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INTERNATIONAL DATA SPACES ASSOCIATION

Scaling and Internationalizing Data Ecosystems in Europe

#datasovereignty
#sharingdataisbetterthanplayingalone
#trustintheiot

EU Economic Spaces

1993

European Single Market

European Economic & industrial transformation

2023

European Common Data Spaces

Industrial & public administration digital transformation. European data economy pillar

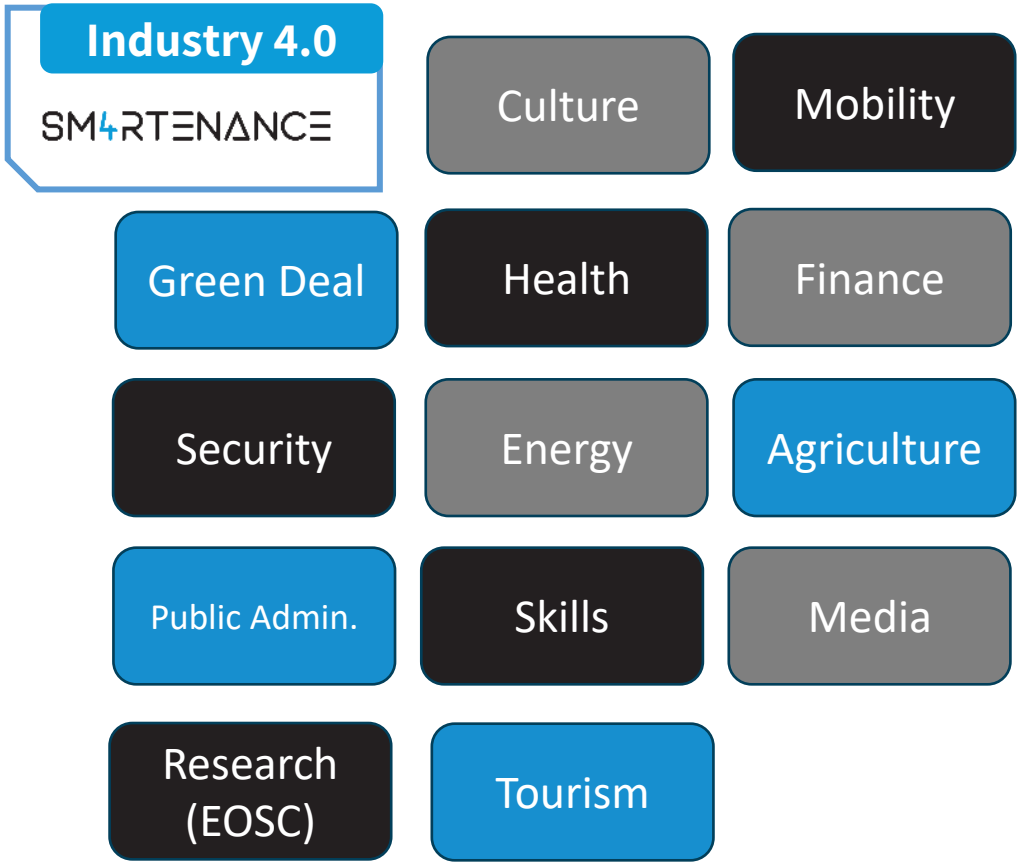
2030

European Net-Zero Space

Industrial green transformation

EU Data Strategy: Data Space Deployment

14 European Common Data Spaces



EOSC (European Open Science Cloud)

SM4RTENANCE

European Deployment of Smart Manufacturing Asset 4.0 MultilateRal DaTa Sharing SpacEs for an AutoNomous Operation of CollAborative MainteNance and Circular Services

Project No: 101123490

Duration: 36 Months

Start Date: 1st October 2023

Consortium: : 42 full partners, 5 associated partners, distributed across 11 EU countries.

Strategic Objective: DIGITAL-2022-CLOUD-AI-03-DS-MANUFACT

Total Budget: 14 M €

EC Contribution: 8M€

Project Website: SM4RTENANCE.EU

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innovalia ASSOCIATION
DAWEX data exchange technology
top-ix WE DO CONNECTIONS
NTT DATA
OTE GROUP OF COMPANIES
SCSN smart connected supplier network
domina data management
FIWARE FOUNDATION
SOVITY
DGS BUILDING THE FUTURE
SQS SOFTWARE QUALITY SYSTEMS
TRIMEK METROLOGICAL ENGINEERING
Cefriel POLITECNICO DI MILANO
PRIMA INDUSTRIE
FIDIA
COMAU
Schneider Electric
FILL YOUR FUTURE
DATAPIXEL QUALITY CONTROL ENGINEERING
TNO
TXT
core
IJSSEL
UNIMETRIK METROLOGY AND CALIBRATION
ATLANTIS ENGINEERING
SYXIS innovate together
Fraunhofer IOSB
INDUSTRIE 4.0 AUSTRIA
UiO
CERTH CENTRE FOR RESEARCH & TECHNOLOGY HELLAS
PIACENZA
AVL
BEMAS
cea
BAIDATA
MADE Competence Center i4.0
AFNeT Services
INTELLIMECH CONSORZIO PER LA MECCATRONICA
VDMA
carsa
eit Manufacturing CLC SOUTH
ASSOCIATED PARTNERS
efnms
INTERNATIONAL DATA SPACES ASSOCIATION
VDI
SIEMENS
VTT

