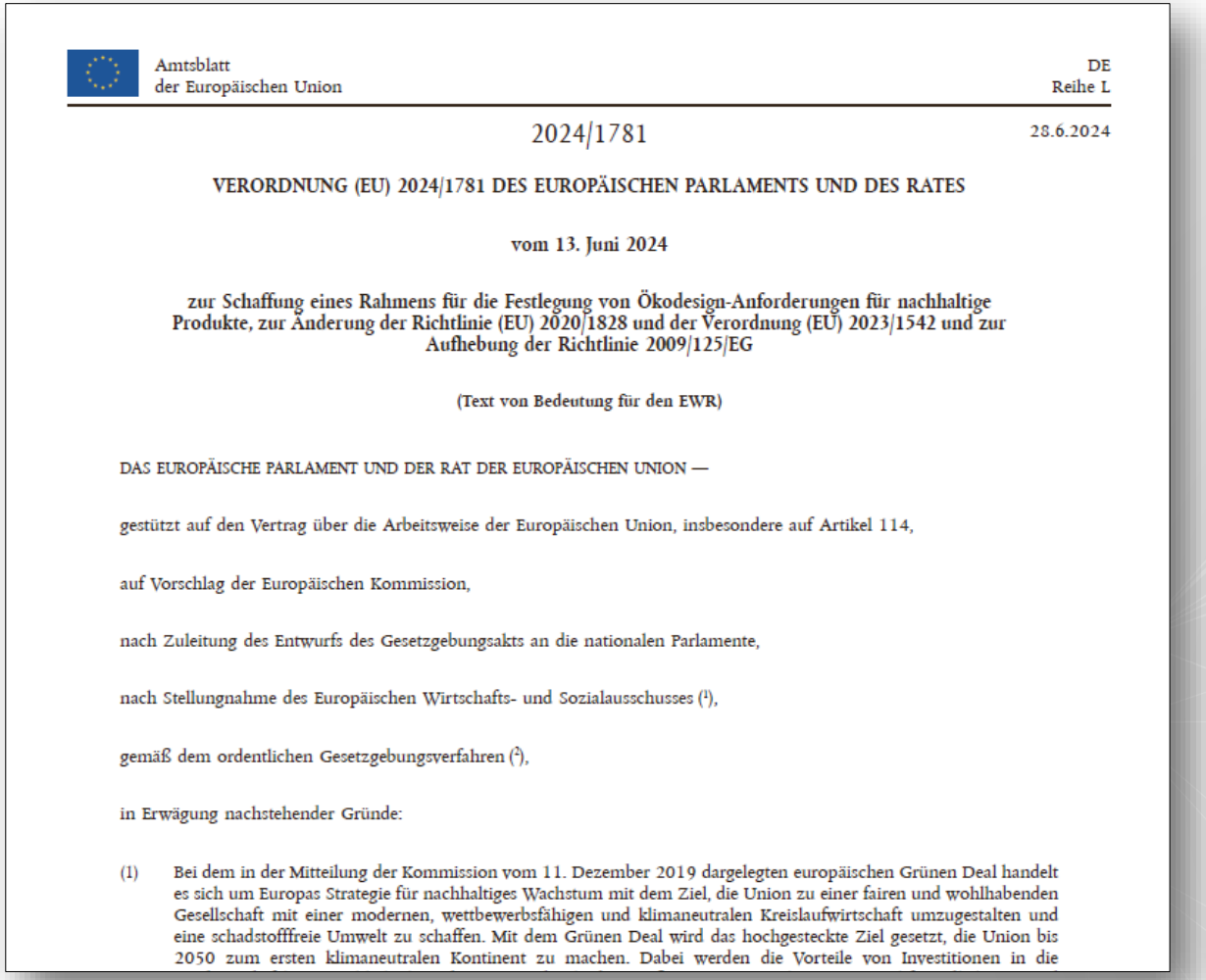
Furniture-X

The path to building a data ecosystem based on AAS for a circular furniture industry

ESPR
Ecodesign for Sustainable Products Regulation
EUDR
European Union Deforestation Regulation

Ecodesign for Sustainable Products Regulation (ESPR)



