Reliability 4.0: Where You Should Be in 2021 and Beyond

Delivered by Maura Abad and Terrence O'Hanlon


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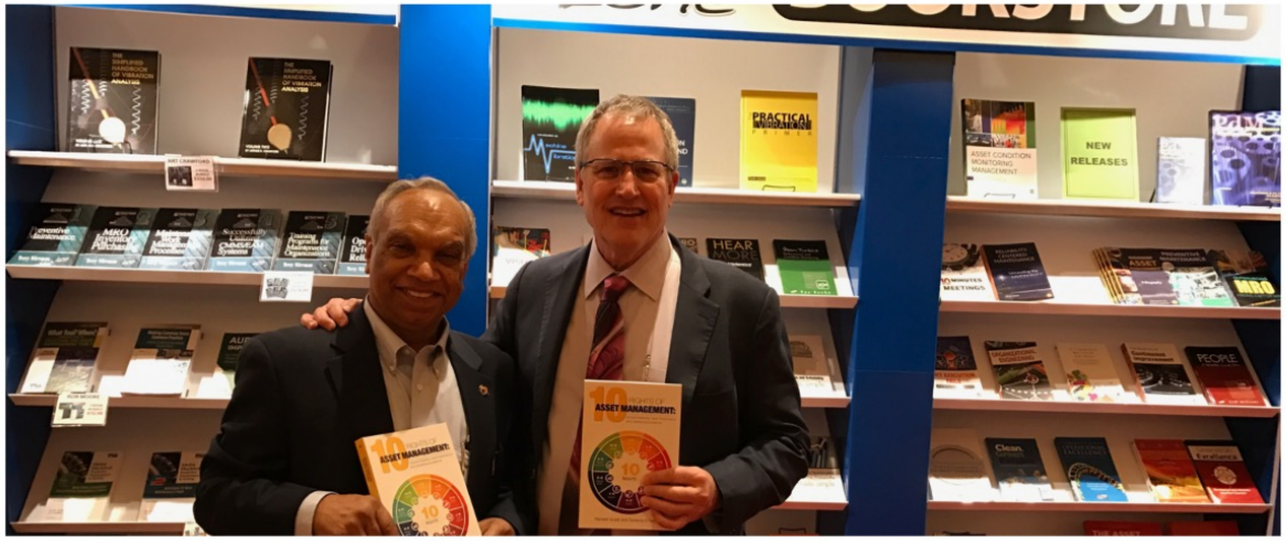
Terrence O'Hanlon, CEO and Publisher of Reliabilityweb.com and Uptime Magazine 150 feet below London at the Crossrail UK Paddington Station site

- ✓ Publisher Uptime Magazine
- ✓ Executive Director, Reliability Leadership Foundation
- ✓ Executive Director, Association of Asset Management Professionals
- ✓ Co-Author 10 Rights of Asset Management
- ✓ Creator: Uptime Elements Reliability Framework and Asset Management System
- ✓ Recipient 1st CRL Black Belt and 1st Veteran CMRP of the Year Award
- ✓ Voting member ISO55000 Asset Management TC251 and ISO TC56 Dependability Advisory Group, Asset Management expert ISO WG39
- ✓ Chairman: Infrastructure Asset Performance Summit
- ✓ Executive Producer IMC, MaximoWorld, The RELIABILITY Conference, Maintenance 4.0
- ✓ Judging Panel Uptime Awards, Year In Infrastructure Awards and Emerson Reliability Program of the Year
- ✓ Co-Founder: IAM USA and 1st US Asset Management Certificate holder
- ✓ I am *excited and enthusiastic* about the people who are seeking to advance Reliability and Asset Management

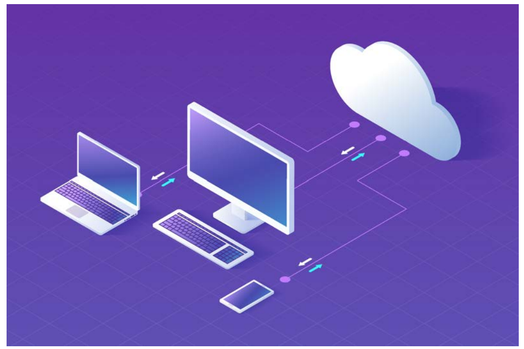


10 Rights of Asset Management

ISBN: 9781941872659

The Four Opportunity Sets That Create Reliability 4.0

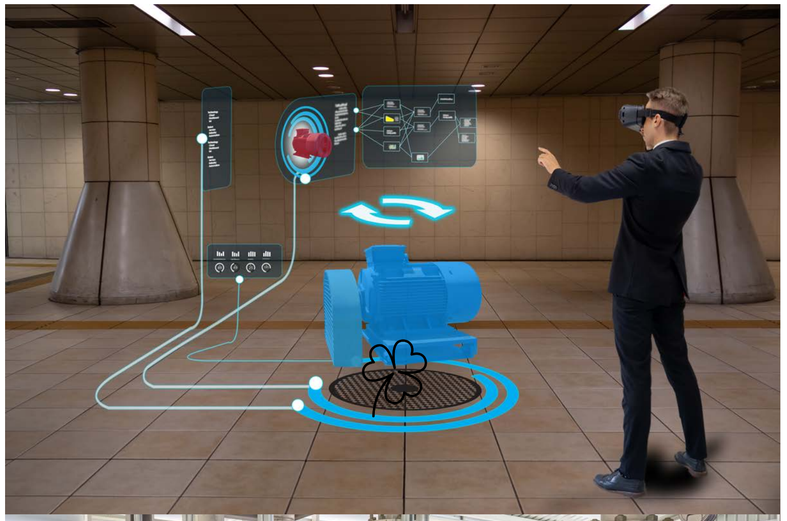
CLOUD AND EDGE



INTERNET OF THINGS [IOT]

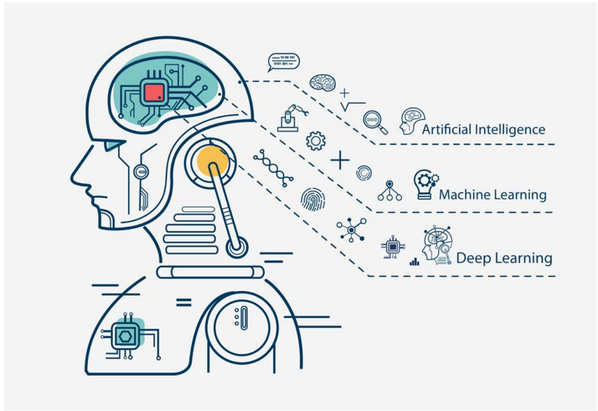
Note: People, Assets, Processes and Data are Things

