

From Materials to Mobility: Weaving Tire Data into the Digital Thread

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| Agenda

01

How are my **Tire Data Siloes** affecting my business?

02

What are the **key business systems** for organizing and contextualizing Tire Data?

03

How do I **optimize** this data with AI/ML?

04

How do I get started?



Digitization ≠ Effective Data Use

The top goals of tech adoption remain consistent year over year – **improve quality, reduce costs and lower risks** related to safety, cybersecurity and compliance.

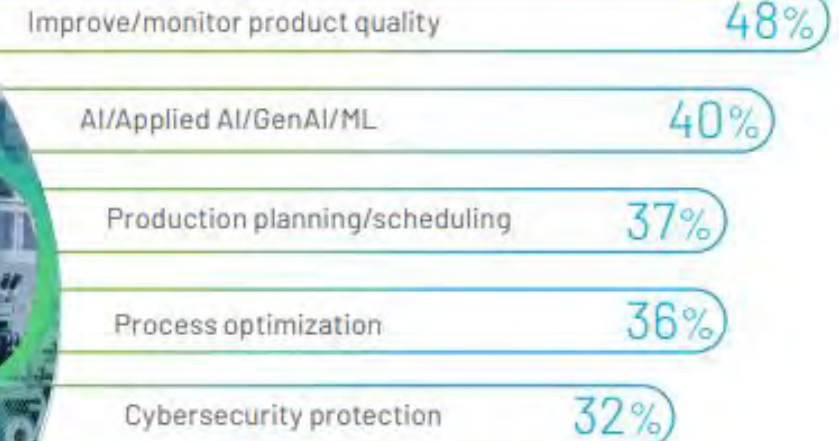
The automotive and tire industry is notably higher than the overall average of 31%, and experienced a 6% increase from last year.

However, there is inefficiency in how data is used across all industries, only 9% of overall respondents report using more than 75% of their collected data effectively. In automotive, that figure drops to 5%, though 37% report using more than 50% effectively.

While the gap between data collection capabilities and the sector's ability to leverage this data for decision making and operational improvements is trending in the right direction, there remains room for improvement.

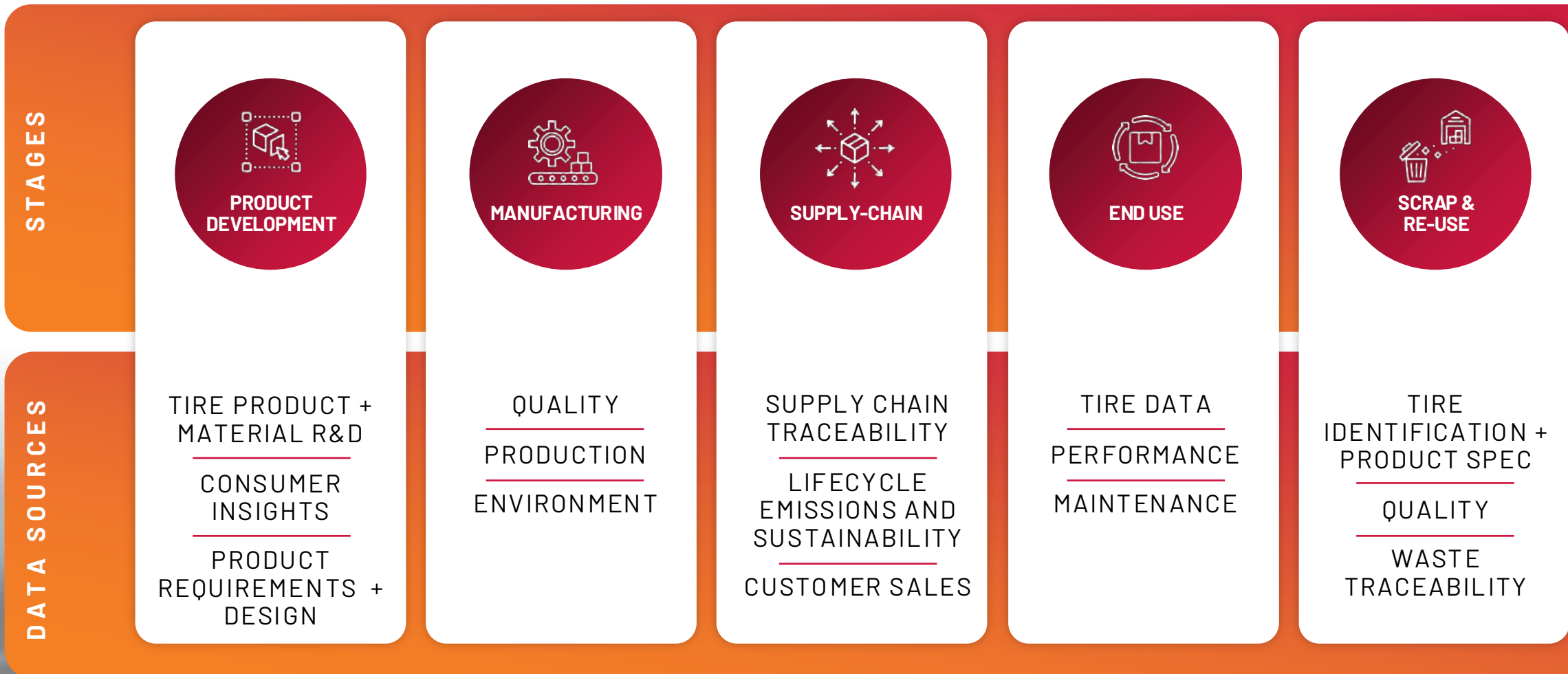


How the data collected is being used





Silos of data in the Tire Value Chain are waiting to be utilized...