Amtsblatt
der Europäischen Union

DE
Reihe L

2024/1781

28.6.2024

VERORDNUNG (EU) 2024/1781 DES EUROPÄISCHEN PARLAMENTS UND DES RATES

vom 13. Juni 2024

zur Schaffung eines Rahmens für die Festlegung von Ökodesign-Anforderungen für nachhaltige Produkte, zur Änderung der Richtlinie (EU) 2020/1828 und der Verordnung (EU) 2023/1542 und zur Aufhebung der Richtlinie 2009/125/EG

(Text von Bedeutung für den EWR)

DAS EUROPÄISCHE PARLAMENT UND DER RAT DER EUROPÄISCHEN UNION —

gestützt auf den Vertrag über die Arbeitsweise der Europäischen Union, insbesondere auf Artikel 114,

auf Vorschlag der Europäischen Kommission,

nach Zuleitung des Entwurfs des Gesetzgebungsakts an die nationalen Parlamente,

nach Stellungnahme des Europäischen Wirtschafts- und Sozialausschusses ([1]),

gemäß dem ordentlichen Gesetzgebungsverfahren ([2]),

in Erwägung nachstehender Gründe:

(1) Bei dem in der Mitteilung der Kommission vom 11. Dezember 2019 dargelegten europäischen Grünen Deal handelt es sich um Europas Strategie für nachhaltiges Wachstum mit dem Ziel, die Union zu einer fairen und wohlhabenden Gesellschaft mit einer modernen, wettbewerbsfähigen und klimaneutralen Kreislaufwirtschaft umzugestalten und eine schadstofffreie Umwelt zu schaffen. Mit dem Grünen Deal wird das hochgesteckte Ziel gesetzt, die Union bis 2050 zum ersten klimaneutralen Kontinent zu machen. Dabei werden die Vorteile von Investitionen in die

[..] products **can only** be placed on the market …**if a** product passport is available

(Art. 8 (1))

NO DATA
NO MARKET!

Timeline – Introduction of the Digital Product Passport

Product group	Rank	Expected / Delegated acts	
End products			+18 months until validity
Textiles / Clothing	1	2027	
Furniture	**2**	**2028**	
Tires	3	2027	
Mattresses	4	2029	
Intermediates			
Iron / Steel	3	2026	
Aluminium	4	2027	

Furniture-X

Foundation of Furniture-X

February 29, 2024 – “Möbelfachschule” in Cologne

The network as a success factor for the concrete roll-out

The associations & umbrella initiatives	Data Competence Center	Integrated Worlds	Morphe	Wuppertal Institute	FIR
✔ **450 Manufacturer** ✔ **8,500 dealers** ✔ **All** relevant **affiliated groups**	✔ Approx. **80 companies** ✔ **270** committed **people** ✔ **Worldwide use** of **IDM standards**	✔ **1,000+ participants** ✔ **All** relevant **systems** networked	✔ **12 years of** product information management ✔ **4 ECLASS** industry models	✔ **Top network in science, research and politics** ✔ **6 CE projects** ✔ **10 Industries**	✔ **70 years of experience** ✔ **5+ active projects in the digital circular economy** ✔ **>50 enrolled companies**