The Road Leads to Digital Twins

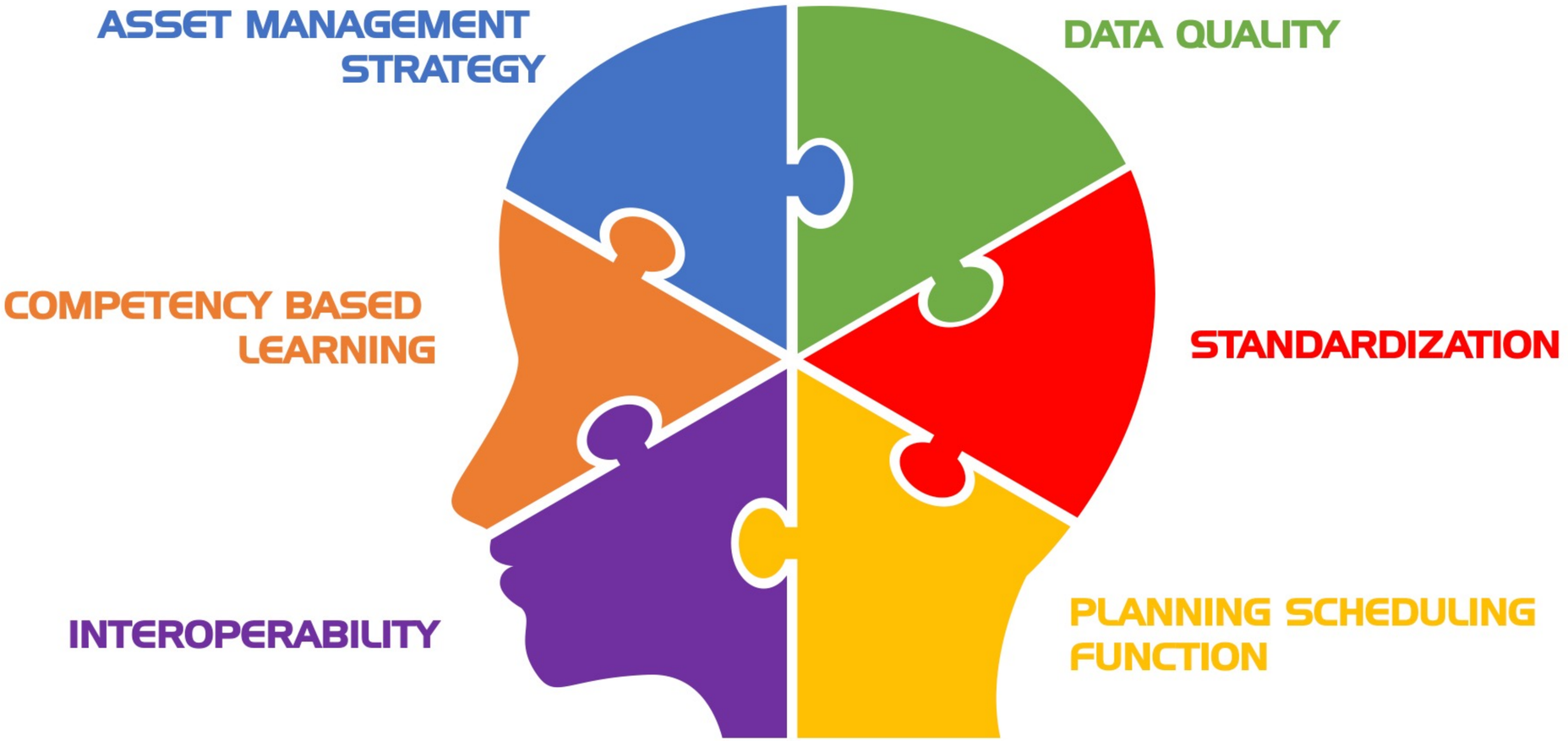


CONNECTED TO DATA EVERYWHERE

AI/MACHINE LEARNING



Top Challenges for Asset Knowledge

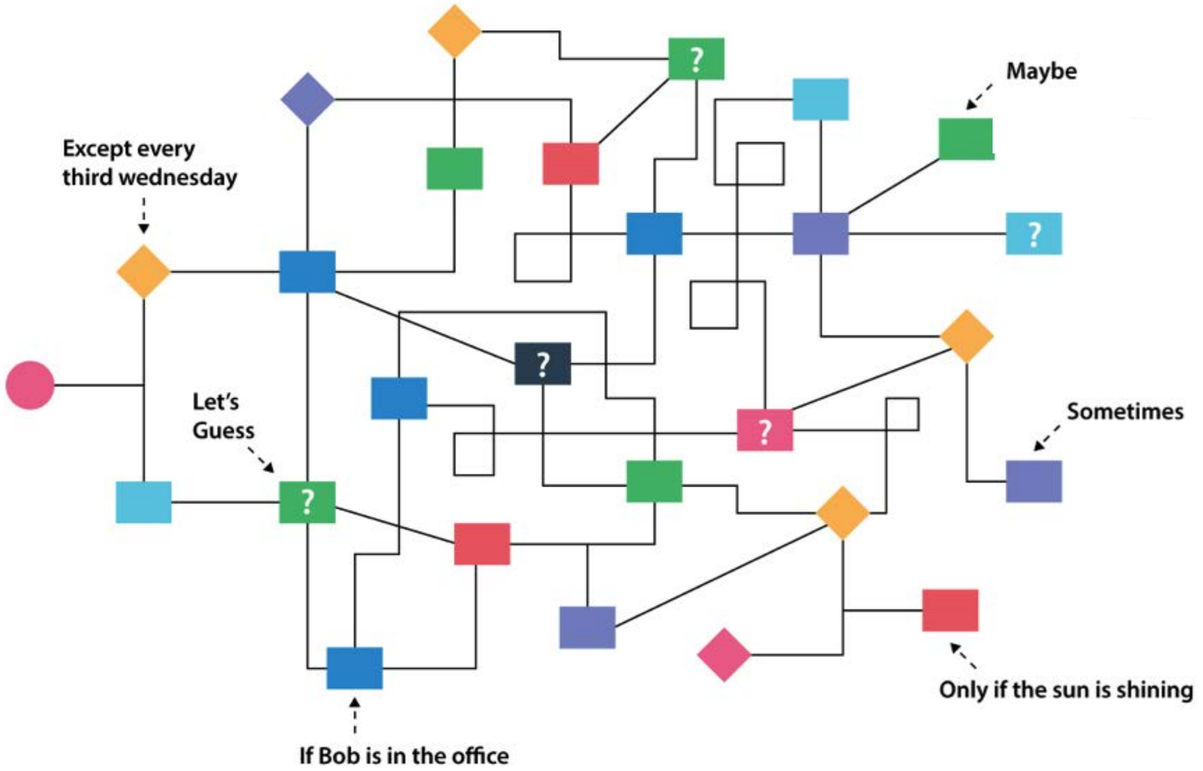


Source: Reliabilityweb.com EAM/CMMS/APM Practices Research 2021

Digitally it's all interconnected

Reliability 4.0 starts with acknowledging that there is a problem

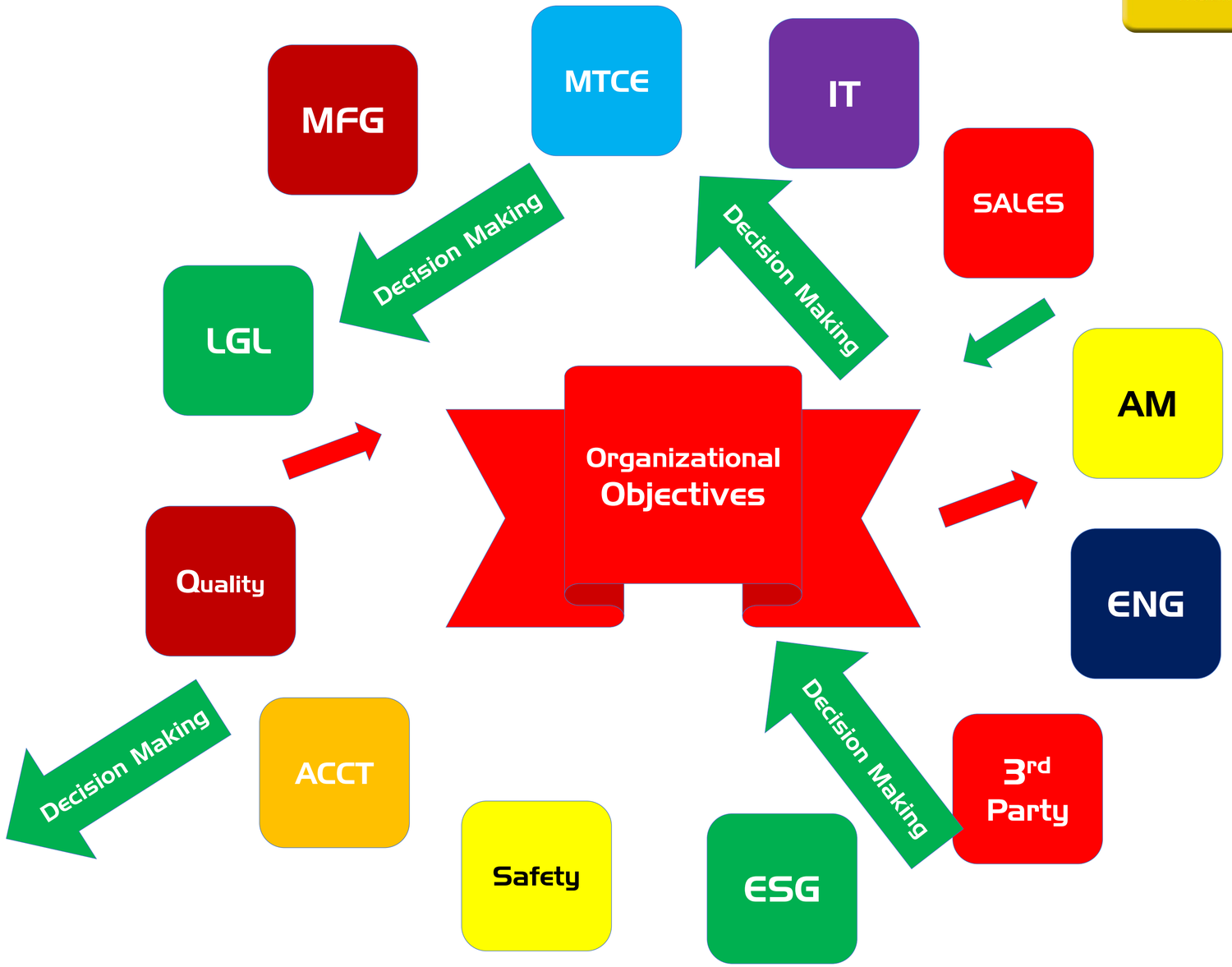
The problem is that we don't operate on real-time data and information insights



