Industrial Agreements, Data Economy Regulation & Manufacturing Data Networks

(Sergio Gusmeroli, Fondazione Politecnico di Milano)

Final Event, 31st May 2024

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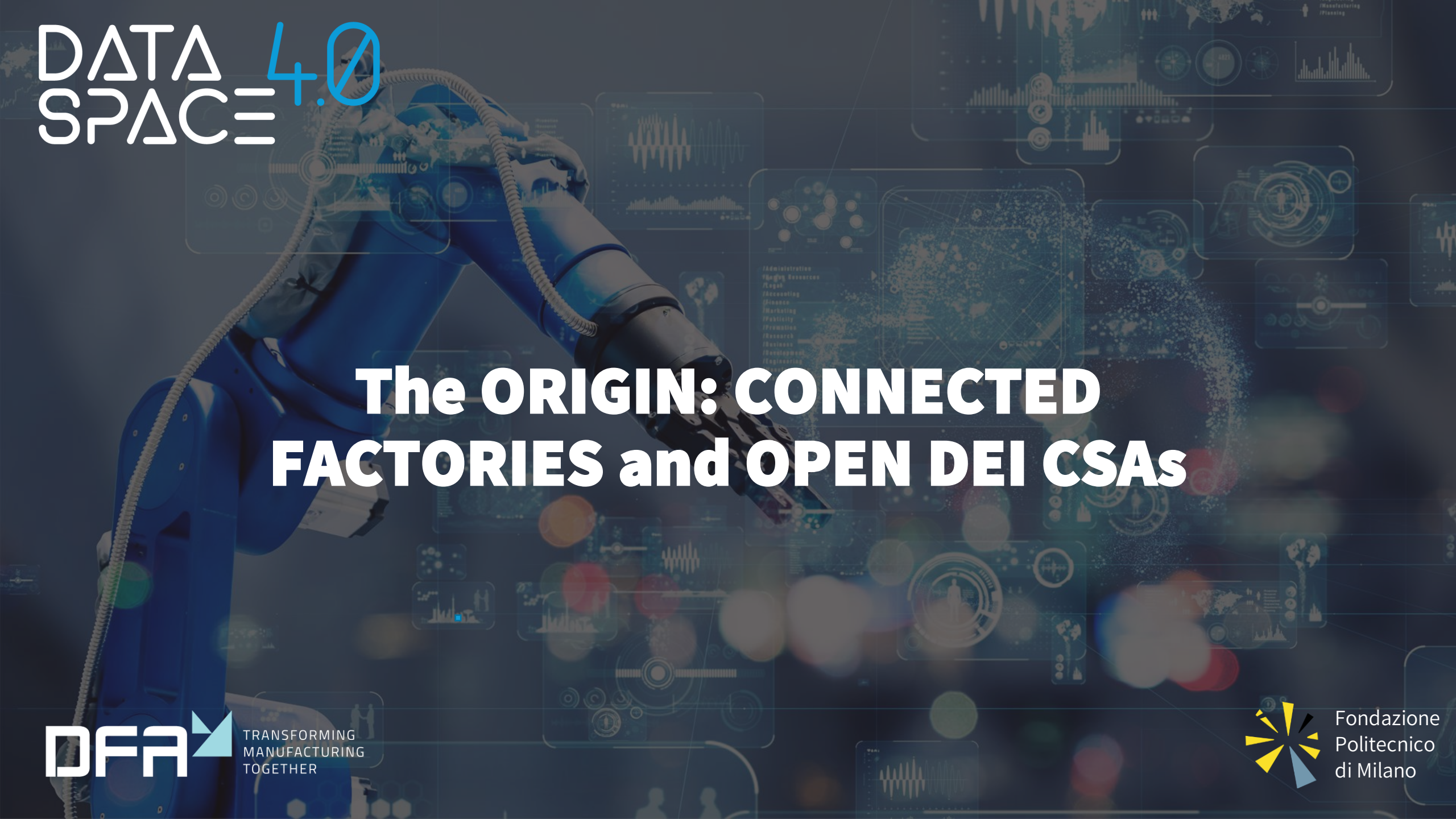

DATA SPACE 4.0

The ORIGIN: CONNECTED FACTORIES and OPEN DEI CSAs

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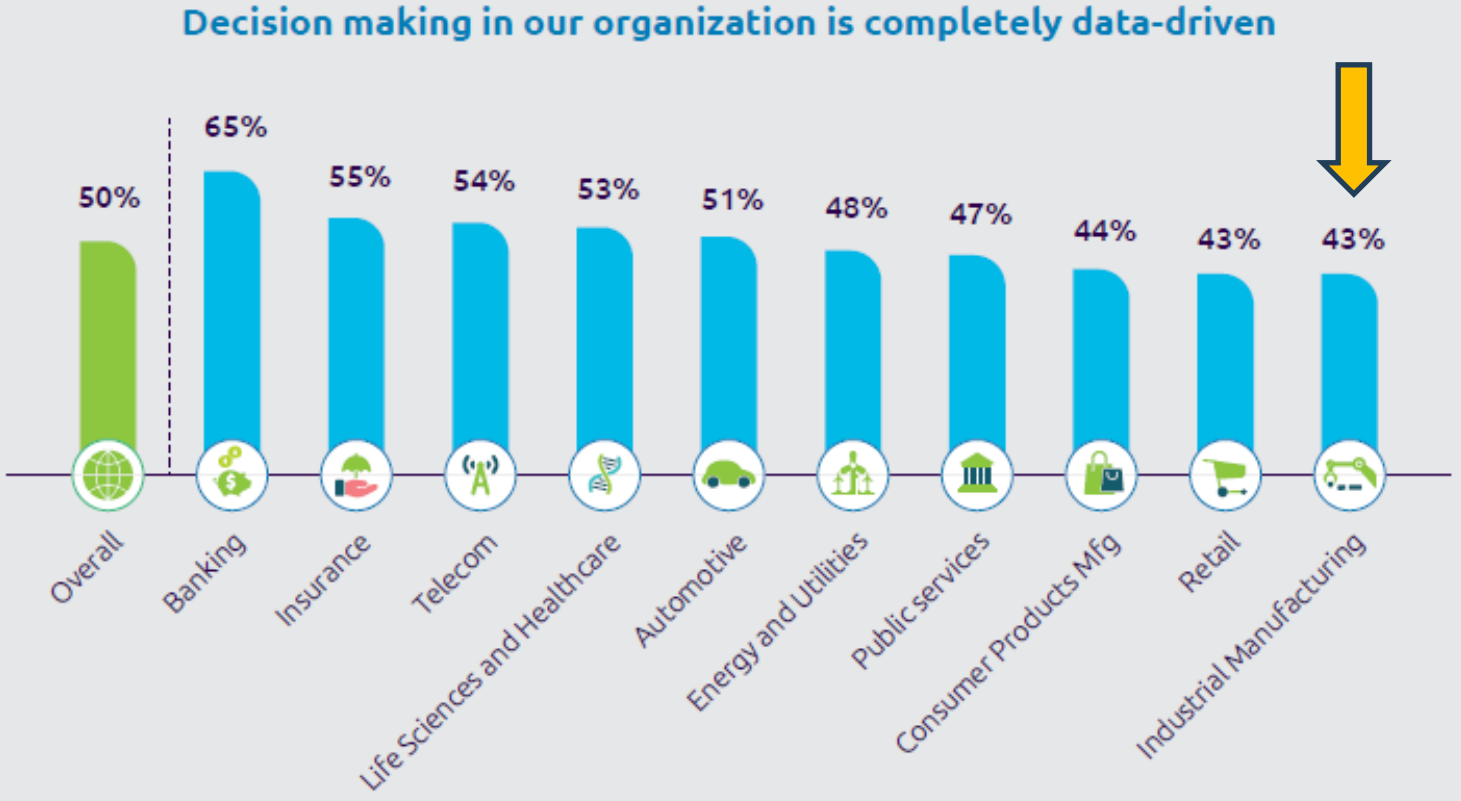
Data Spaces for Manufacturing: Positioning (CAPGEMINI RI)

Figure 4 Banking, insurance, and telecom sectors lead in data-driven decision making



Source: Capgemini Research Institute, Data-powered enterprises survey, August 2020, N=1,004 organizations.

