HOURS IN
ADVANCE

MANY TECHNOLOGY FORCES ARE CONVERGING ENABLING ACCELERATED INDUSTRIAL INNOVATION



Gartner®

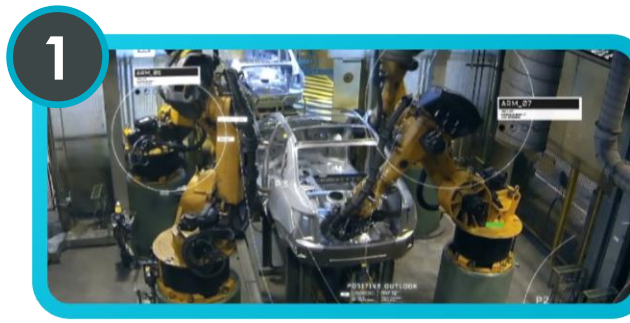


pwc

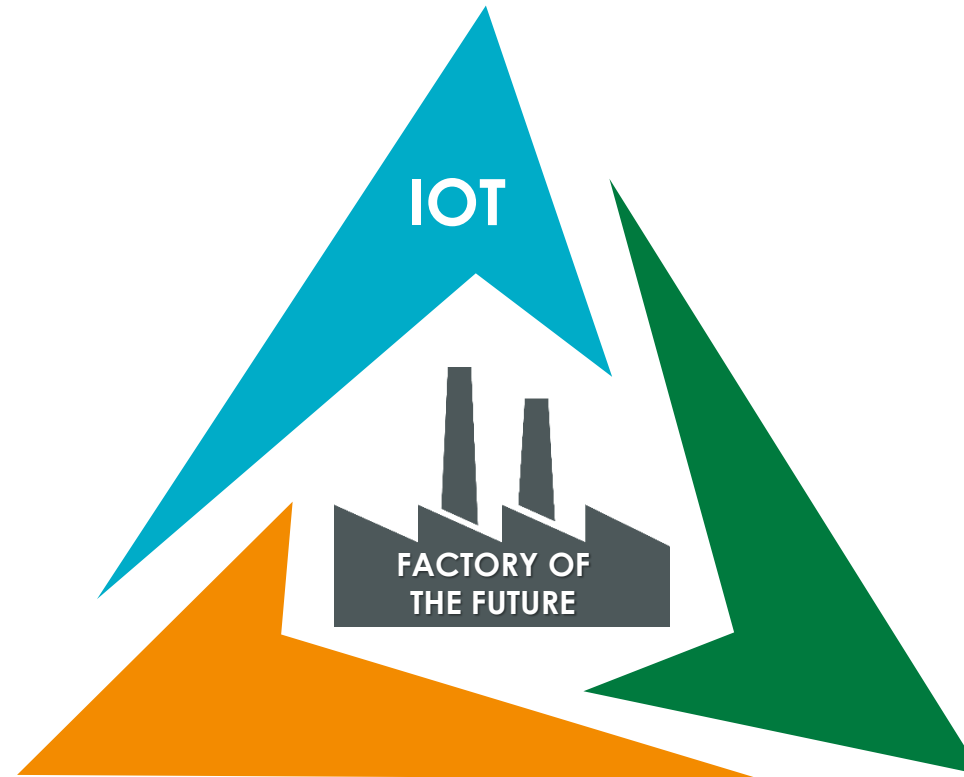
THE BIG 4...



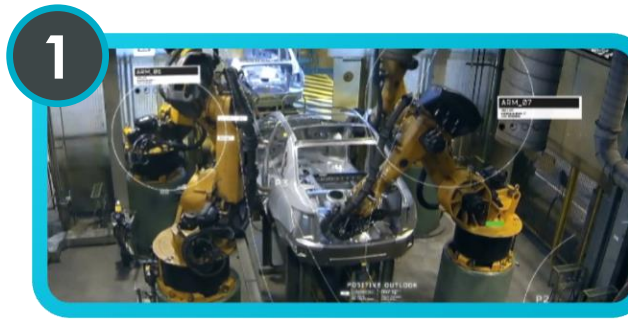
THE BIG 4...



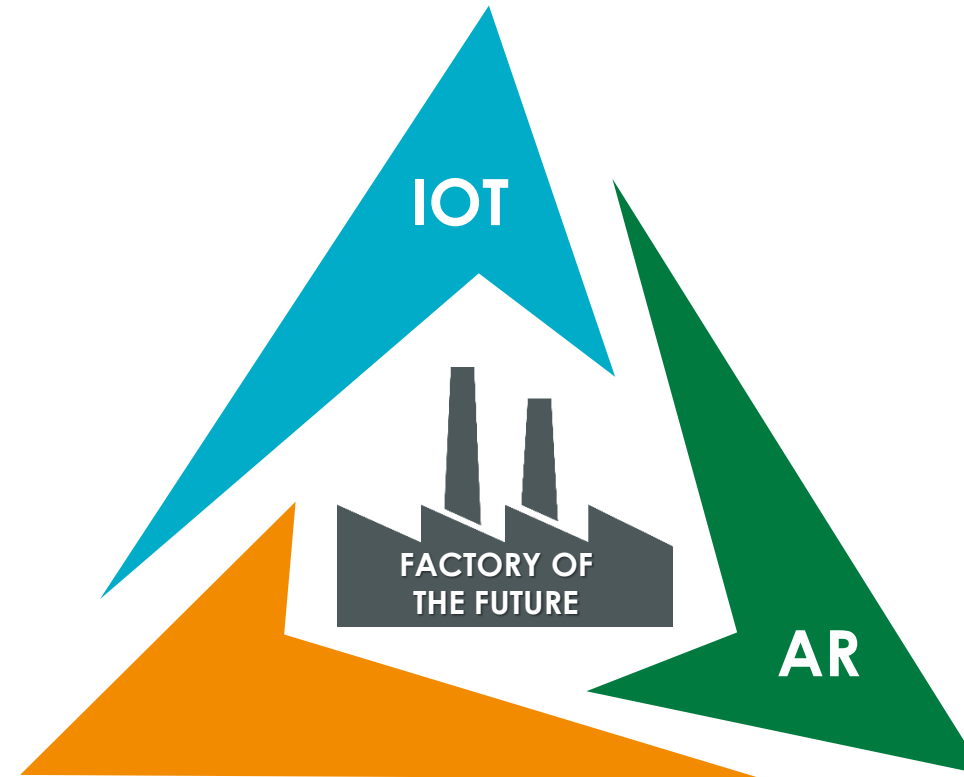
INDUSTRIAL IOT AND ANALYTICS drive IT/OT convergence across the value chain and increases automation and productivity up to 25%



THE BIG 4...

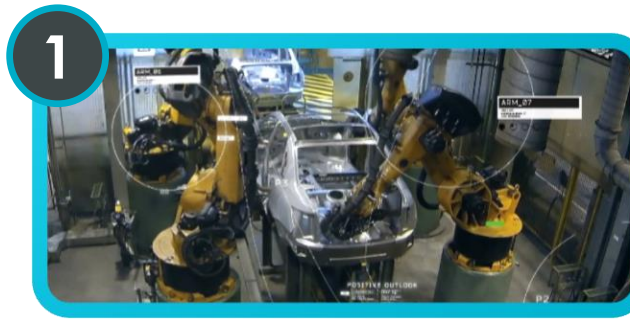


INDUSTRIAL IOT AND ANALYTICS drive IT/OT convergence across the value chain and increases automation and productivity up to 25%



AUGMENTED REALITY makes human labor 30-50% more efficient

THE BIG 4...