Misaligned Decisions

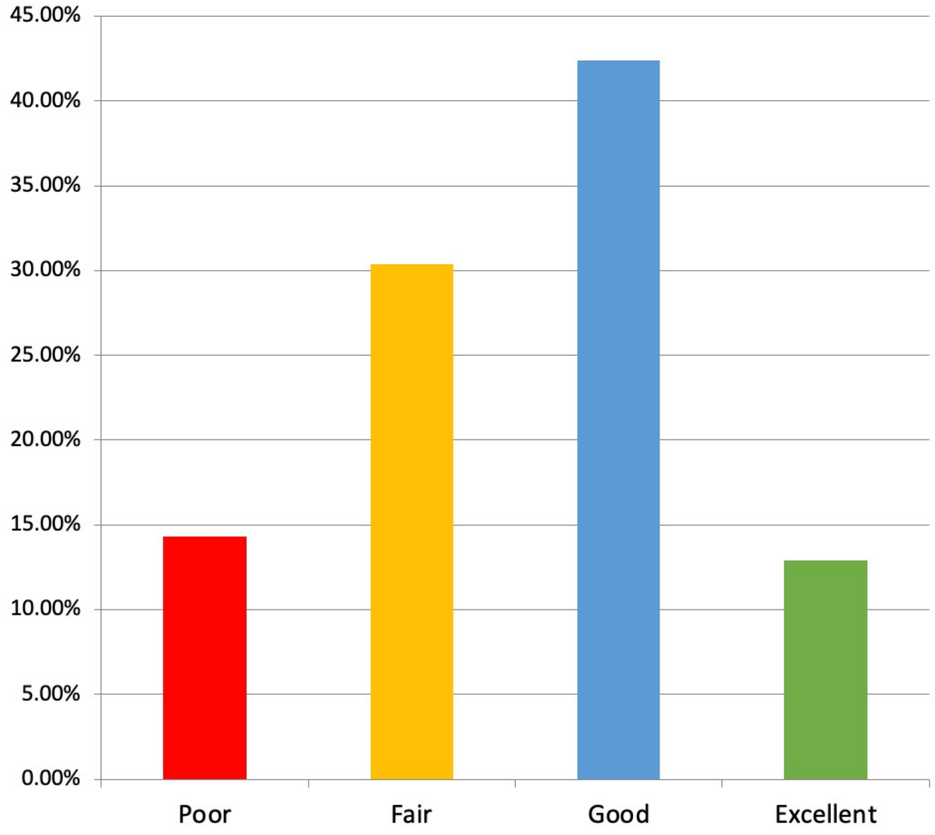
Dm decision making

Your team is most likely **NOT** making their decisions based on insight from real-time data and information from the other stakeholders, stacks, functions and sources



Satisfaction Level with the ability of CMMS/EAM to support maintenance process

- ✓ Only around 13% of the respondent classified their satisfaction with CMMS/EAM as 'Excellent'.
- ✓ Over 42% of respondent termed their satisfaction level as 'Good'.
- ✓ More than 30% of respondents are barely satisfied with their CMMS/EAM while more than 14% classify it as 'poor'.



Source: Reliabilityweb.com EAM/CMMS/APM Practices Research 2021

It Is Not Rocket Science

The Process:

1. Combine engineering data, reality data, and IoT data
2. Create an immersive experience in 3D / 4D
3. Gain a deeper understanding of infrastructure assets