Leaders in the Tire Industry

are using data to optimize operations today...

Predictive AI Transformed a Tire Manufacturer and Boosted Its Sales

AI and Data Science: JK Tyre's Strategy for Enhanced Operations

The company has been taking many initiatives to boost operations, including ramping up its channel and customer connectivity, and its manufacturing, among others.

How Tyre Manufacturers Are Using AI to Shape the Future of the Industry

Pirelli's AI-Enabled Development Mirrors the Pharmaceutical Industry

MAY 15, 2023 AT 02:56 PM EDT

Accelerating Manufacturing Innovation at Michelin With Data and AI

The French tire manufacturer's AI efforts have enhanced value creation, according to the company's chief data and AI officer.

How Are Tiremakers, Suppliers Using AI?

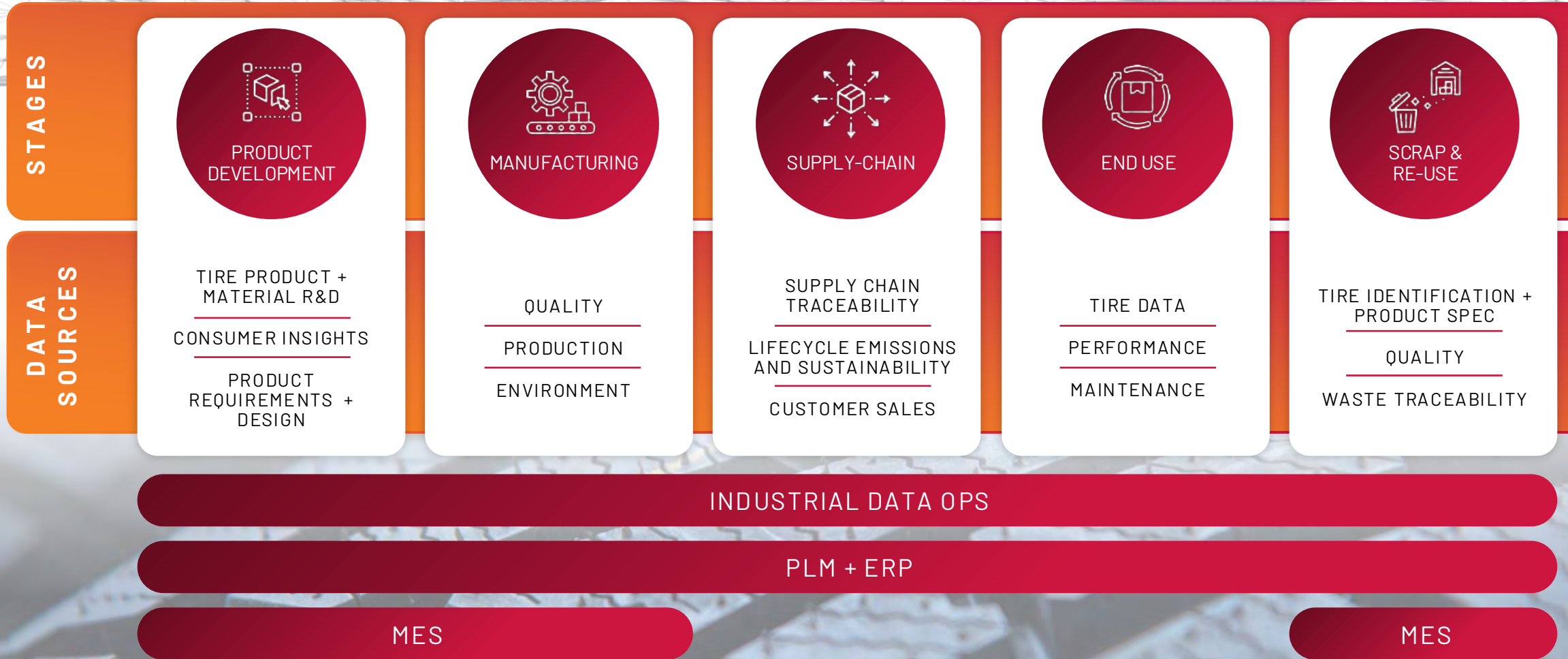
AI is a relatively new concept to the tire industry. But tire manufacturers, suppliers and distributors are already using it in their operations.

Mike Manias • JULY 16, 2023 • 8 min read



The foundation for the digital thread is data

Business Systems provide the ability to organize and contextualize this data.

