

An aerial night view of a city, likely Tokyo, with the Tokyo Tower prominently visible on the left. The city is illuminated with various lights, and a complex network of white lines and dots is overlaid on the image, suggesting a digital or data network. The background is a deep blue sky with a bright light source in the upper right corner.

Digital Twins @DNA-Level

Mattias Stenberg
President, PPM Division
Hexagon



HEXAGON

empowering an autonomous future

The road to autonomy

Enabled by our unique set of core competencies

PHYSICAL WORLD



We digitally **CAPTURE** and **POSITION** the physical world

**SENSOR
SOLUTIONS**
data capture

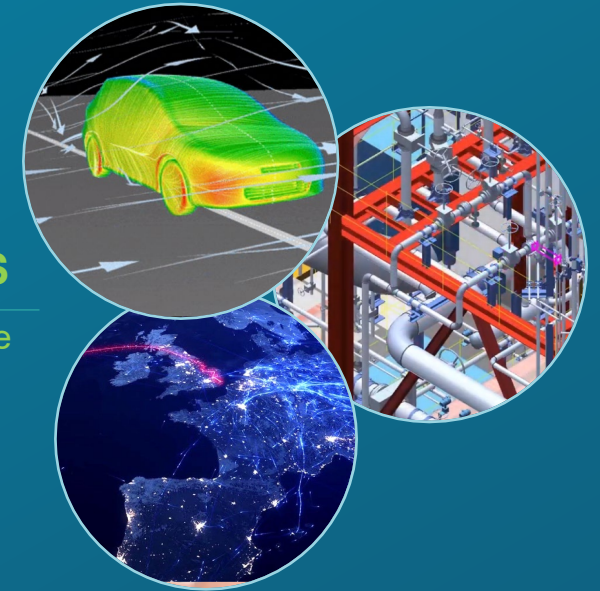


**AUTONOMOUS
SOLUTIONS**
data leverage



We fuse the physical and digital worlds and leverage the power of algorithms to achieve **AUTONOMY**

**SOFTWARE
SOLUTIONS**
data intelligence



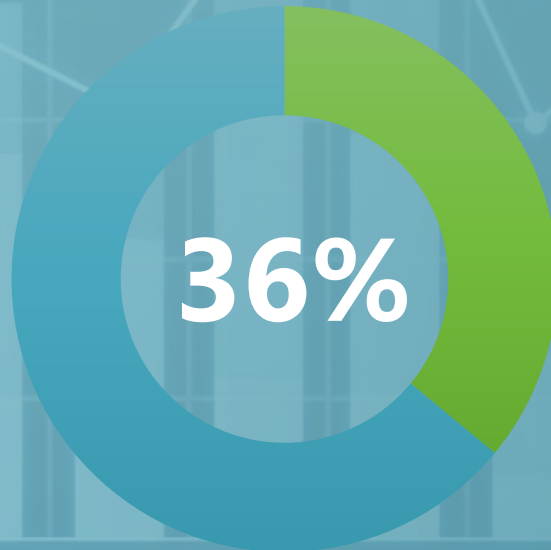
DIGITAL WORLD

We digitally **DESIGN** assets, **SIMULATE** real-world scenarios, and deliver situation awareness with **LOCATION INTELLIGENCE**

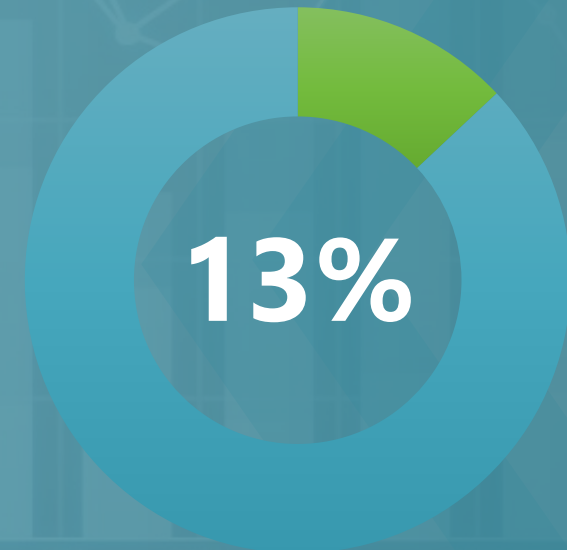


WHAT'S THE PROBLEM / OPPORTUNITY?

