A European Common Digital Manufacturing Infrastructure and Data Space Pathway for Connected Factories 4.0 Data Value Chain Governance

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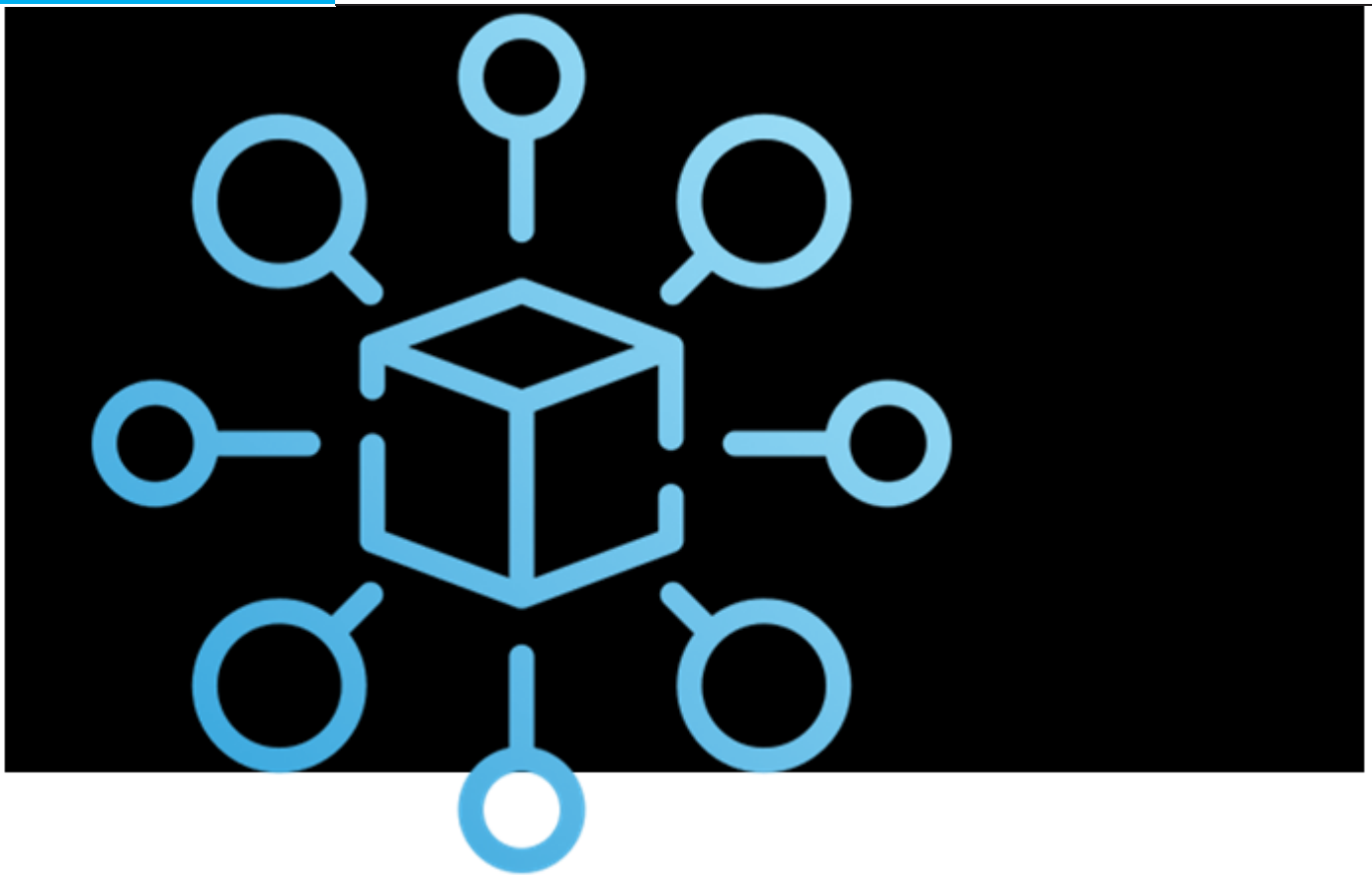

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VDI TECHNOLOGIEZENTRUM GMBH	VDI TZI
BRAINPORT INDUSTRIES COOPERATIE UA	BPI
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ENGINEERING - INGEGNERIA INFORMATICA SPA	ENG
UNPARALLEL INNOVATION LDA	UNPARALLEL
SOFTWARE QUALITY SYSTEMS SA	SQS
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Executive Summary

This document describes the activities performed by the project to facilitate a Manufacturing Data Space Alliance and a governance body. The document describes the efforst peformed to set up a European and International Council, the so called International Manufacturing-X Council (IMX), that will facilitate the global implementation of manufacturing data networks and realise the possibility of making data work.

The document describes the process that has been followed to set up the council and the most recent version of the governance framework and approach. The IMX Council brings together the major initiatives dealing with Industry 4.0 and has helped to consolidate strong european data ecosystems based on transparent, participative and collaborative governance processes and structures.

The IMX Council is a living organisation that will leave beyond the current implementation of the Data Space 4.0 project.

Keywords: Risk management, risks in the project, mitigation measures, risk assessment

Disclaimer

Acknowledgement

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Abbreviations and Acronyms

Acronym	Meaning
CA	Consortium Agreement
CPPS	Cyber-Physical Production System
DoA	Description of Action
EC	European Commission
GA	General Assembly
IPR	Intellectual Property Regulations
KPI	Key Performance Indicator
REI	Responsible Exploitation & Innovation Board
RRI	Responsible Research & Innovation
TCC	Technical Coordination Committee
WP	Work Package

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1 Introduction

1.1 Motivation and Purpose of the document

The development of manufacturing data networks supported by manufacturing data spaces is an activity that will expand at a global scale. Currently, data space technologies for manufacturing are being trialled in different sectors, individual projects and countries by companies of many different sizes. The momentum of data spaces and data sharing for manufacturing cannot be denied. However, fragmented and uncoordinated efforts make it more difficult to reach the necessary scale and adoption of manufacturing data space technologies in the manufacturing sectors. Pioneering initiatives such as Catena-X are showing the pathway in sectors such as automotive but they still lack the necessary scale for adoption and impact.

The purpose of this document is to describe the activities implemented by the Data Space 4.0 project to facilitate an international effort to coordinate the development of data-driven transformation in manufacturing industry. This effort is intended to ensure that european values in deployment and operation in data space in manufacturing can be transferred and supported by global developments and data manufacturing networks. This document also describes the activities and scope of current activities of such governance body .

1.2 Structure of the document

Chapter 1 is the introduction and describes the motivation and the structure of the document.

Chapter 2 provides an overview of the starting point of development of the Governance body; i.e. Trilanteral Alliance.

Chapter 3 provides an overview on the steps implemented towards the establisment of a manufacturing data space alliance (the so called International Manufacturing-X Council (IMX C) and its motivation, vision & mission.

Chapter 4 provides an overview on the technical framework that drives the operations of the data space activities in manufacturing.

Chapter 5 provides an overview on the governance body proposed for IMX Council activities.

Chapter 6 draws some conclusions and describes how the Data Space 4.0 activity about Industry Agreements will be prosecuted along the rest of the project in 2023.

2 Manufacturing Data Space Alliance Background

This Sections provides an overview about the foundations for the establishment of the Manufacturing Data Space Alliance and Governance Body. The starting point on the establishment of such alliance was the ecosystem established by the Industry 4.0 national initiatives; the so called trilateral alliance and the ecosystem of European initiatives in place dealing with manufacturing data spaces. This can be seen in the Figure below and the overall strategy set by Data Space 4.0 to build the Data Space 4.0 continuum.

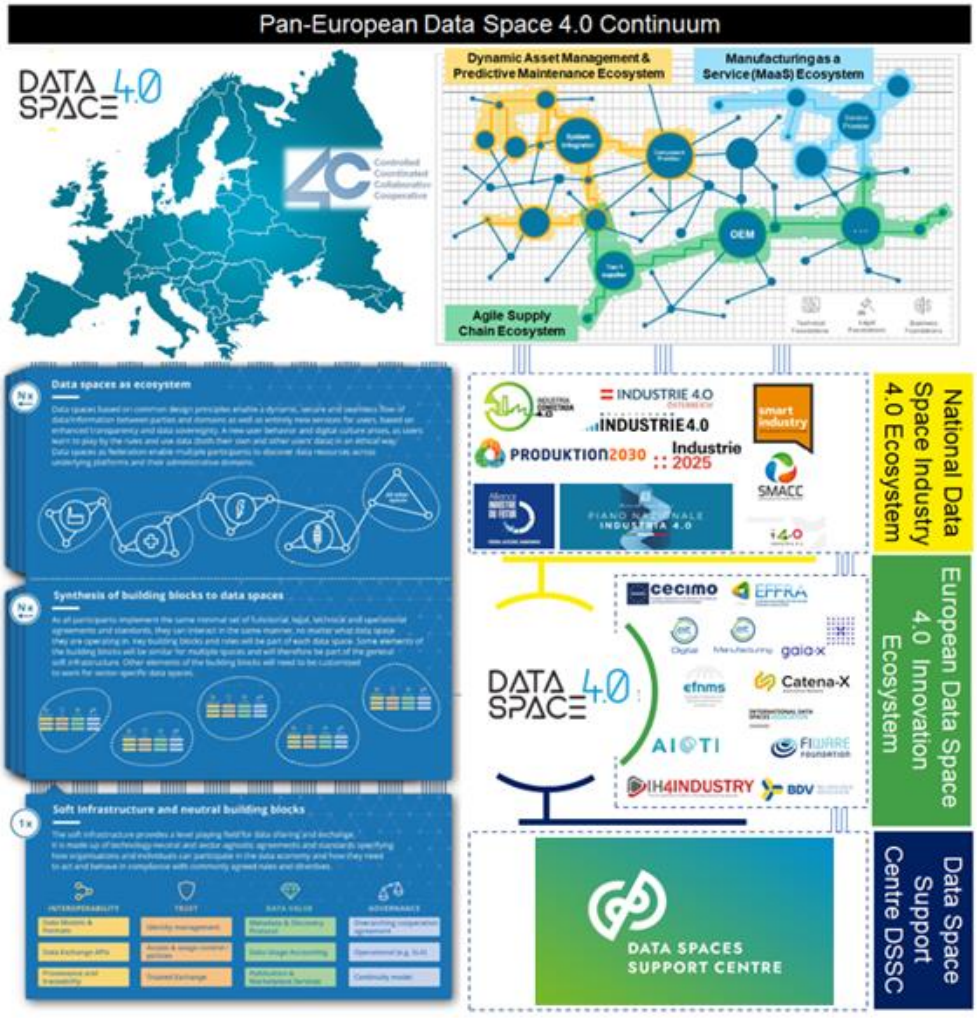

Figure 1 – Manufacturing Data Space Alliance – ecosystem set-up

The context is very well reflected in the position paper published by the Trilateral Alliance "Shaping European Data Spaces for Smart Manufacturing" that integrates significant inputs from the inicial activities of the project . This position paper, presented at Hannover Messe 2023 and discussed at the stakeholder meeting & panel organised by the project – see Annex II for Hannover 2023 agenda, can be regarded as the embryonic document to call for the establishment of an Alliance of national initiatives (see full document in Annex I). We here reproduce the statement:

> *"In close alignment with European partners – from industry, from governments, from academia – and the European Commission, we need to advocate the broad elaboration and roll-out of common foundations for the data space throughout the European manufacturing industry.*
>
> *We demand a pan-European sectorial alliance to harmonize, accelerate, and synchronize national data space initiatives for developing a common European data space for the manufacturing industry. This alliance will mark the ground by defining a common manufacturing data space reference framework that is based on a common technical, legal, and business infrastructure. The alliance will build upon existing results and artefacts to further elaborate and specify the basic building blocks for a coherent, widely accepted operational model for the manufacturing data space based on European values and will drive the economic utilization of manufacturing data spaces by fostering dissemination and best practice sharing." (Position Paper, Shaping European Data Spaces for Smart Manufacturing, February 2023)*

3 Manufacturing Data Space Alliance Establishment

From the Challenge set by the position paper published in February 2023, the community has quickly engaged in a joint effort that has allowed the establishment of a manufacturing data space alliance. As shown in the Figure below, 4 major milestones have followed the open dialogue initiated in Hannover Messe 2023 stakeholder´s meeting.