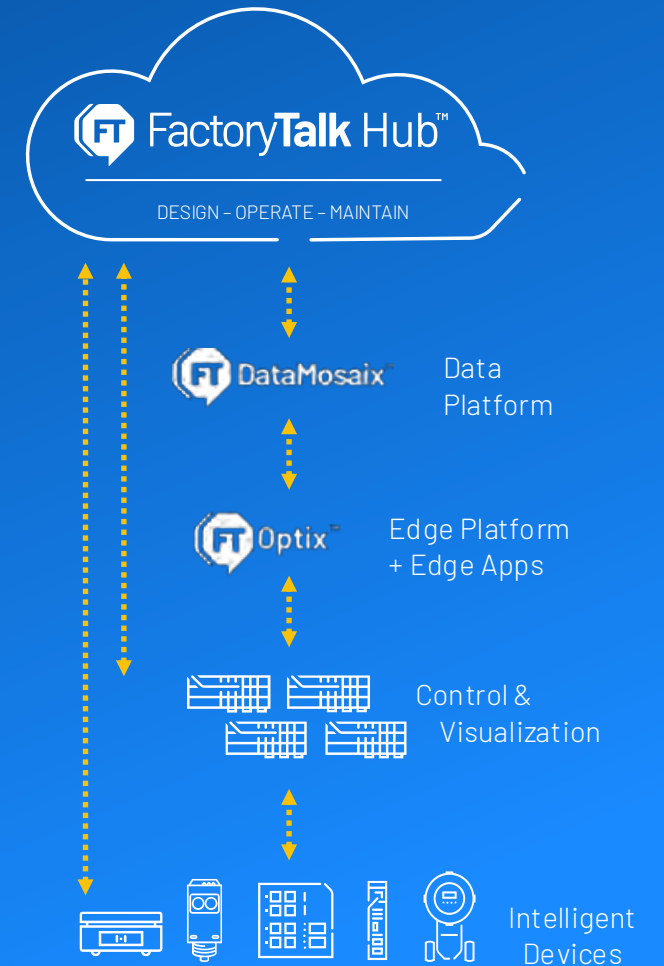
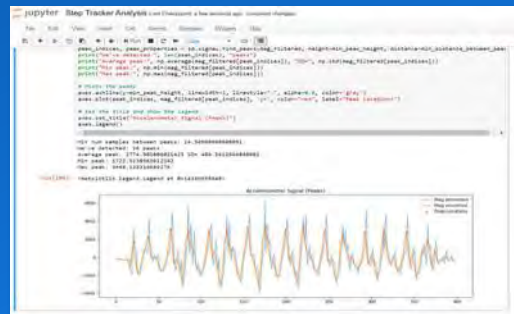
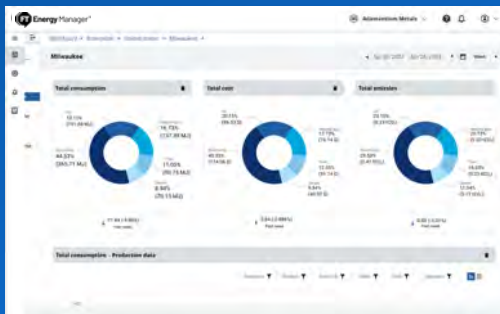




Data is everywhere

It is created at the device, at the controller, at the edge, and in the cloud

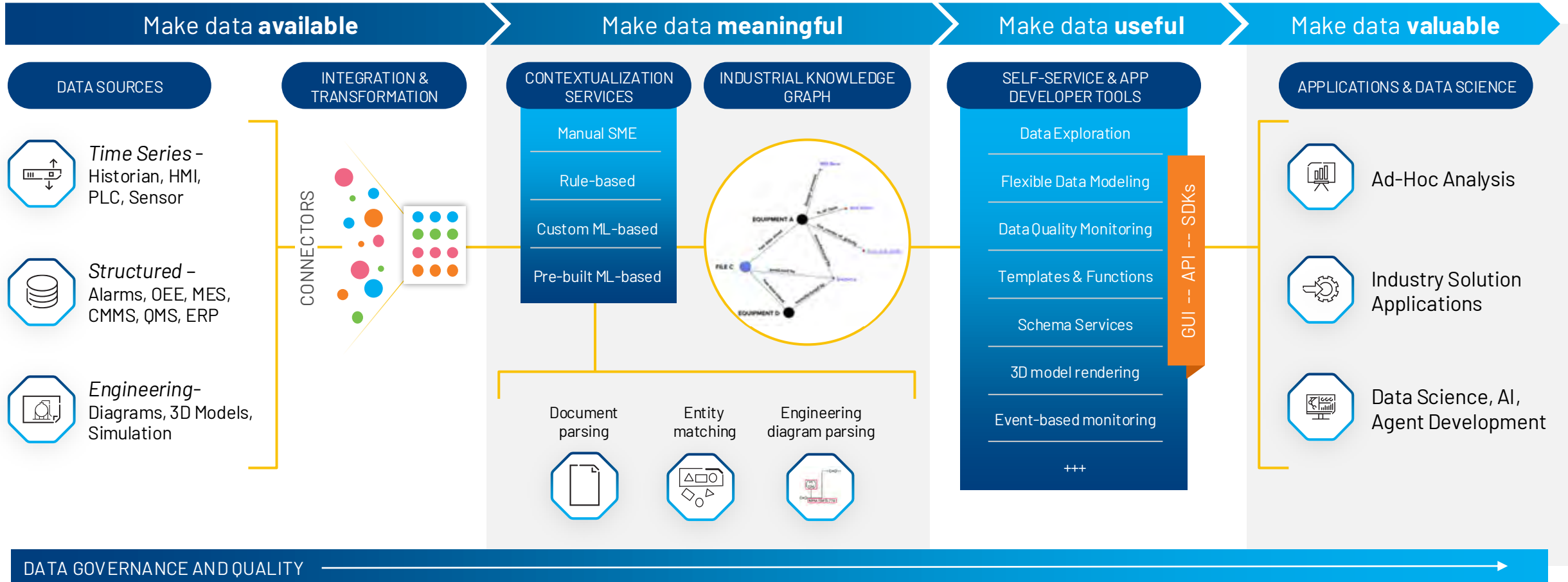
- One set of data, one common truth, from bottom to top
 - Context is both created and aggregated at each layer
 - Carrying the context through the layers enables insights faster and more accurately
- Mix and match how the data is used:
 - Pre-built applications, custom applications, AI/ML development, ad-hoc analysis, agentic workflows