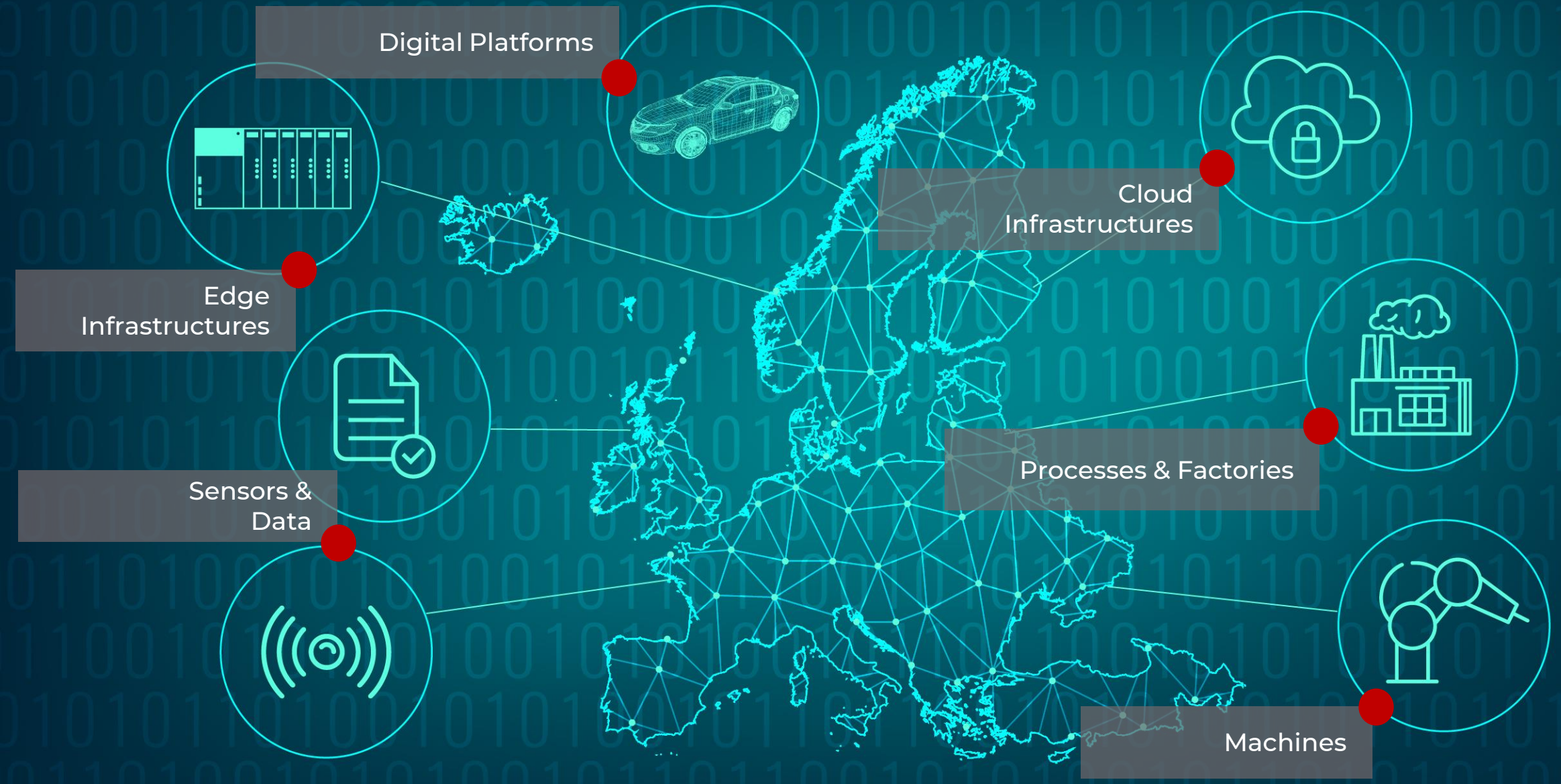
innovalia
ASSOCIATION
ONE DATA
ONE USE

One Partner, One Project

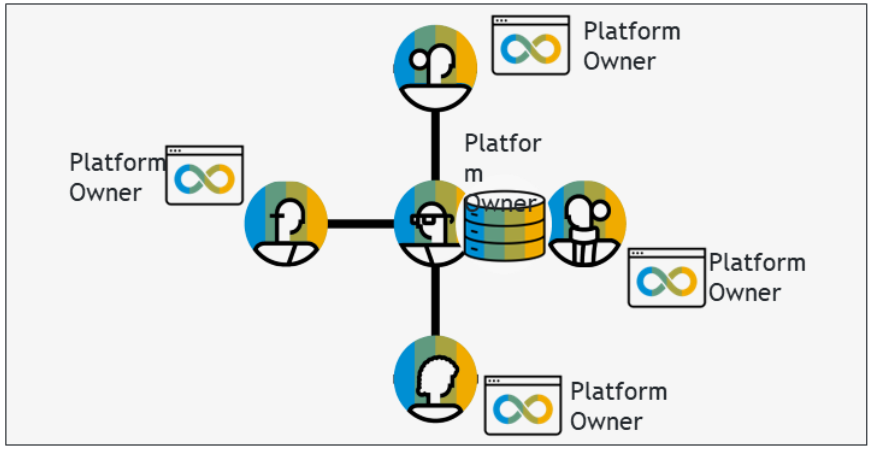
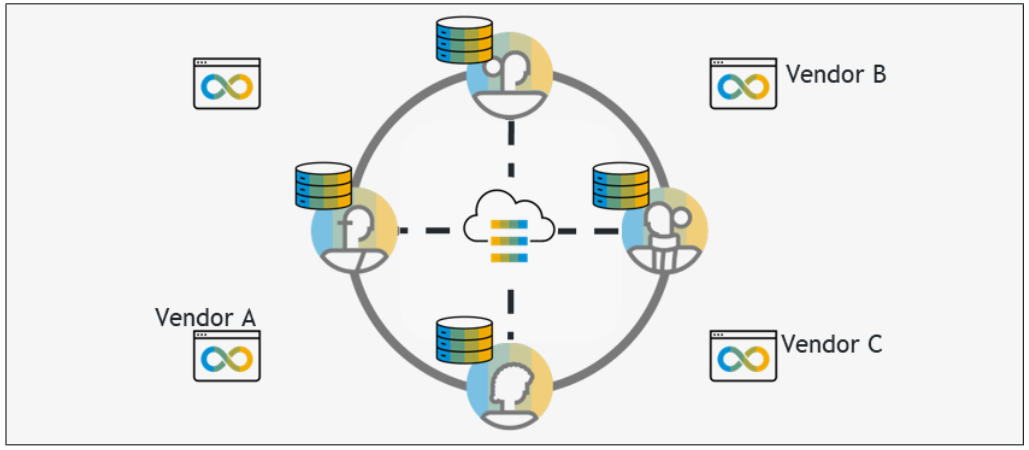
360° Data Integration