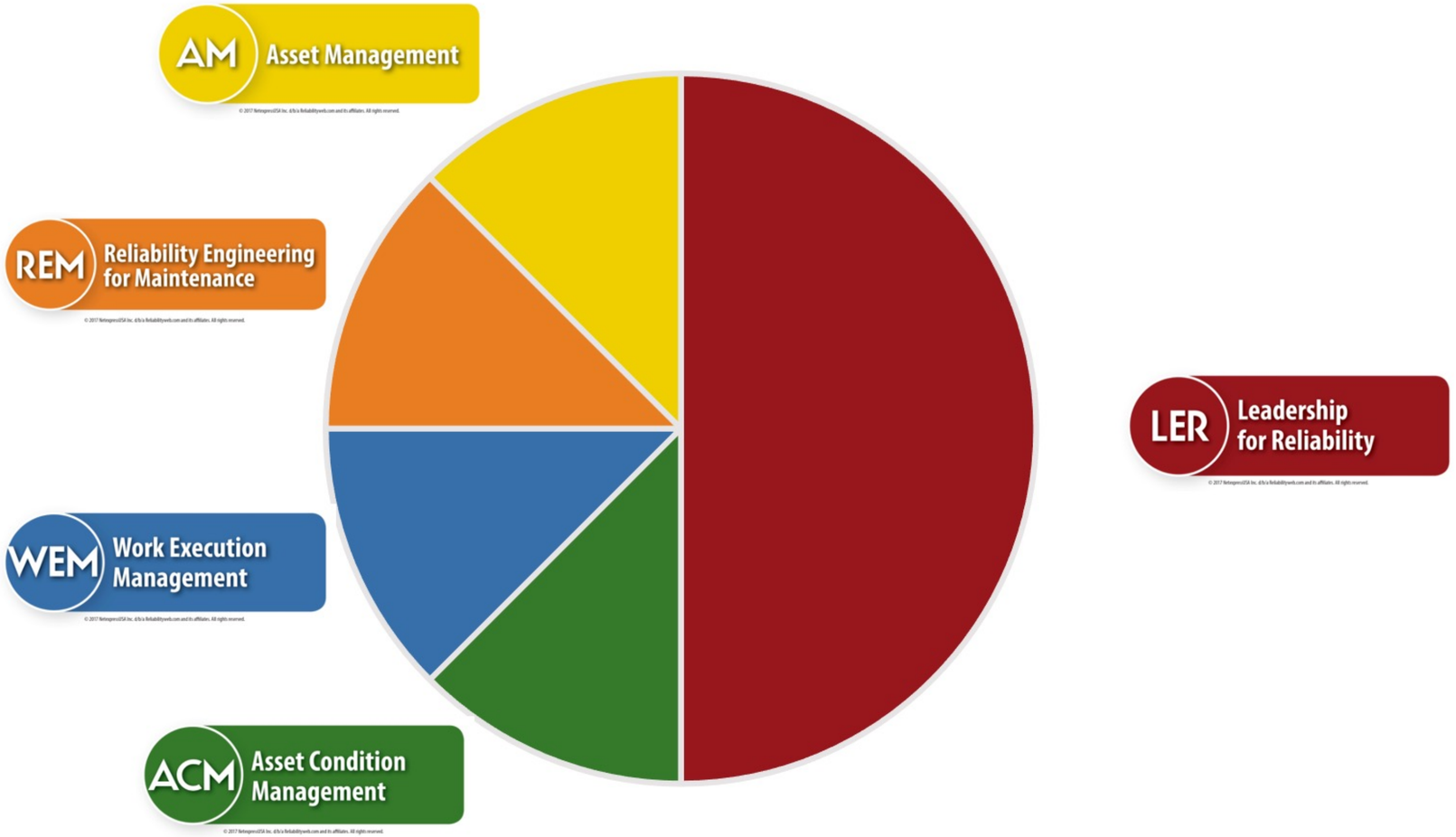
Source: Bentley Systems

What I Thought Would Make Our Assets Perform

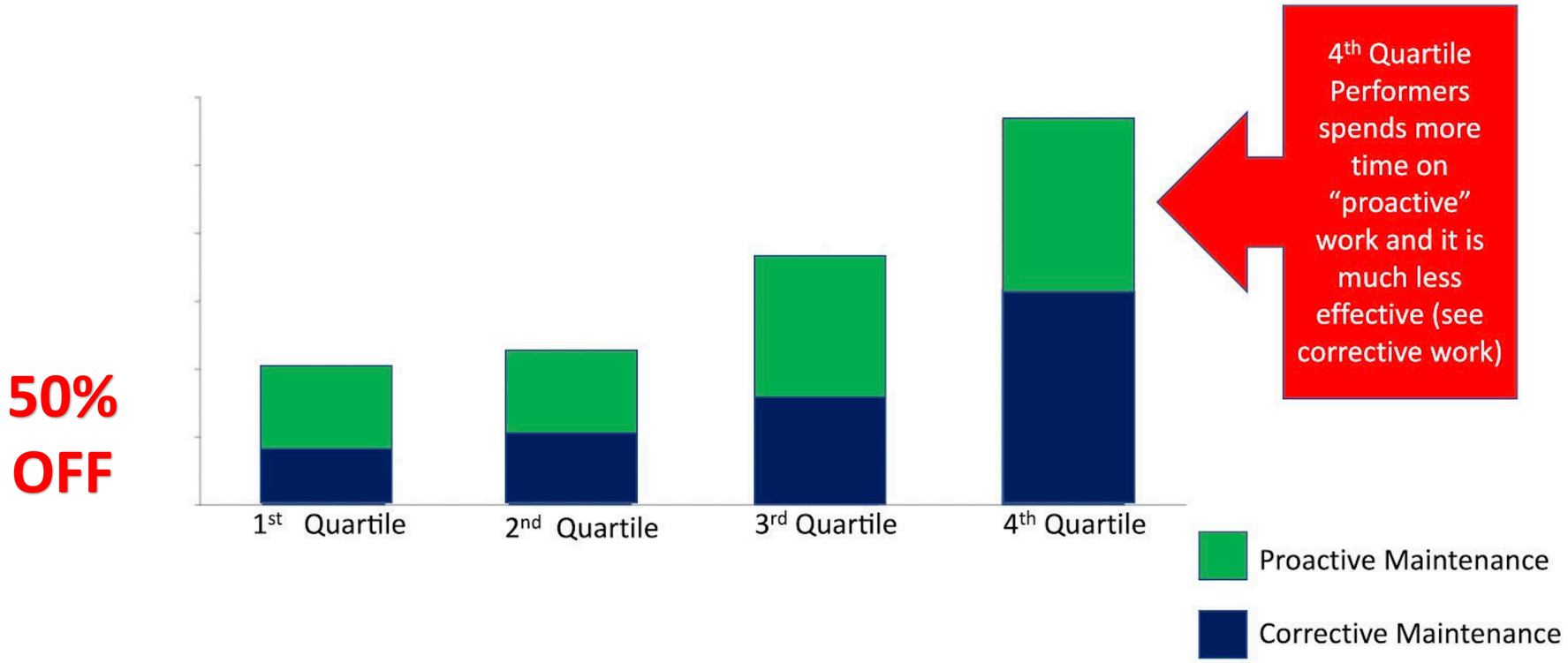
We Only See What We Already Believe

What Really Made Our Assets Perform

A Context of Reliability Leadership Makes The Difference



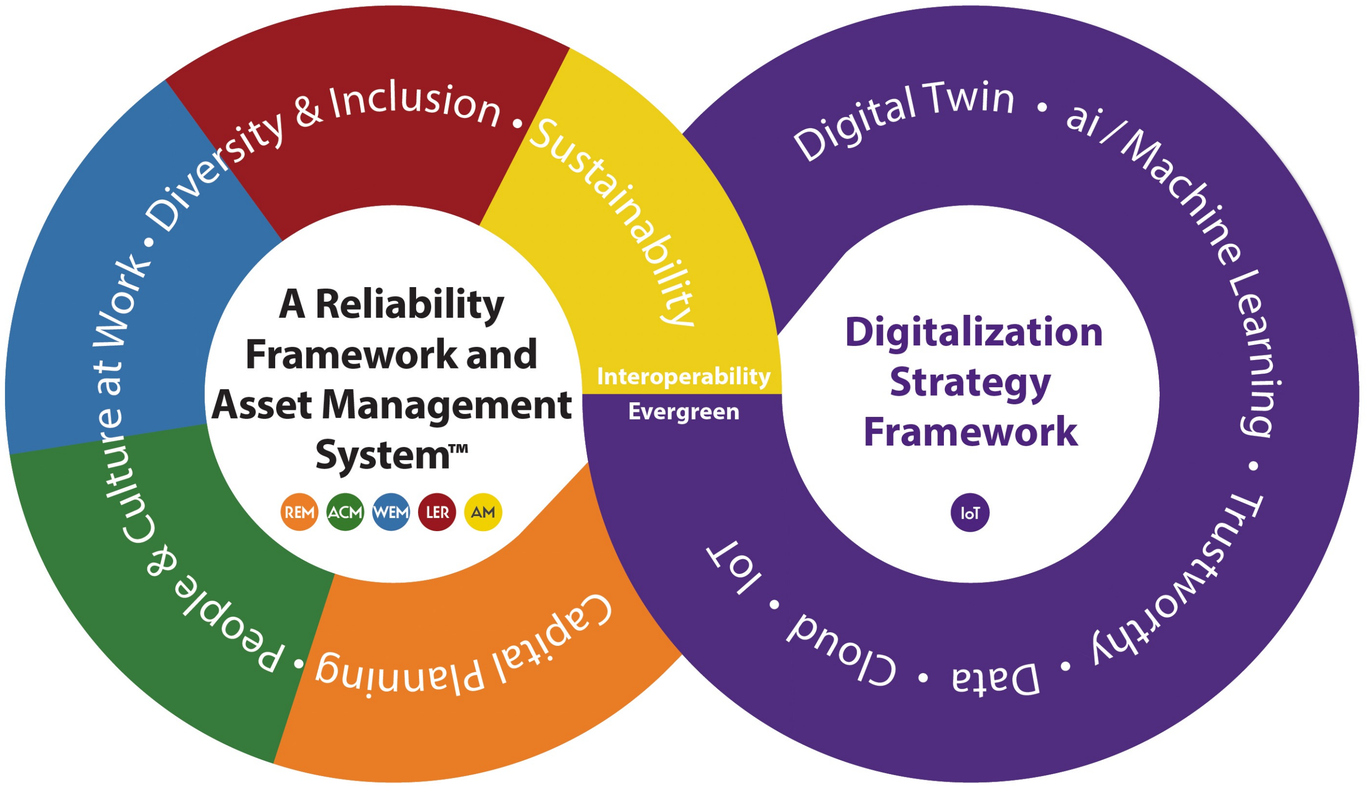
1st Quartile Performers Spend Half The Hours With Better Results