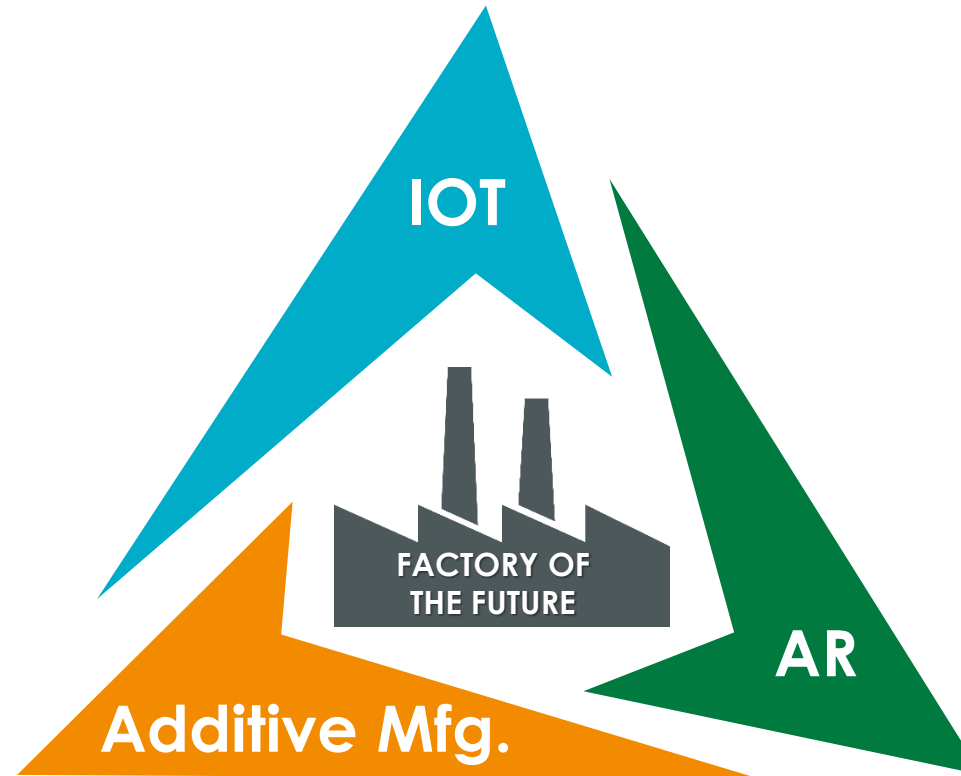
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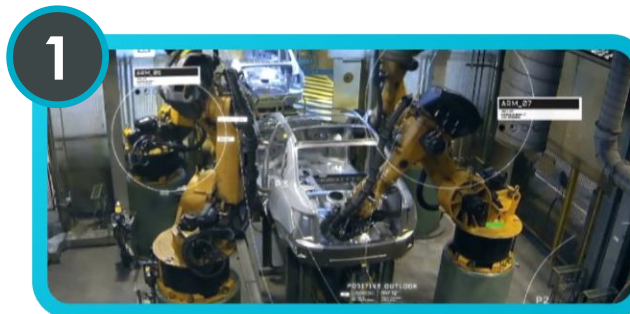
ADDITIVE MANUFACTURING radically transforms engineering, manufacturing and supply chain processes



AUGMENTED REALITY makes human labor 30-50% more efficient



THE BIG 4...



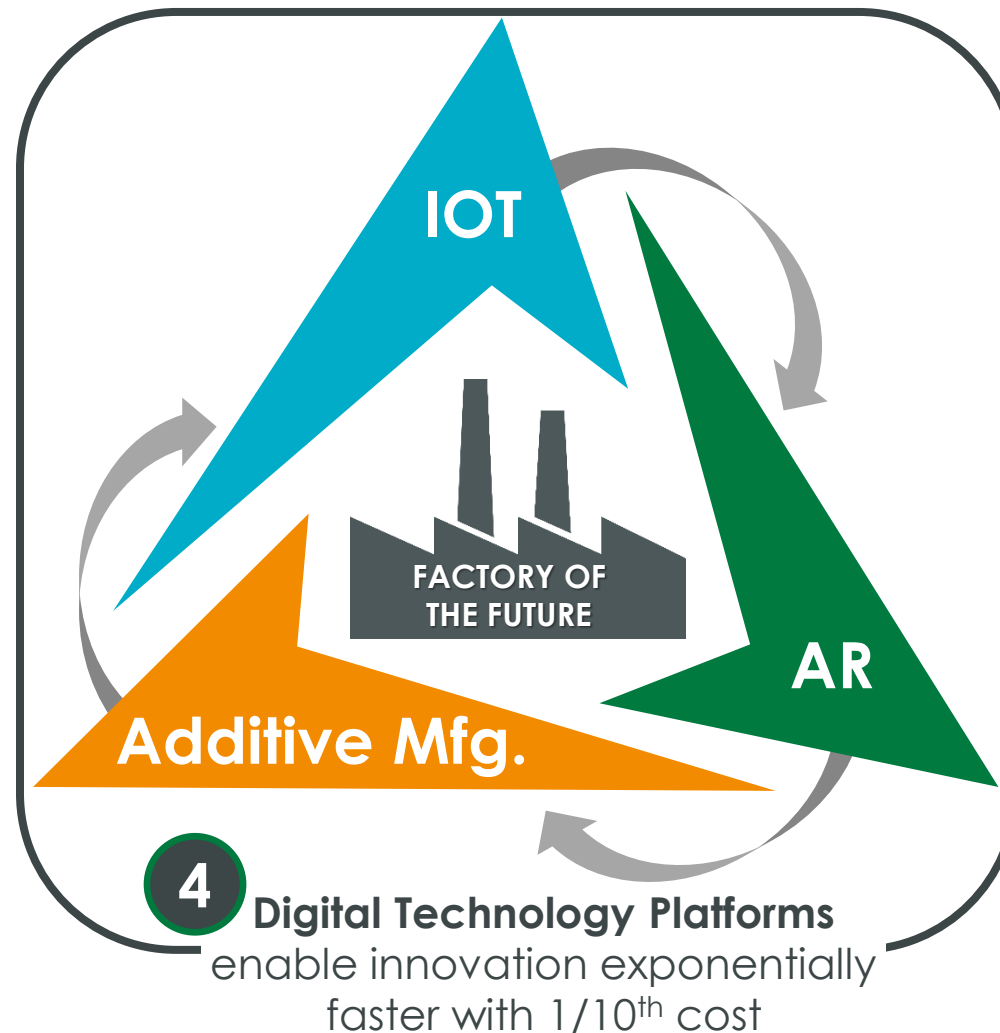
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ADDITIVE MANUFACTURING radically transforms engineering, manufacturing and supply chain processes