European Industrial Data Space

innovalia ASSOCIATION

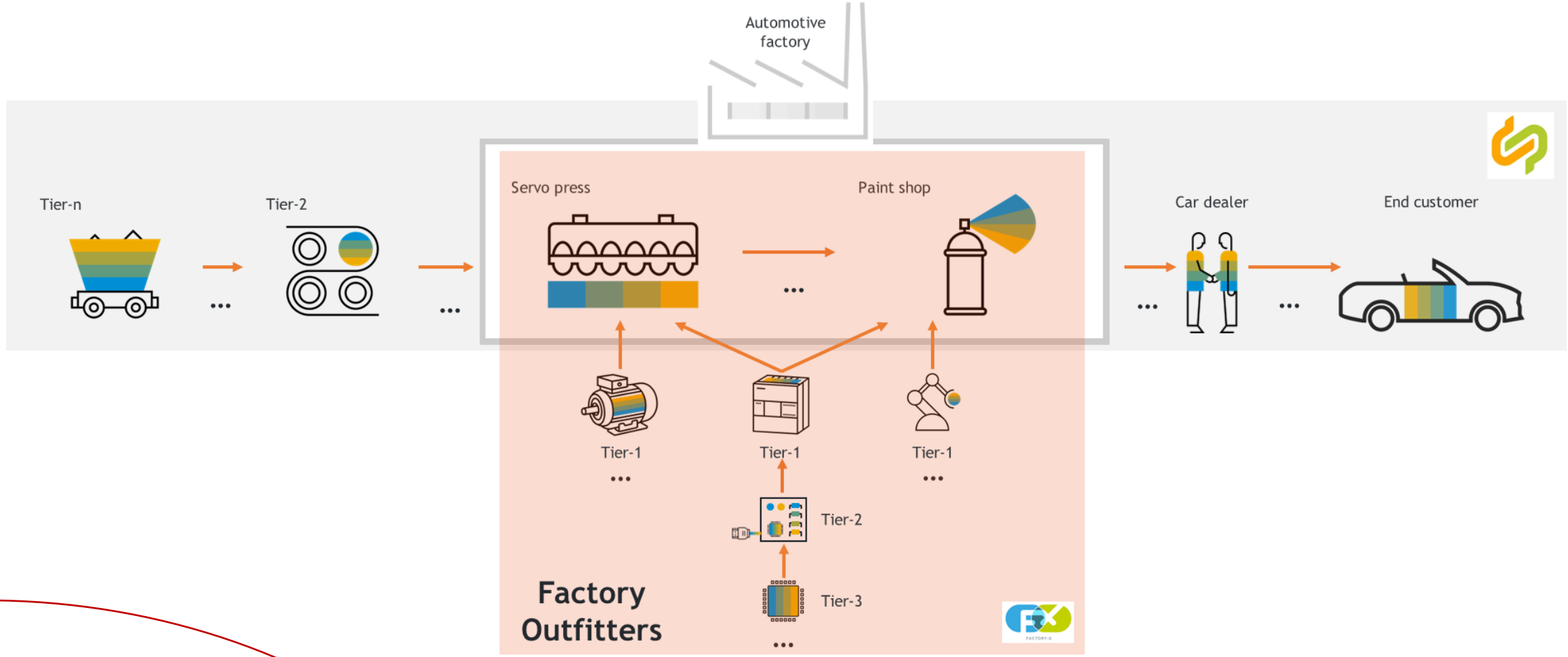


360° DATA INTEGRATION: GLOBAL MULTILATERAL DATA EXCHANGE

	Traditional Platform	Manufacturing-X
		
Applications	Provided by the platform owner all integrated and aligned	Multiple (competing) solutions from various vendors. Each vendor provides and operates his solution
Topology	Central network service	(Slim) federated operating environment provided by an operating company (joint-venture of multiple companies). Data exchange decentral / directly between network participants
Data Persistence	Centrally owned by the platform owner	Decentral data persistence - data resides at data owner who can grant access to others