Data Spaces for Manufacturing: Obstacles (EVERIS for EC)

BDV BIG DATA VALUE ASSOCIATION

Data Sharing

n=129

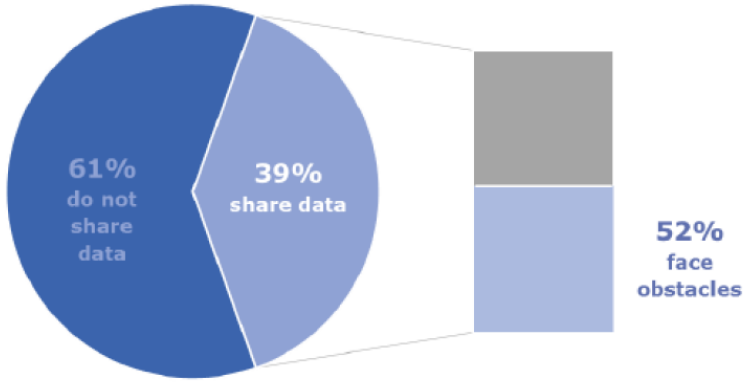
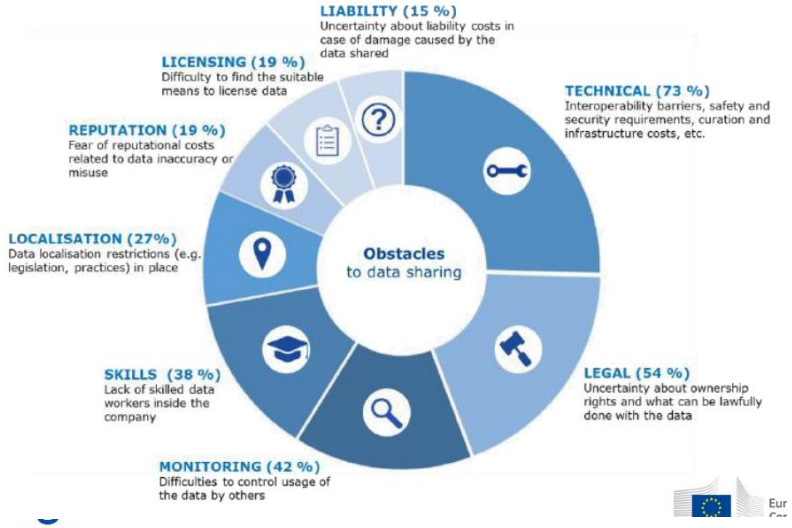


Figure 54. Companies engaged in B2B data sharing and experiencing obstacles

Data Sharing obstacles



Data Reuse

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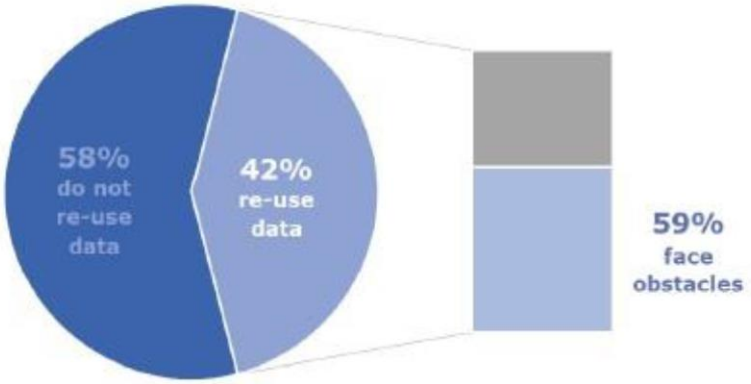
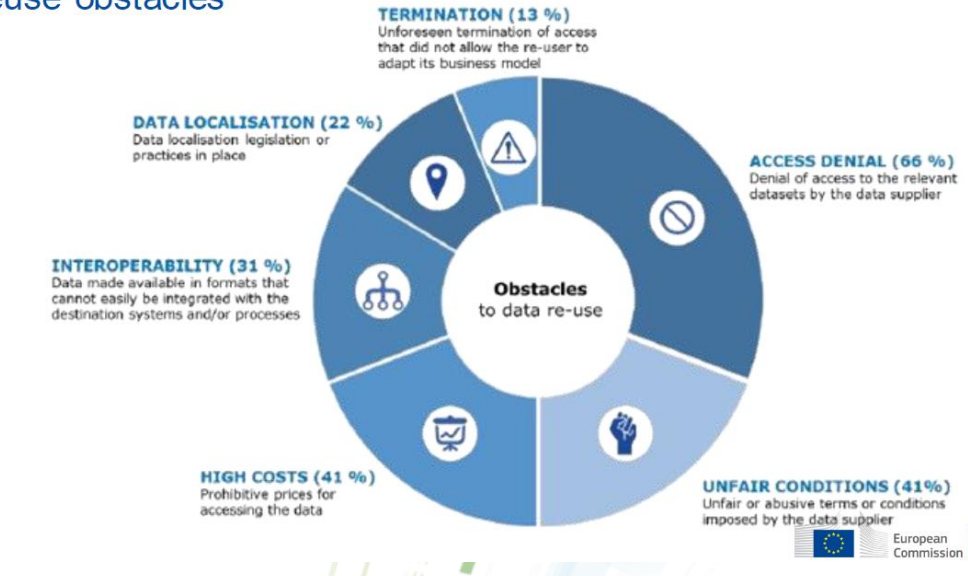


Figure 56. Companies re-using data and experiencing obstacles

Data Reuse obstacles



Data Spaces for Manufacturing Pathway

No Data Control

Data are generated, processed and visualised by closed CPPS and I4.0 systems

Data are locked in Smart Products, Value Chains with limited access by external Users and Systems

Data Silos

(Smart Autonomous Factory) Data is locked in SCADA, MES, ERP enterprise applications

(Collaborative Product-Service Factories) Data is locked in CAD, PDM, PLM enterprise applications

(Hyperconnected Factories) Data is locked in ERP SCM CRM enterprise applications

Data Bridges

Ad-hoc Data Bridges are created between Enterprise Applications for specific purposes

Data Integration and Security / Privacy issues are hardly addressed

Heterogeneous Data Sources integrated on a case-by-case basis

Data Interoperability

Data Interoperability by design, standard data models and ontologies adoption

FAIR Data Spaces enable AI-driven applications; Digital Assistants; VR/AR

Industrial Data Platforms for Data Processing and Sharing

Data Governance models for Data Sovereignty / GDPR

Data Valorisation

Data Economy take-up, Data-driven Innovative Business Models

Open Data Ecosystems in Didactic Factories and Experimental Facilities

Flexible cross-sector Manufacturing Data Marketplaces

Multi-stakeholder Digital Passports for complex Product-Service Systems

CONNECTED FACTORIES

Pathways to digitalisation of manufacturing

THE EUROPEAN DATA STRATEGY

CONNECTED FACTORIES

Open Data Repositories

Data Platforms & Marketplaces

Trusted Data Networks

Smart Autonomous Factories

Product Service Factories

Hyper Connected Factories

AI REGIO

WELD GALAXY

RE4DY
MANUFACTURING DATA NETWORKS

AIDEAS

DIMOFAC

VIMMP
VIRTUAL MATERIALS MARKETPLACE

Circular TwAIn

CIRPASS

AI REDGIO 5.0

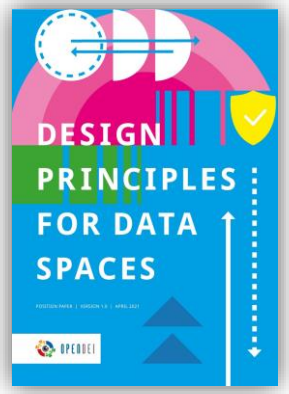
MARKET4.0
CONNECT & PRODUCE

AI.SOV

CLARUS

OPENDEI 12 Building Blocks

OPENDEI



DATA SPACE 4.0

Data Interoperability	Data Sovereignty and Trust	Data Value Creation	Data Spaces Governance
Data Models & formats	Identity Management	Metadata & Discovery Services	Business Agreements
Data Exchange API	Trusted Exchange	Publication & Marketplace Services	Operational Agreements
Provenance & Traceability	Access & Usage Control/Policies	Data Usage Accounting	Organizational Agreements

Technology Building Blocks

Area 2: Intellectual Property + Industrial Agreements

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OPENDEI

INDUSTRY COMMONS

AARHUS UNIVERSITY

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IPscreener

KU LEUVEN

DATA SPACE 4.0

The Data Space 4.0 Industrial Business Methodology: Industrial Agreements, Business and Maturity Models