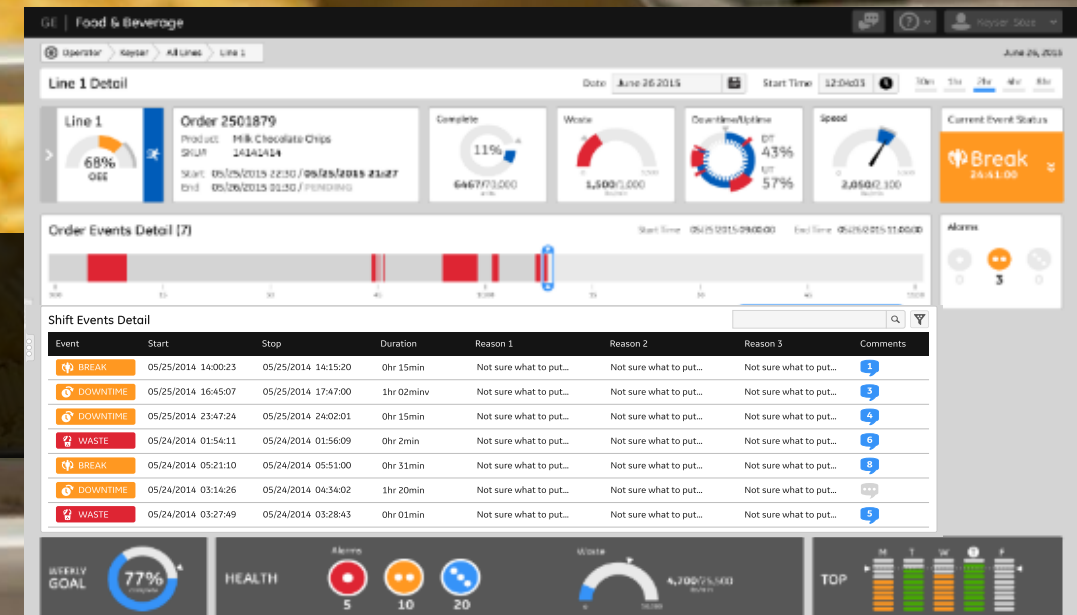
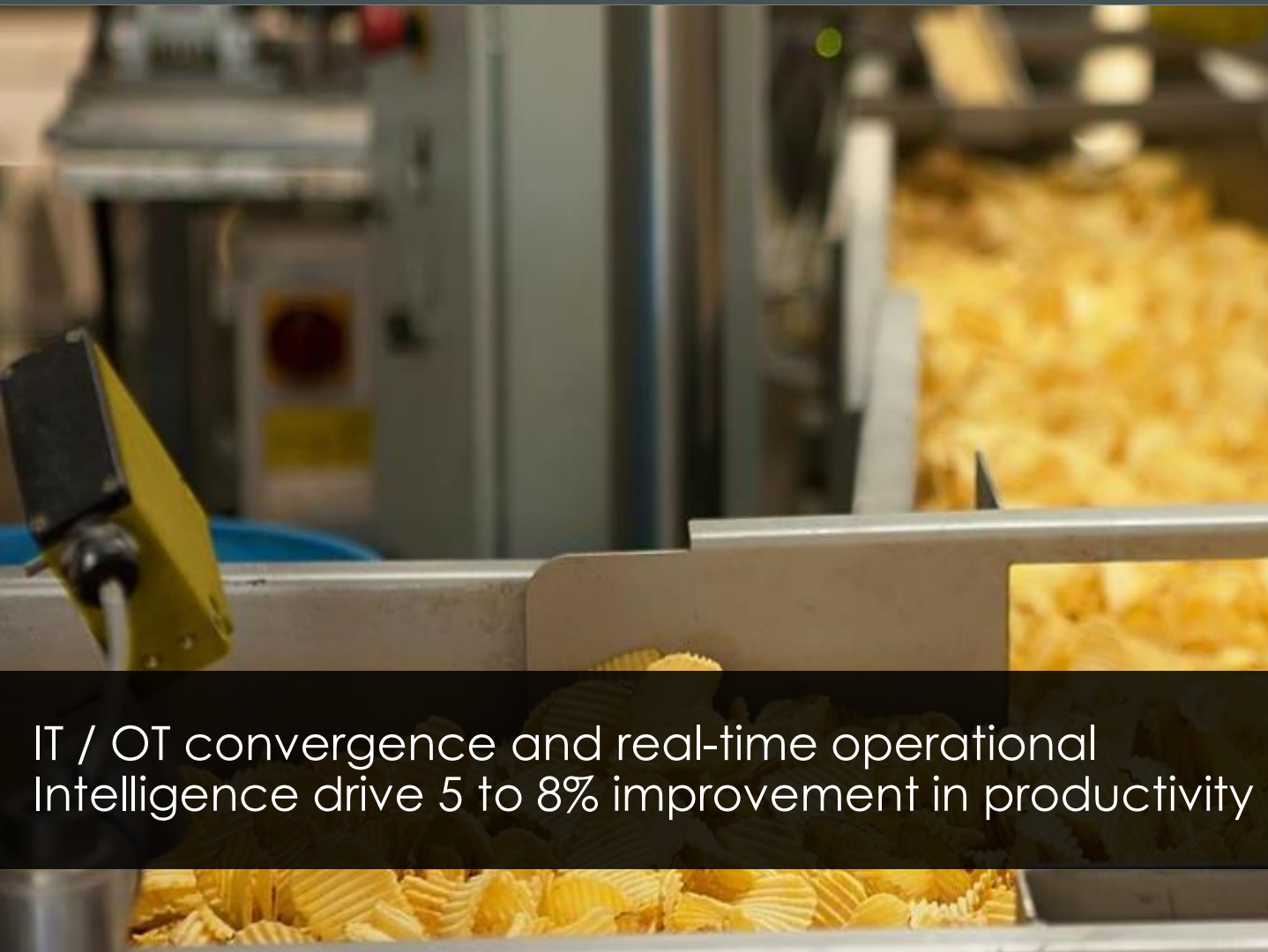


AUGMENTED REALITY makes human labor 30-50% more efficient



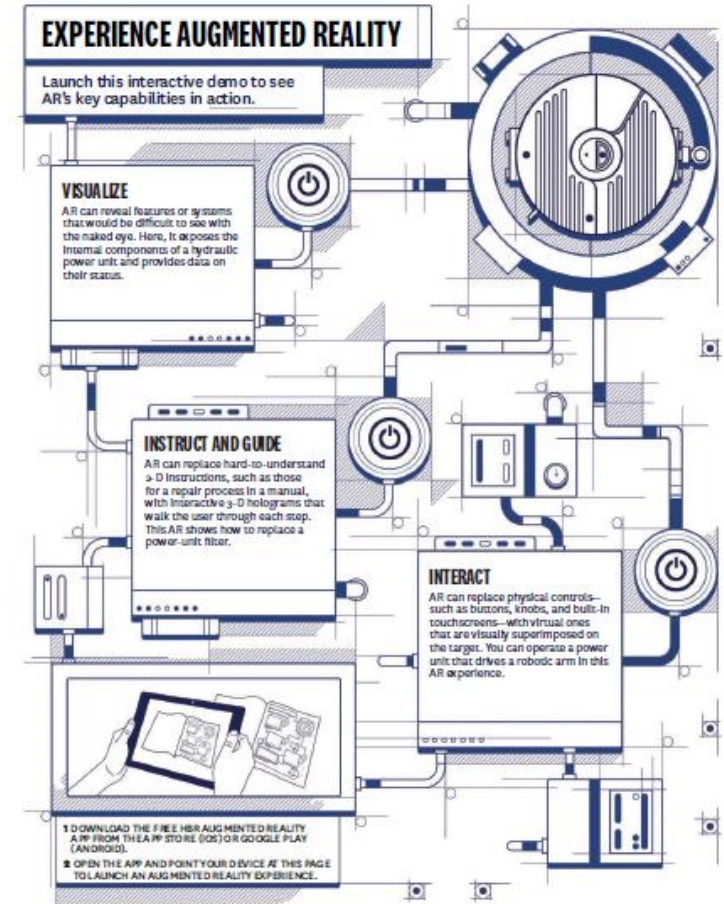
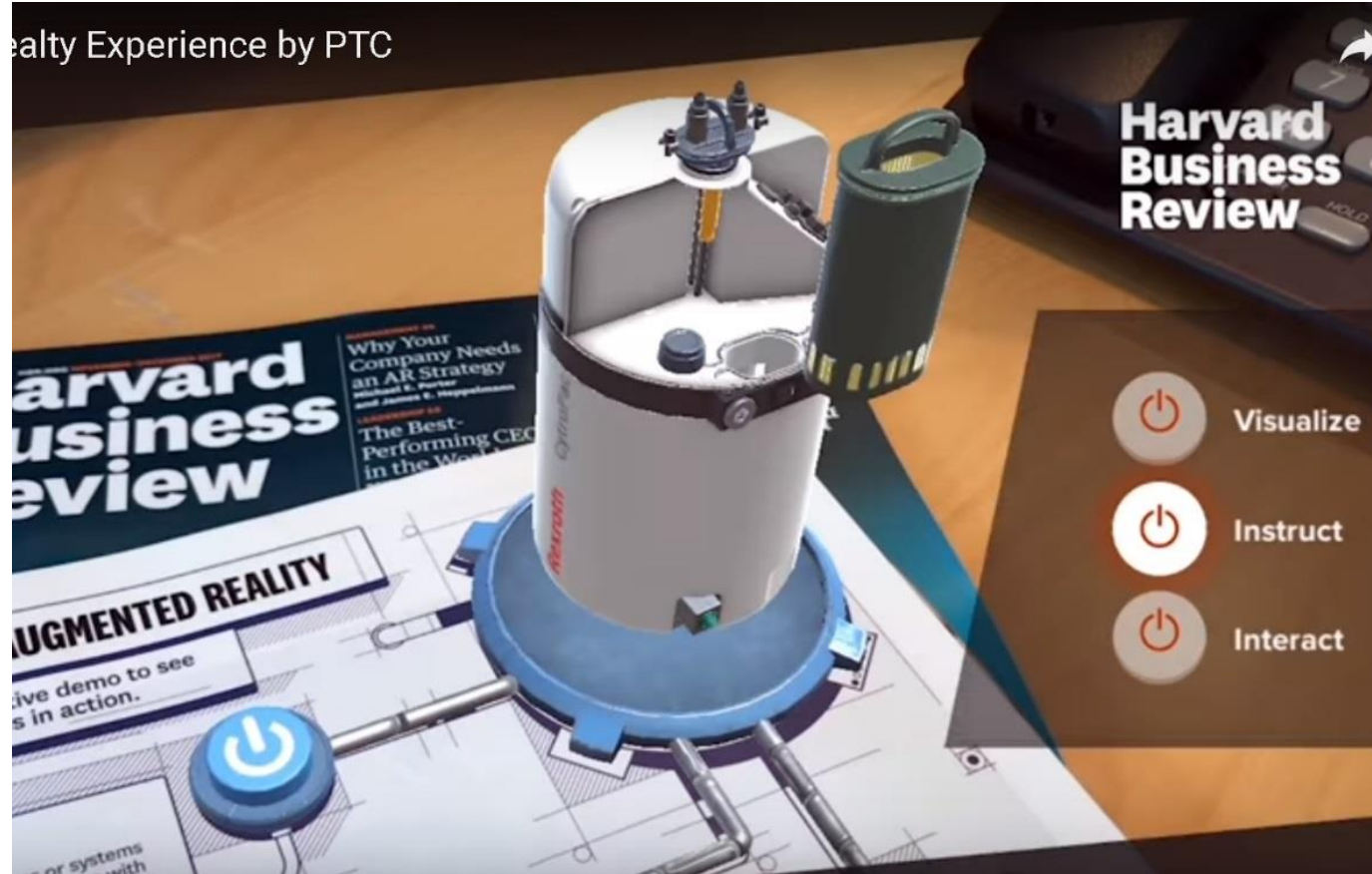
4 Digital Technology Platforms enable innovation exponentially faster with 1/10th cost

