Manufacturing-X

Make Data Work. Competitive, Resilient & Sustainable
The Open Initiative to Build a Cross-Sectorial Data Ecosystem for the Industry
Contents

#1 Motivation & „Big Picture“

#2 Use Cases & Application

#3 Architecture & Technology

#4 Conclusion & Next steps
Gaia-X community **leaves open the purpose of the data exchange** but provides a trust framework to exchange data.
With Catena-X, the automotive industry of the future uses a trustworthy, collaborative, open and secure data ecosystem. All players are networked in end-to-end value chains, in which all partners are on an equal ground, have sovereign control over their data and no lock-in effects occur, which provides a sustainable solution for the digitalization of supply chains, especially for medium-sized and small companies, and supports the cooperation and collaboration of market participants and competitors.
#1 | Motivation & „Big Picture“

Manufacturing-X. Make Data Work.

Manufacturing-X will shape the decentral and collaborative Industrial Data Eco Systems. **Data exchange with common purpose for different industries.** Open, global and cross-sectoral.

- **Resilience**: Reorganize and increase flexibility and independency of industrial value chains and networks.
- **Sustainability**: Increase efficiency and enable data-driven solutions for CO$_2$ balancing and circular economy.
- **Competitiveness**: Accelerate digital innovations and enable new data-driven business models.
#1 | Motivation & „Big Picture“
The Foundational Framework for Manufacturing-X

The Foundational Framework as common guideline for Manufacturing-X activities & international stakeholders.

Strategic Goals
- Resilience
- Sustainability
- Competitiveness

Business Models
- Digital Products and Services
- Everything as a Service

Exemplary Cross-Industry Use Cases
- Product Innovation Collaboration
- Production Optimization / Autonomous Factory
- Supply Chain Transparency
- Energy & CO2-Management

Capabilities
- Shared Services

Foundation
- Shared Technological Base Layer

Constraints
- Regulatory Framework and Standards

Individual Industry Business Challenge
Joint Community Challenge
Contents

#1 Motivation & „Big Picture“
#2 Use Cases & Application
#3 Architecture & Technology
#4 Conclusion & Next steps
Manufacturing-X implements cross-industry use cases and application with both: High business impact and significant ecologic benefit.

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

**Business Models**
Manufacturing-X enables innovative business models based on a unique data-infrastructure.

**Exemplary Cross-Industry Use Cases**
Manufacturing-X addresses cross-sectorial use cases based on a collaborative use of data with high economic and ecologic impact.

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

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

**Constraints**
Manufacturing-X builds on a common technical, organizational and legal framework and contributes to the future development in cooperation with European and international legislative.
The Foundational Framework for Manufacturing-X

The Foundational Framework as common guideline for Manufacturing-X activities & international stakeholders.

Digital Products and Services
- Digital Product Passport
- Machine process consulting
- Flexible production processes
- Energy flexible control
- Digital customer networks

Everything as a Service
- Pay Per Use models
- Flexible service models
- Logistics as a service
- Manufacturing as a service
- Energy flexible contracts

Resilience | Sustainability | Competitiveness
#2 | Use Cases & Application

**Manufacturing-X Use Case: Value-assessment**

Value-assessment to identify collaborative, data-driven use cases within an industrial ecosystem

- **Community Viability:** Where is the money?
  - Customer are willing to pay for the solution. Market is large enough so that companies are willing to invest in development.

- **Strategy:**
  - **Fits to goals:** Use case fits to the Manufacturing-X goals: Resiliency, competitiveness, climate neutrality and sustainability.
  - **Fits for SME:** Use case can be implemented by small and medium sized enterprises (low entry hurdles (“out-of-the-box”), limited dependencies, balance between implementation effort and utility)

- **Value:**
  - **Value proposition:** Use case has a clear value proposition to all involved parties and addresses measurable KPIs (data provider and consumer has a benefit)
  - **Time-to-value:** Use case shows an impact (on beforementioned KPIs) within 1-2 years
  - **Scalability:** General Use case fits to a significant number of companies and industries (still a certain level of tailoring might be required for specific customers)
  - **Interoperability & data sovereignty:** Use case integrates in a larger business context (business process and technology)

- **Technology:**
  - **Fits to framework:** Use case fits to the defined cross-industry framework and implements the agreed open standards if applicable (e.g. Gaia-X, AAS, EDC, …)
  - **Network:** Use case has a clear network focus (multilateral data sharing, multi-level information flow not limited to direct business partners)
Contents

#1 Motivation & „Big Picture“

#2 Use Cases & Application

#3 Architecture & Technology

#4 Conclusion & Next steps
#3 | Architecture & Technology

Core elements for a cross-industry architecture

Common building blocks of a unique technical architecture ensure cross-industry and inter-application interoperability

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

**Business Models**
Manufacturing-X enables innovative business models based on a unique data-infrastructure.

**Exemplary Cross-Industry Use Cases**
Manufacturing-X addresses cross-sectorial use cases based on a collaborative use of data with high economic impact.

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

**Foundation**
Manufacturing-X builds on a common technical, organizational and legal framework and contributes to the future development in cooperation with European and international legislative.
Interoperable data-ecosystems build on a unique kernel

Data-economy in industrial applications rely on a solid core of basic architectural elements and services – with identical requirements for different use cases and industries!

Identity & Trust
Transactions are only carried out if you know and trust each other.
Executions are only possible if sender and recipient can be clearly identified.

Visibility & Access
Equal access with the same performance for all participants.
Transparent access prevents abuse and protects participants.

Service & Sharing
Sharing uniform and standardized services avoids waste and saves energy.

Agreements
New agreements lead to new business models and value creation between participants is realized.

Basic elements of core MFX-architecture
Core elements of basic architecture for a federated data-ecosystem…

✓ are identical for different applications
✓ ensure cross-industry interoperability
✓ have to be developed only once

Core elements are the joint adhesive holding all industries together

Industry-specific architectural elements reflect the specific requirements of each individual sector

Individual use cases build around core services allow for innovative use cases within and across industries
Contents

#1 Motivation & „Big Picture“

#2 Use Cases & Application

#3 Architecture & Technology

#4 Conclusion & Next steps
#4 | Conclusion & Next steps

**Manufacturing-X**

Make data work. Competitive, Resilient & Sustainable.

Manufacturing-X implements the basic infrastructure to deploy **federated data-ecosystems for industrial applications:**

- In an international **approach** Manufacturing-X connects value chains and manufacturing networks across all industrial sectors.

- A **common technical core** build on basic cornerstones from recent developments of Industrie 4.0 guarantees interoperability.

- A use-case based approach focuses on the **economic & ecologic impact** of collaborative use of data and ensures a dynamic scaling of the ecosystem.

- Setting-up an organizational structure will facilitate the **open cooperation of the global MFX-community**.
Join in, participate and contribute to the collaborative development of the Data Space Industrie 4.0!
#4 | Conclusion & Next steps

**Manufacturing-X**
Make data work. Competitive, Resilient & Sustainable.

Want to learn more about Manufacturing-X?

Visit Manufacturing-X on Plattform Industrie 4.0

[www.plattform-i40.de/manufacturing-x](http://www.plattform-i40.de/manufacturing-x)