= data persistence = application

360° DATA INTEGRATION: VERTICAL & HORIZONTAL DATA EXCHANGE



Data Moves at The Speed of Trust

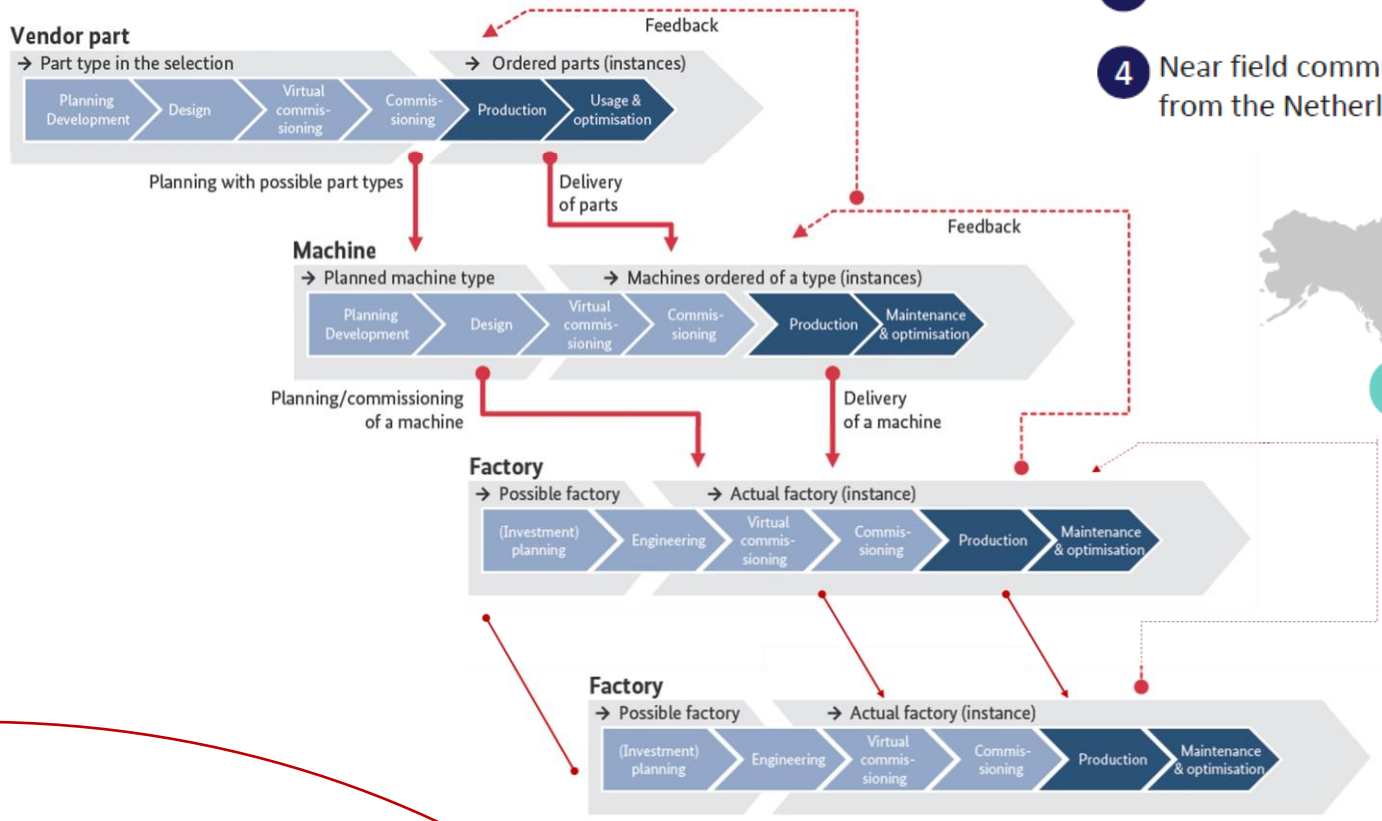
From
Egosystem
To
Ecosystems

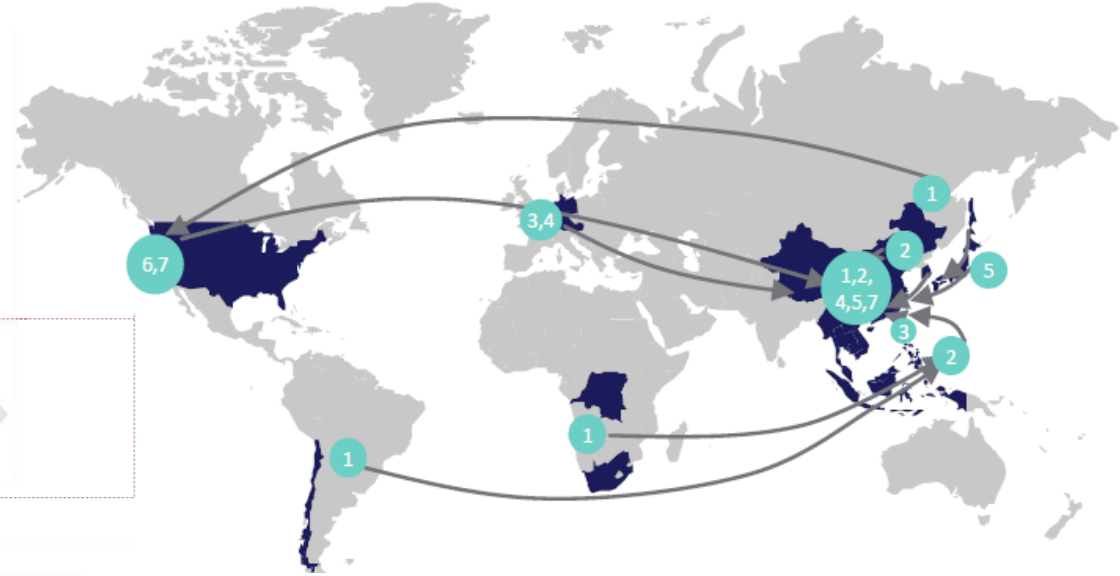
GLOBAL MANUFACTURING DATA ECOSYSTEMS

- Manufacturing is a **Global** Activity
- Manufacturing is an **Information** Activity
- Manufacturing is an **Economic** Activity
- Manufacturing is a **National** Activity
- Manufacturing is a **Supply-Chain** Activity
- Manufacturing is an **Individual** Activity
- Manufacturing Affects **Quality of Life**
- Manufacturing has **Global Sustainability** Impact

GLOBAL MANUFACTURING DATA ECOSYSTEMS

1. Metals imported, rare earth metals mined in China[1]
2. Screen, flash memory from South Korea
3. Accelerometer imported from Germany
4. Near field communications controller from the Netherlands
5. Camera, Compass, LCD screen imported from Japan
6. Wi-Fi chip, Audio Chips imported from USA
7. Final assembly and testing in Shenzhen, China





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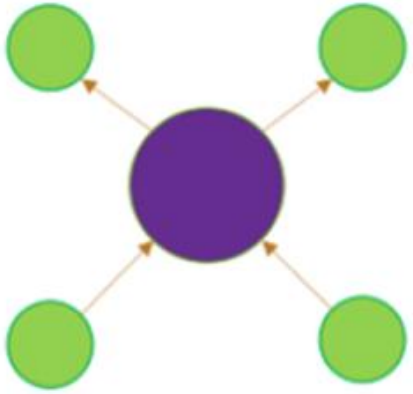
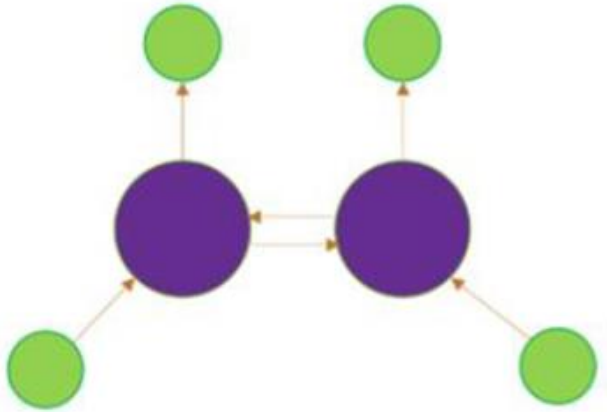
GLOBAL MANUFACTURING DATA ECOSYSTEMS