On July 2023, in Brussels the foundational meeting took place – See agenda in Annex III. This meeting was instrumental in making the initiative aware to all stakeholders in the data space activities and european, international and national level. The foundational meeting was mainly used to agree on the principles that would drive the development of the alliance and the form that it would take.

In October 2023, the public announcement to the overall community was made in Tokio, Japan. This announcement was followed by a number of announcements across the globe taking place for instance in Korea, Canada, Netherlands that concluded in a joint announcement in US and Europe with a joint pannel help in the CESMI Smart Manufacturing Annual Conference 2023 in Greenville, South Carolina and the BDVA EBDVF 2023 in Valencia.

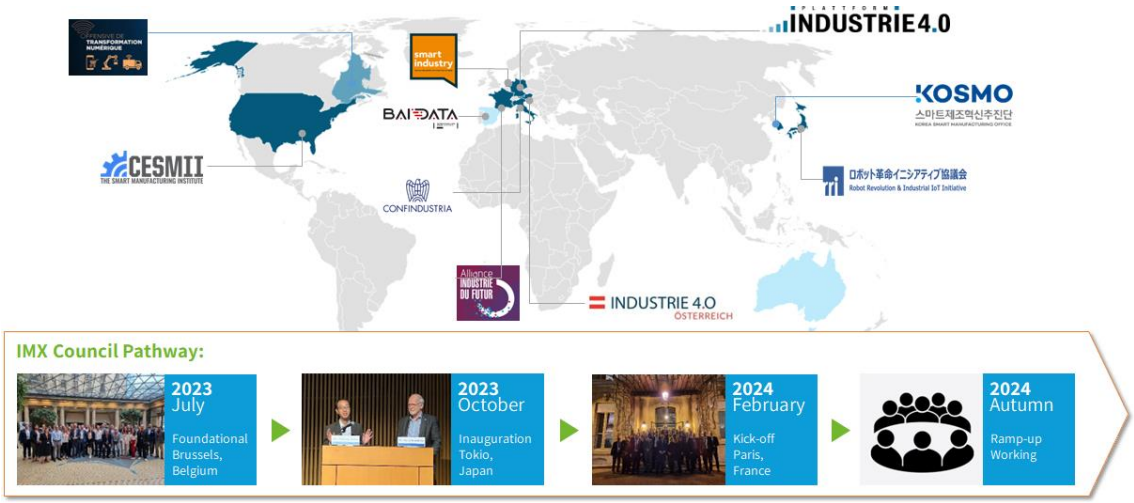

Figure 2 . International Manufacturing-X Council Pathway

These initial activities aimed at raising awareness on the alliance, are now followed by a second phase were the activities of the alliance are actually kicked-off and rampped-up. The kick-off of the IMX Council took place in Paris (Spring Council Meeting) and will be followed by a Fall meeting in the US, coinciding with the CESMI Smart Manufacturing conference in Knoxville.

The following initiatives are currently involved in establishing the IM-X Council:

- Alliance Industrie du Futur, France
- CESMII The Smart Manufacturing Institute, USA
- Confindustria, Italy
- Korea Smart Manufacturing Office Kosmo, Korea

- Offensive de Transformation Numérique, Canada
- Plattform Industrie 4.0, Germany
- Plattform Industrie 4.0 Österreich, Austria
- RRI Robot Revolution & Industrial IoT Initiative, Japan
- Smart Industry Program, the Netherlands
- BAIDATA, Spain

It should be noticed that behind these organisations lay thousands of industrial stakeholders in different areas of activities (automotive, aeronautics, electronics, textile, furniture, food, process industry, machine tool or energy among others) and with a strong reach of small and medium enterprise footprint.

Based on OECD data, the countries that currently conform the Council, as shown in the table below ,account for

- Population: 860M (11% of Globe)
- Total GDP: $ 46.9T (47% of Globe)
- Manufacturing Value-Add GDP: $ 5.2T (35% of Globe)
- Exports: $ 11.5T ($ 9.0T Goods)
- Imports: $ 12.5T ($10.5T Goods)
- GHG Emissions: 9.85 GT-CO2 eq (29% of Globe)
- Democratic Index: 8.1/10 (Global Average: 4/10)
- GII Innovation Index: 56.6/100 (Equivalent Average of 10th rank)

	Aust'lia	Austr.	Can	Fra	Ger	Italy	Japan	S.Kor	Neth	Spn	US	World
GDP [$B] (Nom, 2022)	1,680	471	2,140	2,780	4,070	2,010	4,230	1,670	991	1,400	25,460	100,880
Manf Value-Add [$B] (Nom, 2022)	96	75	210	265	752	284	1,025	429	115	161	2,650	16,550
Population (Million, 2022)	26.0	9.0	38.9	67.9	84.1	58.9	125.1	51.6	17.7	47.6	333	7,951
Exports [$B]	412	212	598	619	1,656	657	748	686	898	495	2,065	31,000
Imports [$B]	290	233	570	822	1,569	696	904	733	964	417	3,243	31,000
GHG Emissions [MT CO_2]	383	62	565	304	750	317	1,100	606	610	249	4,900	33,500
Democracy Index [OCED]	8.71	8.20	8.85	8.07	8.80	7.69	8.33	8.03	9.00	8.07	7.85	3.93
Innovation Index [GII]	47.1	50.2	50.8	55.0	57.2	46.1	53.6	57.8	58.0	44.6	61.8	31.7

Table 1 – IMX-C Founding Members Representativity

The participation of additional nations is now open for expressions of interest that are being considered so the footprint of the initiative can be increased.

3.1 IMX Council Motivation

The main aim of the International Manufacturing-X Council is to to Make Manufacturing Data Work. 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. No country, no initiative, no company can achieve this on its own.

- Deployment needs customization across an infrastructure continuum from cloud to edge, depending on the applications.
- Information sharing and data-driven collaboration among manufacturing initiatives are becoming more relevant for impactful manufacturing data networks.
- Harmonized standards facilitate business scale-up of data ecosystems, which are becoming essential.

Figure 3 – Manufacturing Data Space Governance Opportunities

International Manufacturing-X (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, following FAIR Data Principles. This will result in:

- *Resilience*: Reorganize and increase flexibility and autonomy 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 to create new value for manufacturing.

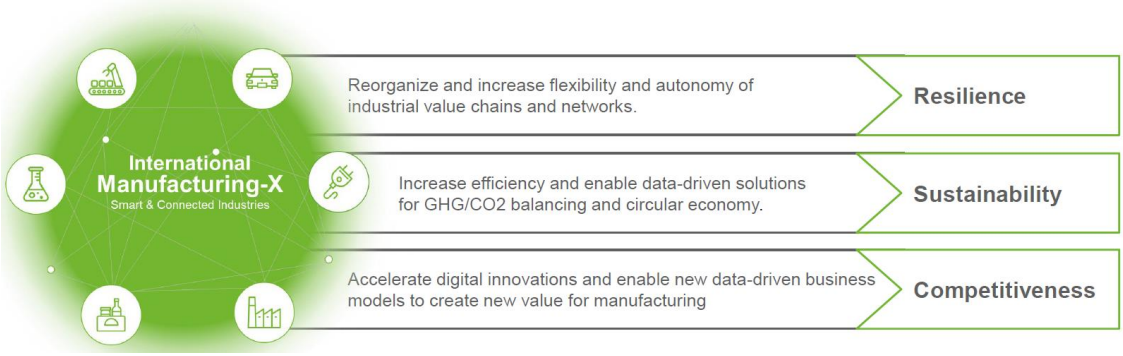

Figure 4 - Manufacturing Data Space Governance Business Value

The Threefold Vision Behind International Manufacturing-X can be summarised as follows:

- CONNECT value chains and manufacturing data networks across industries and countries.
- IMPLEMENT global foundations for data-driven resilient, sovereign and climate-neutral production covering the full life cycle of production and products.
- ENABLE innovative value creation in an interoperable and sovereign data ecosystem.

Figure 5 – Manufacturing Data Space Vision

The IM-X Mission is to realize this vision through three main lines of activity:

- Facilitate use cases on the collaborative use of industrial data for all manufacturing industries.
- Develop the requirements, influence international standardization and framework development for basic infra-structure to deploy federated data-ecosystems for manufacturing.
- Provide guidelines to leverage easyto-use applications and dynamically scale the ecosystems.

The IM-X Council is a unified effort driven by an international ecosystem to:

- develop a joint understanding of data-spaces;
- connect and cooperate with other initiatives that are relevant to manufacturing (e.g. energy, logistics, mobility, etc.);
- facilitate 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);
- enable discussion of use cases and joint projects where appropriate;
- organize joint conferences and events;
- and other topics▪

Open collaboration, inclusiveness, transparency and equal treatment of all the partners inside this ecosystem are key. The IM-X Council will determine collectively what is needed, what to do and who will be responsible.

IM-X will build on existing initiatives and standards. The intention is to trigger international R&D, partnerships, cooperation, standardization, and deployment with and for customers globally.

- *Manufacturing initiatives* (Plattform Industrie 4.0, CESMII, Industry Associations, RRI, …): Global smart manufacturing initiatives are building the foundation for the requirements and needs of infrastructure initiatives and working together to shape standards.

  → IM-X Council will orchestrate and cooperate.