• As the leading association for manufacturers, the **VDM** represents all sectors of the industry both nationally and internationally
• The German Home & Office Retail Association (**BVDM**) represents the interests of around 8,500 companies in the specialist retail sector.
• The **Mittelstandsverbund/ ZGV** represents the commercial association groups. **All relevant association groups** in the sector coordinate their activities in the **Furniture & Kitchen specialist group**
	• Organizer of **standardization committees** in all relevant industry sectors such as **home furniture, kitchen & bathroom.**
	• Designer of the **globally** used Integrated Data Format (**IDM**).
	• Co-initiator of **Moebel Digit@l**
	• **ECLASS Furniture** and derived models **specialist group**
	• Active member of **DIN/DKE** for DPP
	• Associated project partner in **furnFUSION**
		• **Operates IWOfurn as an established platform** for data exchange
		• Connects more than **1,000 companies** in daily business (65 million transfers/year)
		• **Open concept** and **interfaces** to **all relevant system providers**
		• Pioneer for **operating models suitable for SMEs** in the industry with services for the **active networking of all companies**
		• Implementation partner for **furnFUSION**
		• Project member of **R-evolve**
			• Product information management (**PxM**) consulting in industry-wide scenarios for retail and manufacturing
			• Collaboration in the following relevant initiatives
			  • **ECLASS specialist group "50 Furniture, home furnishings"**
			  • Internal ECLASS working groups
			  • **Head of ECLASS WebService**
			  • **Head of ECLASS Product Environmental Footprint**
			  • **ECLASS BIM** TaskForce
			  • **ECLASS WoT** Semantic RDF-Representation
				• Strong **focus on digital circular economy** and resulting **business models**
				• Involved in the development of **DPPs** and **data spaces across industries**
				• **Advising the EU Commission** and the **German government** on the following topics
				• Active in **standardization activities** on DPP and the circular economy
					• Development of **business models** in a scientific and entrepreneurial context
					• Analysis and design of **application-oriented and circular ecosystems**
					• Integration of operational application systems (ERP, MES)
					• Support for SMEs for low-threshold entry into the GAIA-X world (e.g. URANOS-X)

The network as a success factor for the concrete roll-out

Integration of the industry

Use cases & concrete pilots

- ➔ Definition of suitable **reference processes**
- ➔ **Requirements** for and feedback on the concept
- ➔ **Practical integration** / validation of the results
- ➔ **Beacons** for the utilization of results

3-5 supply chain companies from the network

nolte® KÜCHEN · POLIPOL® UNTERNEHMENSGRUPPE

Integration of specific pilots & holistic representation of the industry

User reports & blueprints for the rest of the industry

Public relations work and support from multipliers

Associated organs

VDM · BVDM Handelsverband Möbel und Küchen · Der Mittelstandsverbund ZGV · Daten Competence Center e.V. · Integrated Worlds we connect worlds · Moebel Digit@l

THINK TANKS

Media / Information

Moebel Digit@l · möbel fertigung · möbelkultur · MÖBELMARKT · moebelnews.de die moebelbranche in echtzeit · INSIDE

Implementation of DPP integration

Definition & design of the AAS submodel

- ➔ Development of **basic technologies** and knowledge transfer (**AAS**)
- ➔ **Requirements documentation** for the implementation of a **submodel**
- ➔ **Conception and definition** of the submodel
- ➔ **Documentation of the application guidelines** based on the reference processes

Daten Competence Center e.V. · morphe*

Technical infrastructure for the integration of the DPP AND existing infrastructure of industry players

- ➔ Development of **basic technologies such as IDS** and reference models for industry communities such as **Gaia-X Foundations**
- ➔ Definition of **measures for interoperability** according to analysis of the state of the art and infrastructure of the industry
- ➔ Implementation of **infrastructure for the DPP along the value chain** and **integration of existing digital** infrastructure

Integrated Worlds we connect worlds

Know-how development and transfer

Comprehensive harmonization

Knowledge transfer and coordination

- ➔ **Knowledge transfer / expertise** from several sectors
- ➔ **Control and coordination** of planning with regard to harmonization with **cross-sector projects**
- ➔ **Circular economy orientation**