1 – INDUSTRIAL IOT & ANALYTICS



IT / OT convergence and real-time operational Intelligence drive 5 to 8% improvement in productivity

2 – AUGMENTED REALITY UNLEASHES A STEP-CHANGE IN WORKFORCE EFFICIENCY

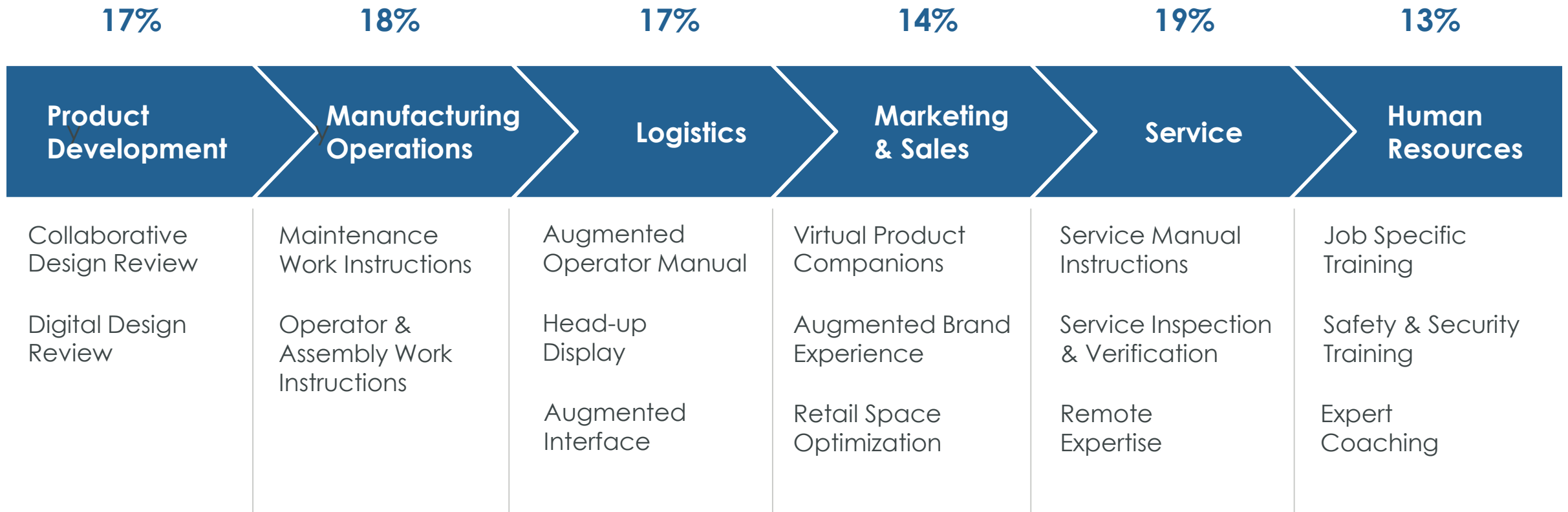


2 – AUGMENTED REALITY UNLEASHES A STEP-CHANGE IN WORKFORCE EFFICIENCY



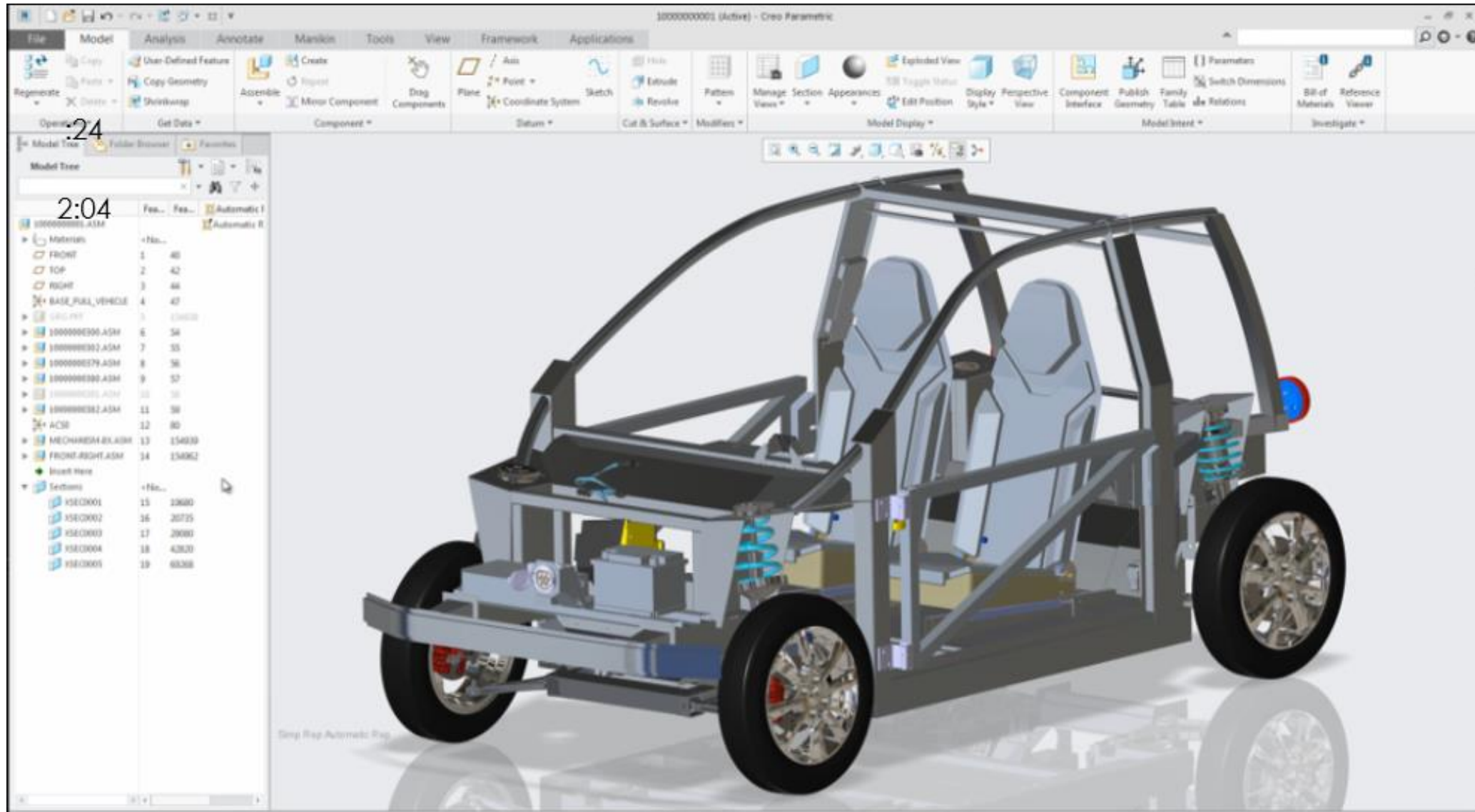
“PTC’s AR has allowed us to create better work instructions to deliver to our production floor within hours, at 1/10 the cost, enabling operator product assembly 30%-40% more efficiently.”