- *Infrastructure initiatives* (EDC/Eclipse, DATA-EX, IDSA, Gaia-X, …): Data and digital infrastructure initiatives have to provide building blocks to fulfill manufacturing needs – from cloud to edge to connected devices.

  → IM-X Council will influence and use.

- *Standards and regulations* (OPC UA, AAS, ECLASS, PCF reports, Battery Passport, …):

  Standards are essential for scaling-up. Cooperation and influence are essential for IM-X.

  Regulations are a given. Lobbying is needed.

  → IM-X Council will define and lobby.

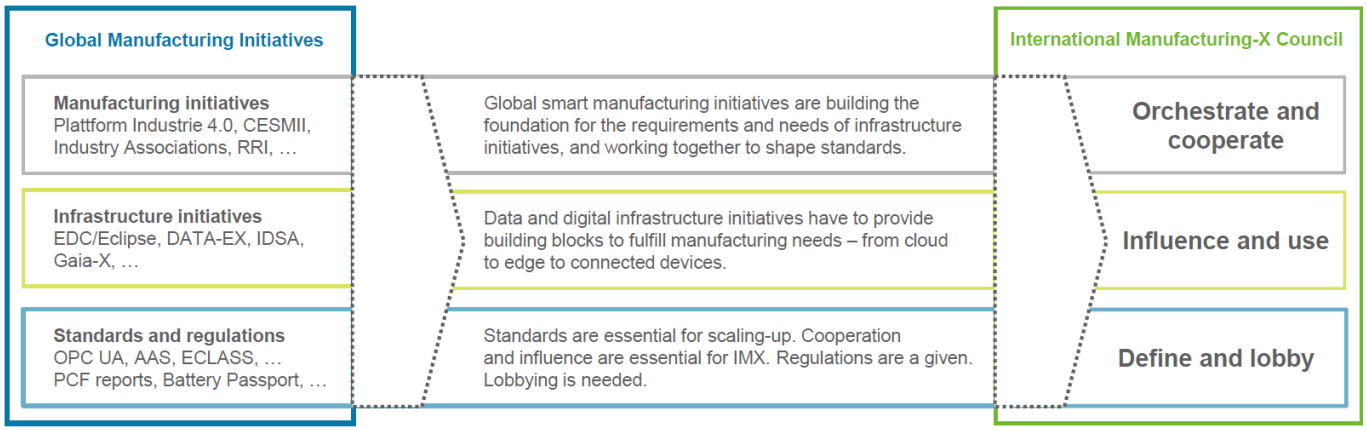

Figure 6 – Context and Activities

4 IMX Council Technical Framework

IM-X will build on a foundational framework, which serves as a common guideline for activities and international stakeholders:. This section will provide a description of the reference framework and main features and added value of adopting and implementing a Manufacturing-X approach and reference model.

Manufacturing-X proposes a Foundational Framework (MX-FF) composed of 6 layers as common guideline for Manufacturing-X activities and international stakeholders:

- Strategic Goals Layer: Manufacturing-X develops the foundations for a competitive and resilient industry in a sustainable society.
- Business Models Layer: Manufacturing-X enables innovative *business models* based on a unique data-infrastructure. IM-X enables innovative business models based on an interoperable dataecosystems (digital products and services; Everything-as-a-Service; etc.).
- Cross-Industry Use Cases Layer: Manufacturing-X addresses *cross-sectorial* use cases based on a collaborative services with extensive use of data with high economic and ecologic impact. IM-X addresses cross-industry use cases based on a collaborative use of data with high economic and ecological impact (product innovation, collaboration and product optimization; autonomous factory; supply chain, transparency and resilience; energy & CO2-management; etc.)
- Capabilities Layer: Manufacturing-X enables development and deployment of *fundamental services* driving the federated data ecosystem.
- Foundation Layer: Manufacturing-X defines *global standards* and runs a *basic technical infrastructure* to guarantee interoperability and sovereignty.

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

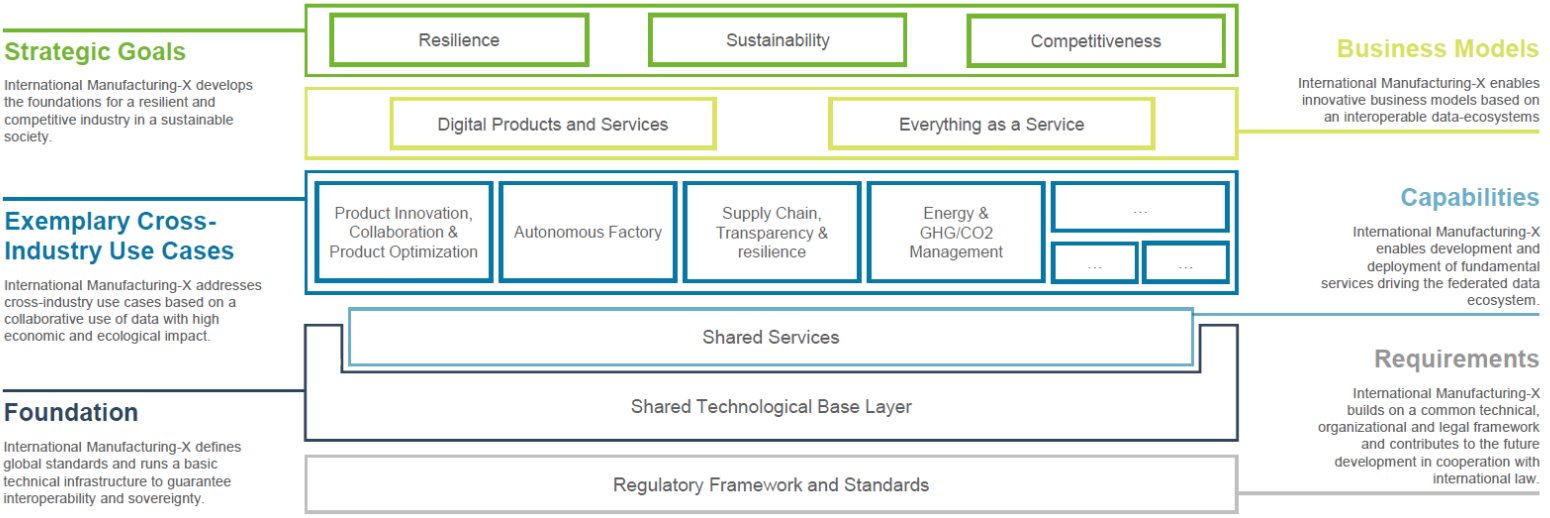

Figure 7 – Manufacturing Data Space Foundational Framework

The DS4.0-FF allows that multiple use cases can be harmonised under a unified approach. As shown in the picture below the focus of the activities of the Manufacturing Data Space is on the establishment of the Common Data Base that will enable industry to unfold a number of ecosystems and added value services and innovative business models:

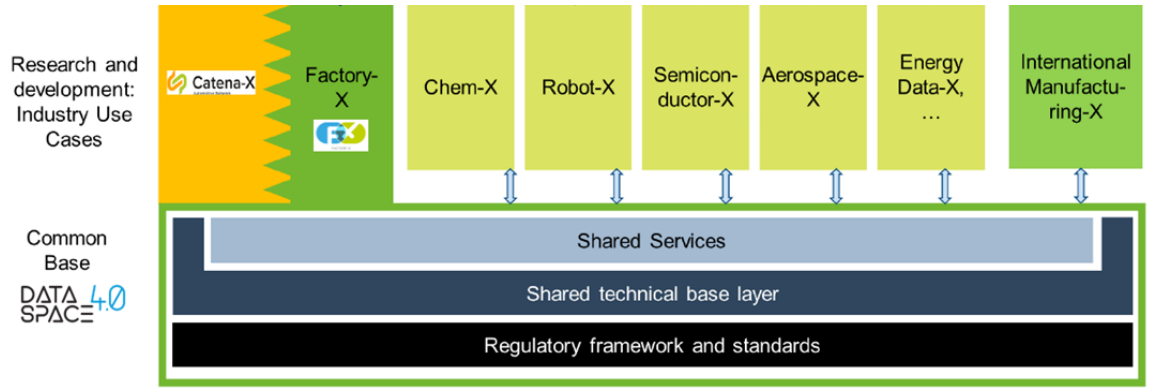

Figure 8 – Manufacturing Data Space FF & Manufacturing Ecosystems & Value Services

The DS4.0 FF is well integrated within the RAMI 4.0 model and aligns with the Data Space 4.0 blueprint. The DS4.0 FF extends the RAMI 4.0 compliant Service Development Reference Architecture (SD-RA) for (big) data-driven factory 4.0 digital transformation maintained by the Digital Factory Alliance (DFA). The goal is to ensure a perfect alignment between data-driven processes, platforms and technologies with overall digital transformation and intelligent automation efforts in manufacturing factories and connected manufacturing networks.