Wuppertal Institut

Targeted integration and coordinated exchange

Relevant break over initiatives, including

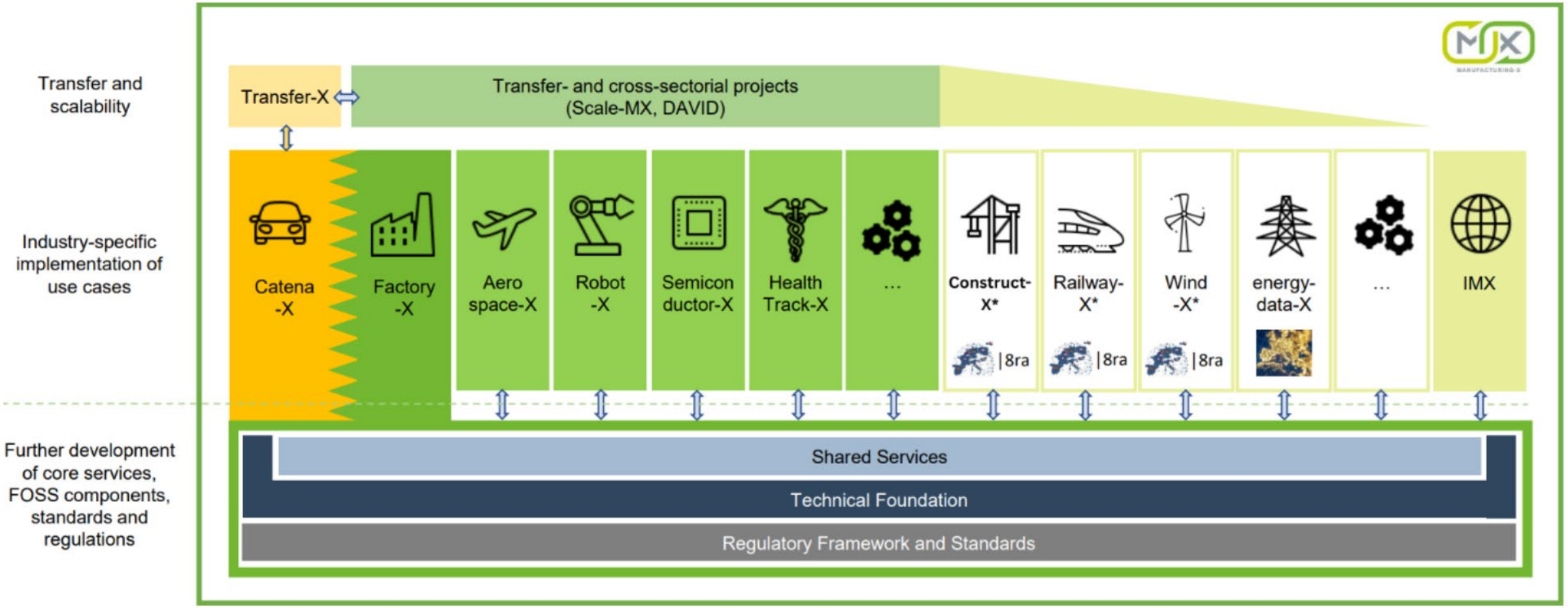
PLATTFORM INDUSTRIE 4.0 · IDTA · CIRPASS Digital Product Passport · ZVEI · gaia-x · UNIVERSITY 4 INDUSTRY · CLASS

Relevant internal industry initiatives

Integriertes Datenmodell · VDM · BVDM Handelsverband Möbel und Küchen · IWOfurn Integrated Worlds Of Furniture · Der Mittelstandsverbund ZGV · furnFUSION

Accompanying expert advice

Manufacturing-X as a driver for data ecosystems



Die Architektur hinter Manufacturing-X

© Bundesministerium für Wirtschaft und Klimaschutz (BMWK)