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Industrial agreements in DVC: T/L clauses (CARSA)

Industry agreements on Shared Data Spaces		
	Technological	**Legal**
Scope	• Standardisation of data sharing and exchanging platforms. • Cross-industrial IT language and standards	• Standard agreement of data sharing and exchange for users interested in obtaining data from or through the platform.
High-level Specification	***Technical Clauses (TC):*** TC 1 Functional agreements *(Definition of roles, essential services, additional roles, certification bodies for participation in the ecosystem, interactions).* TC 2 Authentication agreements (*Common practices and tools for identification and authentication of entities involved in the initiative.*) TC 3 Technical agreements (*Common Reference Architecture for data space, interoperability assessment & criteria)* TC 4 Operational agreements *(DVC Data*	***Sample Clauses (SC):*** SC 1 data availability and quality SC 2 data protection SC 3 data access SC 4 re-use of data SC 5 security measures and technical means for data exchange SC 6 access to background IP SC 7 access to foreground IP SC 10 liability SC 11 parties' rights

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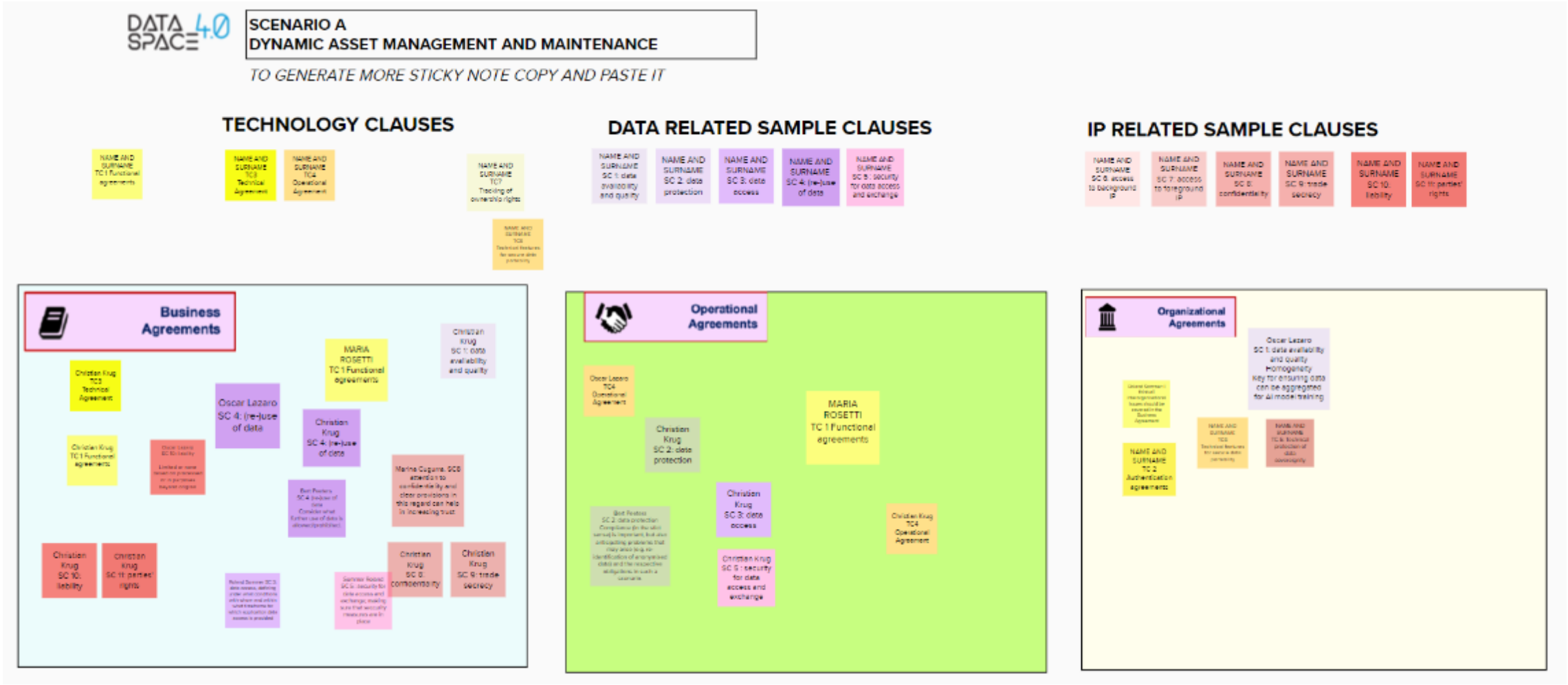
Clauses Validation in Interactive Workshop



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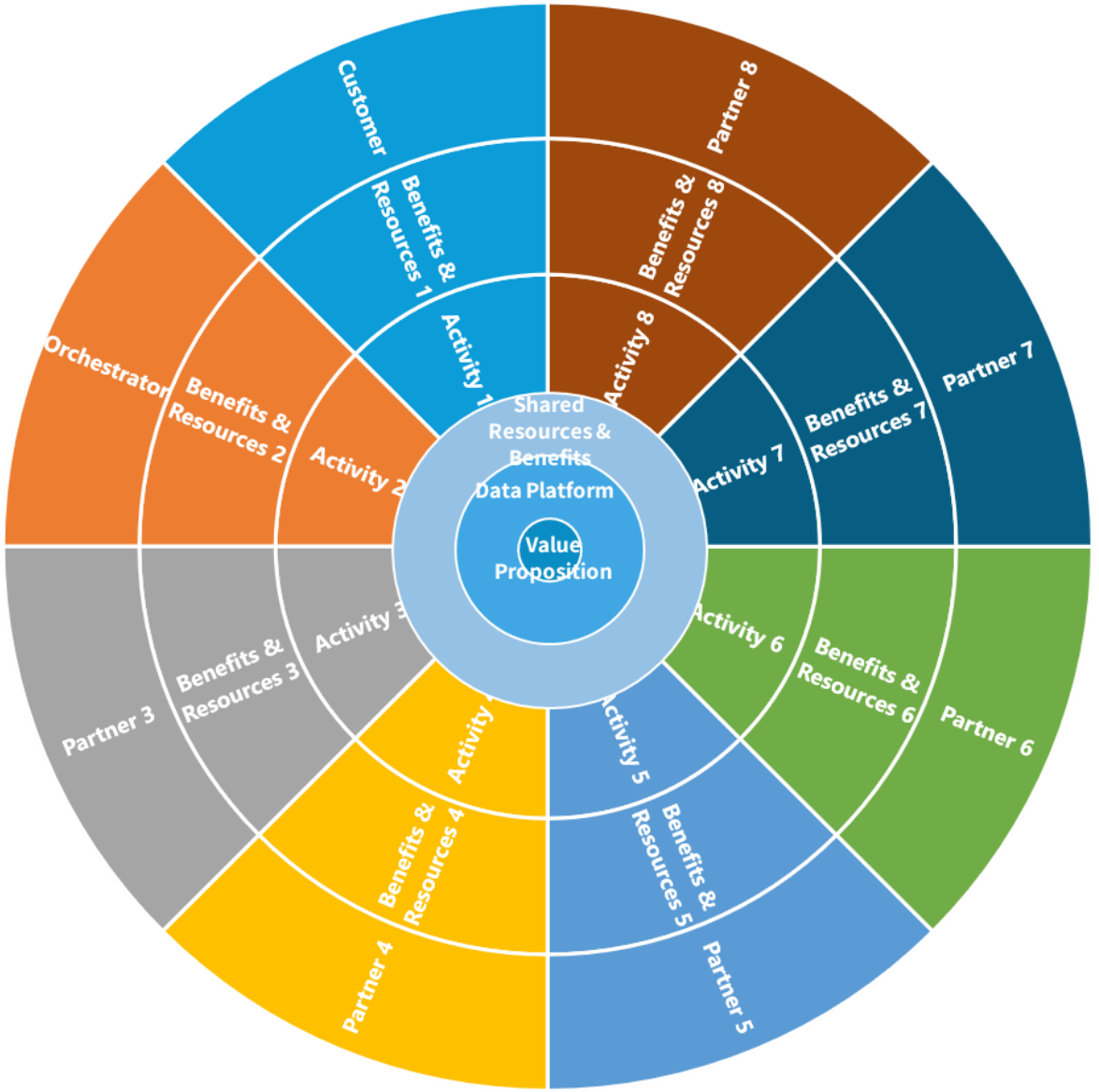
Business Modelling in DVC: the RADAR (IDC)



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Radar Validation in Machine Tools Industry

PRIMA INDUSTRIES Business Model

Value Proposition

Key Objectives

Operations Optimization
- Improve the quality of products
- Improve the execution of services on installed products

New Revenue Generation
- Evolve product and service innovation processes with collaboration and risk/cost sharing in the ecosystem
- Selling proprietary software/APIs
- Data management, trading and monetization

Data Platform

Data Shared
- Product-related data
- Process data

Tech Platform
- Single proprietary ecosystem tech platform - The cloud data space is owned by the cloud provider and feeded by PRIMA machine data.