Today

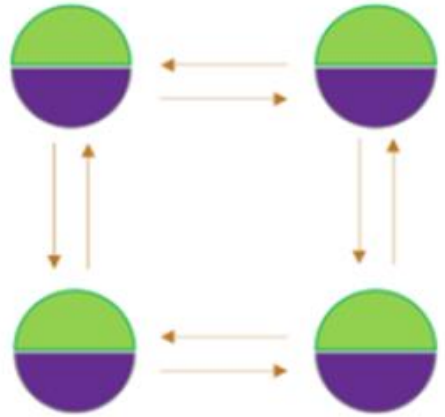


Centralized Data Space Authority

2026

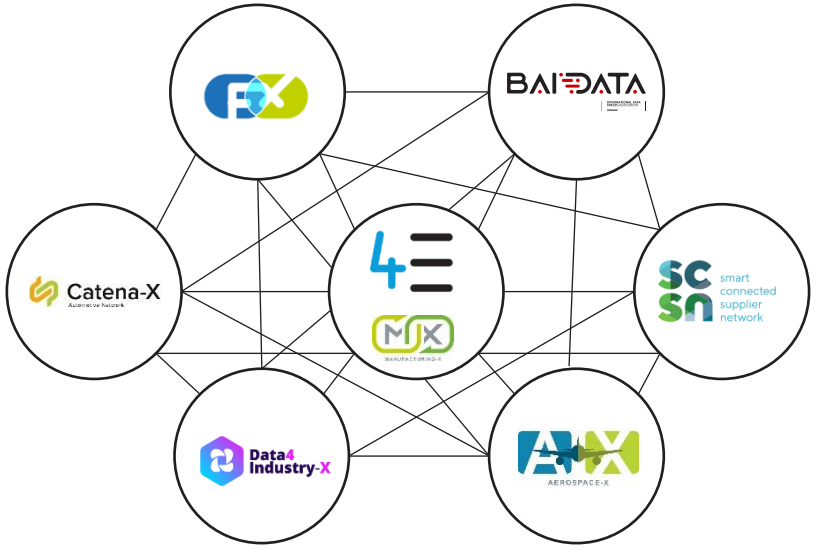


Federated/Distributed Data Space Authority



Decentralized Data Space Authority

Embryonic



GLOBAL MANUFACTURING DATA ECOSYSTEMS

DATA SPACE FEDERATION

VISION

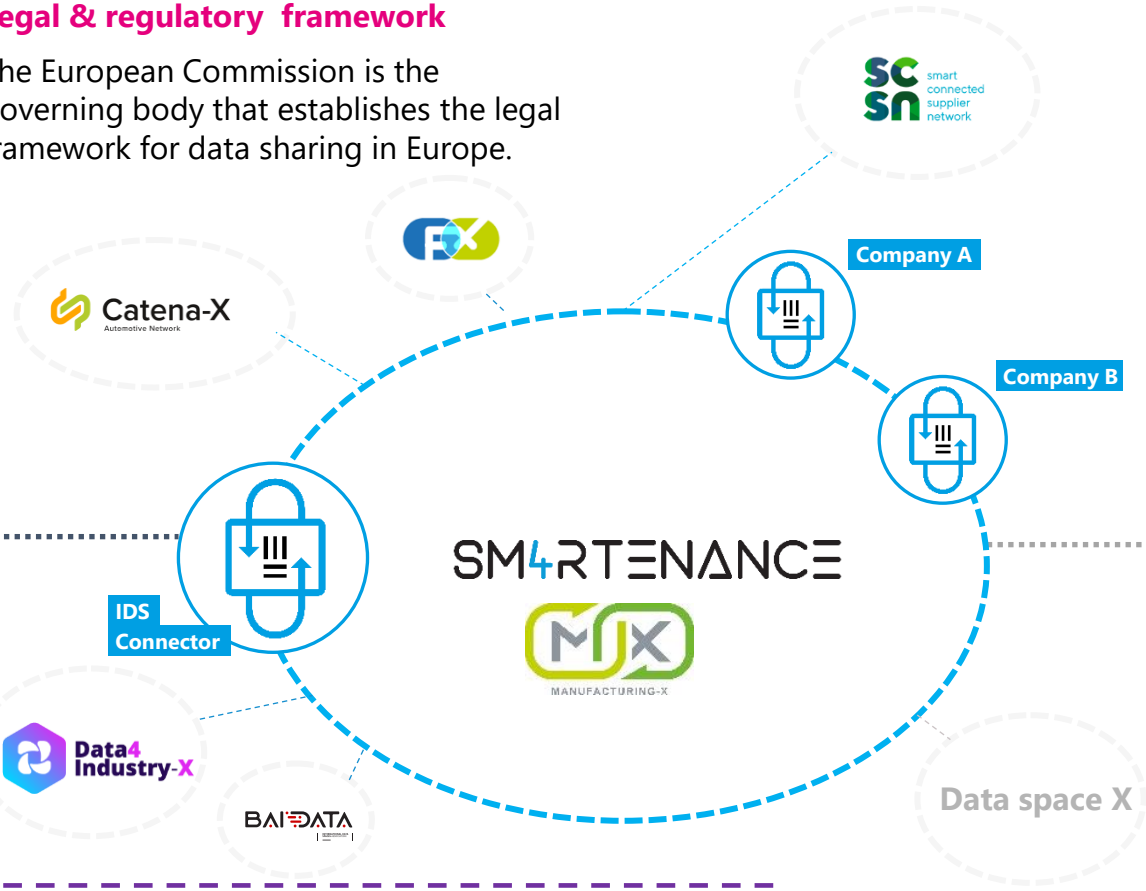
IDS provides a **technical framework** to support data sharing based on diverse policies & agreements.

The **IDS Connector** connects participants with the data space.

The connector understands the data space policies and shares data according to these policies.

Legal & regulatory framework

The European Commission is the governing body that establishes the legal framework for data sharing in Europe.



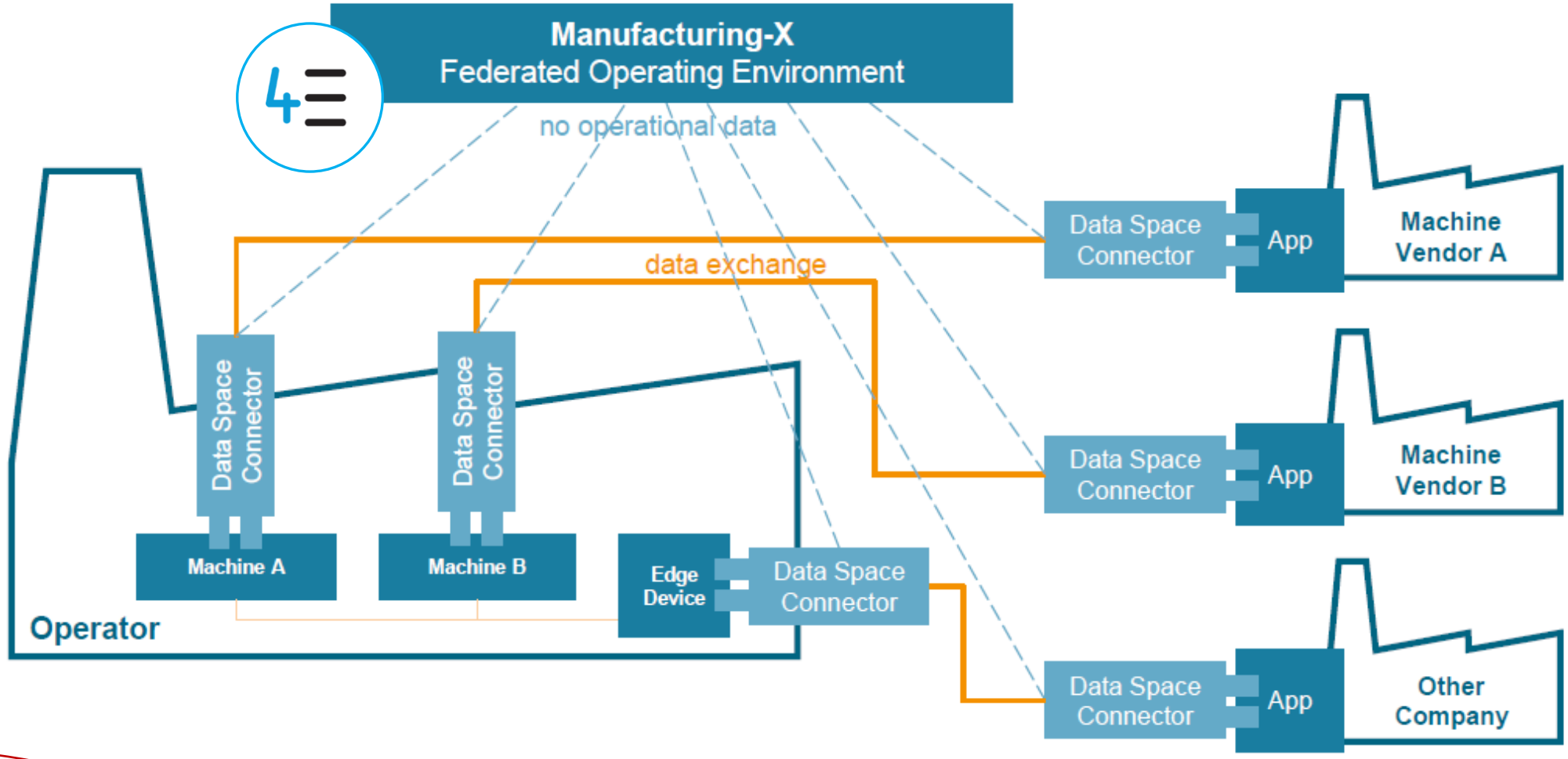
Data space federation policies

Sm4rtenance **builds and sets the federation & interoperation policies of the data space federation**.

