Making Manufacturing-X international

Why – What – How – Who

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Thomas Hahn, Dr. Dominik Rohrmus, Siemens and LNI 4.0

Why?

Challenges and Opportunities for Global Manufacturing Industries

In light of increasing **digitalization** and the resulting requirements, manufacturing throughout the world is facing **unprecedented challenges** and **opportunities.** The **real and virtual world** will continue to **coalesce**. The **entire value chain** will be **integrated and supported by digitalization,** from product, production and process design to on-site customer service and circularity – across locations as well as company and national boundaries.

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!

Why?

Challenges and Opportunities for Global Manufacturing Industries

Internationalization
(e.g. Poland, CESMII, etc)

Security

Data sovereignty

Lack of connectivity

Lack of interoperability

Lack of skills

Lack of speed

As-a-Service business models

SaaS

Standards & Regulations
(e.g. EU CRA, EU Data Act, OPC UA, AAS, …)

Scalability

Why?

Example from Automotive

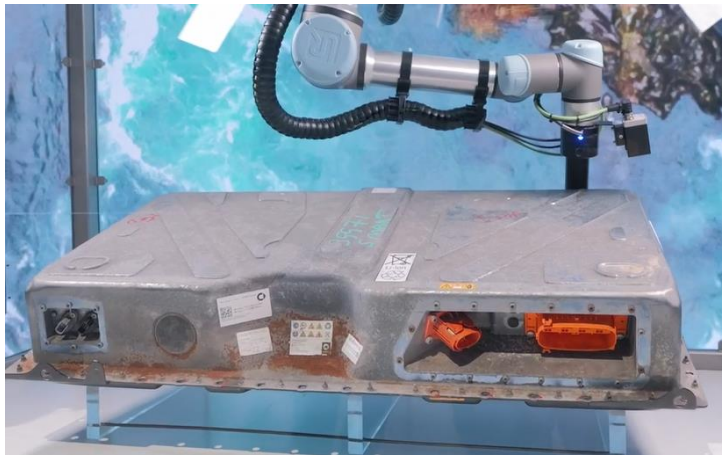
Example: Carbon Footprint

- ~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

1) depending on production

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



Motivation & Big Picture

International Manufacturing-X (IM-X): Make Data Work

IM-X will implement a federated, decentralized and collaborative data ecosystem for smart manufacturing. Open, global and cross-industry, following FAIR Data Principles.

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**

Motivation & Big Picture

Foundational Framework for IM-X

A common guideline for IM-X activities and international stakeholders.

Strategic Goals

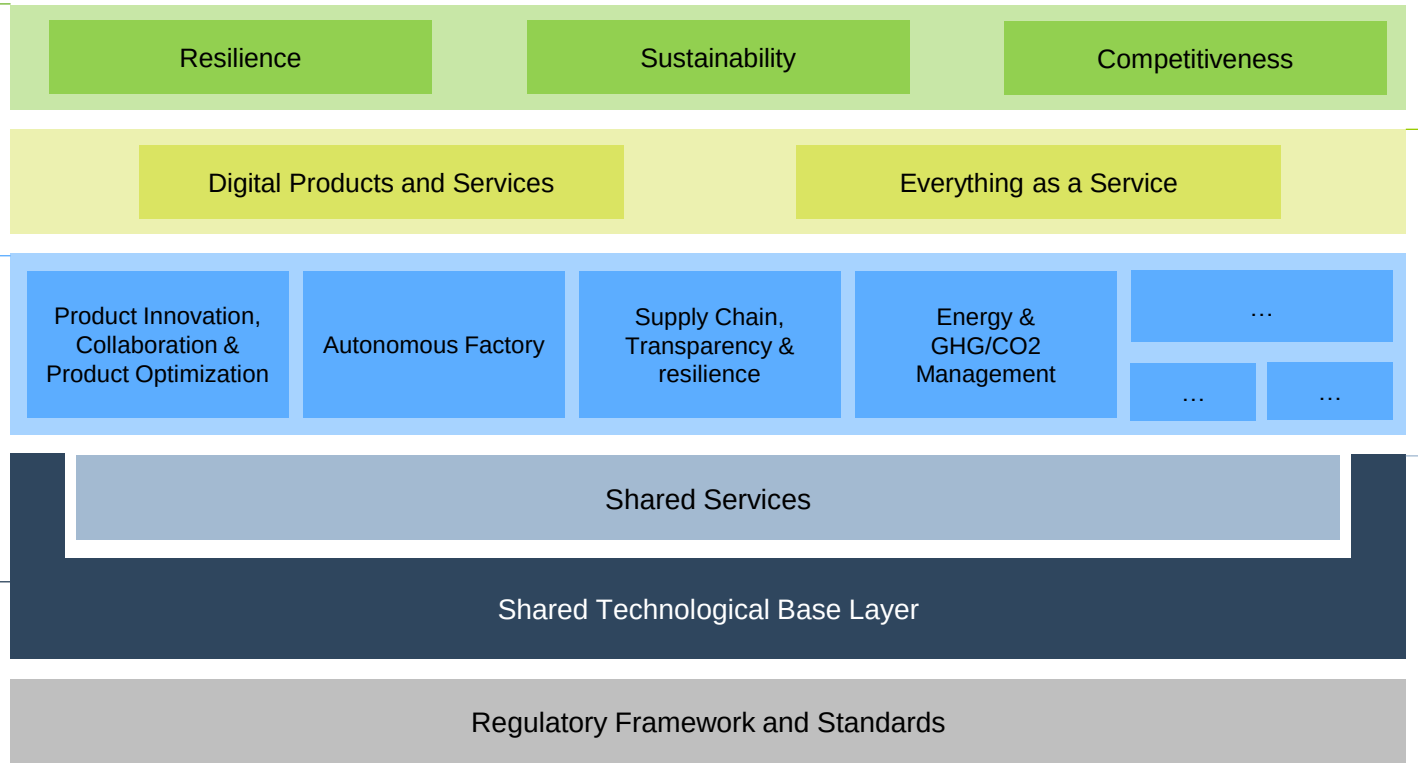
International Manufacturing-X develops the foundations for a resilient and competitive industry in a sustainable society.