INDUSTRY READINESS BIG DATA & ANALYTICS



INVESTING

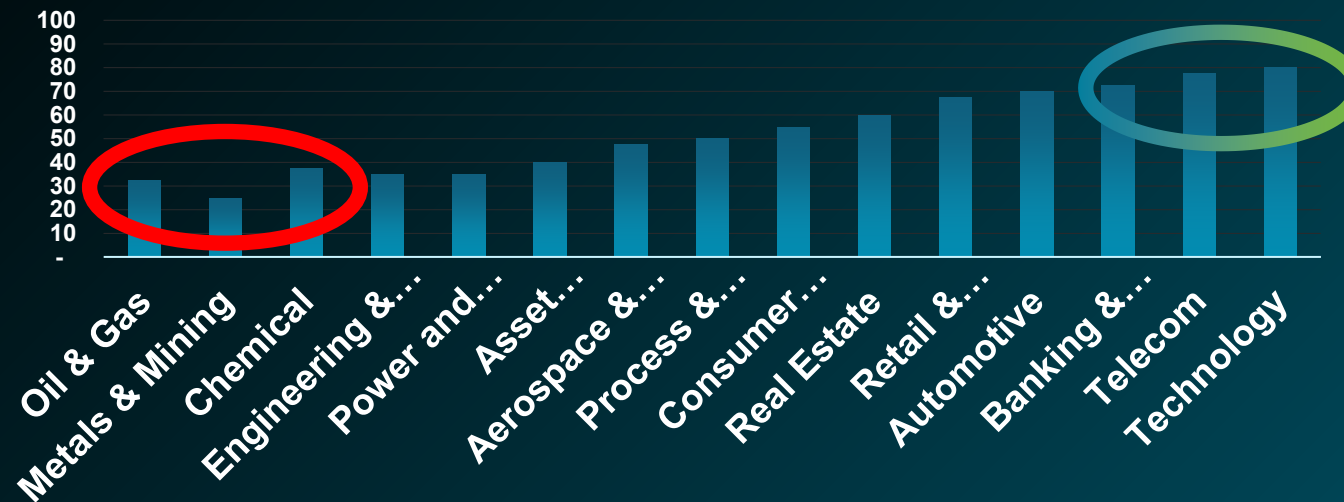


USE INSIGHTS

DIGITAL MATURITY BY INDUSTRY-2019

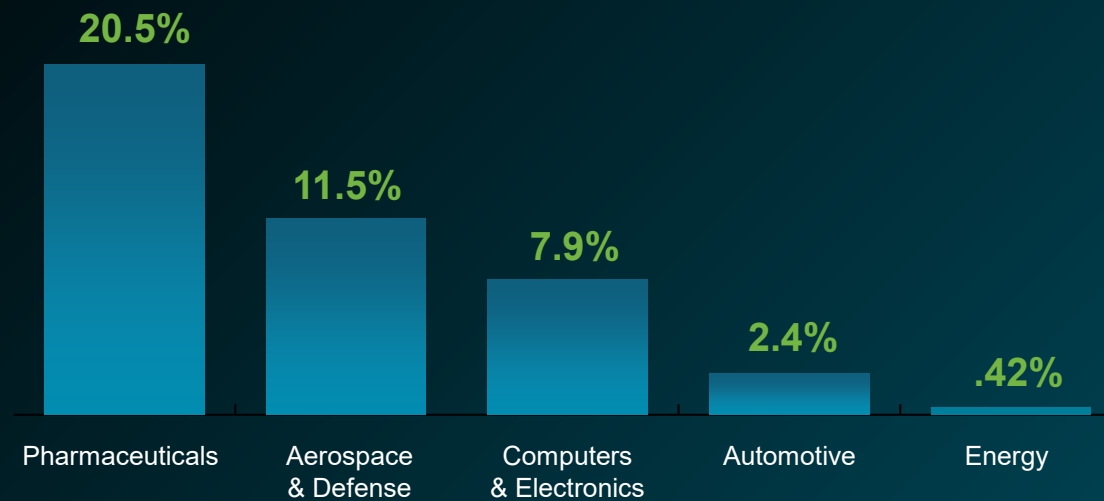
Digitally
Integrated

Pen and
Paper

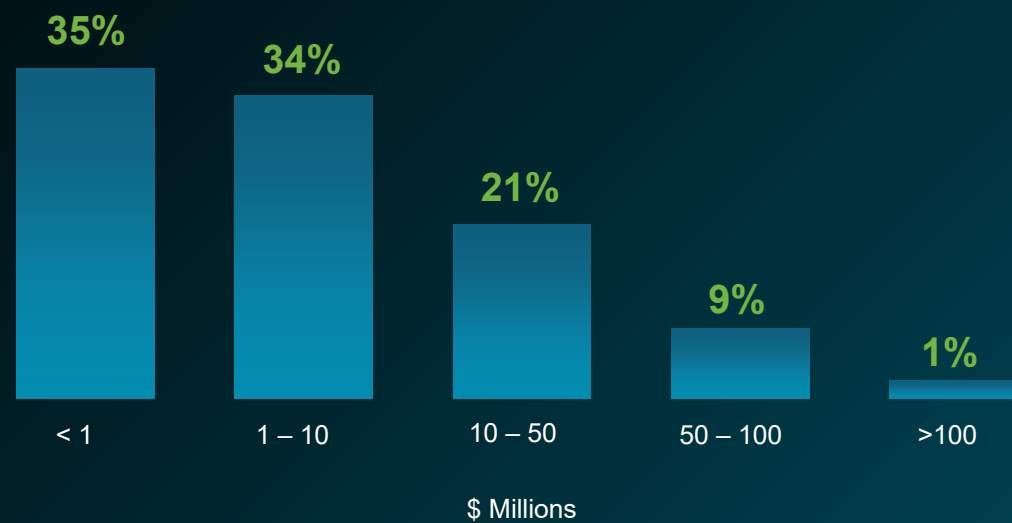


TOTAL R&D SPENDING

PERCENTAGE SHARE OF SALES



BUDGET ALLOCATED FOR DIGITAL TRANSFORMATION 2019





+\$500B
COMPLETION COST
MISS

Hexagon Distinguishing the “Digital Twin”



Connect

A digital twin is a dynamic digital depiction comprised of physical entity information from design/build, transactional and time series sources.

It is the single source of truth unique to a user's perspective for a point in the lifecycle consisting of many digital levels.



Think

Data is diffused seamlessly between the digital depiction and physical entity to enable co-existence.

Then advanced technologies - such as artificial intelligence and machine learning - bring data, algorithms, and context together regarding the physical entity, processes, and people.