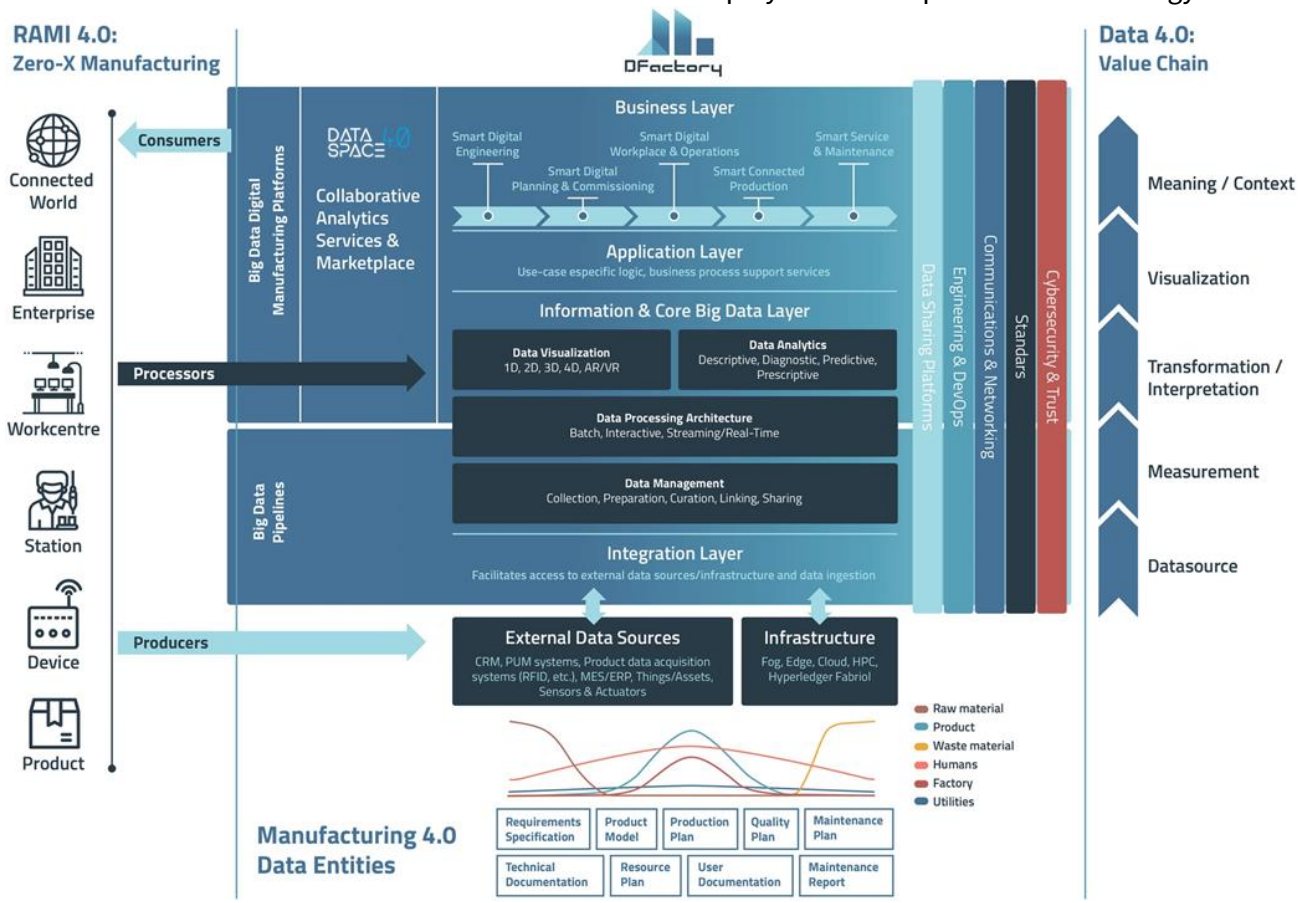

Figure 9 – DFA Reference Architecture

As illustrated in the Figure above the model is composed of four main layers: Integration Layer, Information and Core (Big) Data Layer, Application and Business Layers. This approach is aligned with the ISO 20547 Big Data Reference Architecture—Big Data Application Provider layer—from Data Acquisition/Collection through Data Storage/Preparation (and sharing) further to any Analytics/AI/Machine Learning and also environmental Action/Interaction including Visualization.

These four layers allow the implementation of a big data pipeline and the integration of such pipelines in specific business processes supporting the Factory 4.0 product, process and service lifecycle, i.e. smart digital engineering, smart digital planning and commissioning, smart digital workplace and operations, smart connected production and smart servicing and maintenance. These four Boost 4.0 layers are supported by a set of transversal services, in particular data sharing platforms, engineering and DevOps, Communications and Networking, Standards and Cybersecurity and Trust. These layers enact the manufacturing 4.0 entities and leverage a data 4.0 value chain that transforms raw data sources into quality

data that can be interpreted and visualized, providing mining and context for decision support. This value chain is developed as data is aggregated, integrated, processed, analysed and visualized across the Factory 4.0 layers (product, device, station, workcentre, enterprise and connected world). The Boost 4.0 BD-RA adopts the BDVA RM and adapts it to the specific needs of Industry 4.0.

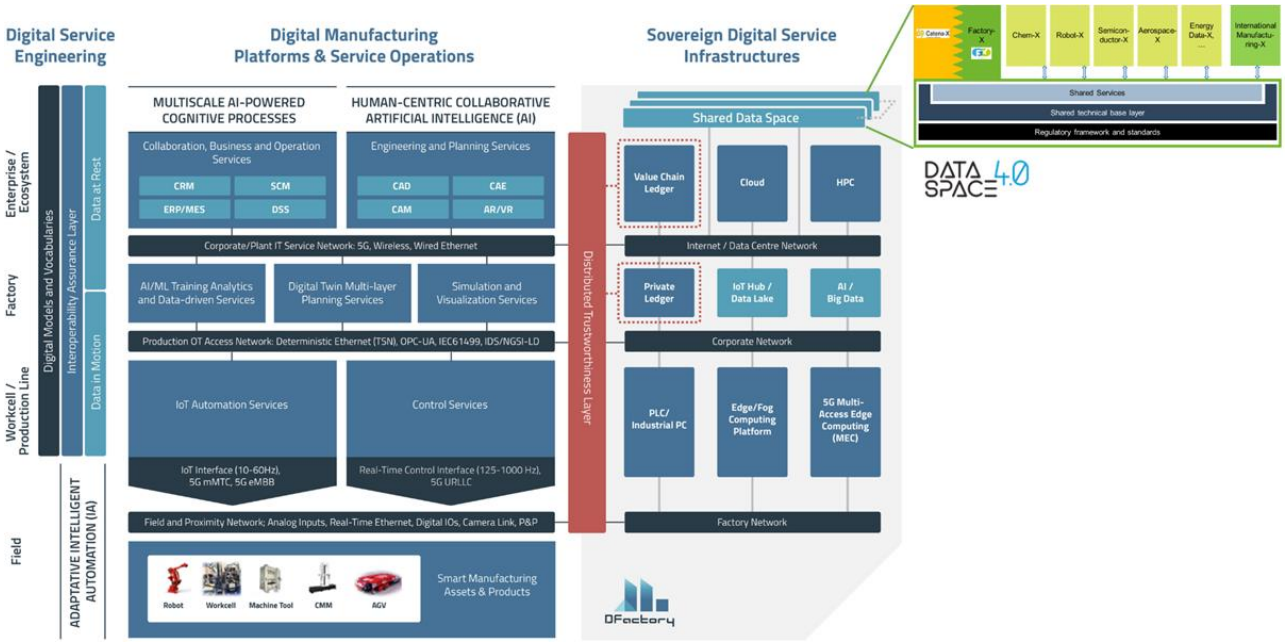

Figure 10 – DFA SD-RA extended by DS4.0 FF

However, the DFA RA needs to be articulated and instantiated with the support of specific platforms, solutions and infrastructures so that the big data-driven manufacturing processes can actually be realized. A more formal harmonization and integration is required to facilitate development of collaborative big data-driven services in the context of a digital factory exhibiting high transferability and replication capabilities for AI powered big data-driven manufacturing processes. This is further facilitated with the application of the DFA Digital Factory Service Development RA (SD-RA), which ensures a broad industrial applicability of digital enablers, mapping the technologies to different areas and to guide technology interoperability, federation and standard adoption. The DFA SD-RA design complies with ISO/IEC/IEEE 42010 architectural design principles and provides an integrated yet manageable view of digital factory services. In fact, DFA SD-RA integrates functional, information, networking and system deployment views under one unified framework. The DFA SD-RA address the need for an integrated approach to how (autonomous) services can be

engineered, deployed and operated/optimized in the context of the digital factory. With this aim, the DFA SD-RA is composed of three main pillars, as depicted in above:

- Digital Service Engineering. This pillar provides the capability in the architecture to support *collaborative model-based service enterprise approaches* to digital service engineering of (autonomous) data-driven processes with a focus on supporting smart digital engineering and smart digital planning and commissioning solutions to the digital factory. The pillar is mainly concerned with the harmonization of digital models and vocabularies. It is this pillar that should develop interoperability assurance layer capabilities with a focus on mature digital factory standards adoption and evolution towards an "industry commons" approach for acceleration of big data integration, processing and management. It is this pillar where "security by design" can be applied both at the big data, manufacturing process and shared data space levels.
- Digital Manufacturing Platforms and Service Operations. This pillar supports the deployment of services and DMPs across the different layers of the digital factory to enact data-driven smart digital workplaces, smart connected production and smart service and maintenance manufacturing processes. The pillar is fundamental in the development of three enabling capabilities central to the gradual evolution of autonomy in advanced manufacturing processes, i.e. multi-scale AI-powered cognitive processes, human-centric collaborative intelligence and adaptive Intelligent Automation (IA). The enablement of both knowledge-based (multi-scale artificial intelligence) and data-driven approaches (collaborative intelligence) to digital factory intelligence is facilitated by the support of service-oriented and event-driven architectures (interconnected OT and IT interworking event and data buses) embracing international and common standard data models and open APIs, thereby enabling enhanced automated context development and management for advanced data-driven decision support.
- Sovereign Digital Service Infrastructures. The operation of advanced digital engineering and digital manufacturing platforms relies on the availability of suitable digital infrastructures and the ability to effectively develop a *digital thread* within and across the digital factory value chain. DFA SD-RA relies on infrastructure federation and sovereignty as the main design principles for the development of the data-driven

architecture. This pillar is responsible for capturing the different digital computing infrastructures that need to be resiliently networked and orchestrated to support the development of different levels and types of intelligence across the digital factory. In particular, the DFA SD-RA considers three main networking domains for big data service operation; i.e. factory, corporate and internet domain. Each of these domains needs to be equipped with a suitable security and safety level so that a seamless and cross-domain distributed and trustworthy computing continuum can be realized. The pilar considers from factory-level digital infrastructure deployment such as PLC, industrial PC or Fog/Edge to the deployment of telecom-managed infrastructure such as 5G multi-access edge computing platforms (MEP). At the corporate level, the reference architecture addresses the need for the development of IoT Hubs that are able to process continuous data streams as well as dedicated big data lake infrastructures, where batch processing and advanced analytic/learning services can be implemented. It is at this corporate level that private ledger infrastructures are unveiled. Finally, at the internet or data centre level, the digital factory deploys advanced computing infrastructures exploiting HPC, Cloud or value chain ledger infrastructures that interact with the federated and shared data spaces. It is in this level where DS4.0 FF extends and harmonised operations.

The DS4.0 extended DFA RA is aligned with ISO 20547 Big Data Reference Architecture. The DFA Sovereign Digital Service Infrastructures pillar allows the reference model to additionally address the ISO 20547 Big Data Framework Provider layer. The DFA RA enables the implementation of four different types of intelligence (smart asset functioning, reactive reasoning, deliberative reasoning and collaborative decision support) to be orchestrated and maps to the 6 layers of the RAMI 4.0 (product, devices, station, workcentre, enterprise and connected world), which target all relevant layers required for the implementation of AI-powered data-driven digital manufacturing processes:

- The lower layer of the DFA RA contains the *field devices in the shopfloor*: machines, robots, conveyer belts as well as controllers, sensors and actuators are positioned. Also in this layer the smart product would be placed. This layer is responsible for supporting the development of different levels of autonomy and *smart product and*

device (asset) services leveraging on intelligent automation and self-adaptive manufacturing asset capabilities.