Exemplary Cross-Industry Use Cases

International Manufacturing-X addresses cross-industry use cases based on a collaborative use of data with high economic and ecological impact.

Foundation

International Manufacturing-X defines global standards and runs a basic technical infrastructure to guarantee interoperability and sovereignty.



Business Models

International Manufacturing-X enables innovative business models based on a interoperable data-ecosystems

Capabilities

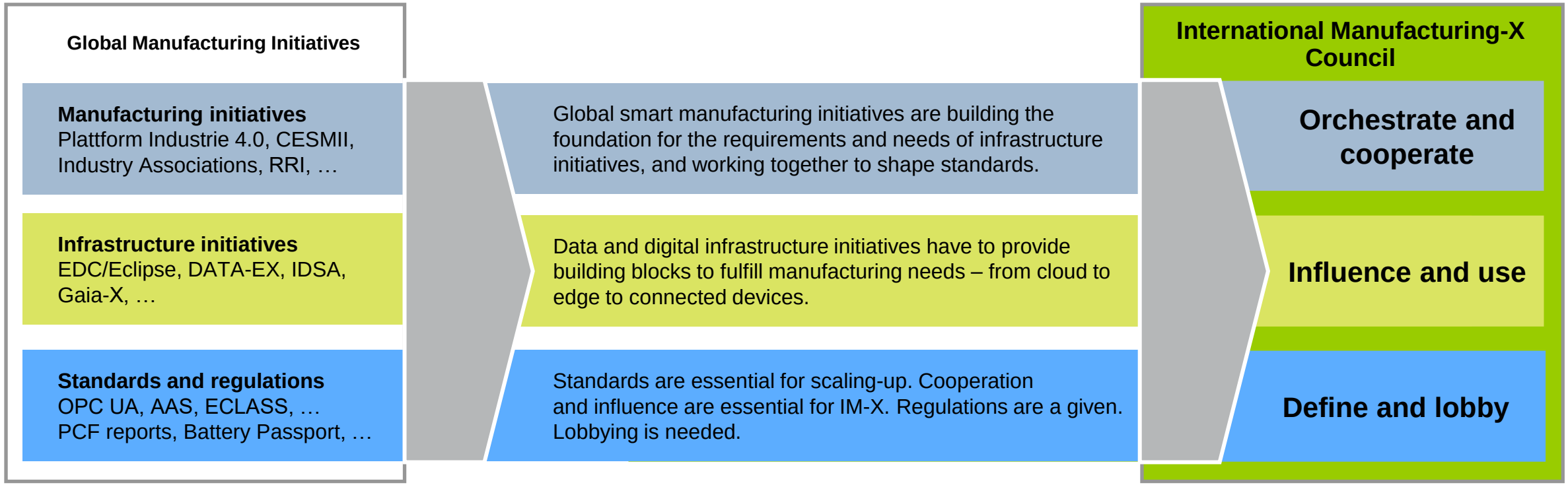
International Manufacturing-X enables development and deployment of fundamental services driving the federated data ecosystem.