2 – AUGMENTED REALITY – INDUSTRIAL APPLICATIONS

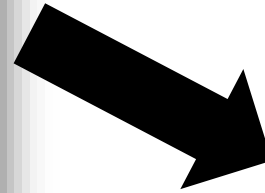
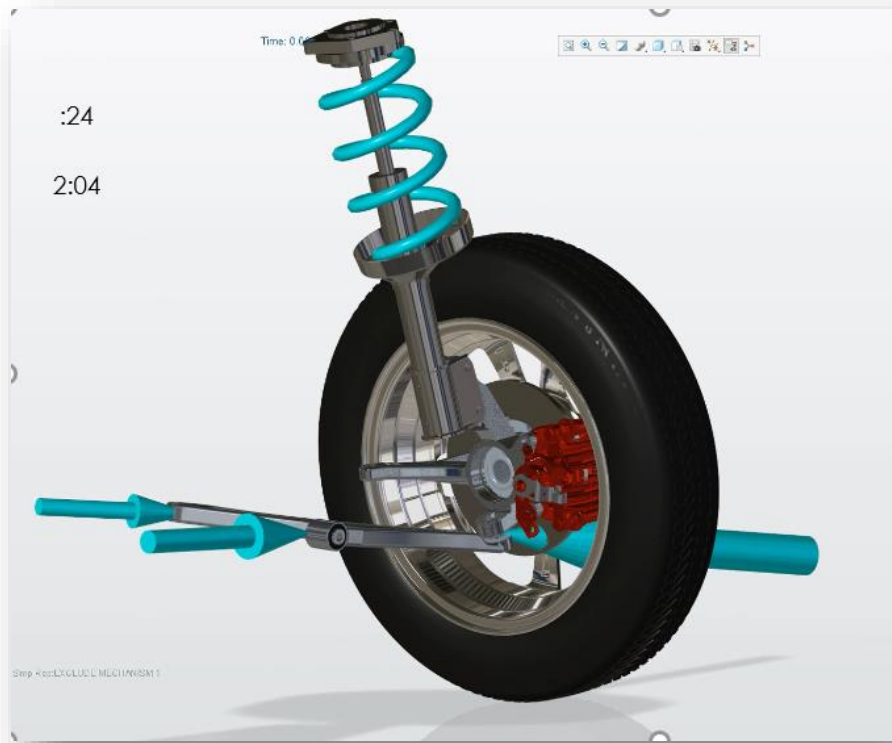


N = 107. Average of 2.3 functional areas chosen per respondent.

3 – IOT POWERS ADDITIVE MANUFACTURING AT



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e.GO



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)

Disparate equipment & data

Unique structures of data

Production sensitive networks

Rigid systems - costly to evolve

Rip and Replace Innovation



LOGISTICS



SUPPLIERS



ENVIRONMENTAL



IOT GATEWAY

MANUFACTURING IS GOING DIGITAL



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

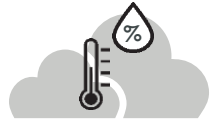
Break-Thru
Innovation



LOGISTICS



SUPPLIERS



ENVIRONMENTAL



IOT GATEWAY



PLANT & CORP.
MANAGEMENT



MAINTENANCE



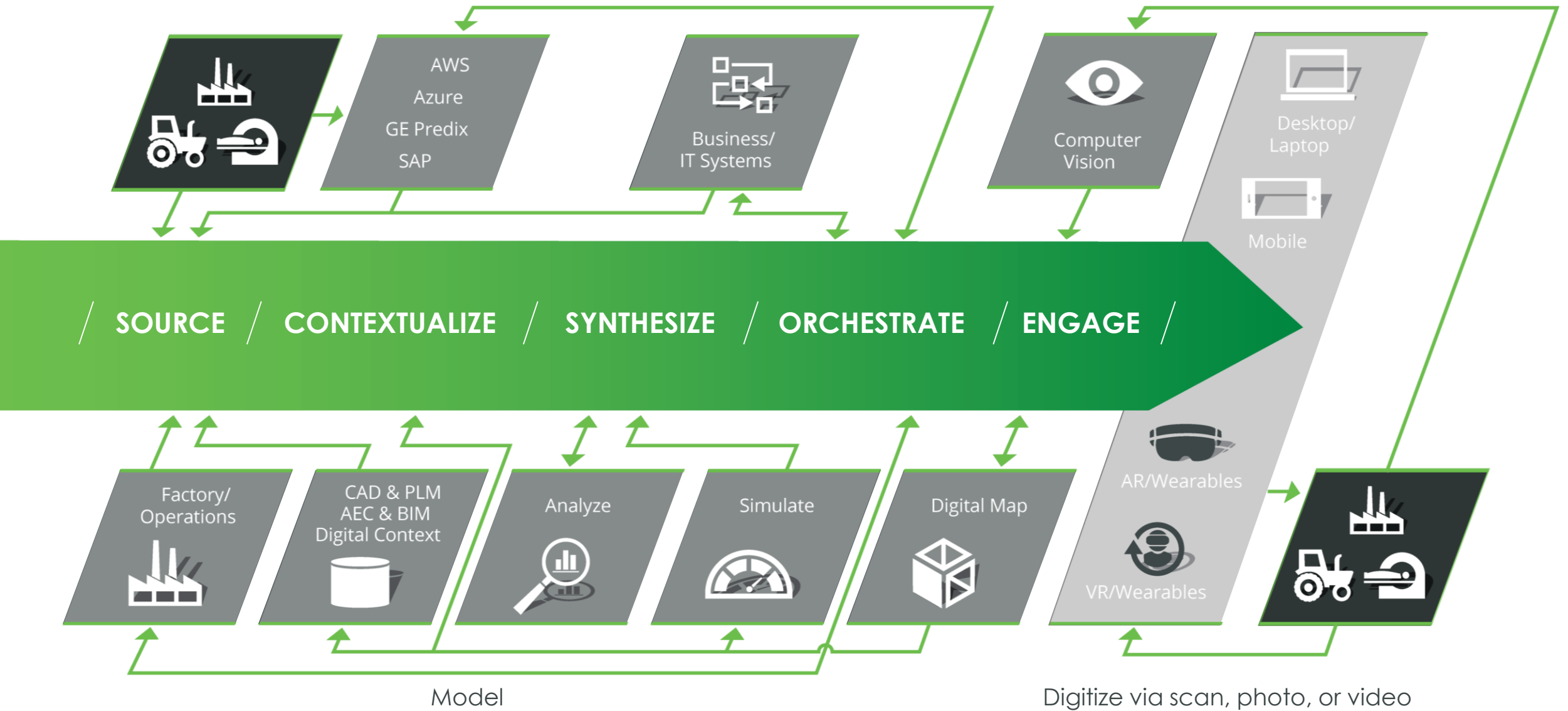
QUALITY



OPERATORS

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

4 – INDUSTRIAL INNOVATION PLATFORM CAPABILITIES




THINGWORX MANUFACTURING ACCELERATOR & APPS

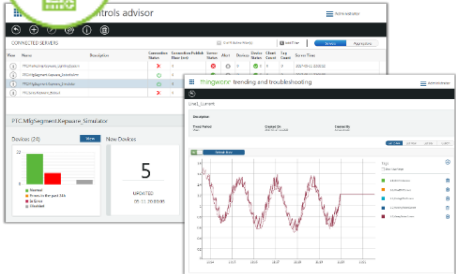


Jumpstart your digital manufacturing transformation journey


ThingWorx Controls Advisor



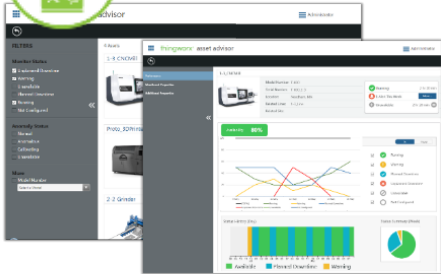
Controls Engineer




ThingWorx Asset Advisor




Maintenance




Partner apps




Reliability Group



Averna




elisa




Rockwell Automation


Customer apps




HIROTEC



DENSO



ELITE
AEROSPACE GROUP




NORTHROP GRUMMAN

THINGWORX
MFG
APPS

Integrations		ThingModels		Business Logic		Widgets	
MES	Quality	Job Order	Assets	KPIs	SPC	OEE	Trending
ERP	Smart Tools	Crew	Shift	Re-order	APM	Work instr.	Asset view

THINGWORX
MFG
ACCELERATOR



/ SOURCE / CONTEXTUALIZE / SYNTHESIZE / ORCHESTRATE / ENGAGE /

THINGWORX
PLATFORM

Contains forward looking information subject to change without notice

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UNIQUE PORTFOLIO TO ENABLE INDUSTRIAL INNOVATION



PARTNER SOLUTIONS	Microsoft	ANSYS	Capgemini	accenture	Hewlett Packard Enterprise
	Rockwell Automation	Deloitte Digital	McKinsey & Company	InVMA	vodafone
APPS & ACCELERATORS	thingworx [®] asset advisor				
	thingworx [®] navigate [™]		thingworx [®] production advisor		
INDUSTRIAL INNOVATION PLATFORM	thingworx [®]	kepware [®]	vuforia [™]		
PRODUCT LIFECYCLE MANAGEMENT	creo [®]	windchill [®]	integrity [™]	servigistics [®]	

CLOUD | HYBRID | ON-PREM

BETTER TOGETHER



Rockwell
Automation



ptc

“As IT and OT converge, there is a natural alignment between our companies. Together, we will offer the most comprehensive and flexible IoT offering in the industrial space.”