- The *workcell/production line* layer represents the individual production line or cell within a factory, which includes individual machines, robots, etc. It covers both the services, that can be grouped in two those that provide information about the process and the conditions (*IoT automation services*), and the actuation and control services (*automation control services*); and the infrastructure, typically represented in the form of PLC, industrial PCs, edge and fog computing systems or managed telecom infrastructures such as MEC. This layer is responsible for developing reactive (fast) reasoning capabilities (automated decision) in the SD-RA and leveraging augmented distributed intelligence capacities based on enhanced management of context and cyber-physical production collaboration.
- At the *factory level*, a single factory is depicted, including all the work cells or production lines available for the complete production, as well as the factory-specific infrastructure. Three kinds of services are typically mapped in this layer: (1) *AI/ML training, analytics and data-driven services*; (2) *digital twin multi-layer planning services*; and (3) *simulation and visualization services*. The infrastructure that corresponds to this layer is the IoT Hubs, data lakes and AI and big data infrastructure. This layer is responsible for supporting the implementation of deliberative reasoning approaches in the digital factory with planning (analytical, predictive and prescriptive capabilities) and orchestration capabilities, which combine and optimize the use of analytical models (knowledge and physics based), machine learning (data-driven), high-fidelity simulation (complex physical model) and hybrid analytics (combining data-driven and model-based methods) under a unified computing framework. This leverages in the architecture collaborative assisted intelligence for explainable AI-driven decision processes in the manufacturing environment.
- The higher layer refers to the enterprise/ecosystem level, that encompasses all *enterprise and ecosystem* (connected world) services, platforms and infrastructures as well as interaction with third parties (value chains) and other factories. The global software systems that are common to all the factories (*collaboration business and operation services* as well as *engineering and planning services*) are supported usually by Cloud or HPC infrastructures. It is this layer that supports the

implementation of shared data spaces and value-chain-level distributed ledger infrastructures for implementation of trusted information exchange and federated processing across *shared digital twins* and asset administration shells (AAS). This layer leverages a human-centric augmented visualization and interaction capability in the context of data-driven advanced decision support or generative manufacturing process engineering.

5 IMX Council Governance Approach

The IM-X Council Structure is based on the following principles:

- COUNTRIES are represented by council members, selected by their respective industry initiatives, and speaking with one voice.
- ONE COUNTRY, one vote. Agreements should be consensus based.
- THE COUNCIL will have 2 speakers, from 2 different countries and at least one from industry. They are selected every 2 years on a rotating basis.
- GOVERNMENT involvement is highly welcomed (national and regional level).
- MEMBERSHIP in the IM-X Council is open to additional countries.

The DS4.0 has proposed a set of activities to influence and align the existing initiatives around data space development. The approach adopted by DS4.0 is shown in the Figure below.

The Joint Commities, Working Groups and Task Forces that can be set up by the IMX-C are mainly intended to facilitate a harmonised contribution to and definition of standards that will facilitate the development of added value services and innovative business models. The IMX Council will be conformed of members that will coordinate and feedback activities at national level integrating the view of private sector, national industry associations, institutions, government and organisations and research & academia. The layout and origanisation at national level has a high degree of autonomy. A meta-level is also propsoed whereby coordination can be set up at world wide region level (EU, APAC, ME, America…)

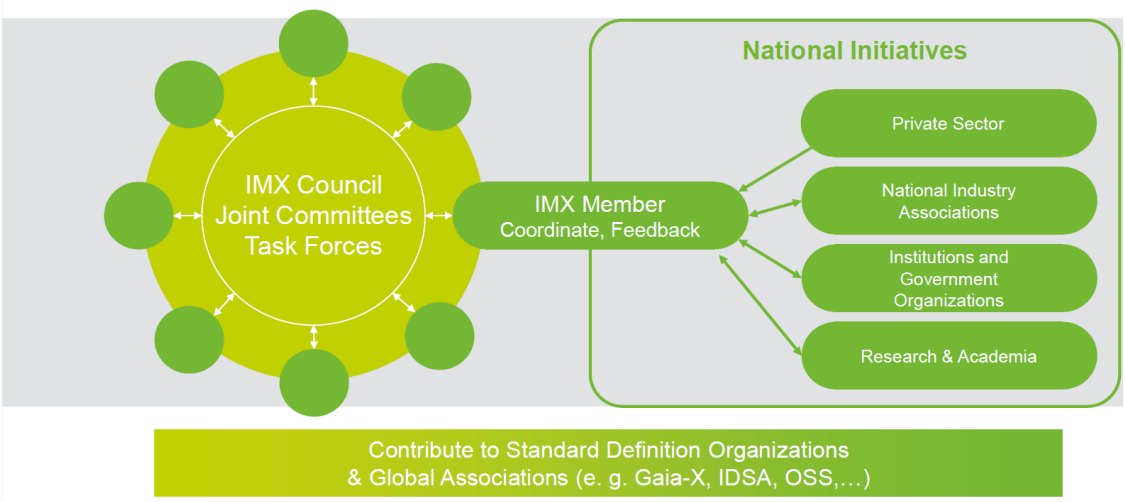

Figure 11 – DS 4.0 Governance Approach

With this approach, as shown in the Figure below it is possible to distinguish between activities to be carried at Global as well as Regional/National levels

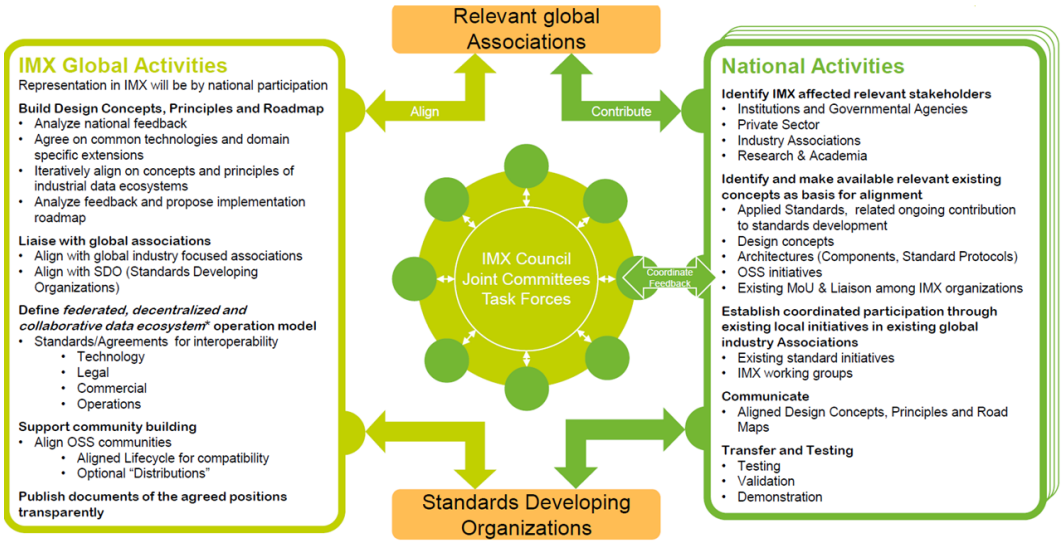

Figure 12 – Activities to be performed at Global and National Level

The main activities to be carried out at global level include:

- Build Design Concepts, Principles and Roadmap.
- Liaise with global associations
- Define federated, decentralized and collaborative data ecosystem* operation model
- Support community building
- Publish documents of the agreed positions transparently

On the other hand, the national activities will focus on:

- Identify IMX affected relevant stakeholders
- Identify and make available relevant existing concepts as basis for alignment
- Establish coordinated participation through existing local initiatives in existing global industry Associations
- Communicate
- Transfer and Testing

Thus, it will be possible to align and coordinate with relevant associations as well as organisations developing standards.

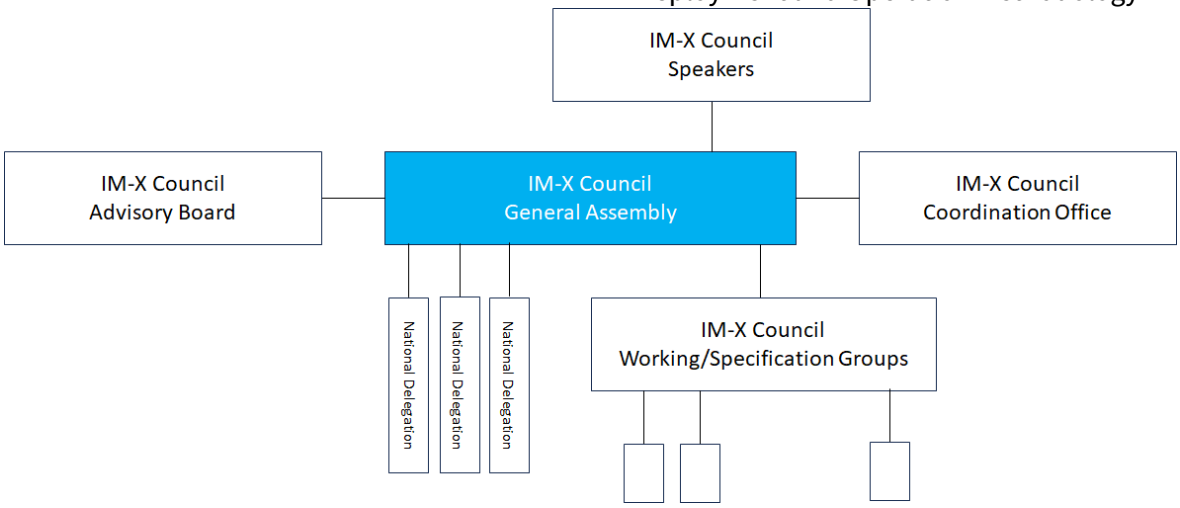

Figure 13 – Manufacturing Data Space Governance Bodies

The DS4.0 Governance approach has also identified the need to set-up the following bodies to facilitate its operation and responsibilities?

- IM-X Council Coordination Office: Day to day IM-X Council activity support (IT, Admin, P&R)
- IM-X Council Speakers (Already in Place): Facilitate IM-X Council activities.
- IM-X Council General Assembly : Decision Making Body, Set Council Priorities/Plan
- IM-X Council Working/Specification Groups : Facilitate IM-X Council Specifications, Provide Inputs and Content
- IM-X Council Advisory Board: Facilitate Guidance, Provide Insights & Experience.

The DS4.0 Governance model proposes a set of type of members and their responsibilities:

- Core Members: Represent National Delegations & hold (a sufficient) mandate to steer national activities and make decisions.
- Market Representation Partners: Offer market and regulatory/policy advice to IM-X Council and bring into IM-X Council a consensus multi-sectorial view of manufacturing market requirements
- Industrial Partners: Offer technical advice to IM-X Council and bring into IM-X Council a consensus view of technical specifications and agreements
- Guests, Observers ……

The different types of partners will participate in the different activities of the varioys Governance Bodies, as shown in the Figure below.