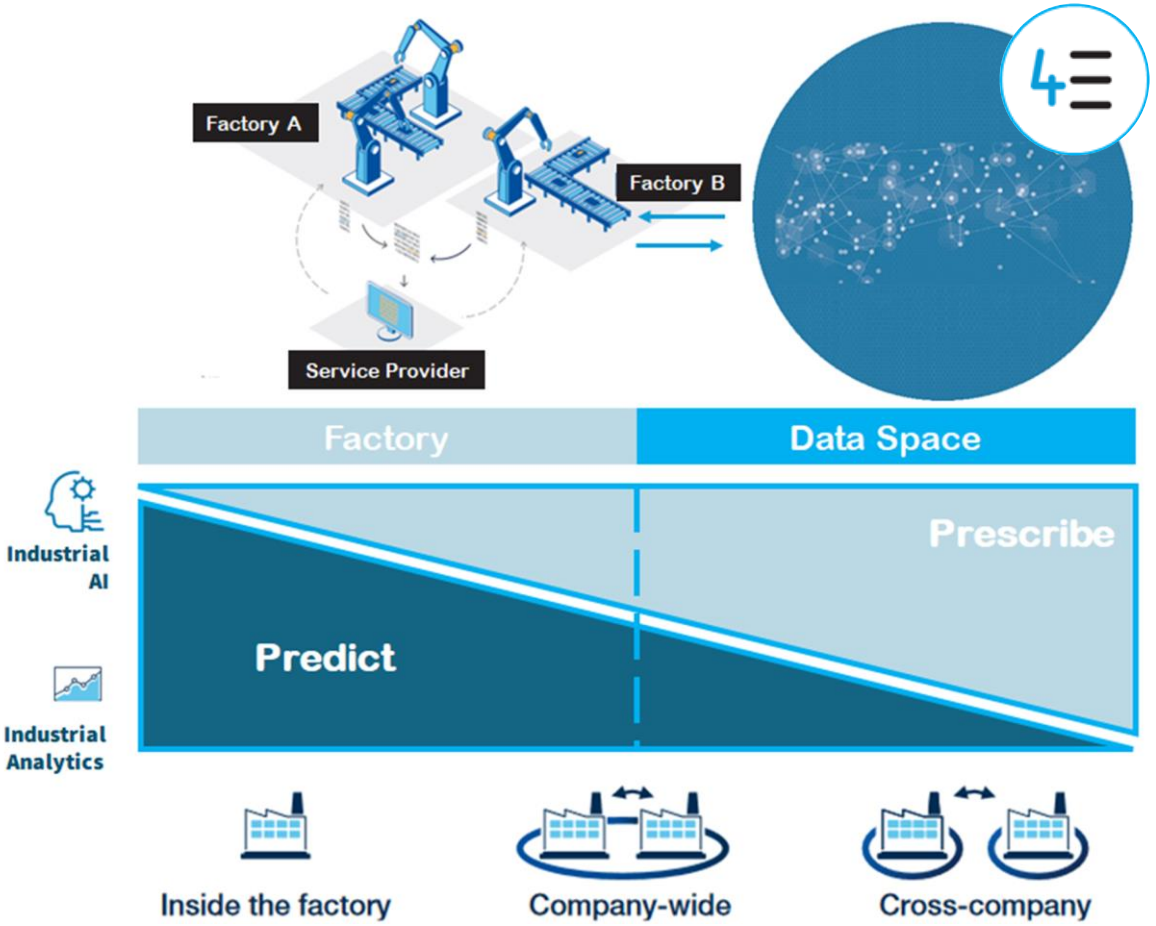
As the **data space federation authority**, it defines the organizational rules and policies for this specific asset 4.0 network federation.

Trusted & Federated Infrastructure

GLOBAL MANUFACTURING DATA ECOSYSTEMS

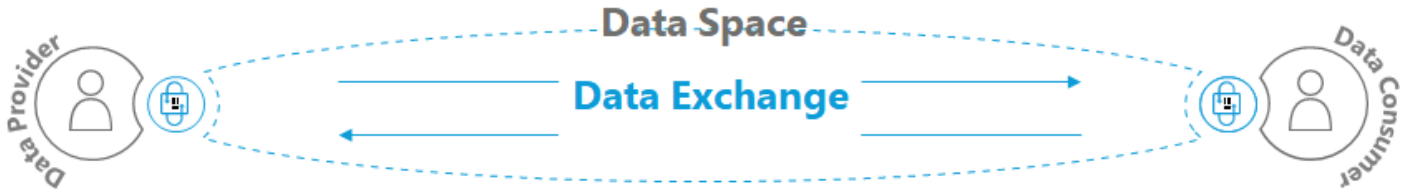


GLOBAL MANUFACTURING DATA ECOSYSTEMS



	Integrated Toolchains and Collaborative Engineering	Information Update and Change Service	Collaborative Information Logistics
Condition Monitoring led Services	Modular Production	Manufacturing as a Service – On Demand Manufacturing	Autonomous Operation-as-a-Service
Traceability	Energy-Consumption and Load Management	Carbon Footprint Management	Circular Economy