50% OFF

Data Sources: Reliabilityweb Research, Allied Reliability Group, Solomon Associates, Electric Power Research Institute [EPRI]

Uptime® Elements

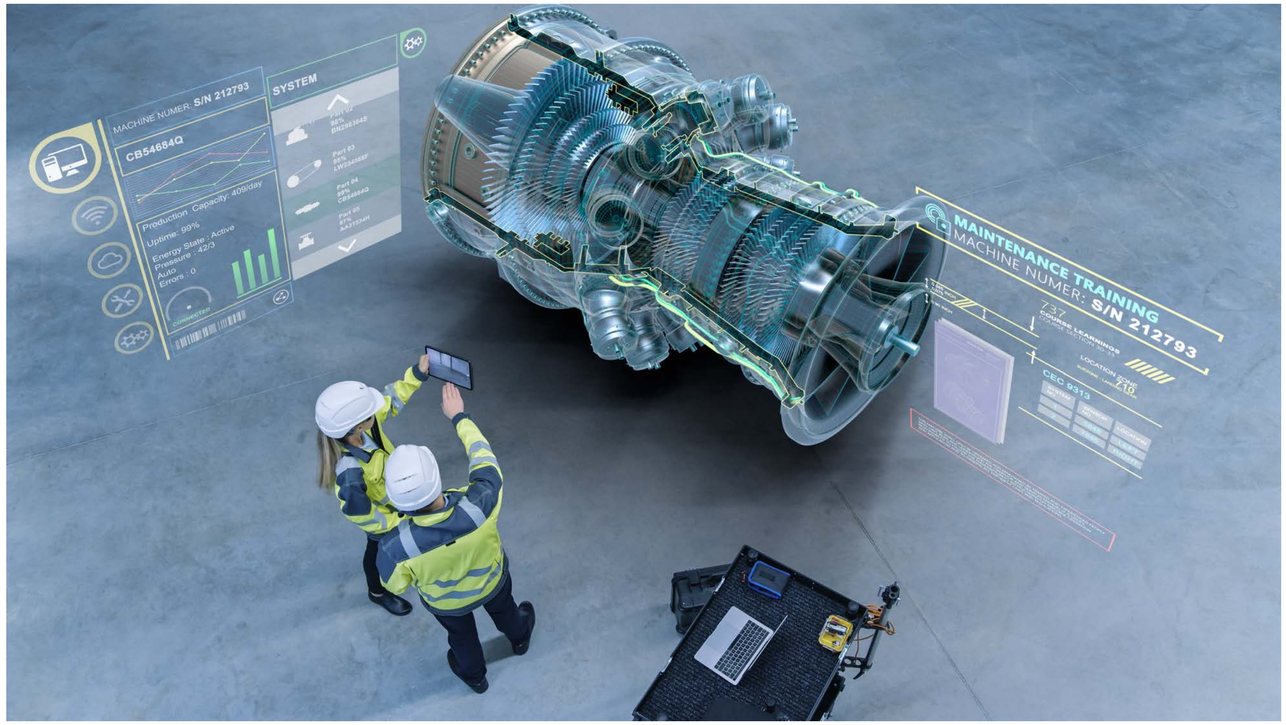


Reliability Leaders want to be connected

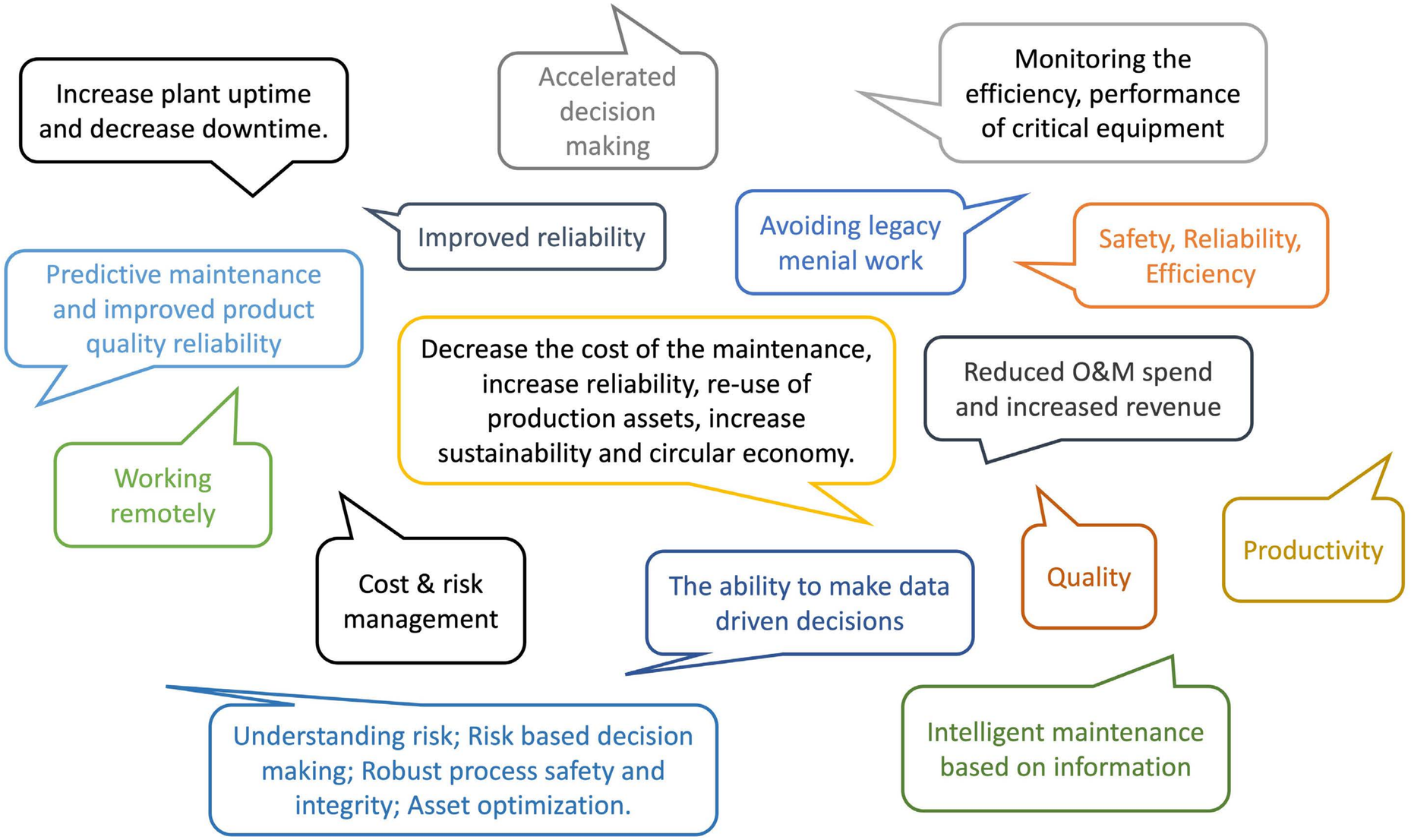
What are we connecting with Reliability 4.0?