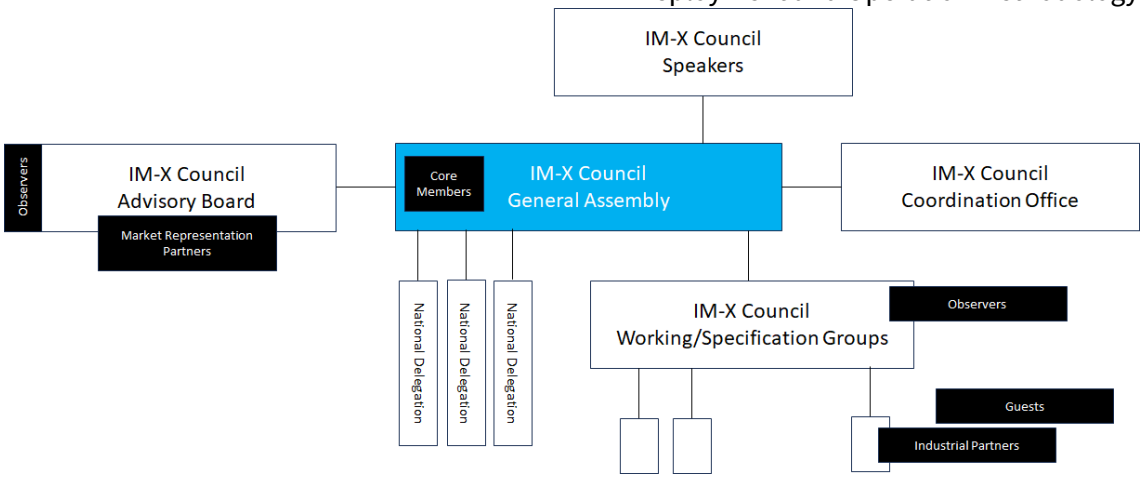

Figure 14 – Membership & Governance Bodies

6 Conclusions

The development of manufacturing data spaces has received recently a lot of attention. The work perfomed was scaterred across a number of initiatives of different natures, companies and territories. This deliverable has presented the result of an on-going effort that will be sustained beyond the end of the project and that will allow a harmonised governance and a concerted effort to design, deployment and operation of data spaces in manufacturing.

The document has presented the current status of development of an International Manufacturing-X Council that should serve as an instrument to coordinate the deployment of data spaces and make data work in manufacturing.

The IMX-C is based on coordination of Industry 4.0 national initiatives as well as in the establishment of effective and efficient mechanisms for pan-European and international alignment.

The IMX is an industry led, business driven and solution focused community with a clear commitment towards deployment and operation of cross-sectorial manufacturing data networks.

The Governance body has defined as well a foundational framework for data space deployment that extends current digital factory models aligned with RAMI 4.0 and that are amenable to DS4.0 blueprint deployments. The foundational framework acknowledge the need for shared infrastructures and services as the foundation for the development of added value services; following the EC reference model for manufacturing data spaces.

The Governance body already brings together 11 countries that account for close to 50% of global manufacturing GDP and the Council has already openned the possibility for additional members to join the initiative.

Thus, european values in data space development can be transferred and adopted worldwide ensuring proper coordination of european efforts, national investments and global operation of data-driven AI-powered manufacturing operations.

The establishment of Data Space 4.0 Governance body as described in this document responds to the challenge and vision set by the Trilateral Cooperation Alliance, which has now

been extended to a broader scope. Moreover, the activities have allowed the establishment and reinforcement of activities across and within European countries, with the consolidation of a Gaia-X Hub Manufacturing community in Austria or the foundation of the BAIDATA community for the development of industrial data economy in Spain and Portugal.

Annex I: Trilateral Position Paper

We, the trilateral cooperation[1], with representatives from France, Germany, and Italy, together with representatives from the Netherlands, call on the European Commission, European governments, data sharing initiatives, and related associations to elevate data sharing in the manufacturing industry on top of the technological strategy agendas: national initiatives must be reinforced and coordinated to collaboratively develop a shared vision and implementation plan to build pan-European data spaces in manufacturing. Without urgent actions paving a pathway towards common data sharing practices, we put Europe's manufacturing industry's competitiveness at risk and might lose data sovereignty in the era of data-driven economies.

Challenges for the European Manufacturing Industry

The global shift towards a data-driven economy has also found its way into the manufacturing domain: in recent years, the usage of data has been significantly rising in importance to drive improvements in engineering, planning, commissioning, operations, and after-sale services. As this shift is mushrooming at unprecedented speed, the future role of data in the manufacturing industry, also at the intersection to its adjacent industries, has now become crystal clear to an increased number of practitioners and stakeholders. At the same time, economies in Europe are faced with drastic global challenges of major complexity that require fast and concerted action. Two exemplified incidents have recently been paralyzing Europe's economies in its foundations:

- First, Europe is forced to radically transition from a resource devouring into a sustainable society to prevent irreversible tipping of biosphere ecosystems as we know them. Scarcity and price volatility of natural resources have already triggered companies at the

[1] The trilateral cooperation between "Alliance Industrie du Futur", "Piano Transizione Industria 4.0" (former Impresa 4.0), and "Plattform Industrie 4.0" was formed in 2017 and aims to support the digitalization processes in the European manufacturing sector. The trilateral cooperation is focused on three core topics: standardization, SME integration and testbeds, and political support.

1

forefront to pivot their business operations for a greener future. Nevertheless, to accomplish a full sustainable transformation of the manufacturing industry, we still have a long path ahead of us.

- Second, vulnerability and missing robustness of Europe's global sourcing and supply chain strategies have been relentlessly disclosed in most recent times. Dramatic chip shortages due to pandemic effects have particularly affected the automotive industry by causing global revenue loss of €190bn to €290bn (as of May 2022), excluding additional operational costs for production shutdowns. Global supply chain delays are still reverberating long after the ultra-large container vessel "Ever Given" got stuck in the Suez Canal in March 2021.

Both, transition to sustainable industries and (re-)building sufficient resilience in supply chains are challenges to embark on whilst maintaining and strengthening global competitiveness with the world's economic superpowers United States (U.S.) and China. At the same time, global trends such as rising product complexity, fast increasing skilled workforce shortages, and decreasing productivity, aggravate the precarious state of European manufacturing industries even further.

The answer to cope with these challenges seems to be self-suggesting: accelerating the next evolutionary phase of the manufacturing industry's digitalization and propelling Industrie 4.0 in broad industrial day-to-day practice on European shopfloors. Key is to innovatively advance beyond pure automation in manufacturing (known as "Industrie 3.0" or third industrial revolution) and to attempt to bridge fragmented or even idle data silos in order to connect production systems, factories, and supply chains across enterprises, thus enabling new data driven business models. This needs to go hand in hand with an intrinsic paradigm shift from bilateral towards multilateral cooperation and collaborative data sharing along entire value chains to satisfy upcoming legal requirements and to exploit future business potentials.

Interoperable and Sovereign Data Spaces for the European Manufacturing Industry

In the era of data-driven economies, data-based value generation will depend on global data spaces that safeguard and guarantee data sovereignty, data interoperability, and data integrity. Data spaces enable multilateral collaborations that allow end-to-end data exchange in a fully interoperable and sovereign data-oriented ecosystem.

The architecture of data spaces is defined by examining at least three essential dimensions that must be considered comprehensively: business, legal, and technical (including security) foundations. The foundation of the data space prescribes frameworks, routines, standards, and guidelines that are agreed upon in a precompetitive manner, which can be used to initiate efficient cross-company collaboration and data sharing.

At present, numerous data spaces are emerging for manufacturing domains around the globe. For tapping into this unknown territory, economies pursue individual exploration and implementation strategies: private vendors push their solutions into the market in the U.S., whereas China runs a more centrally orchestrated approach to organize cross-company data sharing in production. Both strategies are characterized by prevailing domestic legal regulations (e.g. for data-access or data-forwarding), building the backbone of inherent domestic "cultures for data usage" that are in many facets not in line with Europe's data strategy and values. To prevent dependencies from vendors that are not underlying European legal regulations, to defy from non-European data-handling practices, and to maintain ownership of shared manufacturing data, Europe's manufacturing industry must develop a European solution for multilateral data-driven collaboration that incorporates European state-of-the-art data sharing regulations and features European values.

Status quo – Where are we today?

Development activities for manufacturing data spaces in Europe have, until today, been conducted by many different alliances, projects, networks and, in many cases, been driven in the context of national Industrie 4.0 initiatives. On a European level, first "embryonic data spaces" for various applications in the manufacturing sector are about to be established in projects such as *Boost 4.0*, *Qu4lity*, *Eur3ka*, *Productive4.0*, *Market 4.0*, *ConnectedFactories*, or *SmartFactoryEU*.

In addition, several European initiatives aim to mount the required technical infrastructure to bring data spaces into being. *Gaia-X* is the next generation of data infrastructure: an open, transparent, and secure digital ecosystem, where data and services can be made available,

collated, and shared in an environment of mutual trust. IPCEI-CIS creates a sovereign, highly scalable edge-cloud infrastructure in Europe that pursues the goal of creating a technical foundation that links ecosystems of data and infrastructure. The Big Data Value Association (BDVA) focuses on enabling the digital transformation of the economy and society through data and artificial intelligence (Trusted Industrial AI) by advancing in areas such as big data and AI technologies and services, data platforms and data spaces, Industrial AI, data-driven value creation, standardization, and skills.

Complementary, a stream of national initiatives within the trilateral cooperation and the Netherlands is already ongoing for the purpose of laying the foundation for industrial data spaces in the manufacturing sector:

Since 2005, many initiatives have been launched by the French Ministry of Industry to enhance the digital transformation of the industry, e.g. in 2005 through the TIC-PME program (€20mn), in 2020 calls for projects for digital collaborative industrial platforms and the creation of the French Gaia-X Hub, and in 2021 the creation of the "Industry of the Future Solutions sector" leveraged by the "Alliance Industrie du Futur", focusing efforts along four axes:

- organizing, federating, and promoting manufacturing solutions at the national and international level (e.g. within the Gaia-X working group), capitalizing on the results of the existing OTPaaS project, to propose and lead a sovereign platform for industrial data. The objective is to contribute to the work of structuring the platform's European exchanges of industrial data like BoostAeroSpace hub (> €100mn since creation), created by the European aerospace industry in 2011, interconnecting thousands of companies, essentially SMEs;
- initiating the development of new offers through structuring projects with each industrial sector;
- supporting products and services innovation to increase value, through the ATLAS Program (2021-2023) co-funded (> €10mn) by the industry and the French government, promoting intersectoral standardization work;
- reinforcing industry competitiveness and sovereignty.

In Germany, the government has been supporting manifold initiatives to accelerate the development of interoperable data sharing mechanisms, building up towards intersectoral and cross-sectorial data spaces since the midst of the last decade:

- The Plattform Industrie 4.0 and the International Data Space Association (IDSA) described a reference architecture and a formal standard to be used for creating and operating virtual data spaces for multiple industries;
- Major investments have been undertaken within public-private-partnerships to describe the technical foundations of data sharing resulting in a broad acceptance of industry-specific data models for manufacturing data spaces, as especially OPC-UA and the concept of the Asset Administration Shell (AAS);
- In initial projects such as the "Legal Testbed Industrie 4.0", "Gaia-X Federation Services", "AAS connected" or "Sovereign Cloud Stack", the basic foundations have been developed alongside three essential dimensions of manufacturing data spaces: technical, legal, and business interoperability;
- The implementation of manufacturing data spaces has successfully been ignited within the automotive sector by a dedicated funding and digital-transformation program bringing together more than 100 companies under the umbrella of Gaia-X principles – with the Catena-X consortium at the forefront of the development;
- Since its foundation in 2020, the Industrial Digital Twin Association (IDTA) provides main services for a successful implementation of data spaces, built on the AAS according to industry needs.