GLOBAL MANUFACTURING DATA ECOSYSTEMS

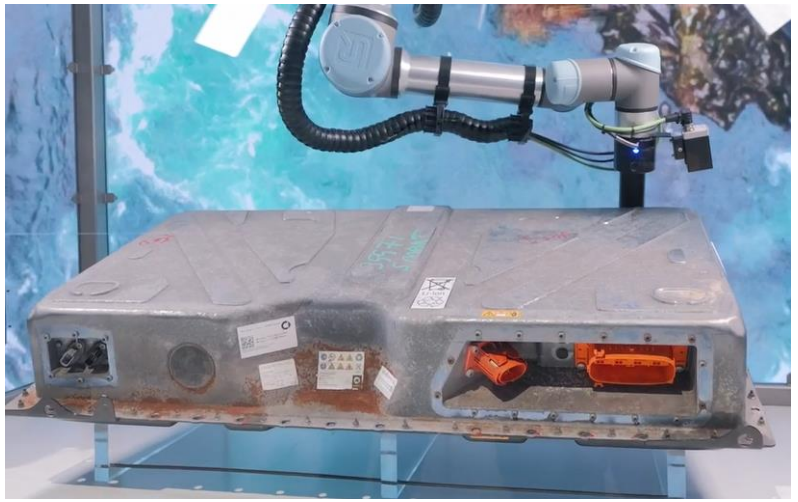


Example: Carbon Footprint

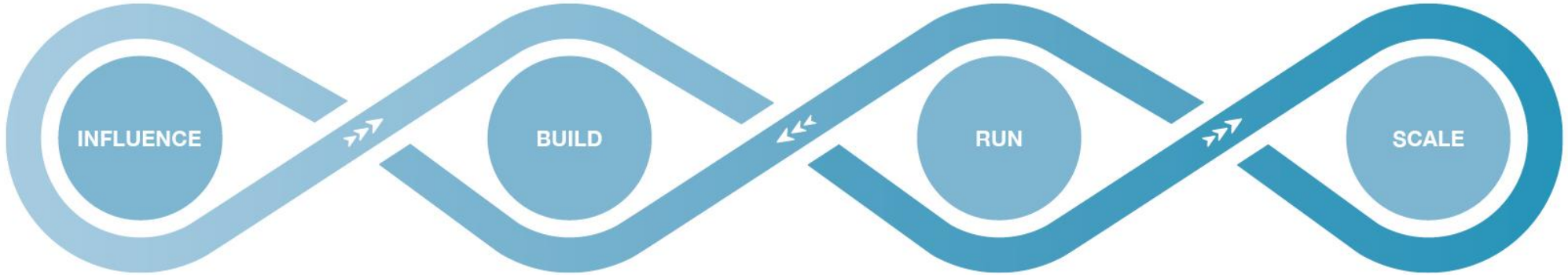
- ~10% of CO2 emissions from industry generated by **own factories**, ~90% by upstream/downstream supply chain [1)]
- To reduce CO2 emissions, transparency along the entire value chain is necessary

Example: Battery production

- Only if we use the potential of digitalization we can produce batteries more sustainably
- **~ 96% of the ingredients of a battery are recyclable**
- Consistent and transparent use of **digital twins** along the **complete cycle** the design and production will be more **sustainable**



GLOBAL MANUFACTURING DATA ECOSYSTEM HELIX

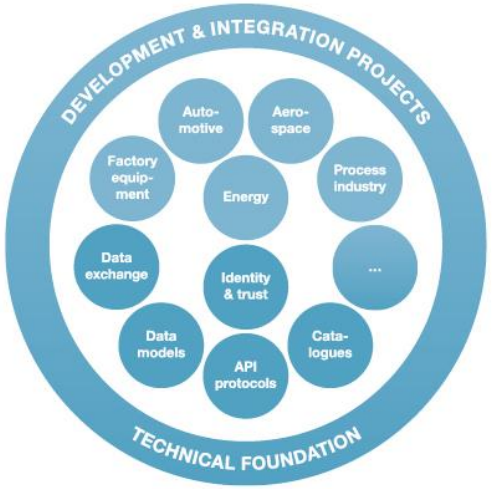


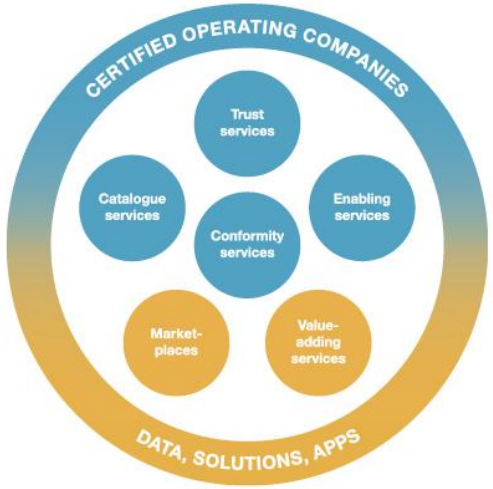
ALIGN OBJECTIVES & VISION | AGREE GOVERNANCE & RULES | DESIGN CONCEPTS, PRINCIPLES & ROAD MAPS

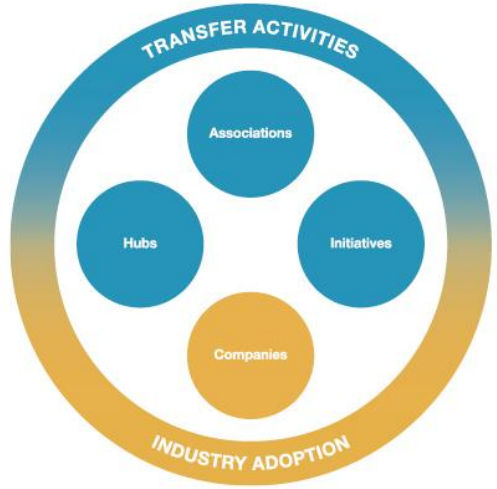
DEVELOP OSS COMPONENTS WITHIN THE COMMUNITY TO SUPPORT USE CASES | INTEGRATE TECHNICAL BUILDING BLOCKS

SECURE AND TRUSTED OPERATION OF ENABLING AND VALUE-CREATING SERVICES IN A DISTRIBUTED MODEL

SME SUPPORT ACTIVITIES | CONSULT & TRAIN | PROVIDE TEST BEDS & TEST SUPPORT | USE CASE ROLL OUT

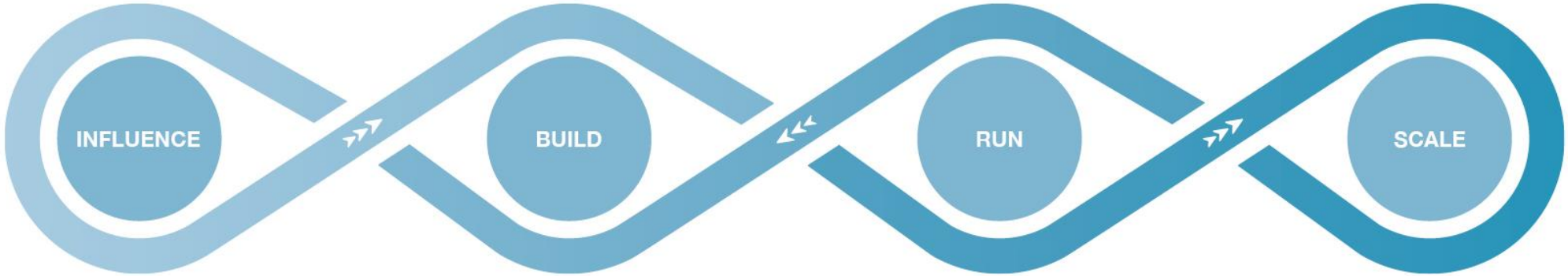






Standards **Technology** **Operations** **Value**

GLOBAL MANUFACTURING DATA ECOSYSTEM HELIX



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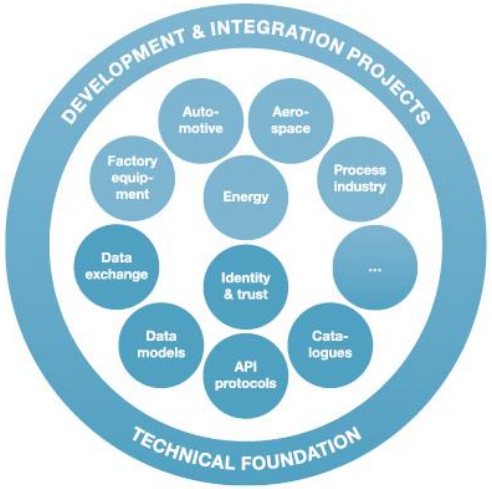