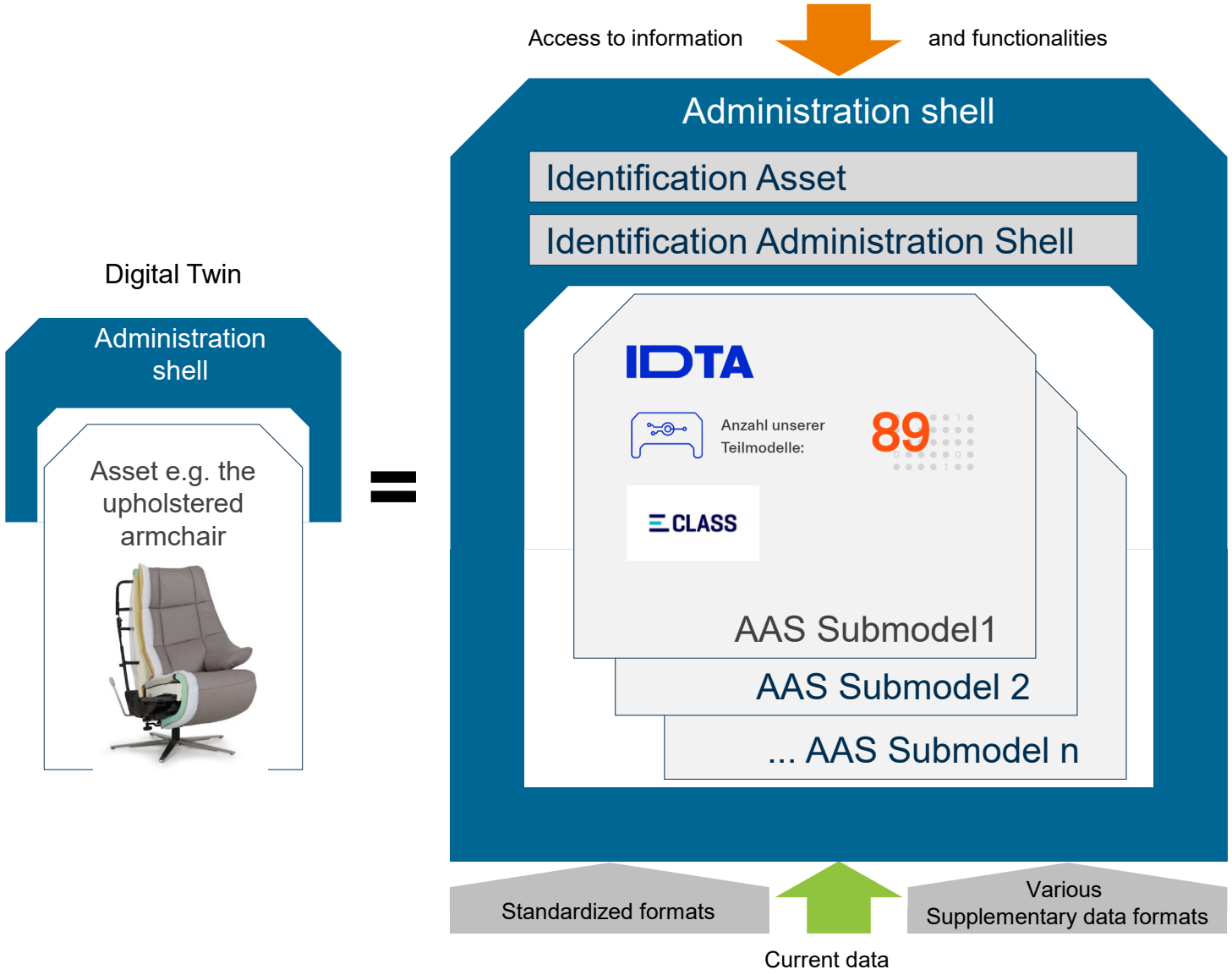
The expert advisory board

Name	Organization	Email Adress	Key Facts
Martin Auerbach	Fachverband Matratzenindustrie e.V.	martin.auerbach@heimtex.de	Existing showcase (mattresses, home textile); Exchange of experience and direct reference to furniture; Synergy with the "Polster" demonstrator
Heiner Strack	Verband der deutschen Möbelindustrie e.V.	h.strack@moeblindustrie.de	Relation to the EU level for standardisation and regulation; A look at content regulation beyond the sub-area "DPP"
Ernst Esslinger	Formerly Homag AG	ernst.esslinger@outlook.de	Expert for added value through the use of digital twin concepts; Reference to Industry 4.0; Driving force beyond regulation (added value through "Additional Services")
Tim Geiser	Der Mittelstandsverbund – ZGV	t.geier@mittelstandsverbund.de	Relation to the EU level with regard to regulation; Perspective from the point of view of associations and retailers, across all sectors
Martin Führ	Hochschule Darmstadt	martin.fuehr@h-da.de	Expert on legal certainty issues; Relation to EU level regarding Law/regulation in the wider circular economy environment
Thorsten Kroke	ECLASS e.V	kroke@eclass-office.com	Impulse generator regarding modelling content; Bridge between ECLASS and IDTA; Bridge to value chains towards trade and consumers and many other industries
Meik Billmann	IDTA – Industrial Digital Twin Association	meik.billmann@idtwin.org	Link regarding IDTA / AAS for Everybody; Link to other sectors / industries
Raoul Klingner	Fraunhofer-Institut für Holzforschung, Wilhelm-Klauditz-Institut WKI	raoul.klingner@wki.fraunhofer.de	Link to the wood industry; Contact to the VHI, the Association of the German Wood-Based Panel Industry e.V., in coordination with the Managing Director Ms. Anemon Strohmeyer