Requirements

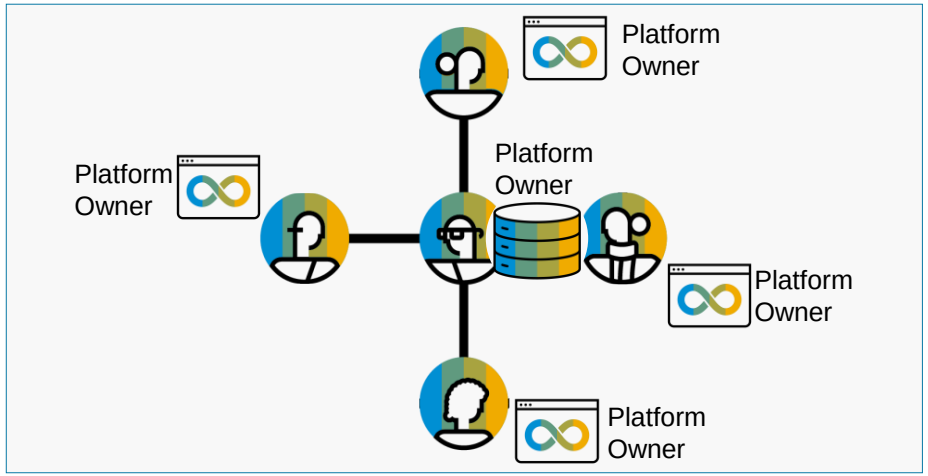
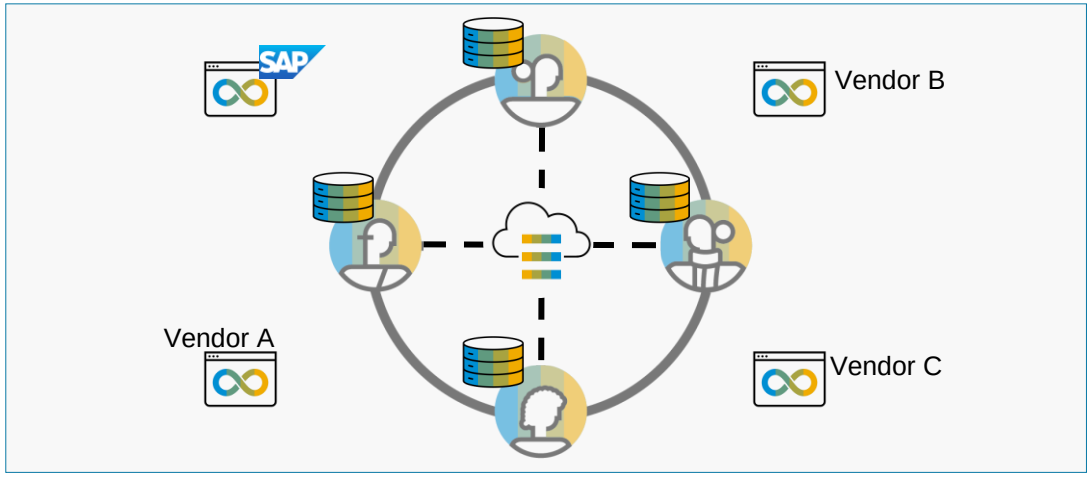
International Manufacturing-X builds on a common technical, organizational and legal framework and contributes to the future development in cooperation with international law.

Landscape of Initiatives in the Context of global manufacturing

Manufacturing-X is international. Our intention is to trigger international R&D, partnerships, cooperation, standardization and deployment with and for customers globally.



How it is different from traditional Industry Platforms

	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

The Threefold Vision Behind IM-X

1.
Connect value chains and manufacturing data networks across industries and countries.

2.
Implement global foundations for data-driven resilient, sovereign and climate-neutral production covering the full life cycle of production and products.

3.
Enable innovative value creation in an interoperable and sovereign data ecosystem.

Mission

The IM-X Mission: Make Data Work at a Global Scale, Across Industries and Stakeholders

IM-X will implement a **federated**, **decentralized** and **collaborative** data ecosystem for smart manufacturing. It aims to enable **open**, **global** and **cross-sector** international operation of **cost-effective** data networks.