Blake Moret

Chairman and CEO
Rockwell Automation

“Leveraging Rockwell’s industry-leading industrial control and software technology, strong brand, and domain expertise with PTC’s award-winning technology enables industrial enterprises to capitalize on the promise of the industrial IoT and Augmented Reality.”

Jim Heppelmann

President and CEO
PTC

ACCELERATING DIGITAL TRANSFORMATION

Aligning our respective strategies and solutions for
“Smart, Connected Operations” & **“The Connected Enterprise”**
to more rapidly deliver value for industrial
customers.

Proven Industrial
Solutions & Expertise –
Unmatched by Anyone

Rapidly Deliver
Digital Transformation

Empower Workers
through Industry-
Leading Technology

Quickly Deliver
End-to-End Industrial
IoT & Augmented
Reality Apps

JOINING FORCES TO ACCELERATE YOUR DIGITAL TRANSFORMATION

Faster Time to Market

**Operational
Productivity**

Asset Management

**Enterprise Risk
Management**



- Drive Supply Chain Efficiency
- Simplify Design Process
- Support New Lines of Business



- Increase Uptime
- Provide Predictable Operating Costs
- Improve Quality
- Reduce Operating Capital
- Enable Flexibility and Agility



- Support Preventative Maintenance
- Improve Reliability
- Reduce Mean Time To Repair
- Manage Parts
- Deliver Service
- Monitor Remotely



- Facilitate Compliance
- Improve Safety

INDUSTRY AND TECHNOLOGY ALIGNMENT: RECIPE FOR INDUSTRIAL IOT SUCCESS



Perfectly Aligned
Focus

Complementary
Expertise

Complementary
Segments

Complementary
Products



Smart Connected Operations



Tech Expertise

+

Rockwell
Automation

Connected Enterprise Operations



Domain Expertise



Brand Recognition

Industrial

Retail

Med Device

Automotive

CPG

Pharma /
Chem

Materials

Aerospace
& Defense

Electronic &
High Tech

Machine
Builder

Mining

Oil & Gas



creo®



windchill®



vuforia®



kepware®



thingworx®

FactoryTalk®



Allen-Bradley

CAD

PLM

Augmented
Reality

Connectivity

IoT

Analytics

Industry-specific
MES

Automation

Industrial
Control, Sensors
& Networking



InnovationSuite

powered by PTC



Built for Industrial Innovation

Quickly Deploy Industrial Apps

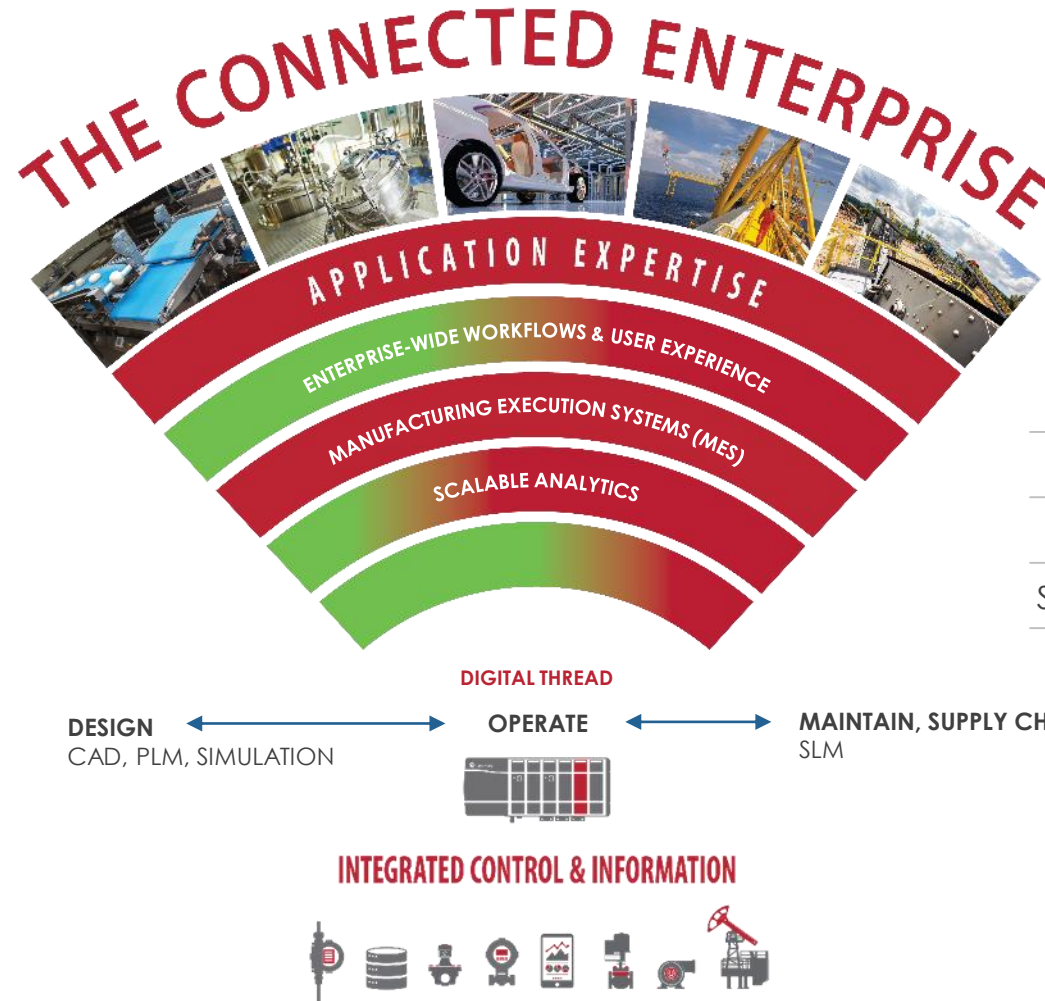
Augmented Reality Experience

Agile and Flexible

Wrap and Extend Existing

Technology

Expansive Ecosystem



Rockwell Automation

IIoT Installed Base

Industry Application Expertise

Customer Innovation Process

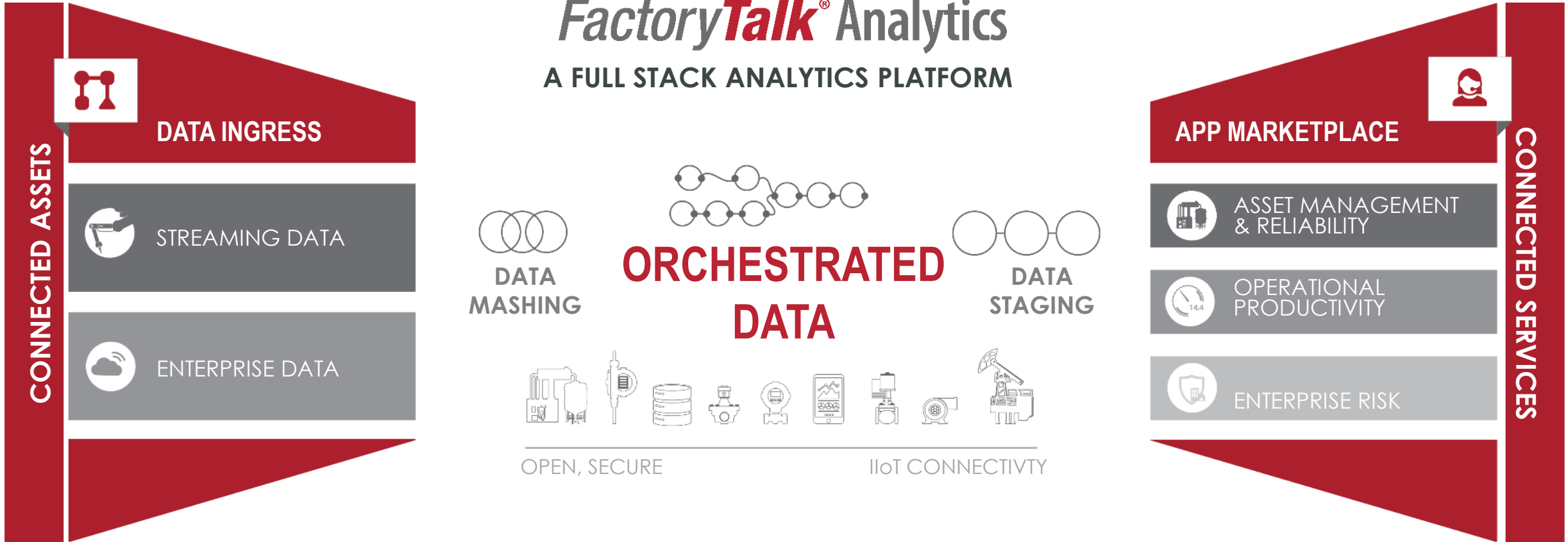
Scalable from Cloud – Edge – Device

Understanding of Real Time Data

Our combined capabilities create the most comprehensive, flexible industrial information platform in the market