In Italy, since the year 2017, the government has promoted a plan towards the digitalization and data sharing of the entire country, regarding the manufacturing sector. Today, the "Piano Transizione 4.0" aims at diffusing knowledge and concrete actions around Industry 4.0 paradigms by subsiding investments (e.g. through tax credit) both in education

and smart and connected industrial assets. In accordance with this plan, a set of concrete actions has been conducted around the data space field. In this sense, we mention:

- the creation of several Digital Innovation Hubs and Competence Centers spread over the entire country to support Italian companies towards digitalization;
- the participation of several Italian institutions, associations and private entities to EU data space initiatives, such as Gaia-X, FIWARE, IDSA, and BDVA, aiming at fostering data sharing;
- regarding Gaia-X, the Italian Ministries of Economic Development, of Innovation and Digital Transition and of University and Research together with Confindustria, Fondazione Bruno Kesler and the National Institute of Nuclear Physics (INFN) collaborated to establish the Gaia-X Hub Italia;
- last, considering the involvement of Italy in the abovementioned data space initiatives, Italy contributed to the establishment of DSBA (Data Space Business Alliance founded by BDVA, FIWARE, Gaia-X and IDSA) intended to accelerate the data economy in Europe.

In the Netherlands, the theme of data sharing has been on the industry's strategic agenda since 2014. This has to do with the open innovation and strategic collaboration that takes place in complex, mostly high-tech value chains. From the beginning, the Netherlands pursued strategic collaboration with Germany in this regard. This has led to several initiatives in the field of data sharing:

- The Data Space "Smart Connected Supplier network" (SCSN), in which over 400 high-tech companies from the Netherlands and abroad are connected, based on "connect once - communicate securely with the entire chain";
- The realization of a Gaia-X Hub for industry at the Brainport Industries Campus;
- The establishment of a Dutch-German field lab AI4DT in which we take the next step when it comes to data sharing in industry and being able to share digital (digital twin) models with each other, and
- the active involvement in the set-up and development of Catena-X;
- In January 2020, the Data Sharing Coalition was founded. The Data Sharing Coalition is an open and growing, international initiative in which a large variety of more than 60 organizations collaborate on unlocking the value of (cross-sectoral) data sharing.

Since November 2020, the European manufacturing community and the European Commission have been in close conversations to drive the deployment of data spaces for manufacturing across Europe, revealing the needs to:

- federate currently fragmented and dispersed initiatives into a concerted effort;
- quickly extend current cross-border data space activities;
- connect data space developments and Industrie 4.0 strategies;
- agree on common pan-European foundations among all stakeholders without compromising their respective autonomy.

We, the trilateral cooperation, together with representatives from the Netherlands, reinforce those findings without "re-inventing the wheel" and emphasize the urgent need to bring together pan-European "Industrie 4.0 initiatives" for getting up to speed in the development of pan-European data spaces for the manufacturing industry to ensure global competitiveness.

What we need: an Alliance of national initiatives

In close alignment with European partners – from industry, from governments, from academia – and the European Commission, we need to advocate the broad elaboration and roll-out of common foundations for the data space throughout the European manufacturing industry.

We demand a pan-European sectorial alliance to harmonize, accelerate, and synchronize national data space initiatives for developing a common European data space for the manufacturing industry. This alliance will mark the ground by defining a common manufacturing

data space reference framework that is based on a common technical, legal, and business infrastructure. The alliance will build upon existing results and artefacts to further elaborate and specify the basic building blocks for a coherent, widely accepted operational model for the manufacturing data space based on European values and will drive the economic utilization of manufacturing data spaces by fostering dissemination and best practice sharing.

With this manifesto, we intend to make a very clear call to all data sharing initiatives in Europe to join our alliance, put data sharing on the radar of SMEs and governments to invest and ensure proper regulation. To master the common challenges of the industry's transformation, a public-private-partnership-approach is required, where political boundary setting is combined with entrepreneurial problem-solving and where investments from public and private sectors are strategically aligned. With respect to the recently published European horizontal regulation proposal (the so-called "Data Act"), where data sharing activities are promoted without making any distinction between B2C and B2B data, industry is advocating for a more sector- and problem-specific approach that does not lead to additional requirements and legal uncertainties, especially for the manufacturing industry. What industry needs is more legal certainty and trust building, as well as guaranteeing approaches to foster industrial data economy. If we do not act now, our competitiveness is in serious danger.

We, the trilateral cooperation, in close collaboration with Smart Industry from the Netherlands, with the support of European Digital Innovation Hubs (EDIHs) and the Test & Experimentation Facilities (TEFs), propose to boost this sectorial alliance to send a unified voice across European, national, and regional manufacturing data-driven initiatives. Under one single common governance framework for technical and business alignment, all partners will best capitalize on data directives and regulations and unlock business potentials in manufacturing products, factories, and supply chains. The alliance provides the safe environment to proceed integrated pan-European collaborations to fix manufacturing data spaces' cornerstones and jointly ensure Europe's competitiveness in the manufacturing sector.

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Annex II: Hannover Messe 2023 Agenda


LEADER´S DIALOGUE
2023
(Hall 19/20)
Tuesday 18.04.2023
10:00 – 12:00


INDUSTRIE4.0
Leaders' Dialogue 2023
Next level of Industrie 4.0 – can digital ecosystems push resilience and sustainability?
18. April 2023, 10:00 – 12:00 Uhr / Halle 19/20, Saal New York 1, Hannover Messe
Panel I: 10:00 – 10:35 Uhr
Next Level of Industrie 4.0 – Opportunities and Challenges ahead
Dr. Robert Habeck, Bundesminister für Wirtschaft und Klimaschutz
Prof. Dr. Sabine Döring, Staatssekretärin im Bundesministerium für Bildung und Forschung
Micky Adriaansens, Ministerin für Wirtschaft und Klima, Niederlande
Siegfried Russwurm, Präsident, Bundesverband der Deutschen Industrie e.V.
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TRANSFORMING MANUFACTURING TOGETHER

Panel II: 10:35 – 11:15 Uhr

Connecting industrial value-chains for competitiveness and sustainability: Unlock new opportunities via cooperation in dataspaces

Henrik Schunk, Geschäftsf. Gesellschafter, SCHUNK GmbH & Co KG & Chairman Plattform Industrie 4.0

Claudia Nemat, Vorstandsmitglied für Technologie und Innovation, Deutsche Telekom AG

Cedrik Neike, Mitglied des Vorstands und CEO Digital Industries, Siemens AG

Dr. Peter Weckesser, Chief Digital Officer, Schneider Electric SE

Dr. Tanja Rückert, Geschäftsführerin und Chief Digital Officer, Robert Bosch GmbH

Christian Thönes, CEO, DMG MORI [tbc]

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Panel III: 11:15 – 12:00 Uhr

Advancing manufacturing towards a digital ecosystem – sustainable and competitive: Manufacturing-X

Dr. Gunther Kegel, CEO, Pepperl & Fuchs & Präsident, ZVEI e.V.

Dr. Thomas Schneider, Chief Technology Officer, TRUMPF Werkzeugmaschinen SE + Co. KG

Jürgen Sturm, Chief Information Officer, ZF Friedrichshafen AG

Uli Homann, Corporate Vice President Cloud, AI, Manufacturing, Microsoft

Allessandro Pistillo, Director Digital Strategic Projects, BASF SE

Francesco Bonfiglio, CEO, GAIA-X AISBL

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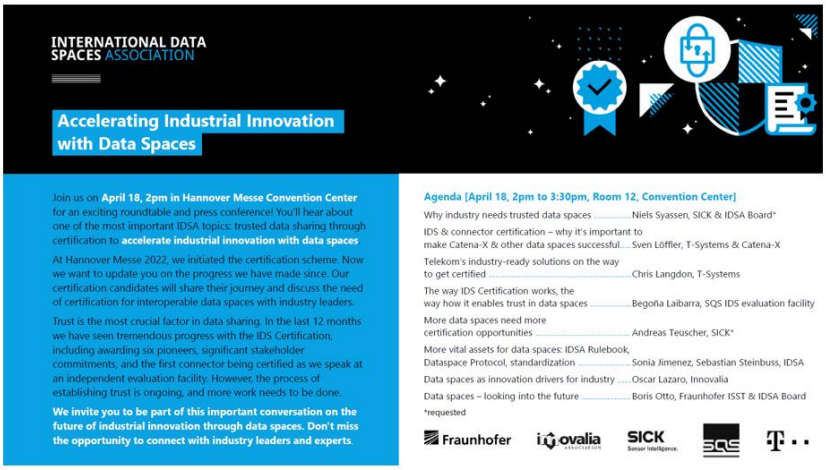
IDSA ROUND TABLE
2023
02
(Convention Center,
Hall 12)
Tuesday 18.04.2023
14:00 – 15:30