This can be realized through **3 main lines of activity**:

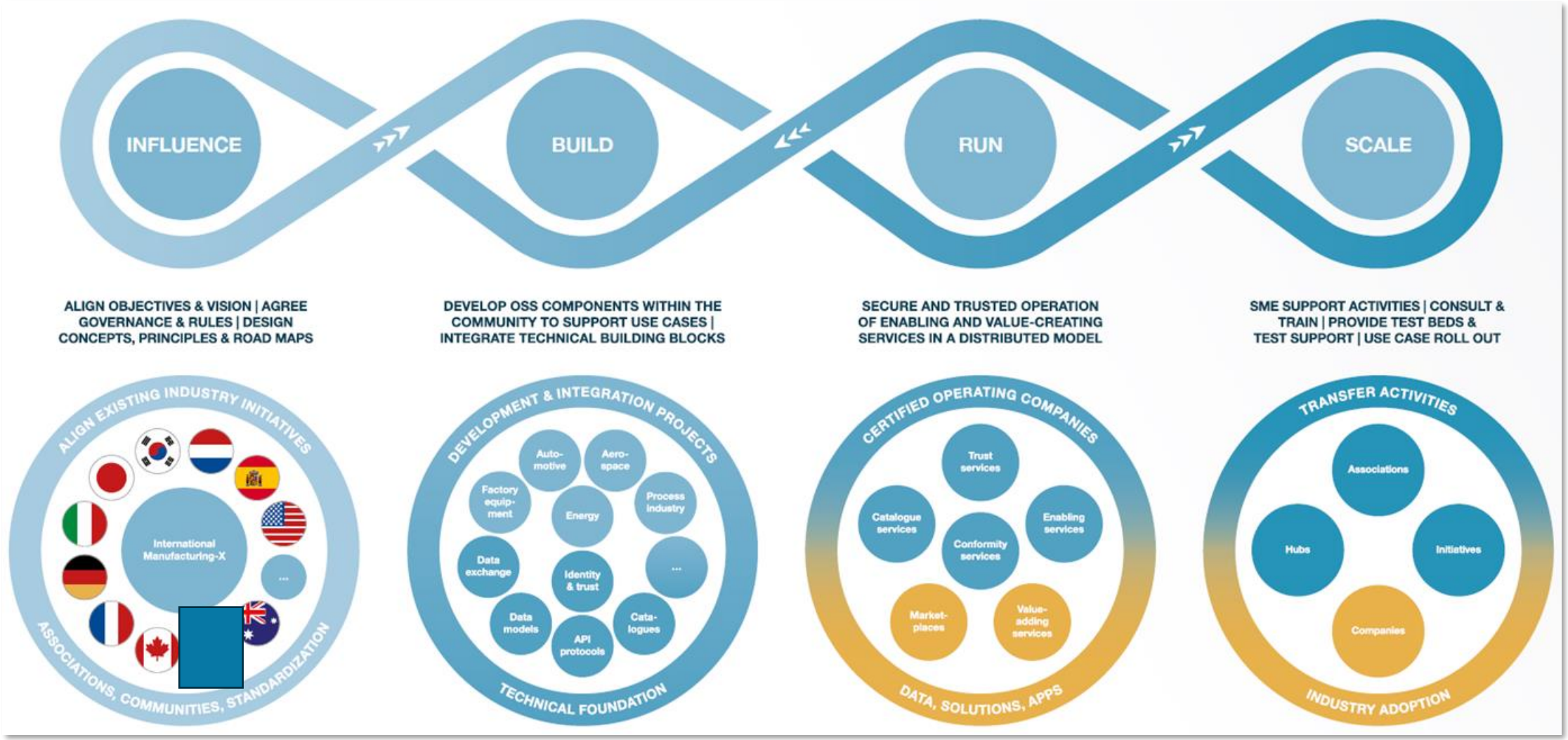
1.
Facilitate industry use cases on the collaborative use of industrial data for all manufacturing industries.

2.
Develop the requirements, influence international standardization and framework development for basic infra-structure to deploy federated data-ecosystems for manufacturing.

3.
Provide guidelines to leverage easy-to-use applications and dynamically scale the ecosystems.

How?

How Industrial Data Ecosystems work



How?