FactoryTalk® Analytics

A FULL STACK ANALYTICS PLATFORM

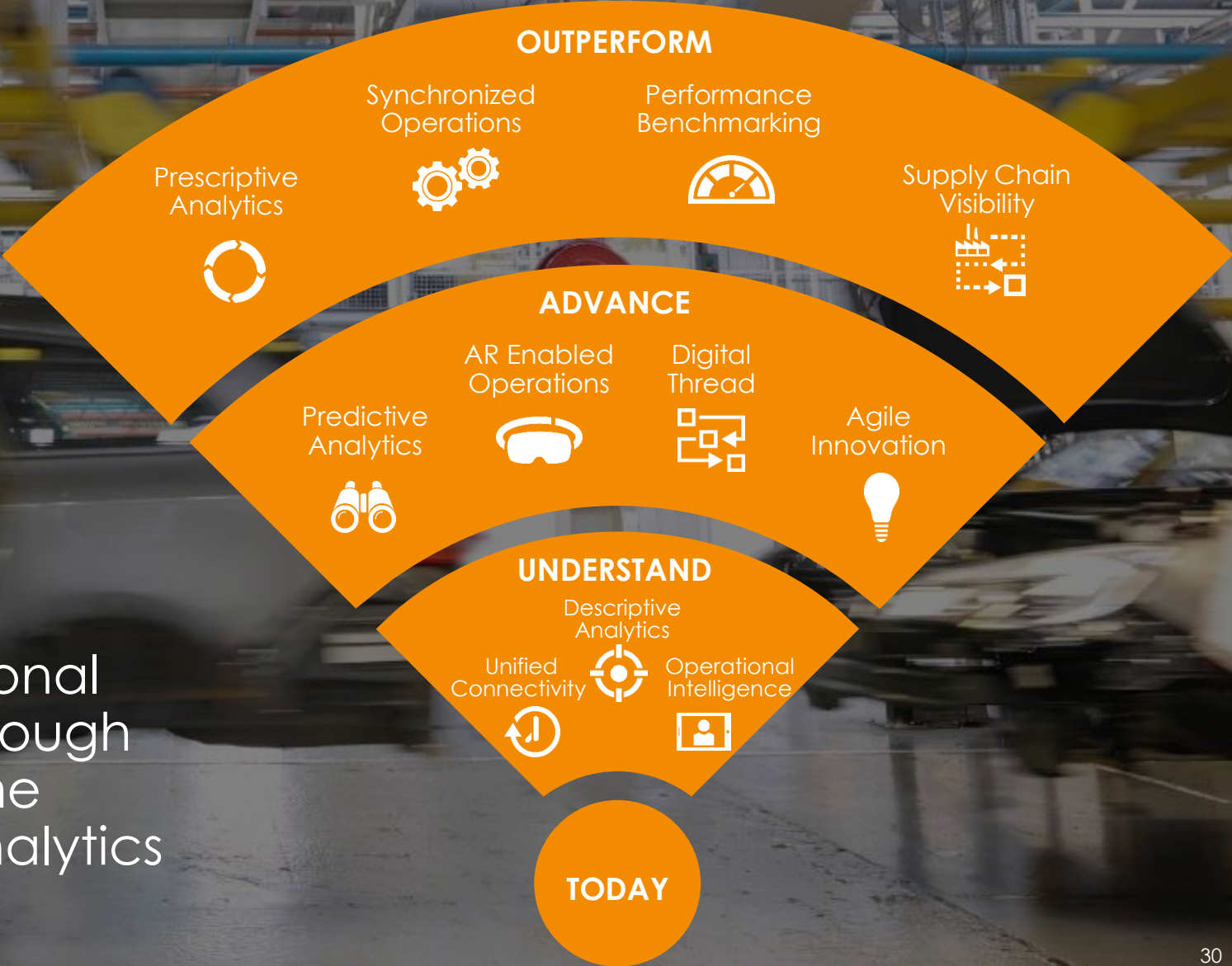


Edge
FactoryTalk® Analytics

DataFlowML
FactoryTalk® Analytics

DataView
FactoryTalk® Analytics

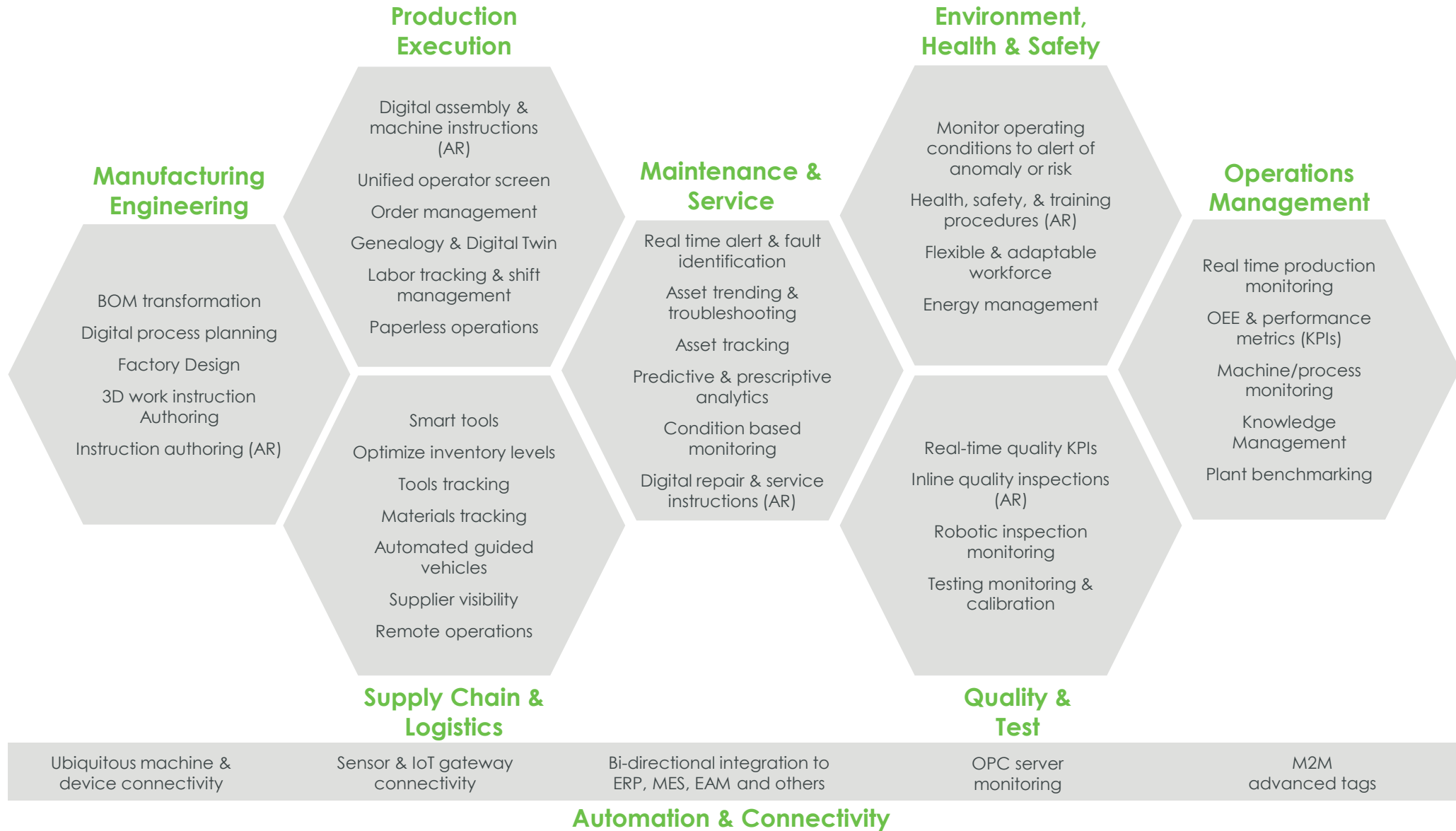
Continuously improve operational performance and flexibility through digital manufacturing, real-time intelligence and predictive analytics