- ✓ The **People and their Managers**
- ✓ The **Processes**
- ✓ The **Intelligence**
  [the smart stuff on plant floor]
- ✓ The **Data** and **Analysis**

Connected and integrated **[plays well together]** so one can create and layer on previous Reliability 4.0 work

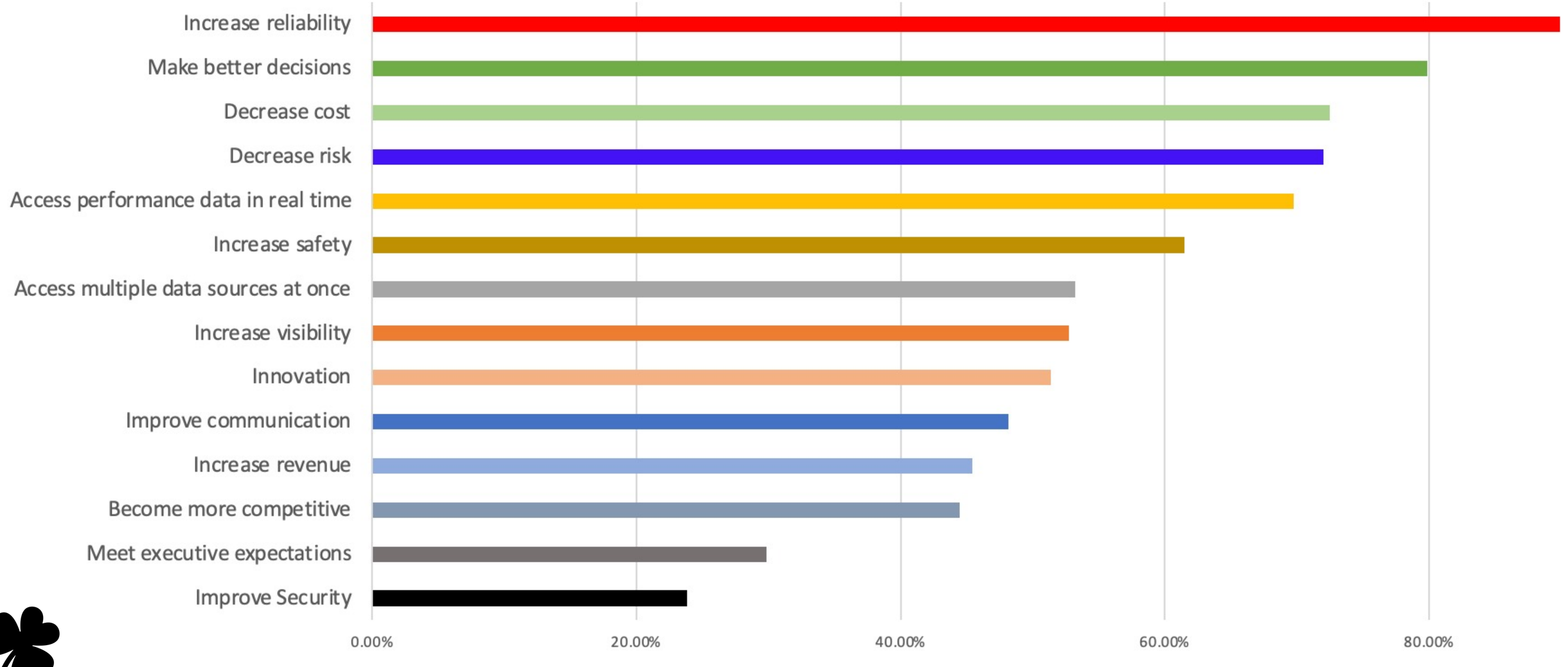


What is the most significant benefit of Reliability 4.0?



Source: Digitalization: Digital Twins, Artificial Intelligence, Machine Learning and the Internet of Things Study 2021 by Reliabilityweb.com

Why Reliability 4.0?

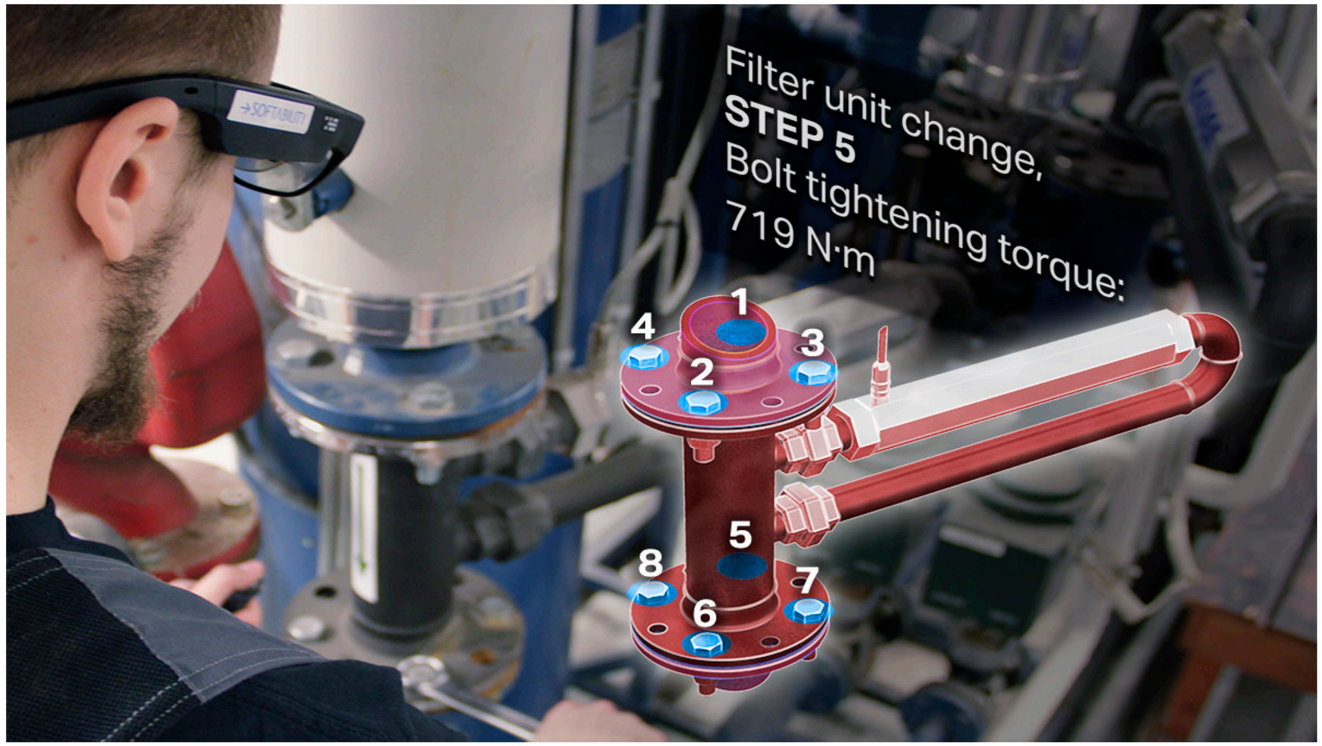


#1 Interest For Reliability 4.0

What specific application for Reliability 4.0 interests you most?

#1 Digital Twin

- **Digital Twin** is a virtual representation of real-world entities and processes, **synchronized** at a specified frequency and fidelity



Data Source: Digitalization: Digital Twins, Artificial Intelligence, Machine Learning and the Internet of Things Study 2021 by Reliabilityweb.com

Definition Source: Reliability Leadership Foundation Digitalization Consortium Glossary [Draft 2021]