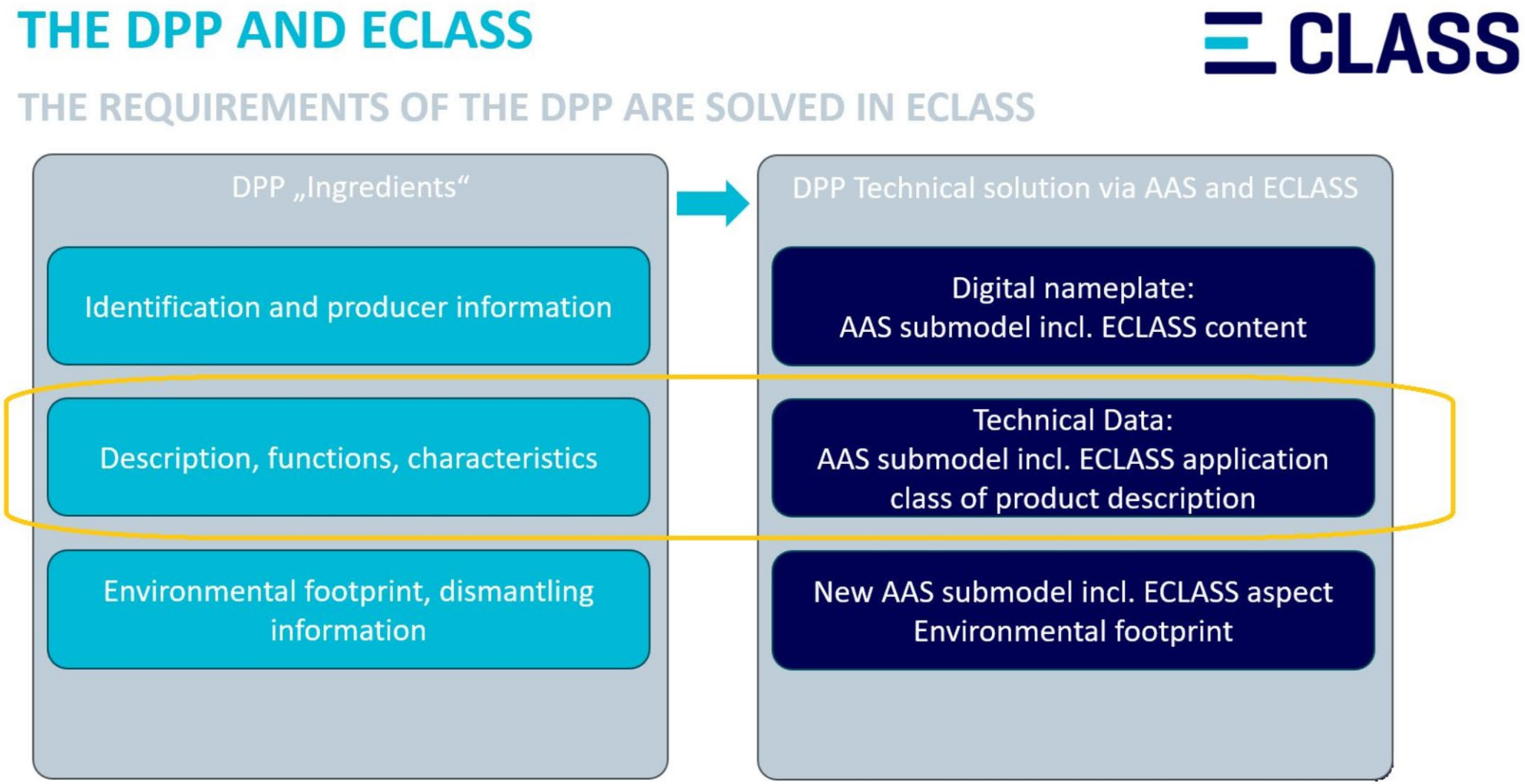
The administration shell AAS - Asset Administration Shell

A standard for the setup and provision of digital twins and the DPP also for furniture?