Key Technologies
- Connectivity and networking platform
- Cloud infrastructure
- Data privacy, protection, and loss prevention solutions

Governance

Governance Model
- Hierarchical governance model with a hierarchical centralized decision making and central governing partner that has control over data and sets rule for data governance, management and usage

Legal Form
- No recognized legal form

IP Rights
- PRIMA customer agreement for the data storage
- PRIMA owns the proprietary software
- Cloud provider owns the platform

Partners

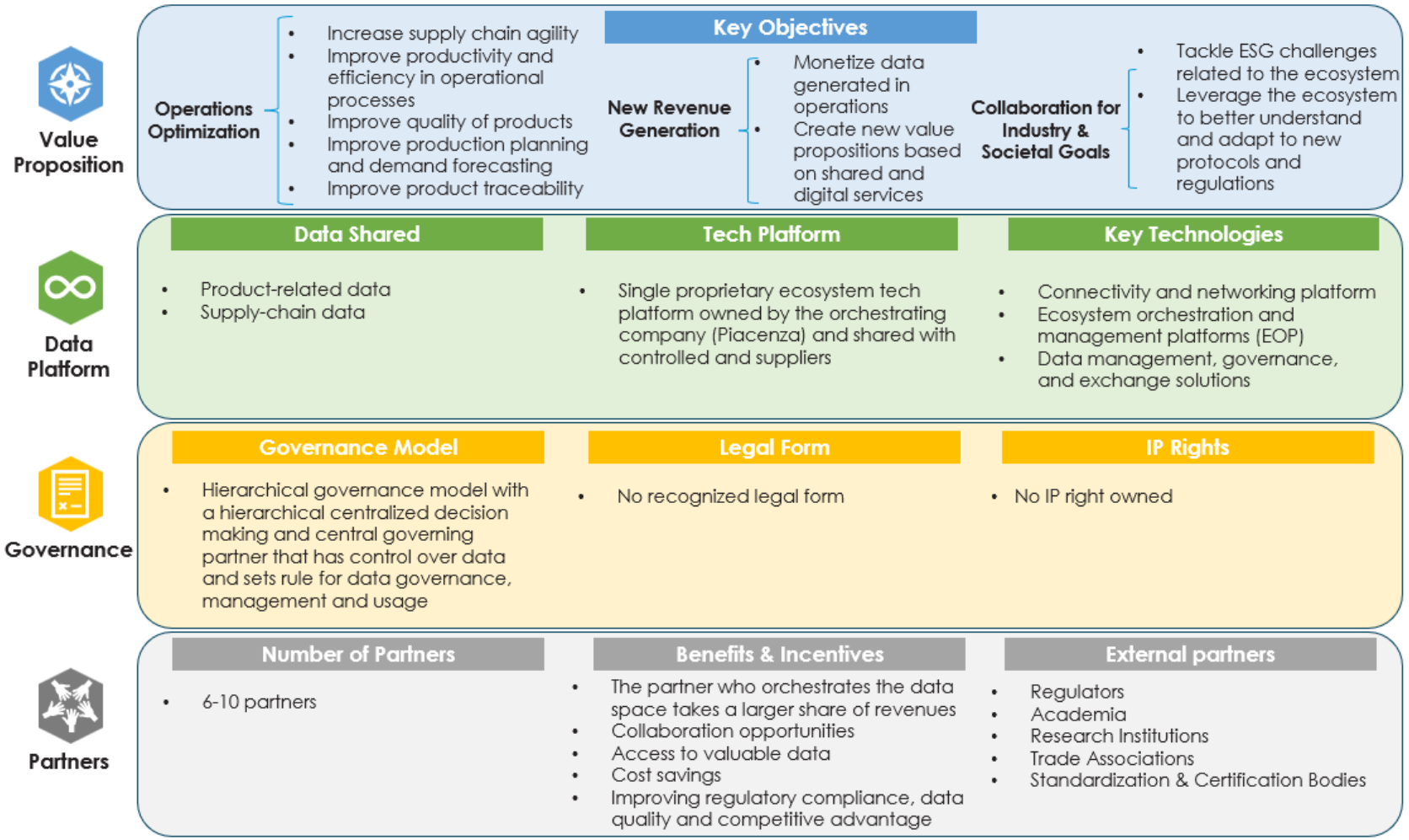
Number of Partners
- 1-5 partners

Benefits & Incentives
- The partner who provides the technology platform takes a larger share of revenues
- Collaboration opportunities
- Cost savings
- Value generated for customers

External partners

Radar Validation in Textile Data Value Chains

FRATELLI PIACENZA Business Model



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Radar Validation in Circular Economy (Carbon Fibre wastes)

CFRP waste for Drones Pilot Business Model

Value Proposition

Key Objectives

Operations Optimization
- Improve productivity and efficiency in operational processes
- Improve the quality/availability of data for production and demand forecasting
- Enhance supply chain visibility via collaboration with Trading partners

Collaboration for Industry & Societal Goals
- Increase reuse of CFRP waste for sustainability and legislation purposes

Data Platform

Data Shared
- Process data
- Product-related data
- Supply chain data
- Materials data

Tech Platform
- Open distributed technology platform among participants, with some application and data shared
- Owned by a tech provider that is part of the ecosystem
- Platform made available to other external organizations

Key Technologies
- IoT
- Industry cloud dedicated platform
- Data management, governance & exchange solutions
- Digital marketplaces

Governance

Governance Model
- Distributed governance model, where decision-making power is shared among multiple stakeholders involved in managing and utilizing data within the ecosystem

Legal Form
- No recognized legal form

IP Rights
- No IP rights owned by the ecosystem

Partners

Number of Partners
- 3 Partners

Benefits & Incentives
- No revenue sharing mechanisms in place
- Access to valuable data
- Collaboration Opportunities
- Cost savings
- Gaining competitive advantage
- Improving regulatory compliance