INTERNATIONAL DATA SPACES ASSOCIATION
Accelerating Industrial Innovation with Data Spaces
Join us on April 18, 2pm in Hannover Messe Convention Center for an exciting roundtable and press conference! You'll hear about one of the most important IDSA topics: trusted data sharing through certification to accelerate industrial innovation with data spaces
At Hannover Messe 2022, we initiated the certification scheme. Now we want to update you on the progress we have made since. Our certification candidates will share their journey and discuss the need of certification for interoperable data spaces with industry leaders.
Trust is the most crucial factor in data sharing. In the last 12 months we have seen tremendous progress with the IDS Certification, including awarding six pioneers, significant stakeholder commitments, and the first connector being certified as we speak at an independent evaluation facility. However, the process of establishing trust is ongoing, and more work needs to be done.
We invite you to be part of this important conversation on the future of industrial innovation through data spaces. Don't miss the opportunity to connect with industry leaders and experts.
Agenda (April 18, 2pm to 3:30pm, Room 12, Convention Center)
Why industry needs trusted data spaces ..... Niels Syassen, SICK & IDSA Board*
IDS & connector certification – why it's important to make Catena-X & other data spaces successful ..... Sven Löffler, T-Systems & Catena-X
Telekom's industry-ready solutions on the way to get certified ..... Chris Langdon, T-Systems
The way IDS Certification works, the way how it enables trust in data spaces ..... Begoña Laibarra, SQS IDS evaluation facility
More data spaces need more certification opportunities ..... Andreas Teuscher, SICK*
More vital assets for data spaces: IDSA Rulebook, Dataspace Protocol, standardization ..... Sonia Jimenez, Sebastian Steinbuss, IDSA
Data spaces as innovation drivers for industry ..... Oscar Lazaro, Innovalia
Data spaces – looking into the future ..... Boris Otto, Fraunhofer ISST & IDSA Board
*requested
Fraunhofer
ovalia
SICK
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Tuesday, 18th April, 2023 Convention Centre Hall 11	
15:30 – 15:35	**Welcome** *Dr. Oscar Lazaro (Managing Director, Innovalia, Data Space 4.0 Coordinator)*
15:35 – 15:45	**European Deployment of Data Spaces in Manufacturing** *Matthias Kuom (Project Officer, EC)*
15:45 – 16:45	**Manufacturing-X in the Spotlight** *Ernst Stöckl-Pukall (Head of Unit for Digitisation and "Industrie 4.0", Department for Industrial Policy, Federal Ministry of Economy and Climate Action)* *Thomas Hahn (Chief Expert Software, Siemens AG Germany)* **International Data Space 4.0 Lighthouse Initiatives** Open dialogue & presentations from international data space 4.0 stakeholders
16:45 - 16:55	Break
16:55 – 17:15	**Building a European Alliance for Deployment of Data Spaces in Manufacturing** *Dr. Oscar Lazaro (Managing Director, Innovalia, Data Space 4.0 Coordinator)*
17:15-17:35	**DSSC European Data Space Support Cente** *Ulrich Ahle (CEO, FIWARE Foundation)*
17:35-17:55	**High Value Data Sets Scenarios & Blueprints** *Sergio Gusmeroli (Politecnico di Milano)*
17:55-18:00	**Closing** *Dr. Oscar Lazaro (Managing Director, Innovalia, Data Space 4.0 Coordinator)*
18:00 - 19:00	Get Together & Fingerfood

Data Space 4.0 is a flagship initiative of

https://www.hannovermesse.de/event/shaping-digital-ecosystems-globally/exp/103893

Shaping Digital ecosystems globally

Show more

CONFERENCE PROGRAM
Industrie 4.0 Conference Stage

19.04.2023 | 14:50 - 15:30 (CEST)
Hall 8, Stand D17

Expert Panel
Topic: Industrie 4.0

Speakers


Oscar Lazaro
Innovalia Association


John Dyck
CESMII - The Smart Manufacturing Institute


Kwang Hyun An
KOSMO - Korea Smart Manufacturing office


Yoichi Nonaka
Hitachi, Ltd.


Ernst Stöckl-Pukall
German Federal Ministry for Economic Affairs ...


MODERATION
Henning Banthien
Plattform Industrie 4.0

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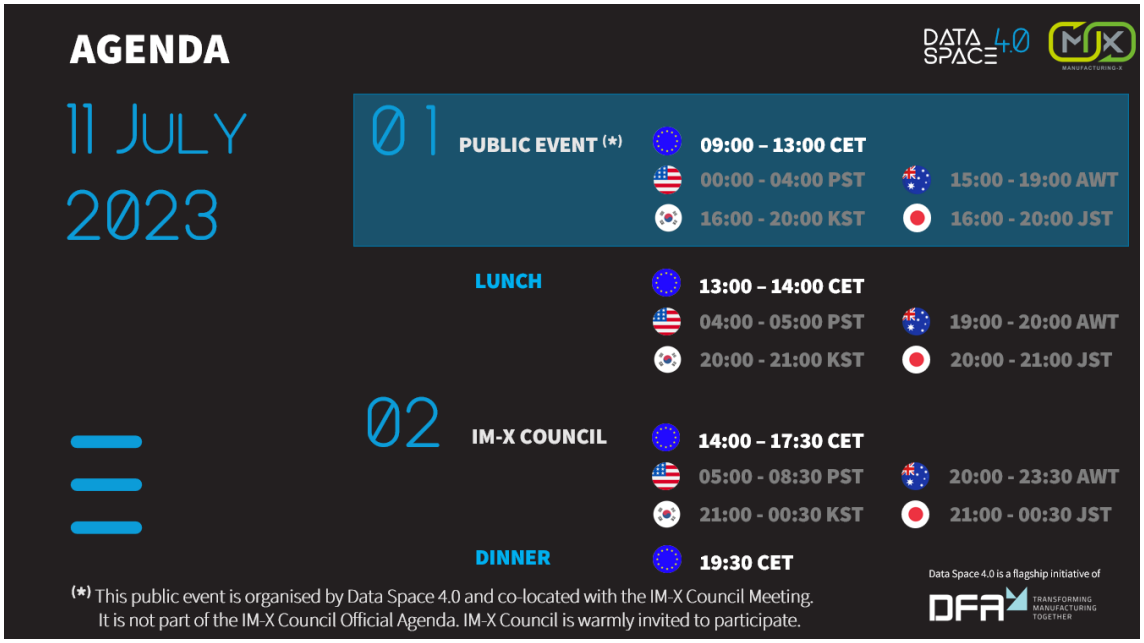
Annex III: IMX Council Foundational Meeting Agenda

https://digitalfactoryalliance.eu/international-experts-dialogue/




LOCATION
RESIDENCE PALACE
WETSTRAAT 155,
1040 BRUSSELS
https://www.residencepalace.be/en
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01
PUBLIC EVENT – INTERNATIONAL EXPERTS DIALOGUE
Residence Palace (Brussels)
Tuesday 11.07.2023
09:00 – 13:00 CET
This public event is organised by Data Space 4.0 and co-located with the IM-X Council Meeting.
It is not part of the IM-X Council Official Agenda. Participation is welcomed but not mandatory.


International Experts Dialogue
Global Manufacturing Data Spaces Roundtable: Unveiling National Initiatives, Platforms, Projects and Government Support
ROUND TABLE
Experts from around the world
Presenting initiatives in each country related to data spaces in manufacturing
Exploring platforms and national initiatives supporting the industry
Analyzing government roles & support
Discussing industrial projects & strategic investments
EUROPEAN APPROACH
Dive into the European projects & initiatives
Presentation of EU Data Space 4.0
Data Space 4.0 is a flagship initiative of
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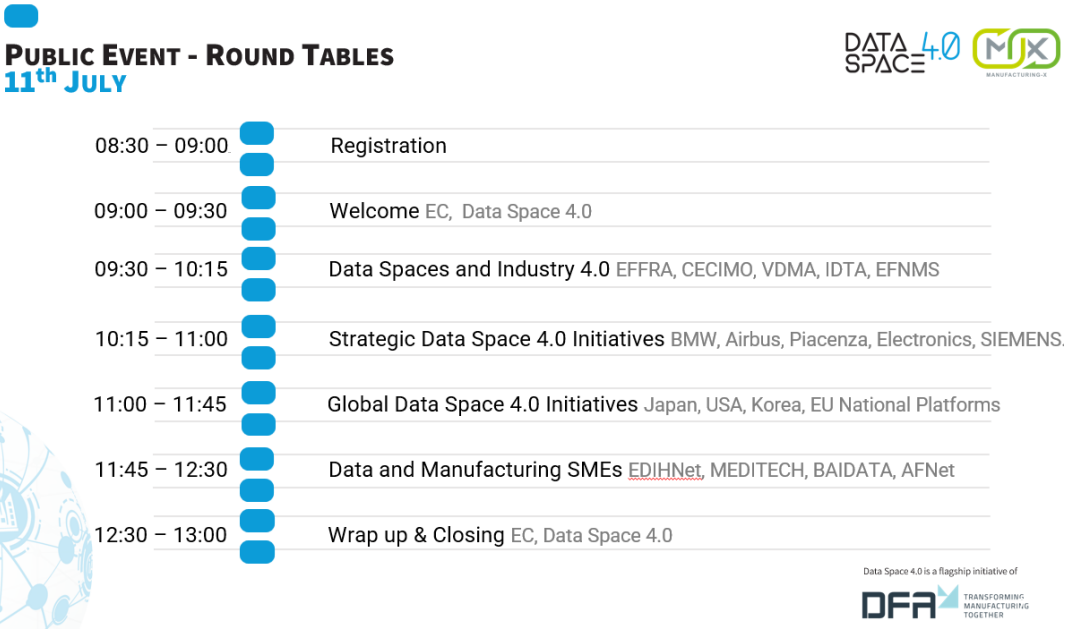
PUBLIC EVENT - ROUND TABLES
11th JULY
08:30 – 09:00 Registration
09:00 – 09:30 Welcome EC, Data Space 4.0
09:30 – 10:15 Data Spaces and Industry 4.0 EFFRA, CECIMO, VDMA, IDTA, EFNMS
10:15 – 11:00 Strategic Data Space 4.0 Initiatives BMW, Airbus, Piacenza, Electronics, SIEMENS.
11:00 – 11:45 Global Data Space 4.0 Initiatives Japan, USA, Korea, EU National Platforms
11:45 – 12:30 Data and Manufacturing SMEs EDIHNet, MEDITECH, BAIDATA, AFNet
12:30 – 13:00 Wrap up & Closing EC, Data Space 4.0
Data Space 4.0 is a flagship initiative of
TRANSFORMING MANUFACTURING TOGETHER

Speakers

Wim Vancauwenberghe
EFNMS

Roland Sommer
Plattform Industrie AT

Alexander Allmendinger
OPC Foundation

Kazuo Nakashima
RRI (Japan)

Sergio Gusmeroli
Politecnico di Milano

Thomas Hahn
Siemens AG

Matthias Kuom
European Commission

Andreas Faath
VDMA e.V.

Ute Burkhardt
VW, Catena – X

Oscar Lázaro
BAIDATA, EU DATA SPACE

Henning Banthien
Plattform Industrie DE

Clara Pezuela
FIWARE Foundation

Matthias Bölke
IDTA

Jean Pascal Riss
Schneider

John Dyck
CESMII (US)

Christoph Mertens
IDSA, DSBA

Kwanghyun An
Kosmo (Korea)

Ana García
BDVA

Maria Rossetti
EDIHNET

Gianluigi Riccio
Meditech

Agenda
IM-X Council Kick-off Meeting

Welcome 10'	
45'	IM-X Council: Overarching vision and goals
45'	IM-X Council: Mandate
Break 15'	
90'	Global Alignment among Existing Initiatives: Needs, Challenges and Approach (Short pitches)
30'	Outline the to-do tasks moving forward and plan for effective implementation
Closing and next steps 10'	

DINNER at 19.30

Data Space 4.0 is a flagship initiative of DFA TRANSFORMING MANUFACTURING TOGETHER

Agenda
IM-X Council Wrap Up Meeting

Welcome 10'

30' Recap key points discussed during the IM-X Council: Vision & Mandate

40' Internal Organisation & Operational Processes

Break 15'

15' Summarize the action items and next steps

Closing and next steps 10'

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