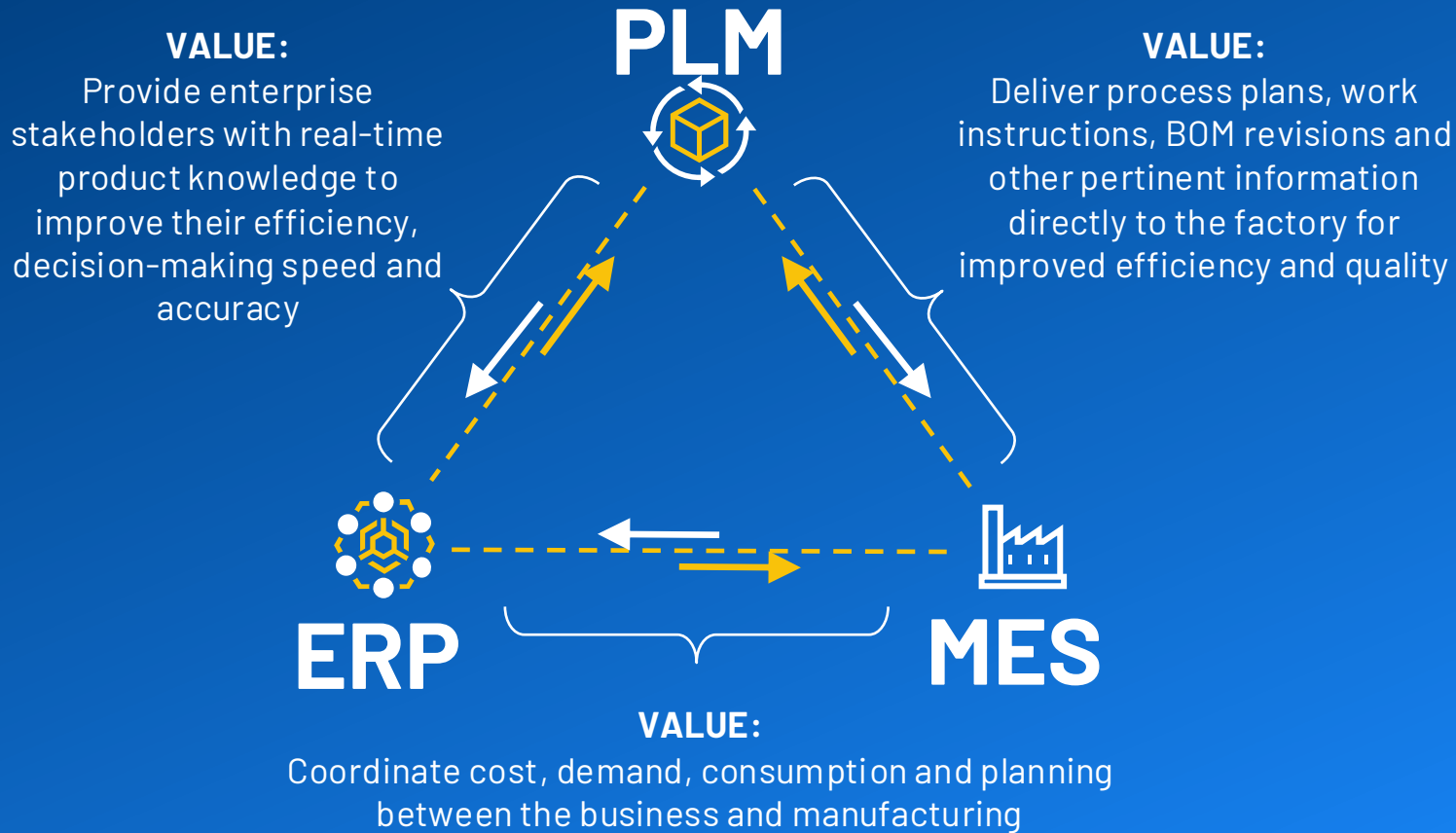
Industrial Data Ops Platform

Expose industrial data with DataOps to realize value through apps and analytics





| The value of integrating PLM, MES, and ERP data



QUANTIFIED VALUE

15-30% improvement in production efficiency

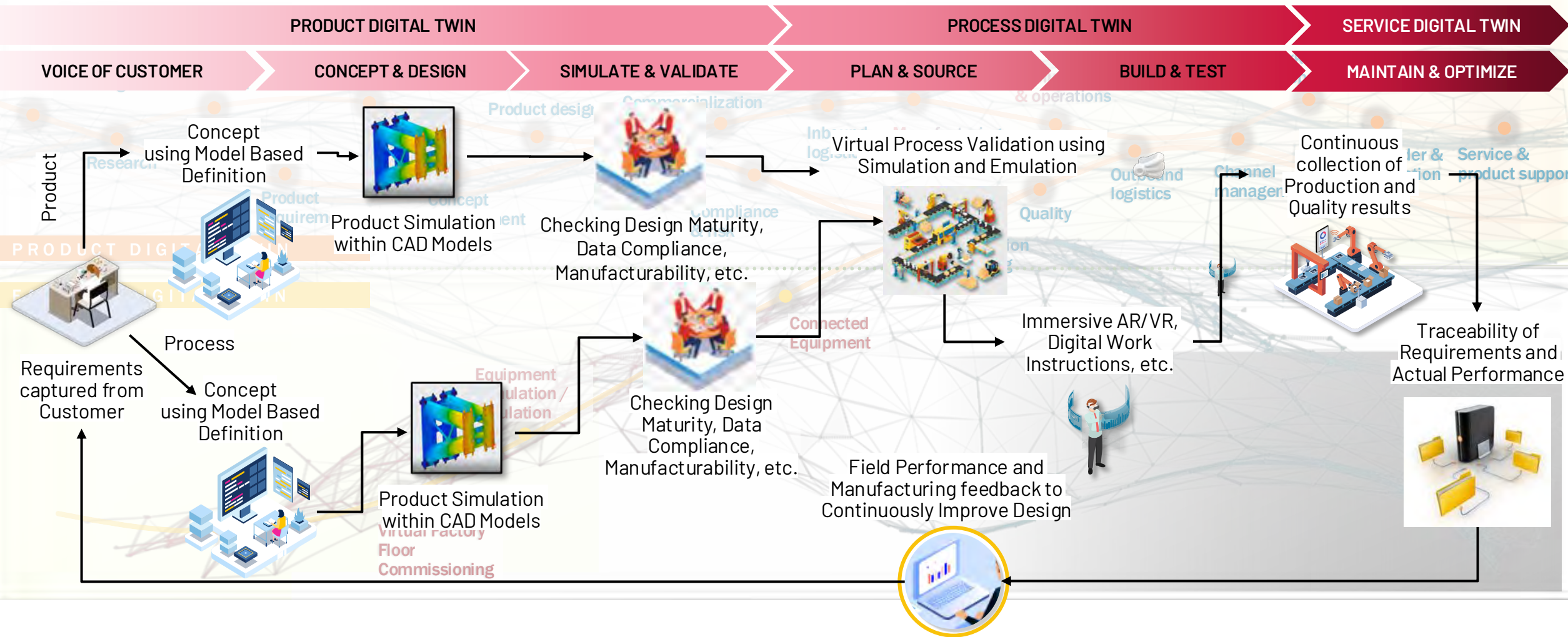
30% faster time-to-market

25% lower development costs

20% higher rate of launched products passing quality tests

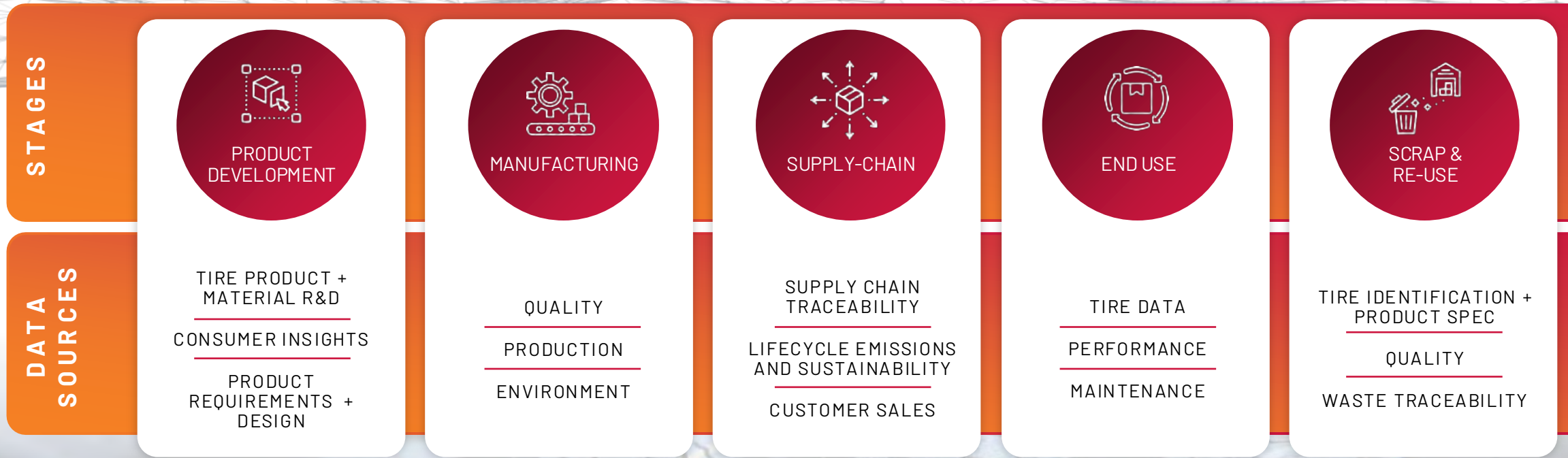


With PLM, Tire Lifecycle Data informs Product and Process Design





With the growing capability of technology and people, tire lifecycle data can be woven into the Digital Thread, one AI/ML use case at a time.



DIGITAL PRODUCT PASSPORTS

PRODUCTION SCHEDULING OPTIMIZATION

AUTONOMOUS OPERATIONS (QUALITY, MAINTENANCE, ETC.)

AI/ML USE CASES



The emergence of modern digital technologies is allowing companies to transform production data and shift from Automation to Autonomy



LINE-OF-SIGHT	DESCRIPTIVE	DIAGNOSTIC	PREDICTIVE	PRESCRIPTIVE	AUTONOMOUS
Human Control <i>(Manual)</i>	Human In The Loop <i>(Open Loop)</i>				Human Oversight <i>(Closed Loop)</i>
WHAT HAPPENED	WHAT IS HAPPENING?	WHY DID IT HAPPEN?	WHAT IS ABOUT TO HAPPEN?	WHAT SHOULD I DO?	WHAT IS THE MACHINE DOING?