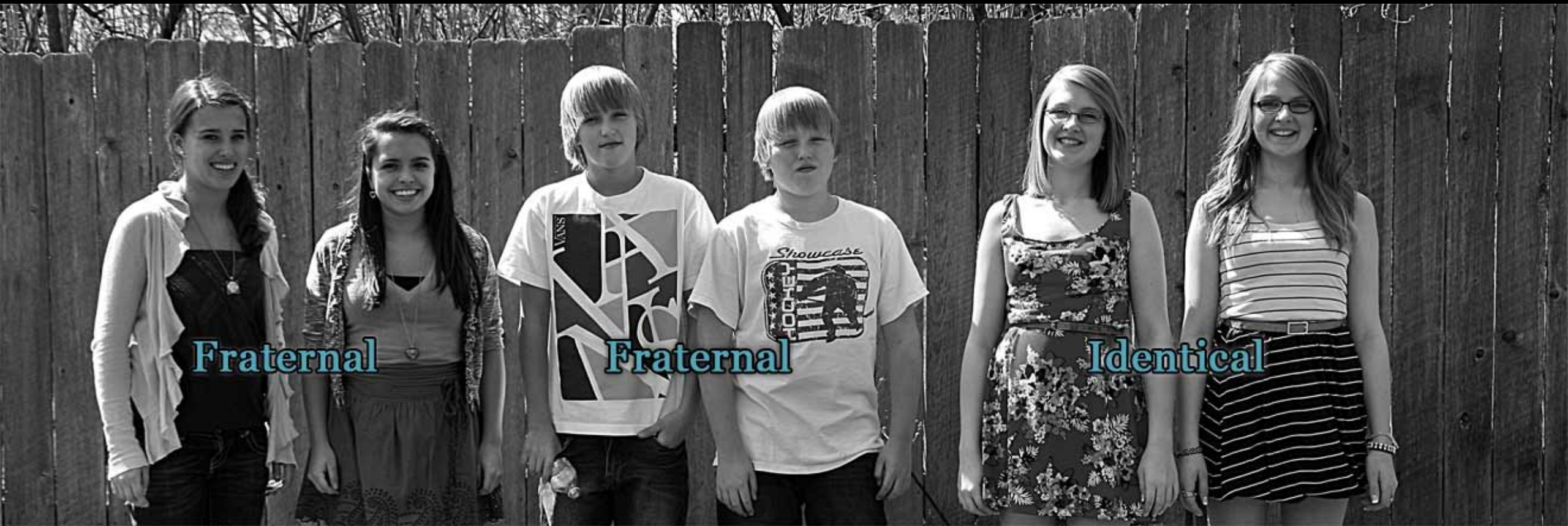


Do

With this comes understanding, prediction, and optimization for the physical entity to drive improved business outcomes.

TECHNOLOGY INVESTMENT PRIORITIES

PRIORITY TECHNOLOGIES	ALREADY ADOPTED	IN THE NEXT 2 YEARS	BETWEEN 2-5 YEARS	SUM OF BEYOND 5 YEARS
Digital twin	0%	2%	1%	1%
End-to-end digital asset lifecycle management	2%	7%	8%	2%
3D printing	5%	3%	3%	4%
Wearables / AR / VR	3%	2%	4%	6%
Production / Process optimisation (Advanced process control)	11%	14%	11%	6%
Data driven demand matching / Dynamic scheduling	5%	8%	9%	7%
Supply chain optimisation	9%	11%	9%	8%
Smart energy management	10%	12%	12%	11%
Digital quality management	14%	13%	12%	13%
Predictive maintenance	13%	7%	11%	13%
Remote monitoring and maintenance	11%	13%	11%	14%
Resource optimisation (human capital and machines)	16%	9%	12%	14%



Fraternal

Fraternal

Identical



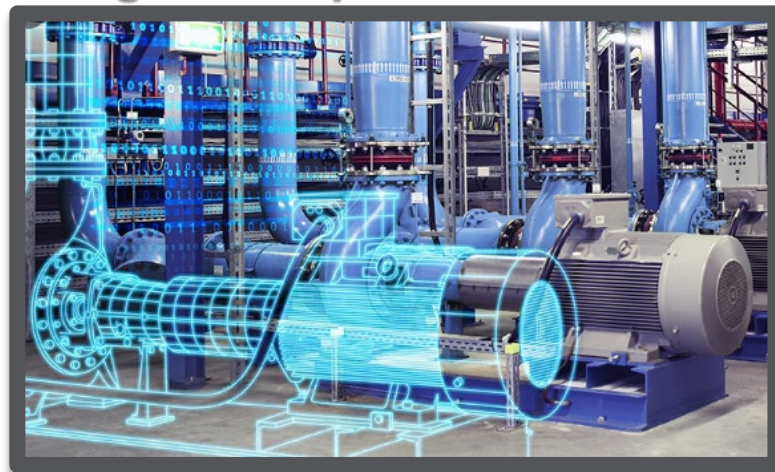
Fraternal Twins, sharing some but not all the same genes.