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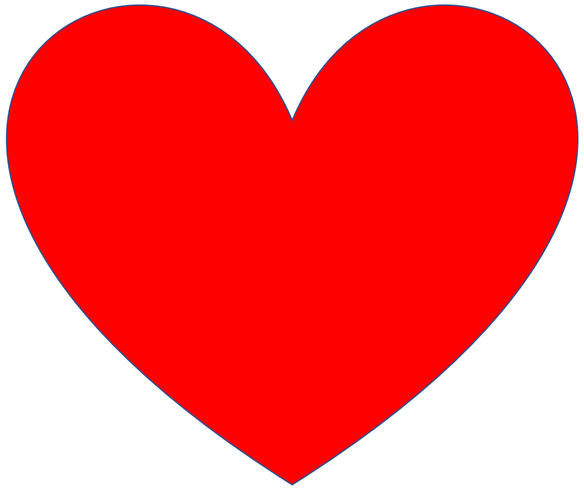
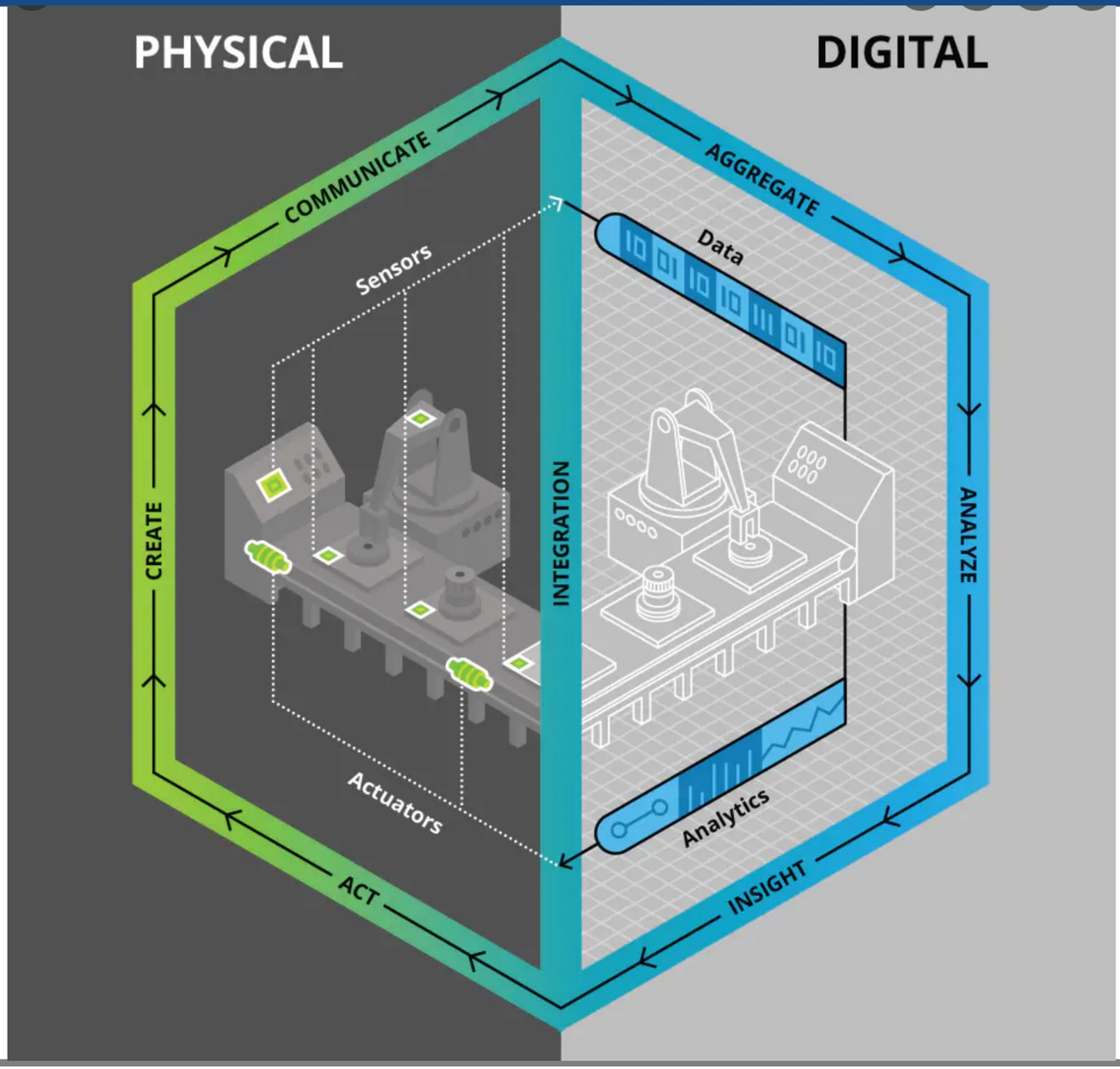
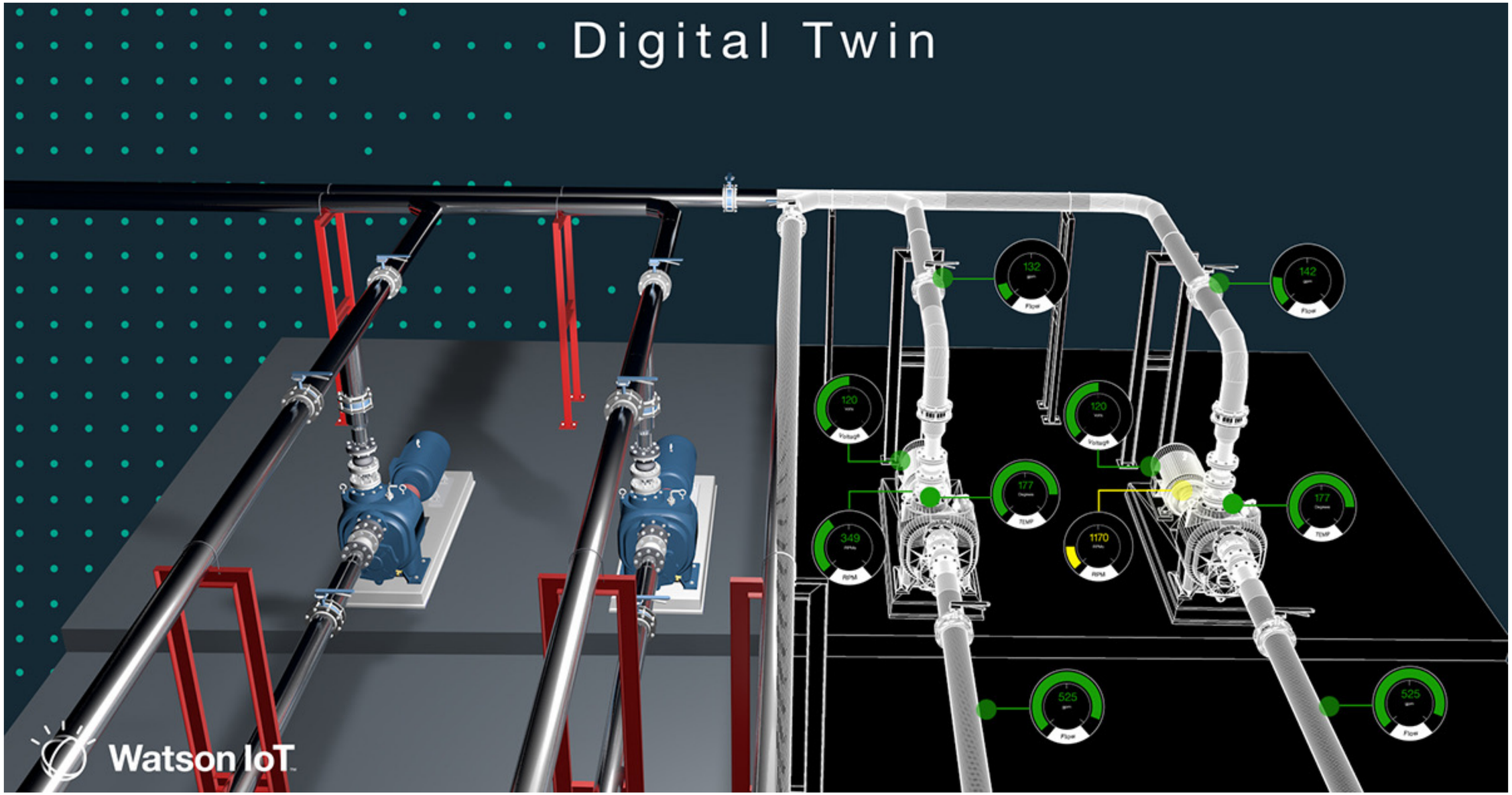
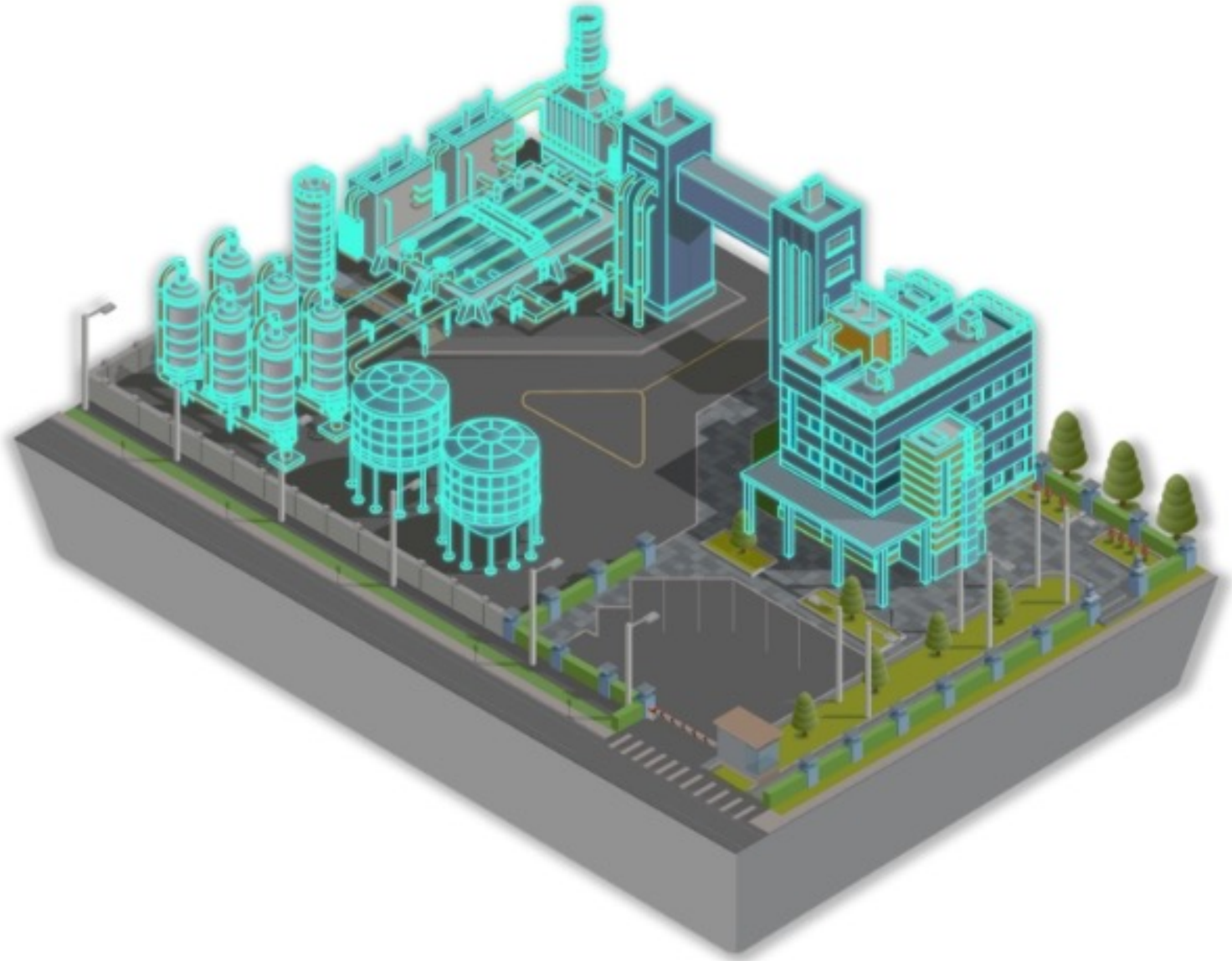
I  Digital Twins