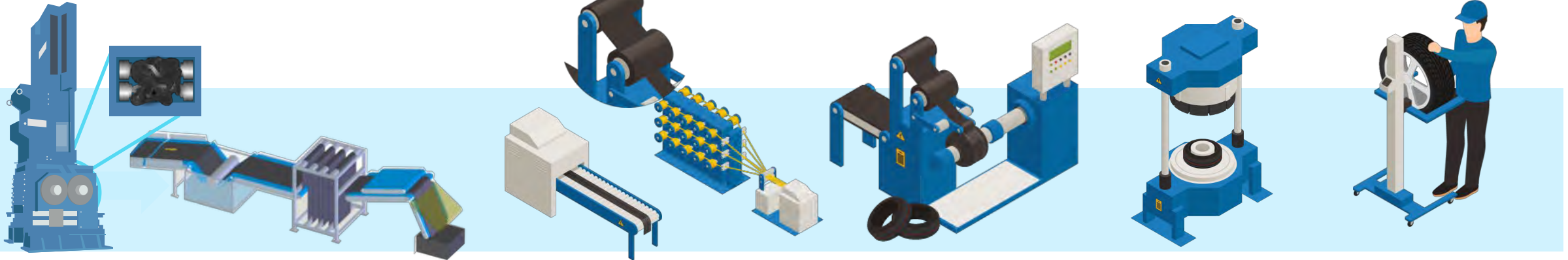
Autonomous Operations in Tire



= Successfully Implemented in Tire



= Ongoing Implementation in Tire



Mixing



Batch-Off & Dipping

Cooling

Slab Laydown

Extruding



Beading Calendering



Tire Building



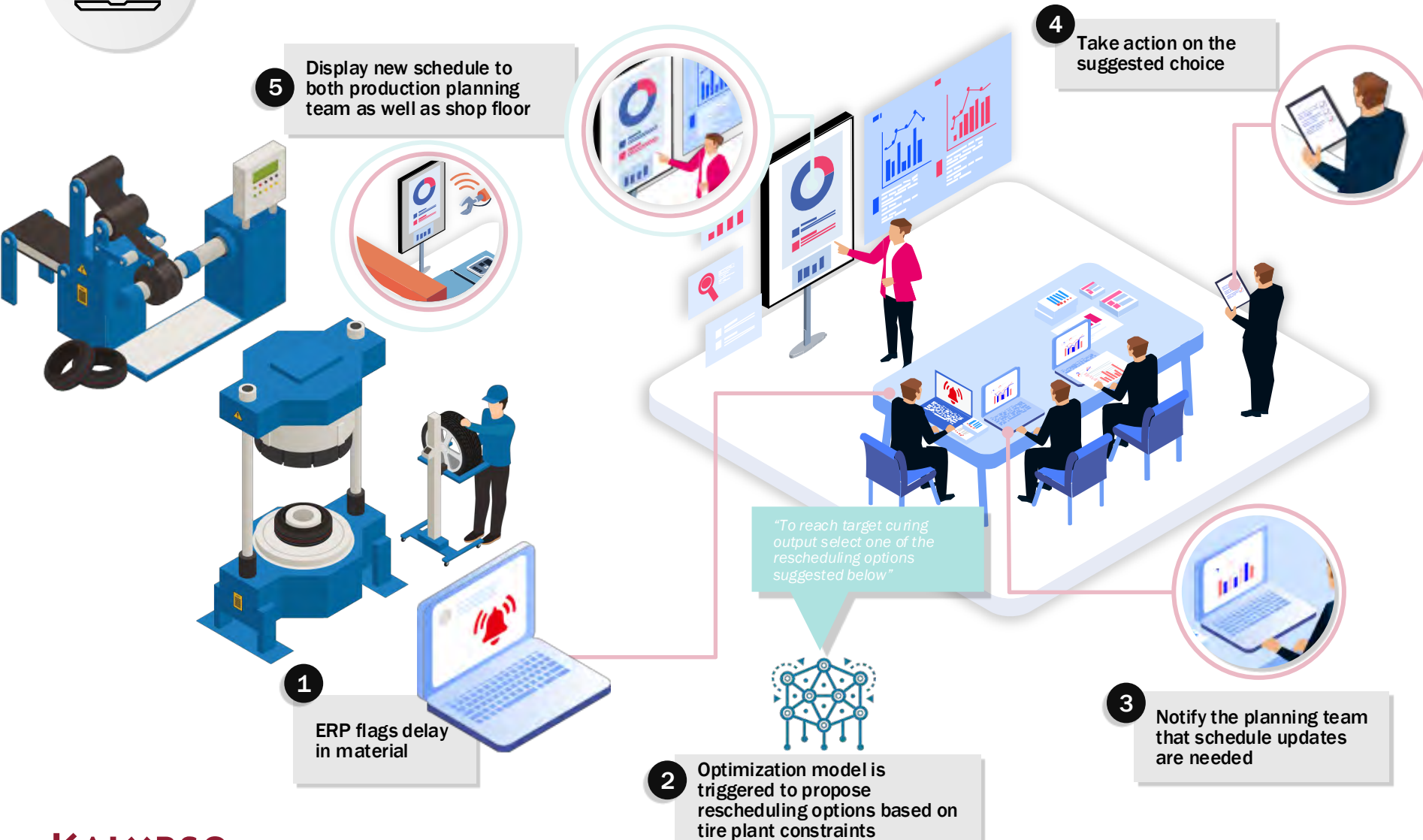
Curing



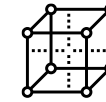
Final Inspection



Production Scheduling Optimization in Tire



Respond to a Disturbance:



Simulate outcome with new input data



Test changes to machine setup and/or planning parameters



Predict impact on target variable



Prescribe proactive actions to achieve desired result based on predictions



Validate results, comparing physical and digital assets



Improve the model



Digital Tire Passports

Solution for material provenance, compliance, responsible & sustainable sourcing \