External partners
- Standardization & Certification Bodies

DATA SPACE 4.0

Plooto

Product Passport through Twinning of Circular Value Chains

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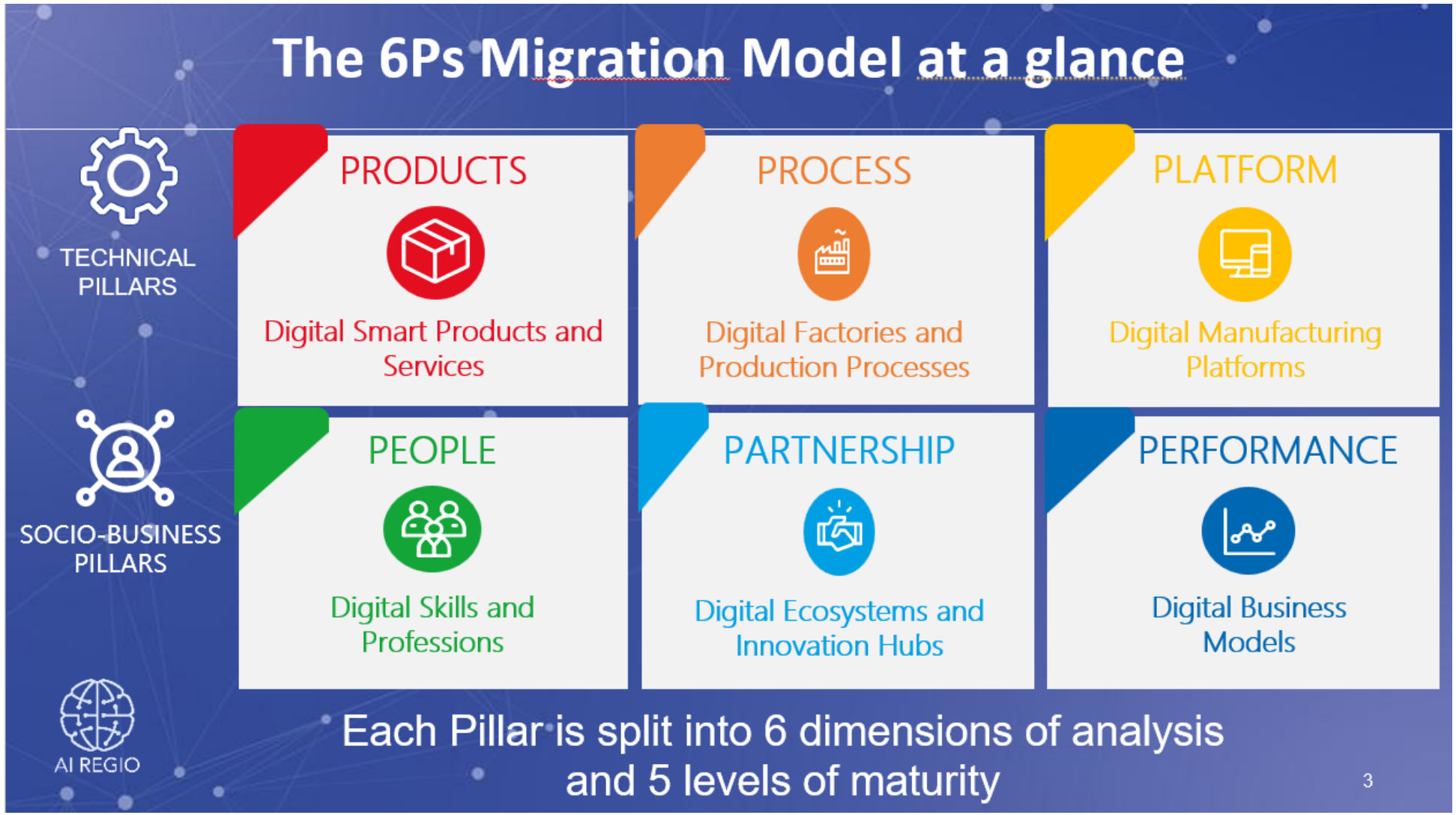
Maturity Modelling in Data Value Chains (POLIMI)



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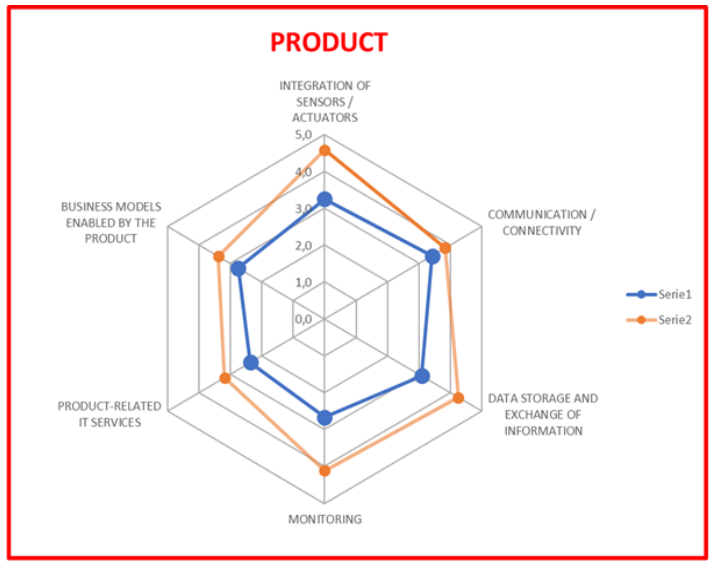
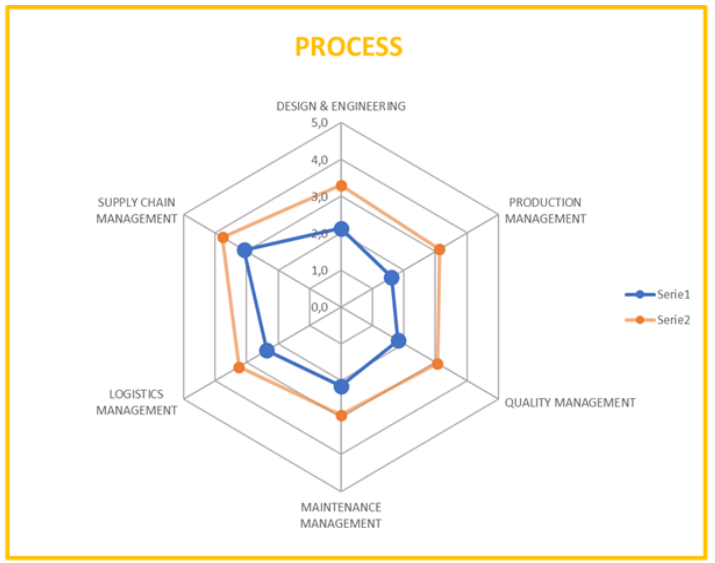
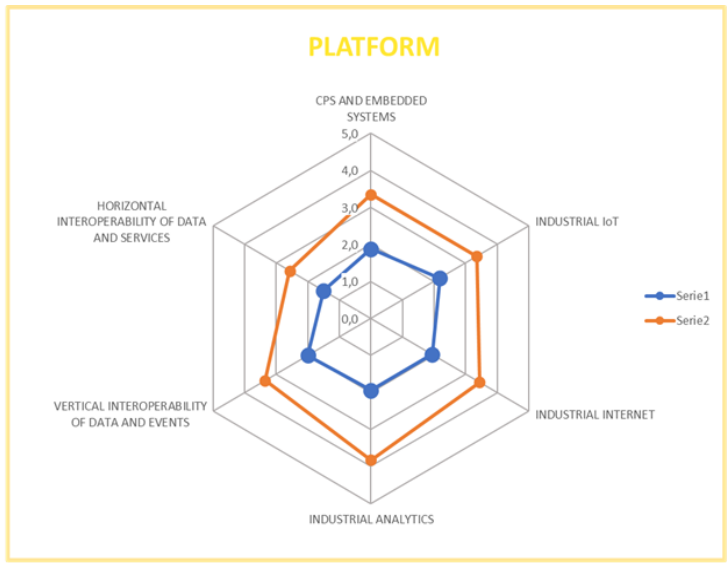
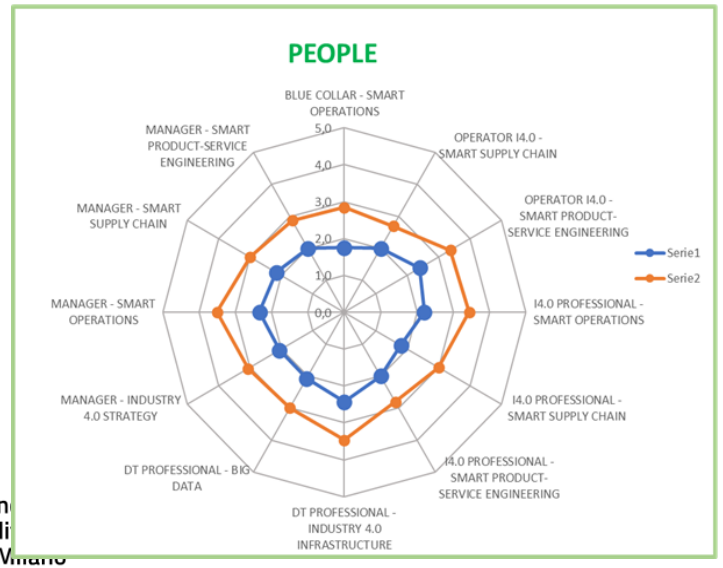
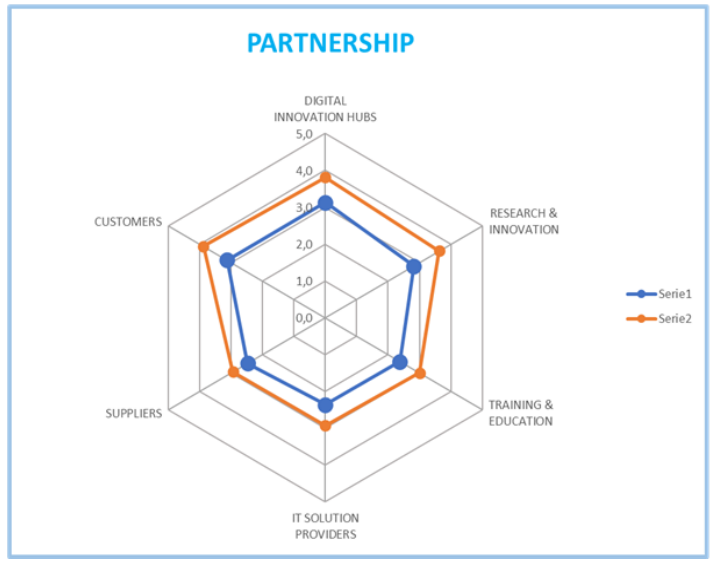
Maturity Modelling Radar Charts (POLIMI)