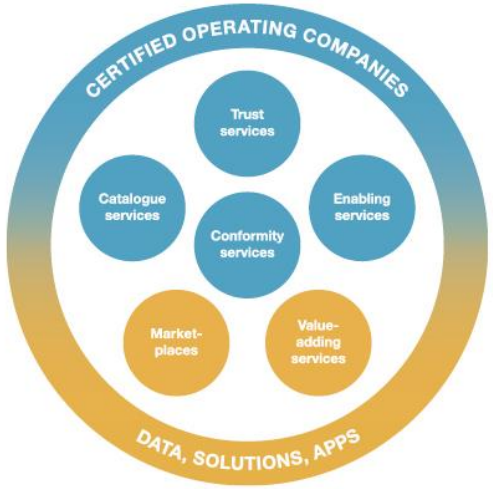

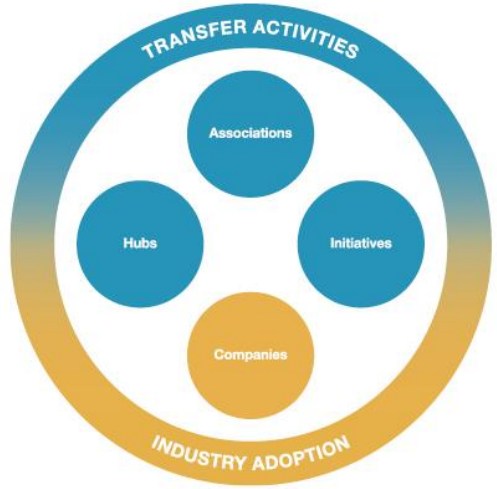

ACT LOCAL – THINK GLOBAL

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CHALLENCES GLOBAL MANUFACTURING DATA ECOSYSTEMS

Deployment **needs customization across an infrastructure continuum** from cloud to edge, depending on the applications.

Information sharing and data-driven collaboration among manufacturing initiatives across the supply network are becoming more relevant for impactful manufacturing data networks.

Harmonized standards facilitate business scale-up of data ecosystems, which are becoming essential.

✓ No country, no initiative, no company can achieve this on its own!

INTERNATIONAL MANUFACTURING-X: MAKE DATA WORK

Reorganize and increase flexibility and autonomy of industrial value chains and networks. **Resilience**

Increase efficiency and enable data-driven solutions for GHG/CO2 balancing and circular economy. **Sustainability**

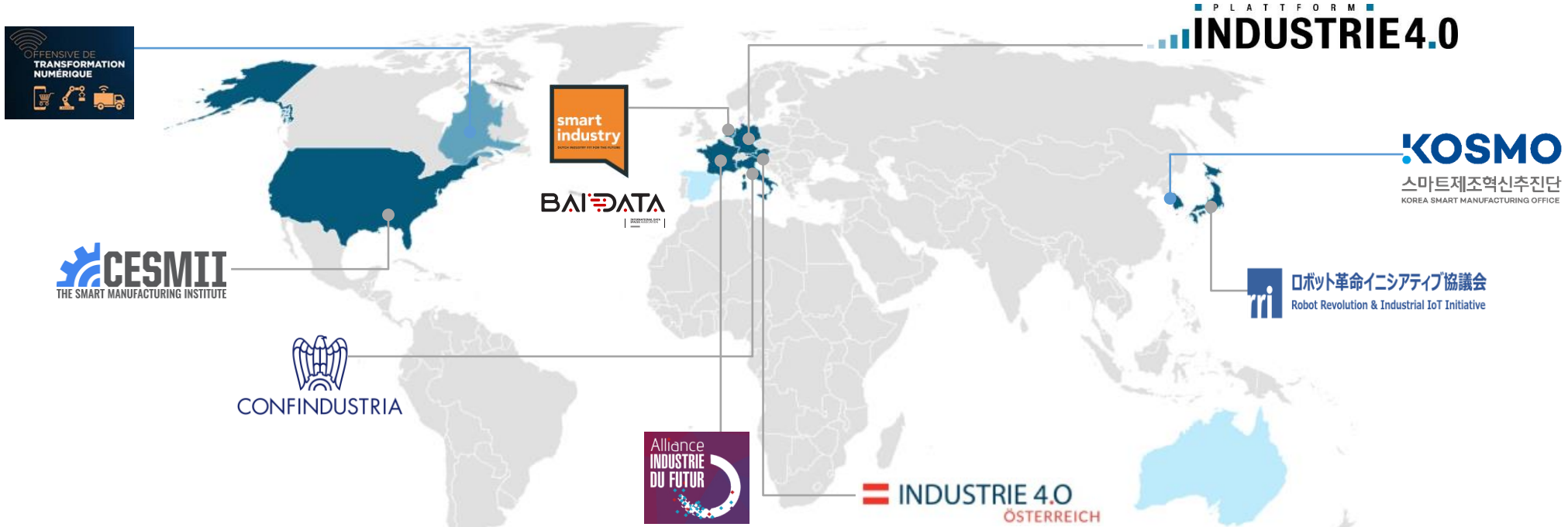
Accelerate digital innovations and enable new data-driven business models to create new value for manufacturing **Competitiveness**

INTERNATIONAL MANUFACTURING-X: MAKE DATA WORK

THE IMX COUNCIL: A CO-DESIGN AND UNIFIED EFFORT DRIVEN BY AN INTERNATIONAL ECOSYSTEM

- Develop a joint understanding of data-spaces.
- Define a joint framework for interoperable IMX (technology, standards, etc.) that manufacturing product/solution architecture can build upon.
- Connect and cooperate with other initiatives that are relevant to manufacturing (e.g. energy, logistics, mobility, etc.).
- Discussion of use cases and joint projects where appropriate.
- Drive international harmonization and standardization (consensus based and de-facto based).
- Open exchange of regional initiatives (specific projects, opportunities, etc.).
- Joint conferences and events.
- … and other topics

INITIATIVES INVOLVED IN ESTABLISHING THE IMX COUNCIL



What has happened so far:

2023 July
Foundational
Brussels,
Belgium

2023 October
Inauguration
Tokio,
Japan

2024 February
Kick-off
Paris,
France

2024 Autumn
Ramp-up
Working

DEBATE **CONSENSUS** **ACTION**

Hannover Messe
Platform Industrie 4.0
24 April 2024

Reunión de lanzamiento: mesa de datos para la industria

BAIDATA Sectorial Round Table:
Data in Manufacturing(X)
13 May 2024

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WHERE
DATA ECONOMY
HAPPENS