Ultimate Digital & Operational Twin

Operational Technology
Configuration & Cybersecurity



Next-Gen
Digital & Operational Twin



Connected Worker, Situational
Awareness, Analytics & Event Data



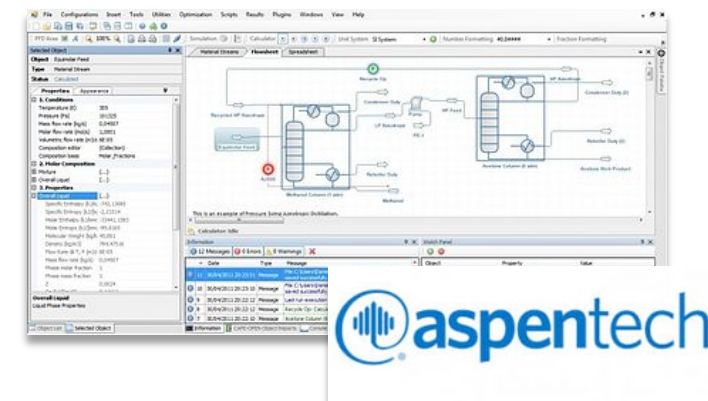
Design Configuration &
Engineering Data



Process Historian



Process Simulation

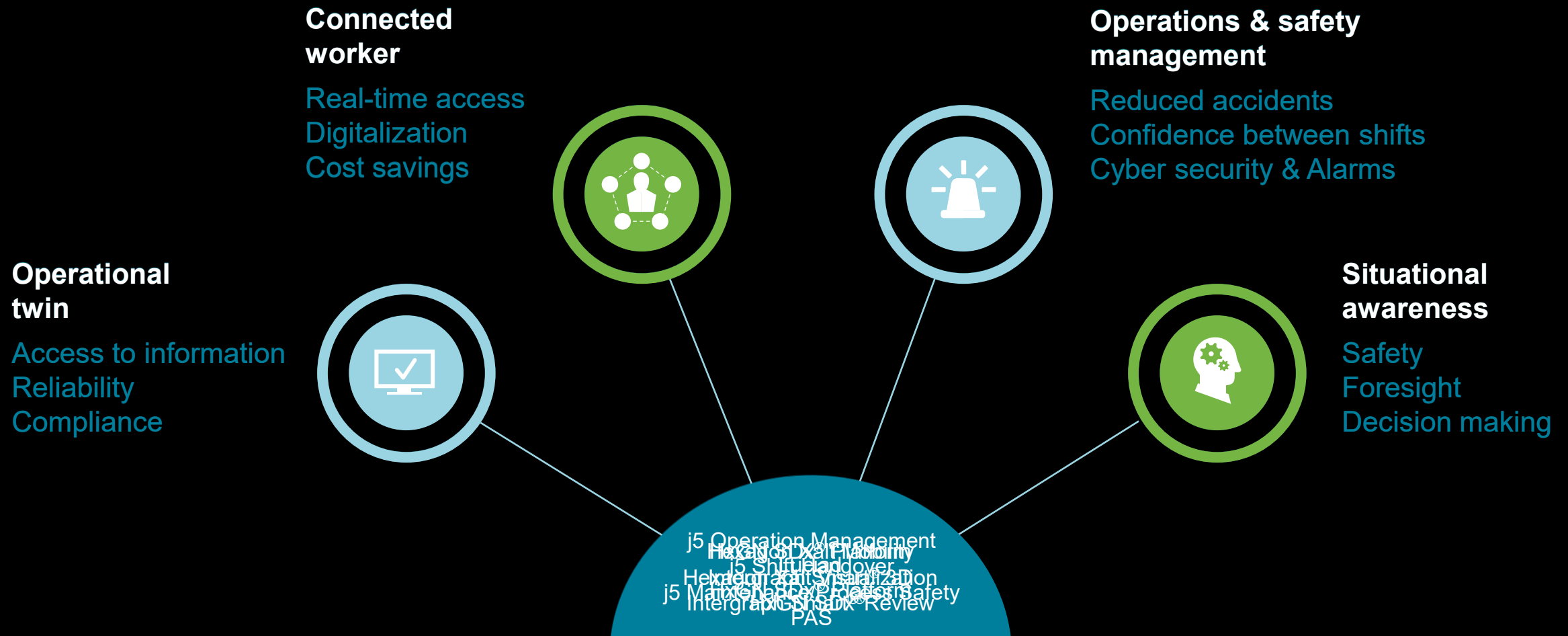




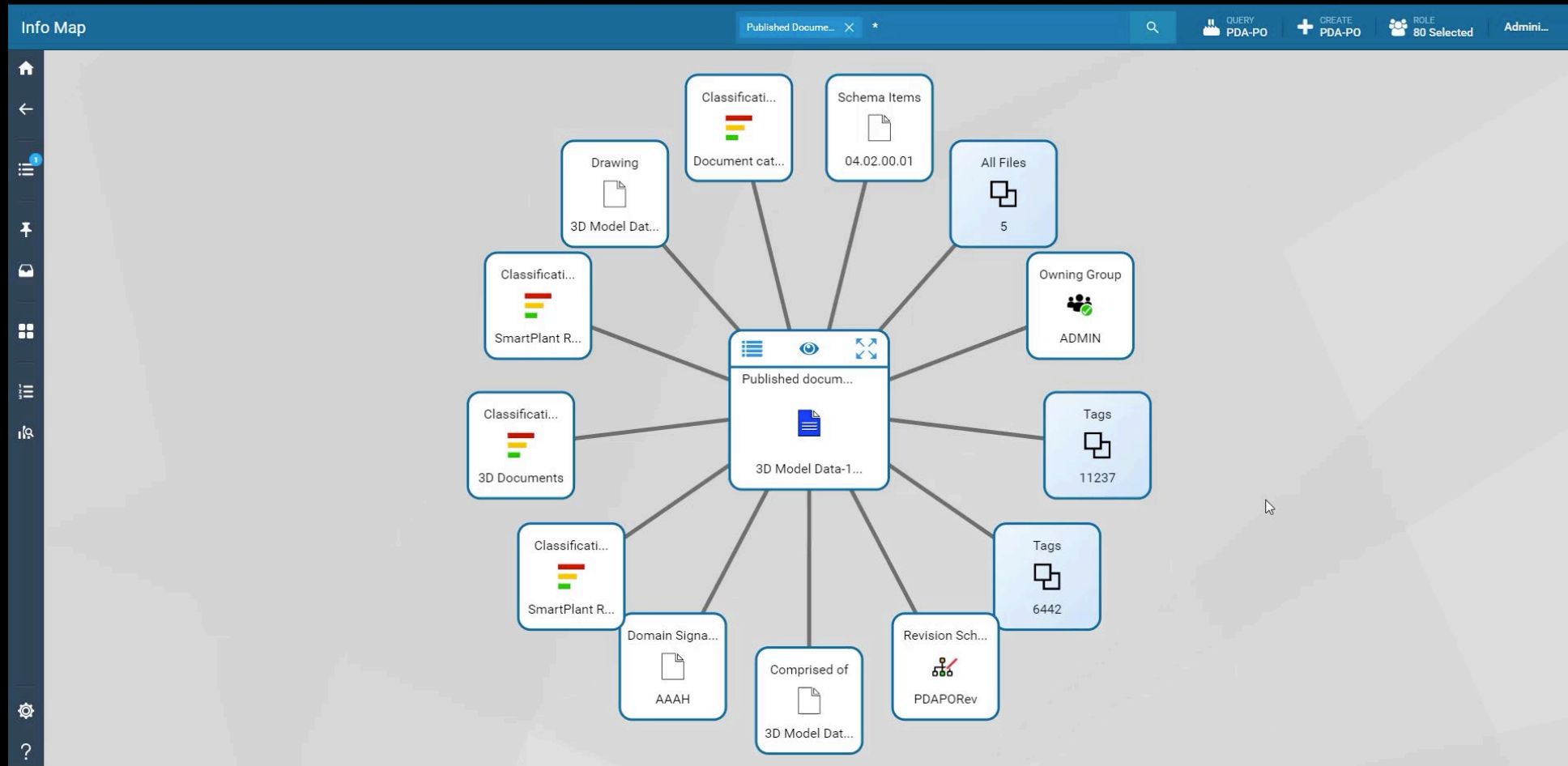
EMPOWERING THE DATA



PUTTING DATA TO WORK



OPERATIONAL TWIN





LAYERS

Tracking

Zones

Assets

Plant 2

Plant 1

Tags

Laser Scans

Bing

MEASUREMENT

EFFECTS

  Selected Tag:

Summary

- Digital Twins are a clear mega-trend and many of the industries we serve are late in terms of adoption
- Digital transformation will continue to accelerate, through COVID forced changes, and eventually accepted as a survival mechanism.
- Hexagon is uniquely positioned to create DNA level identical digital and operational twins
- Creating a hi-fidelity digital twin requires the integration of many data sources, Hexagon is approaching this through R&D, partnerships (Aspentech, OSI) and M&A highlighted recently through PAS.
- As operational systems increasingly become connected and employees work more remotely cyber security will rise on the agenda.