Establishing the International Manufacturing-X Council

Open collaboration, inclusiveness, transparency and equal treatment of all the partners inside this international Manufacturing-X ecosystem are key!

The **International Manufacturing-X Council** will determine collectively what is needed, what to do and who is responsible.

One Country, One Vote

What?

The IM-X Council: A Co-Design and Unified Effort Driven by an International Ecosystem

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

Who?

Initiatives Involved in Establishing the IMX Council

What has happened so far:

2023 July

Initiation Brussels, Belgium

2023 October

Inauguration Tokio, Japan

2024 February

Kick-off Paris, France

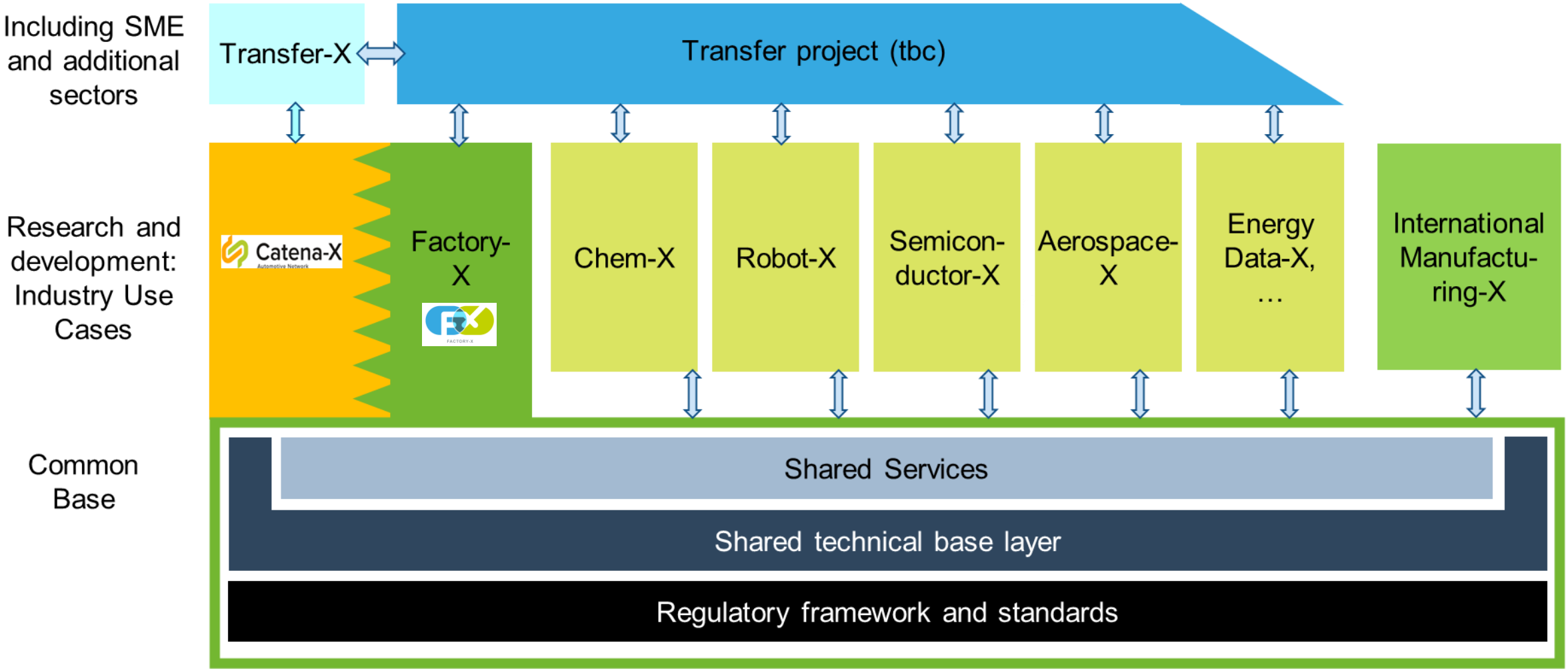
2024 September

INDUSTRIE 4.0 ÖSTERREICH

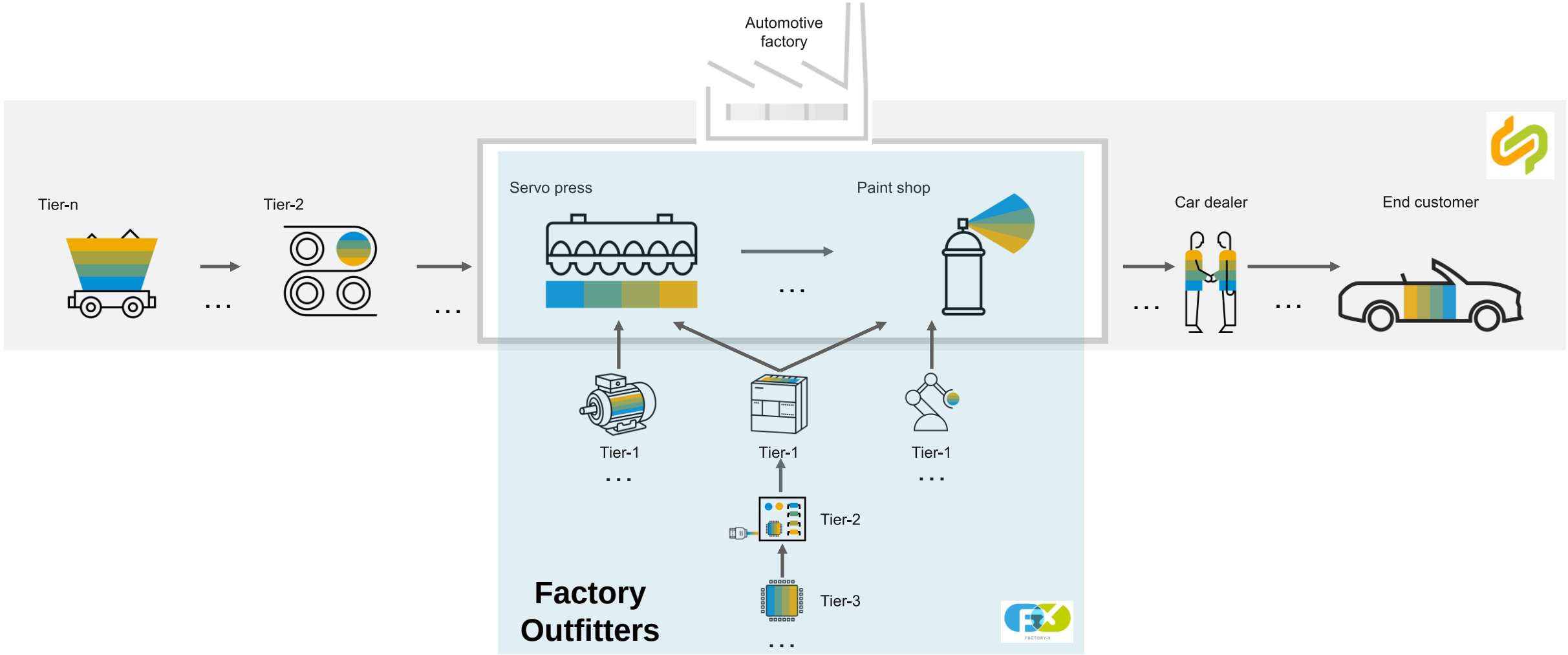
Germany: domain specific projects

IM-X will implement a federated, decentralized and collaborative data ecosystem for smart manufacturing. Open, global and cross-industry, following FAIR Data Principles.

Germany: cooperation between the projects



Germany: Catena-X and Factory-X meet



Germany: Factory-X Industry Use Cases

11 Use Cases für horizontalen- und vertikalen Datenaustausch

Integrated Toolchains and Collaborative Engineering

DPP

Information Update and Change Service

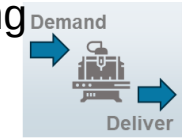
Collaborative Information Logistics

Condition Monitoring led Services

Modular Production

Manufacturing as a Service – On Demand Manufacturing

DPP



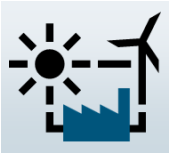
Autonomous Operation-as-a-Service

Traceability

DPP

Energy-Consumption and Load Management

DPP



Carbon Footprint Management

DPP

Circular Economy

DPP

Factory-X Kernel & Basis Services

What's next?

We are driven by business purposes

- WG on data-spaces (influence, build, run, scale)
- WG on DPP, Regulation
- WG overview about projects around the world. Knowledge transfer
- WG on testbed to elaborate jointly technologies (e.g. for DPP, PCF etc.)
- Next events:
  - 2024 October: Japan and Korea public events
  - 2024 November: USA IMX meeting
  - 2025 April: Hannover Fair 2025