THINGWORX DELIVERS VALUE FOR ALL MFG FUNCTIONS



SELECT IIOT MANUFACTURING USE CASES



ACCELERATE YOUR TRANSFORMATION



ThingWorx Platform

INDUSTRIAL CONNECTIVITY

FOUNDATION

ANALYTICS

AUGMENTED REALITY

ACCELERATOR & APPS

THINGWORX NAVIGATE

THINGWORX CONTROLS ADVISOR APP

THINGWORX ASSET ADVISOR APP

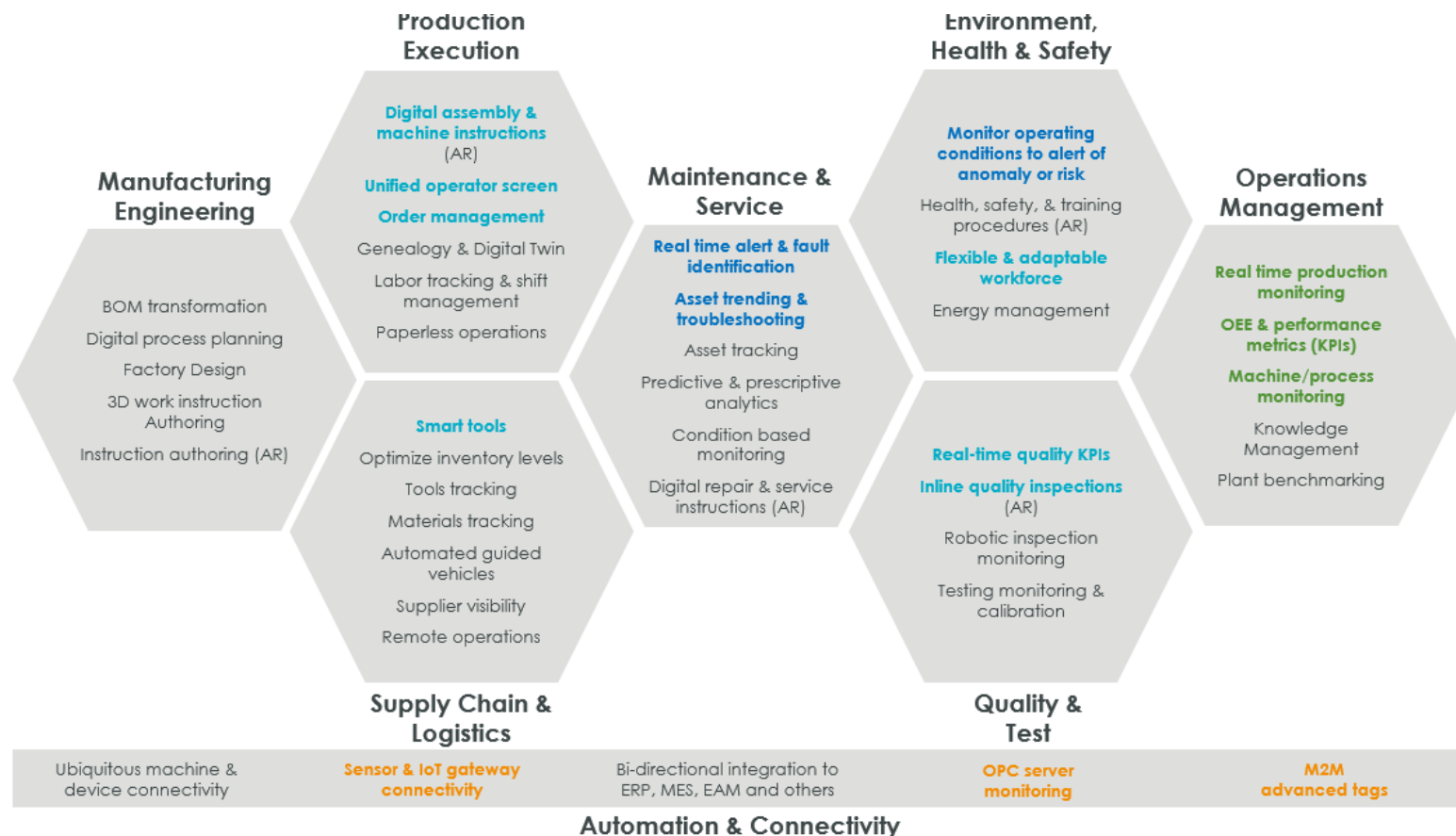
PRODUCTION KPI ACCELERATOR

OPERATOR SCREEN ACCELERATOR

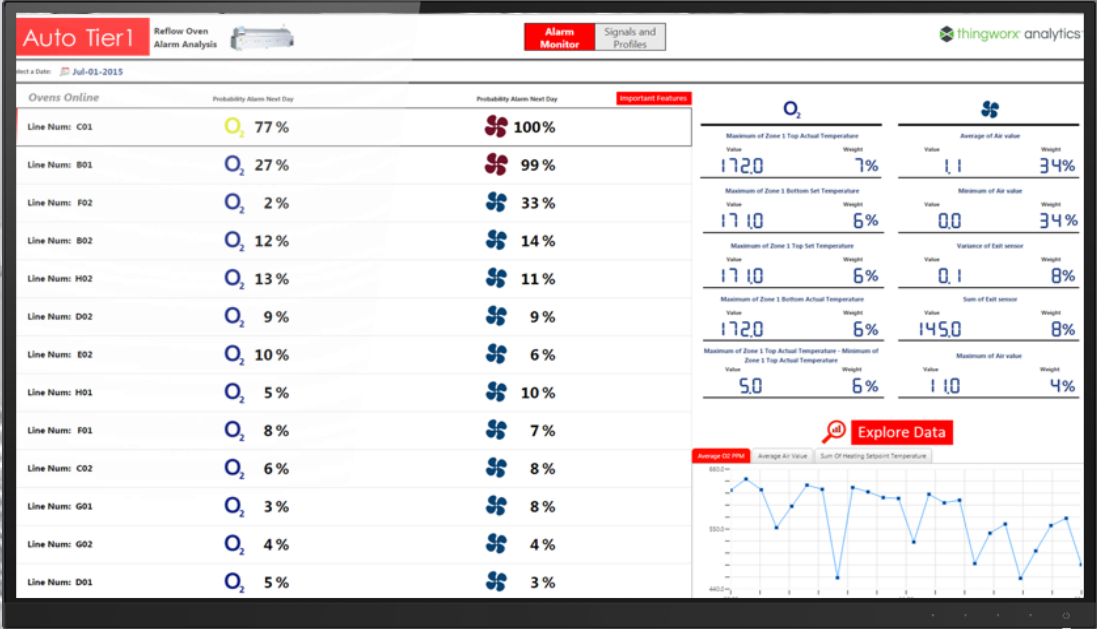
(Beta June 2018)

ThingWorx Developer Zone

ThingWorx Marketplace



QUICKLY & EASILY DEVELOP, DEPLOY & EXTEND
TO DELIVER UNMATCHED TIME-TO-VALUE !



IoT WITH ANALYTICS REDUCE DOWNTIME:
Predicting alarms 24 hours in advance, with a 91% accuracy



“X-Factory has been a great opportunity and a wonderful learning experience for HIROTEC, and I thank PTC for inviting us to partner with them.”

– Katsu Uno
HIROTEC AMERICA
Chairman and CEO

HIROTEC AMERICA IMPLEMENTS IoT: Enabling Timely Data Driven Decisions – Rapid Time to Value with 6 week IoT sprints

- ✓ **Higher operational performance leads to higher value**

“Approximately one trillion dollars in company value is lost every year to suboptimal operating performance.”

– Emerson

- ✓ **Massive global market growth rate**

“The global size of industrial internet of things (IIoT) market was valued at approximately USD 145.81 Billion in 2017 and is expected to reach approximately USD 232.15 Billion by 2023, growing at a CAGR of around 8.06% between 2018 and 2023..”

– Zion Market Research

- ✓ **Arguably the biggest driver of productivity and growth in the next decade**

“The Industrial Internet of Things (IIoT) could add \$14.2 trillion to the global economy by 2030.”

- Accenture





ptc