Digital Twins in Operations



Digital Twins in Operations



#2 Interest is Connected Asset Condition Management

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IoT Internet of Things Digitalization

ACM Asset Condition Management

Co connect

Sc source

Co connect

Motor/Pump

- ✓ Vibration
- ✓ Temperature
- ✓ Flow
- ✓ Voltage
- ✓ Current
- ✓ Other data

Model of Motor/Pump (Digital Twin)

Cl collect

Cl collect

Comparison

Imminent failure detected?

An analyze

NO

Healthy Asset

YES

An analyze

Machine Learning

Do do

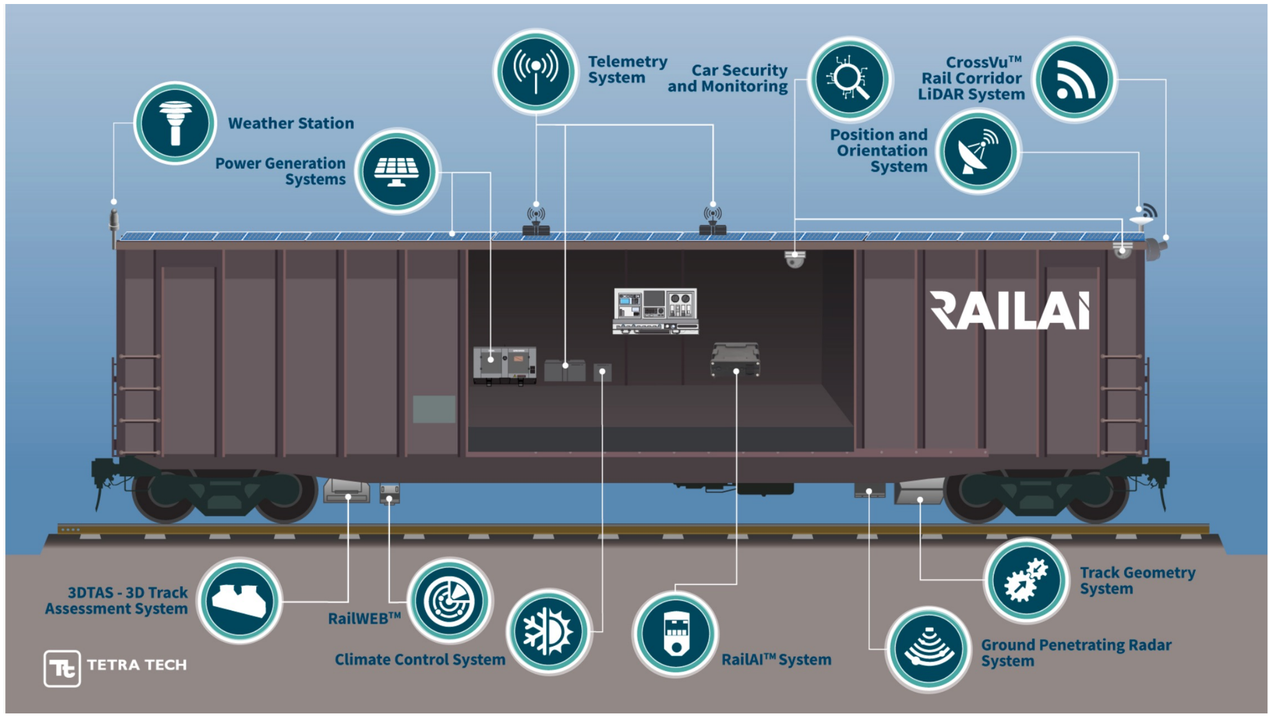
Analysis

Classification

Reliability 4.0 Is About Leveraging Technology

People Inspecting Things

Machines Inspecting Things




Meet Spot
Safety, Efficiency, Predictability
Boston Dynamics

Thermal Inspection

Radiation Detection

Noise Anomaly Detection

Leak Detection

Search and Alert

Gauge Reading

Performance Art

Telemedicine

Gas Detection

Digital Twin Creation

Site Documentation

Sc source

Co connect

Cl collect

Detection, Diagnostics and Prescription

Massive volumes of autonomous inspection data requires advanced analytics to make the best recommendations

Sc source

Co connect

Cl collect

Do do

An analyze

Source: Bentley System Automated Rail Inspection Analysis
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