CREATE DIGITAL TWIN



Product Identity
Material + Batch ID



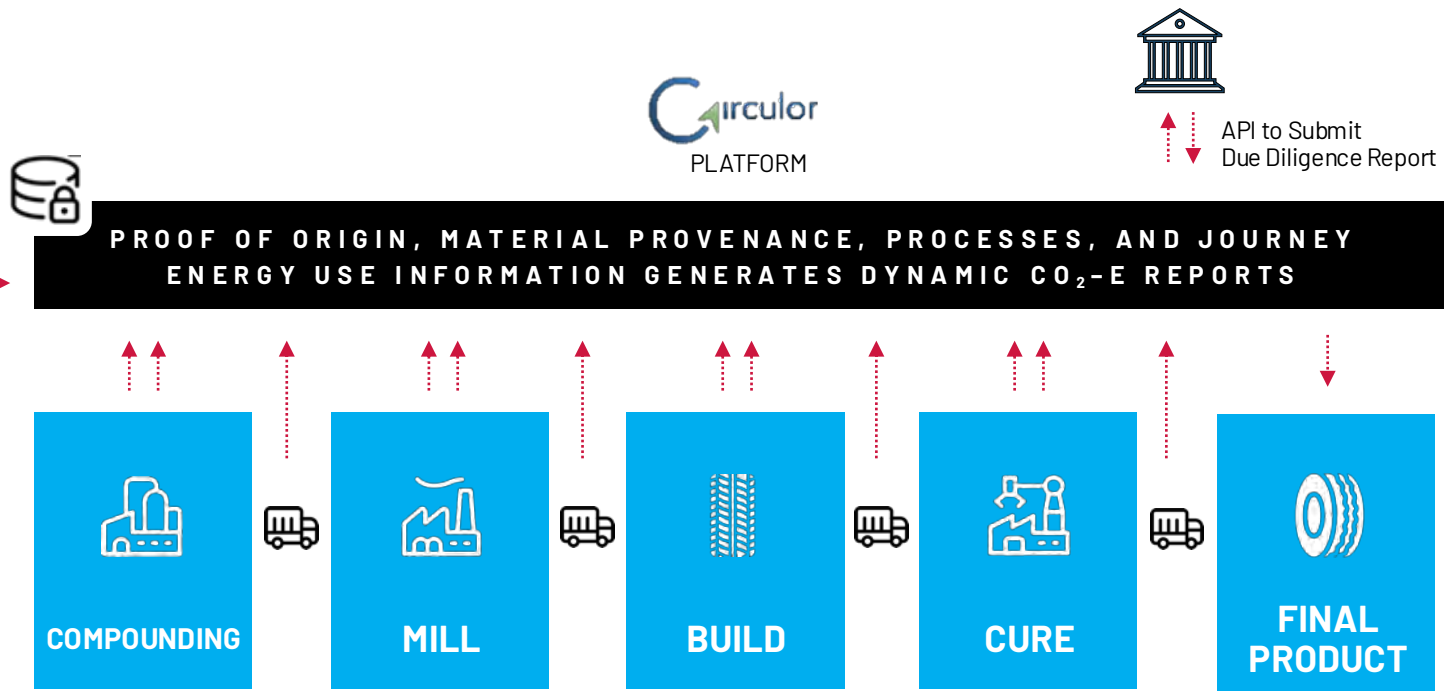
Producer identity
Face recognition



Origin
GPS / QR / NFC Tags

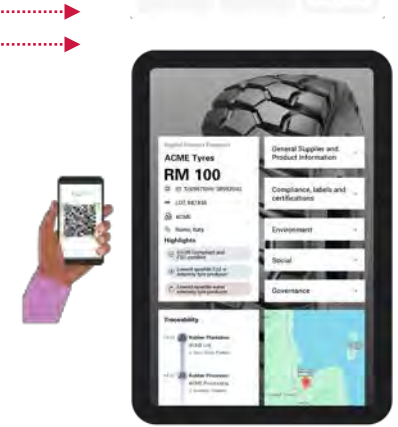


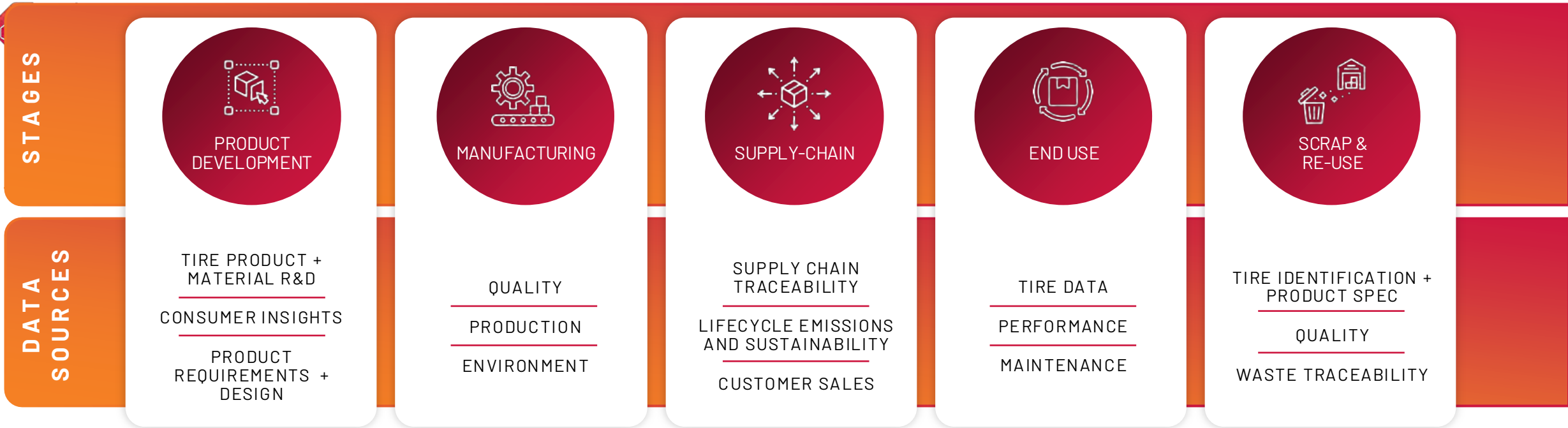
Raw Rubber



Blockchain technology proprietary algorithms verify and establish chain of custody, as well as attribute accumulated CO₂-e emissions and ESG performance, which are ultimately inherited by the final product

Comprehensive Traceability:
Track other tire materials beyond rubber, including high-risk materials like synthetic rubber, silica and steel. (DPPs – ESRP, US CBP and US UFLPA).





DIGITAL PRODUCT PASSPORTS

PRODUCTION SCHEDULING OPTIMIZATION

AUTONOMOUS OPERATIONS (QUALITY, MAINTENANCE, ETC.)

INDUSTRIAL DATA OPS

PLM + ERP

MES

MES

“

32% of Manufacturers report **deploying + integrating** new technology is the biggest internal obstacle to growth...

--10th Annual State of Manufacturing Report



Delivering transformation at scale requires:

A **comprehensive set** of digital capabilities 



Scaling based on **proof of value**, not proof of concept

Shrewd project selection and portfolio management 



Human-centered design and organizational change management focus

A series of delivered **successes** 



Thank you

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