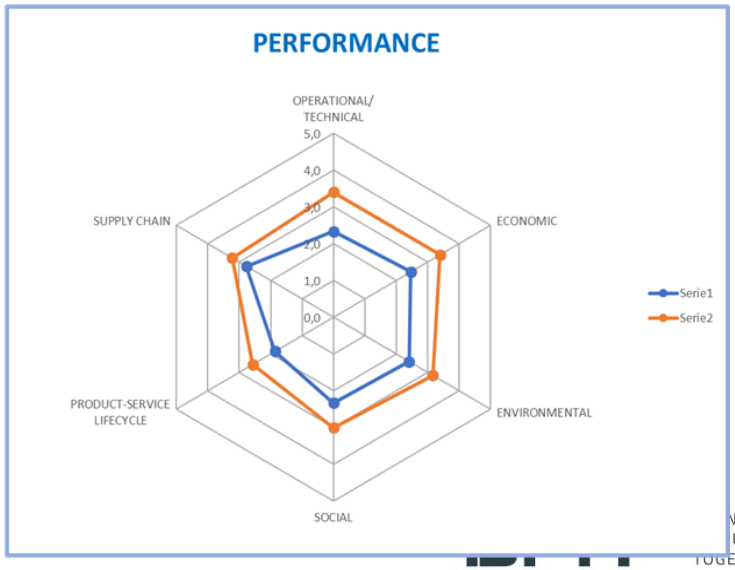












6P Validation in Data Spaces

DATA SPACE 4.0

THE EUROPEAN DATA STRATEGY

CONNECTED FACTORIES

Dynamic Assets Management

Sustainable Green Products

Agile Supply Chains Value Networks

SM4RTENANCE

Industrial Data Spaces

MARKET4.0 TRICK

Industrial Data Platforms

Plooto Circular TwAIn

Industrial Circular Networks

PRIMA INDUSTRIE

smart connected supplier network

ACCELIGENCE

TRIMEK METROLOGICAL ENGINEERING

itema

IMA

FILL

PIACENZA 1733

HAIKI COBAT

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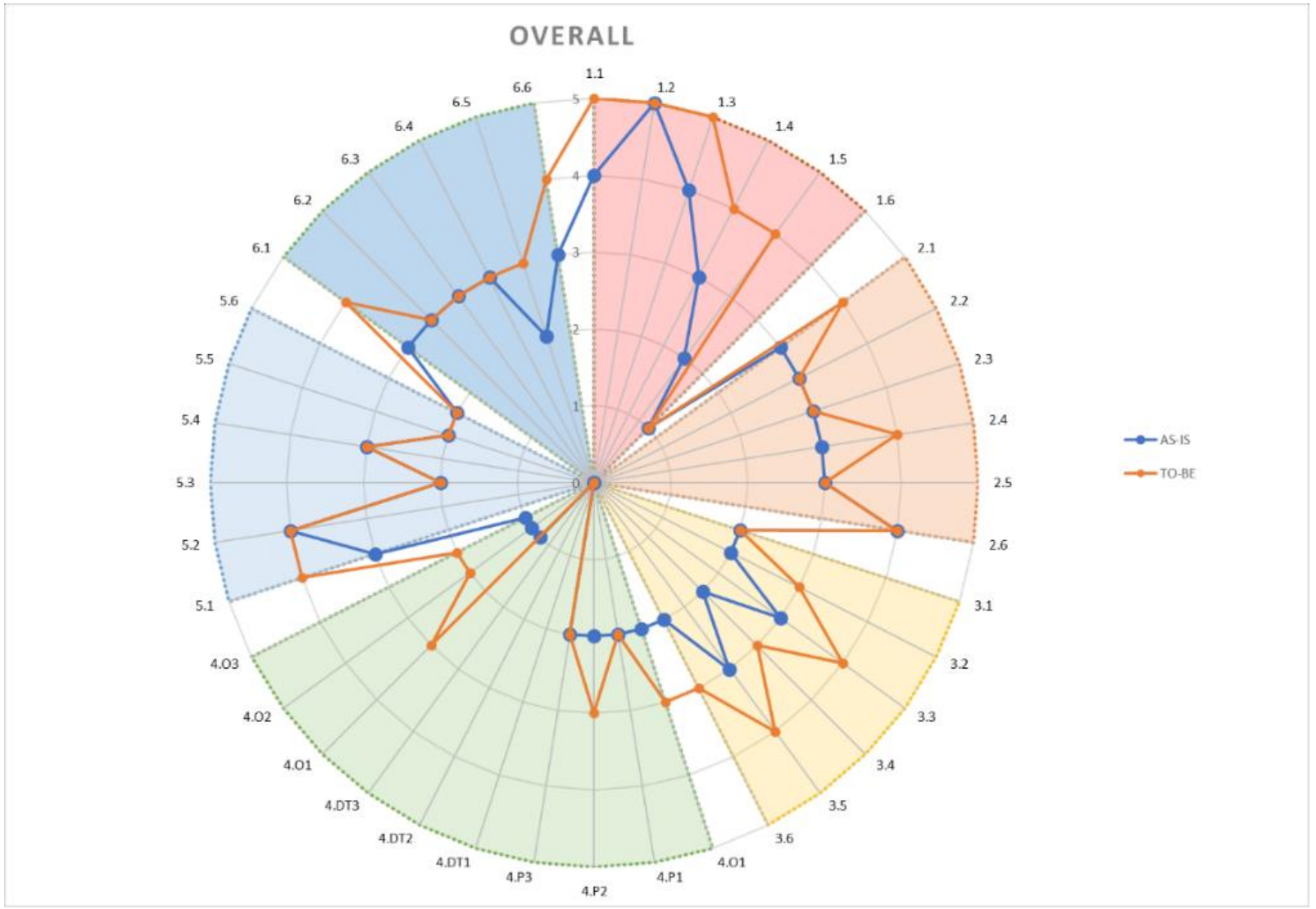
6P Validation in Machine Tools Industry



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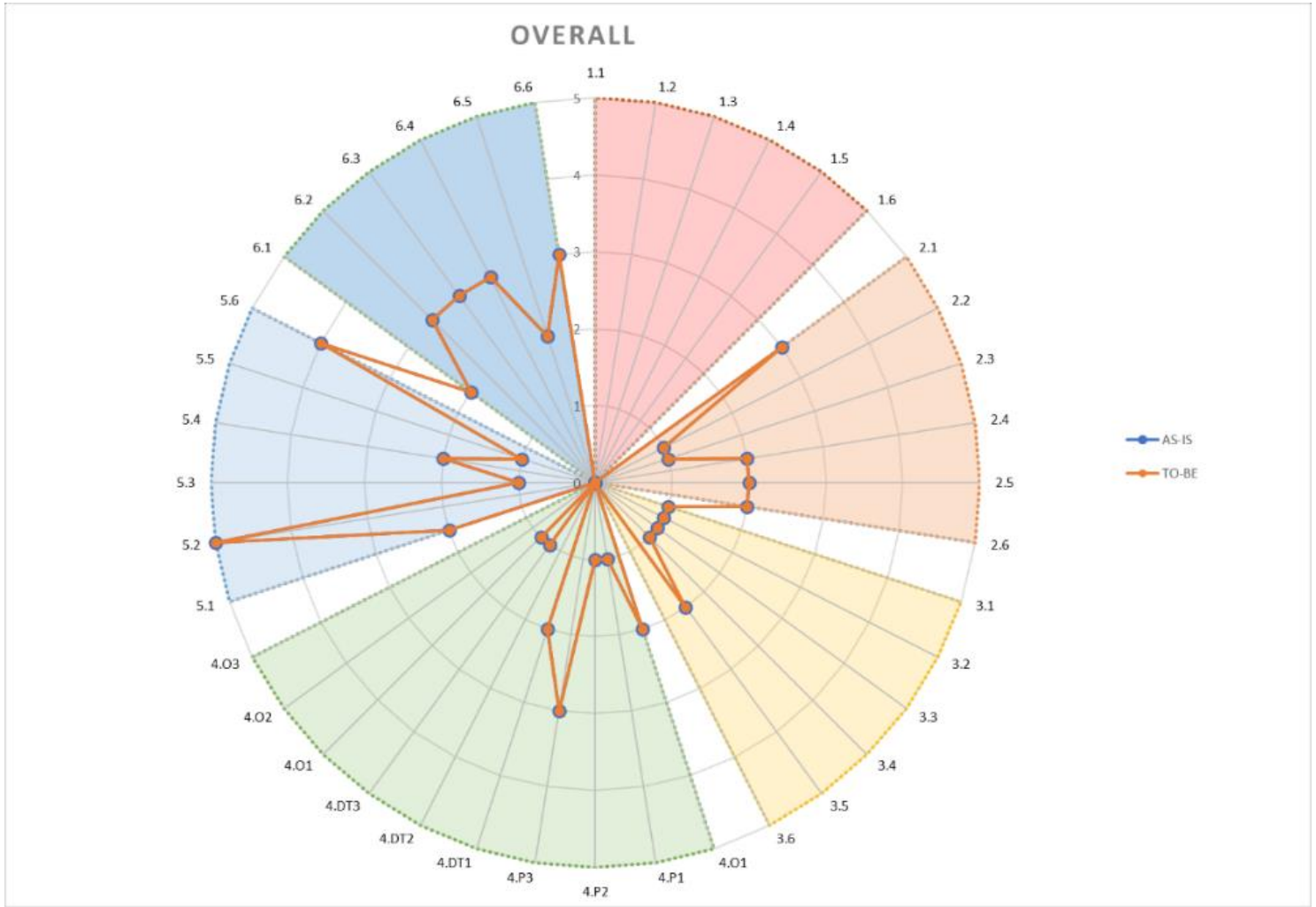
6P Validation in Circular Economy (Carbon Fibre wastes)



Product Passport through Twinning of Circular Value Chains

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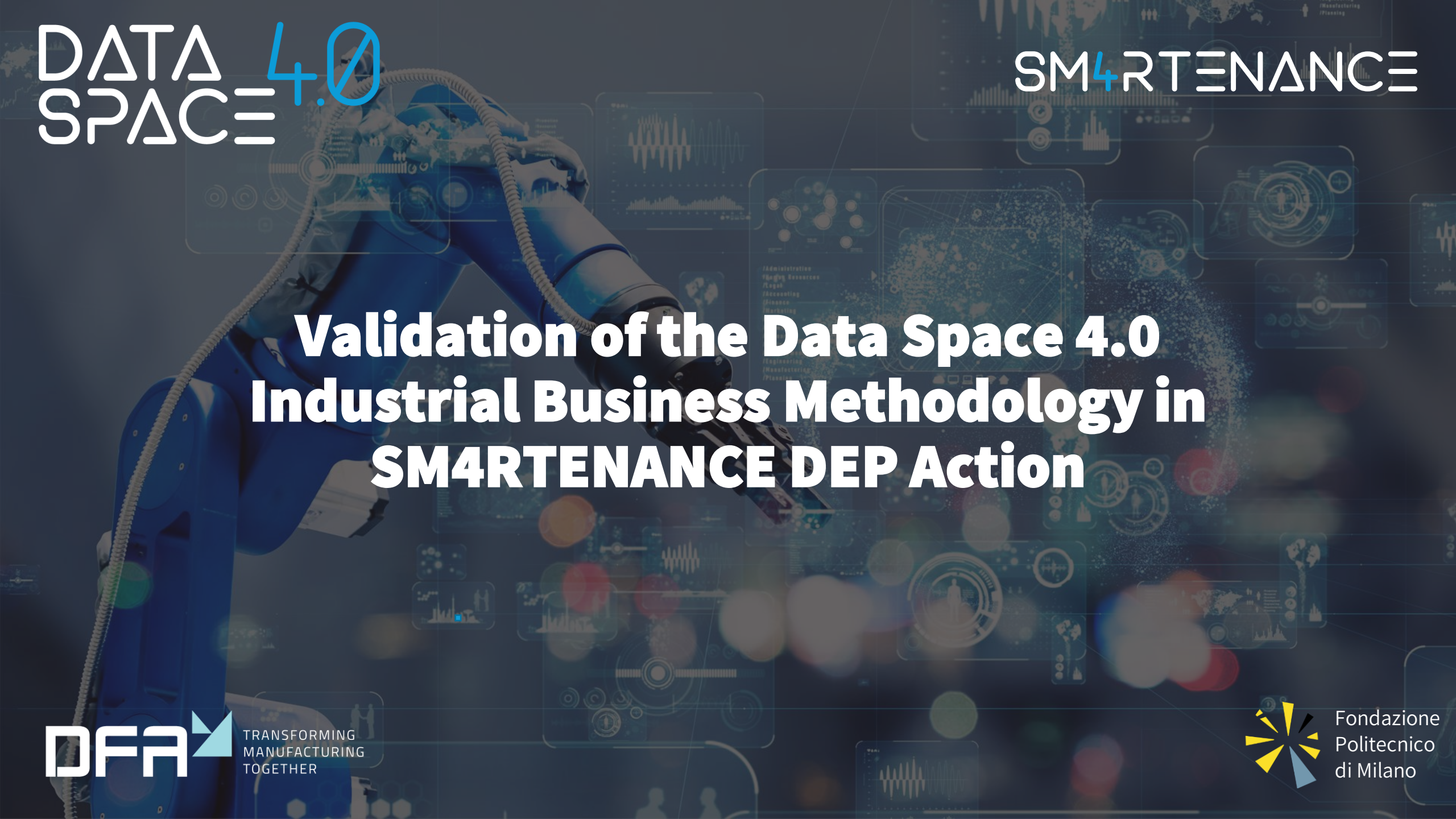
DATA SPACE 4.0
SM4RTENANCE
Validation of the Data Space 4.0 Industrial Business Methodology in SM4RTENANCE DEP Action
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DSSC Blueprint 1.0 Building Blocks

Business and organisational building blocks

Business

- Business model development
- Use case development
- Data product development
- Data space intermediary

Governance

- Organisational form and governance authority
- Participation management

Legal

- Regulatory compliance
- Contractual framework

The Manufacturing Industry Viewpoint to DS

INTERNATIONAL DATA SPACES ASSOCIATION

EUROPEAN STRATEGY FOR DATA

9 *Data spaces in key sectors*

Manufacturing	Green	Mobility
Health	Finance	Energy
Agriculture	Public Administration	Skills

European Data Space

- **DATA**
  FAIR, High Value pools of Data
- **PLATFORM**
  Infrastructure to use and exchange data
- **PORTAL**
  Appropriate governance models / mechanisms

How to realize?

Data Space adoption Phases

THE EUROPEAN DATA STRATEGY

CONNECTED FACTORIES

Open Data Repositories

Data Platforms & Marketplaces

Trusted Data Networks

Smart Autonomous Factories

Product Service Factories

Hyper Connected Factories

SM4RTENANCE

DAWEX

SOVITY

BAIDATA

PIACENZA 1733

itemalab

COMAU

FIDIA

PRIMA INDUSTRIE

Materializing Business adoption Phases

SM4RTENANCE

	PIACENZA 1733	itemalab	COMAU	FIDIA	PRIMA INDUSTRIE
DATA FAIR, High Value pools of Data	PIACENZA 1733	itemalab	COMAU	FIDIA	PRIMA INDUSTRIE
PLATFORM: Infrastructure to use exchange data	domina data management	INTELLIMECH CONSORZIO PER LA MECCATRONICA	TXT	DGS BUILDING THE FUTURE	TXT
PORTAL: governance models agreements BPMN	SYXIS innovate together	INTELLIMECH CONSORZIO PER LA MECCATRONICA	TXT	DGS BUILDING THE FUTURE	INTELLIMECH CONSORZIO PER LA MECCATRONICA

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MADE Competence Center I4.0

TRUSTED Data Space for ITEMA (DATA)

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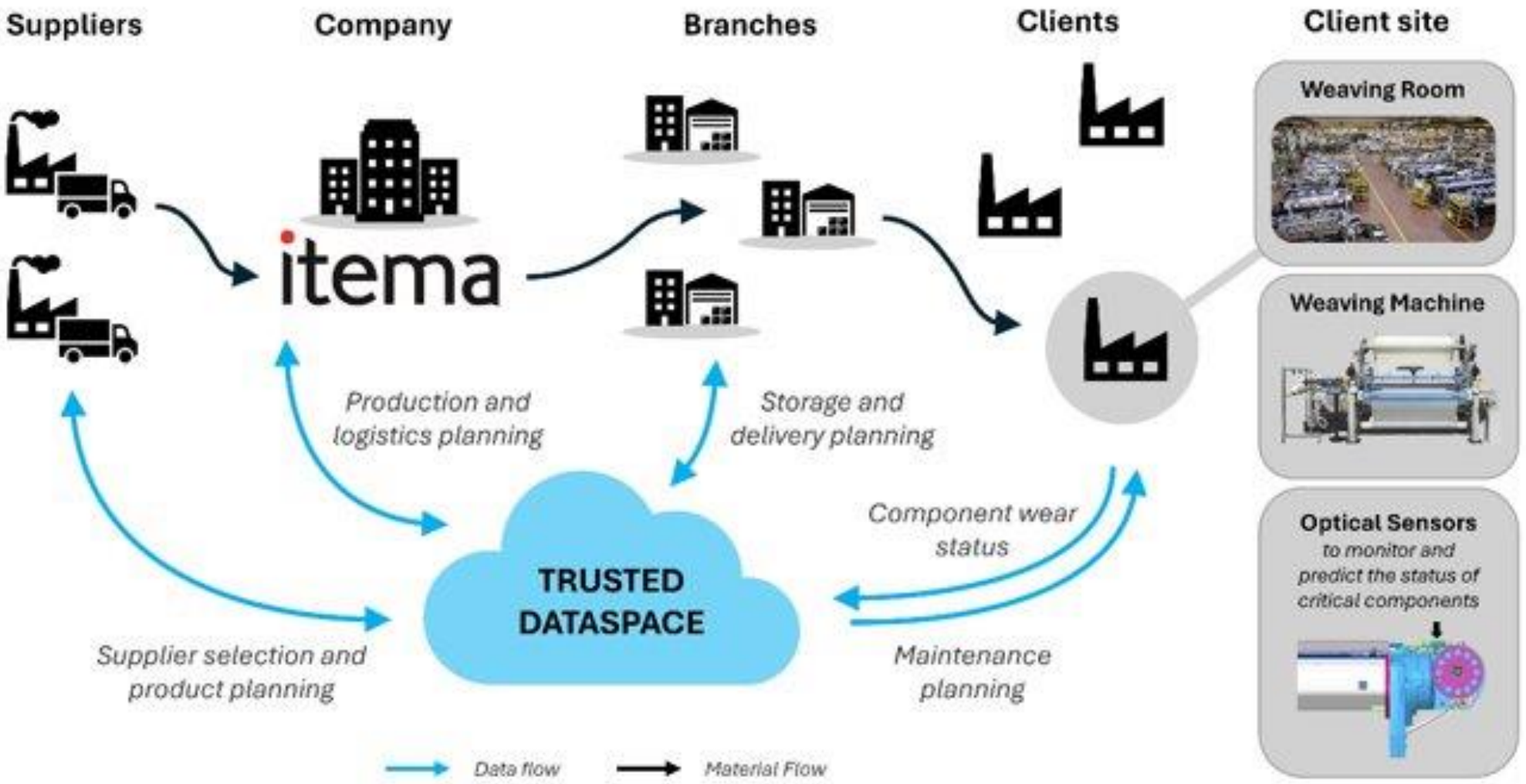

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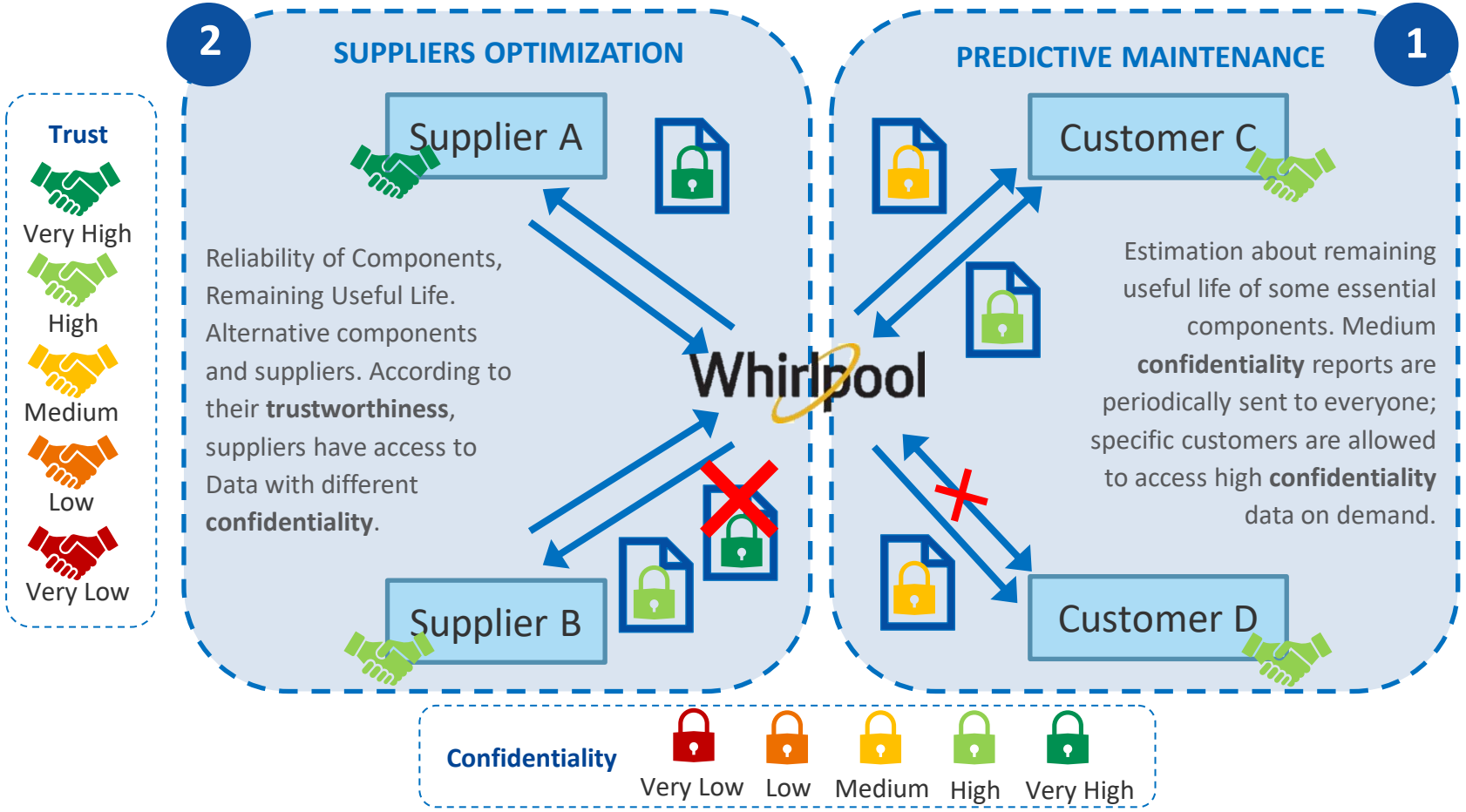
Industrial Agreements Sovereignty (PORTAL)

Cefriel

AI.SOV

eit Manufacturing



- Single Manufacturer's Hierarchical Governance (e.g. OEM, ITEMA COMAU)

Whirlpool

- Multi Manufacturer's Sectoral Regional non-Hierarchical Governance (e.g. SCSN or Biella Wool District)

SCSN smart connected supplier network

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MADE Competence Center I4.0

GRACIAS, THANKS, MERCI, DANKE, GRAZIE, DANK JE, OBRIGADO

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