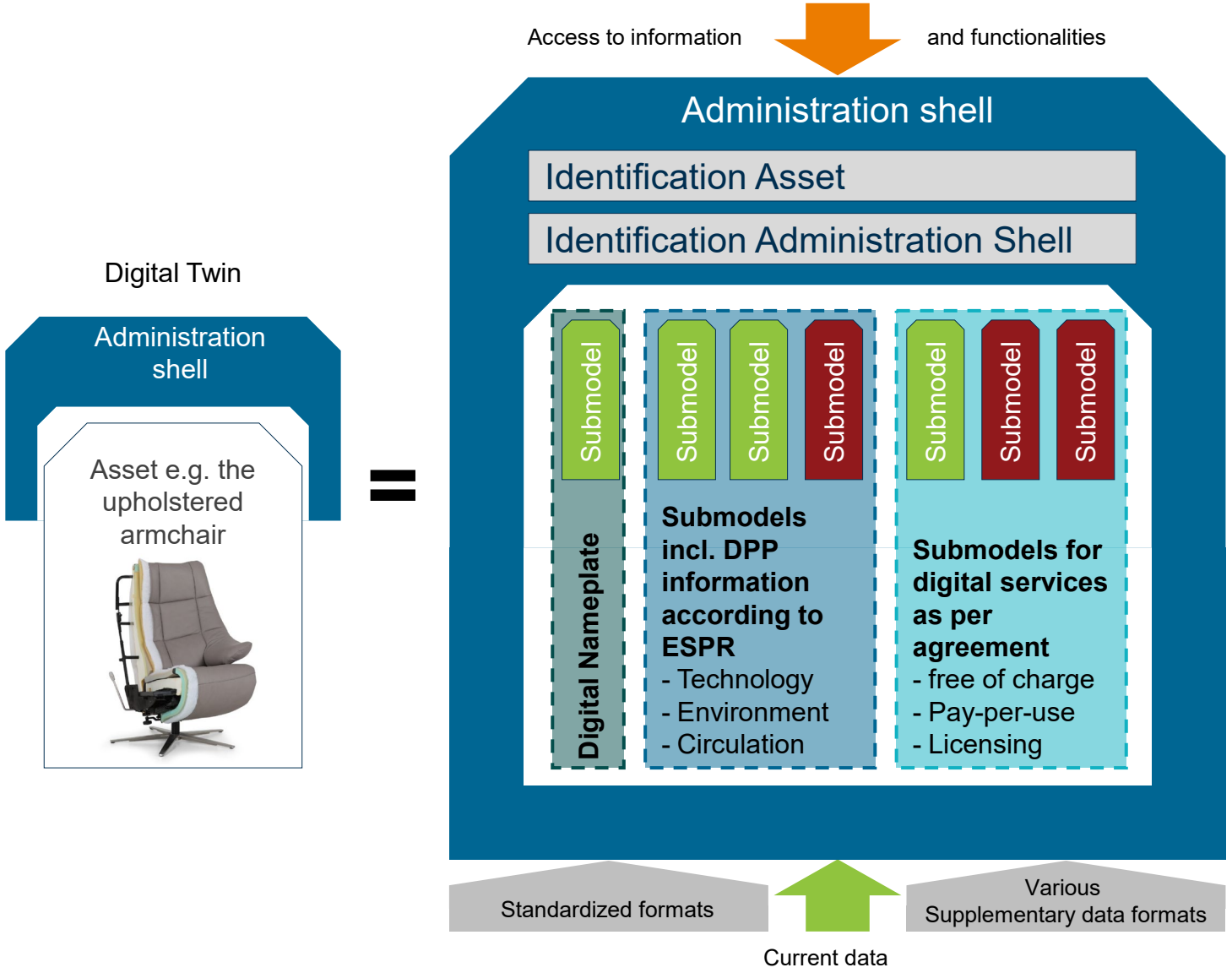
Building digital twins with the AAS (including furniture)



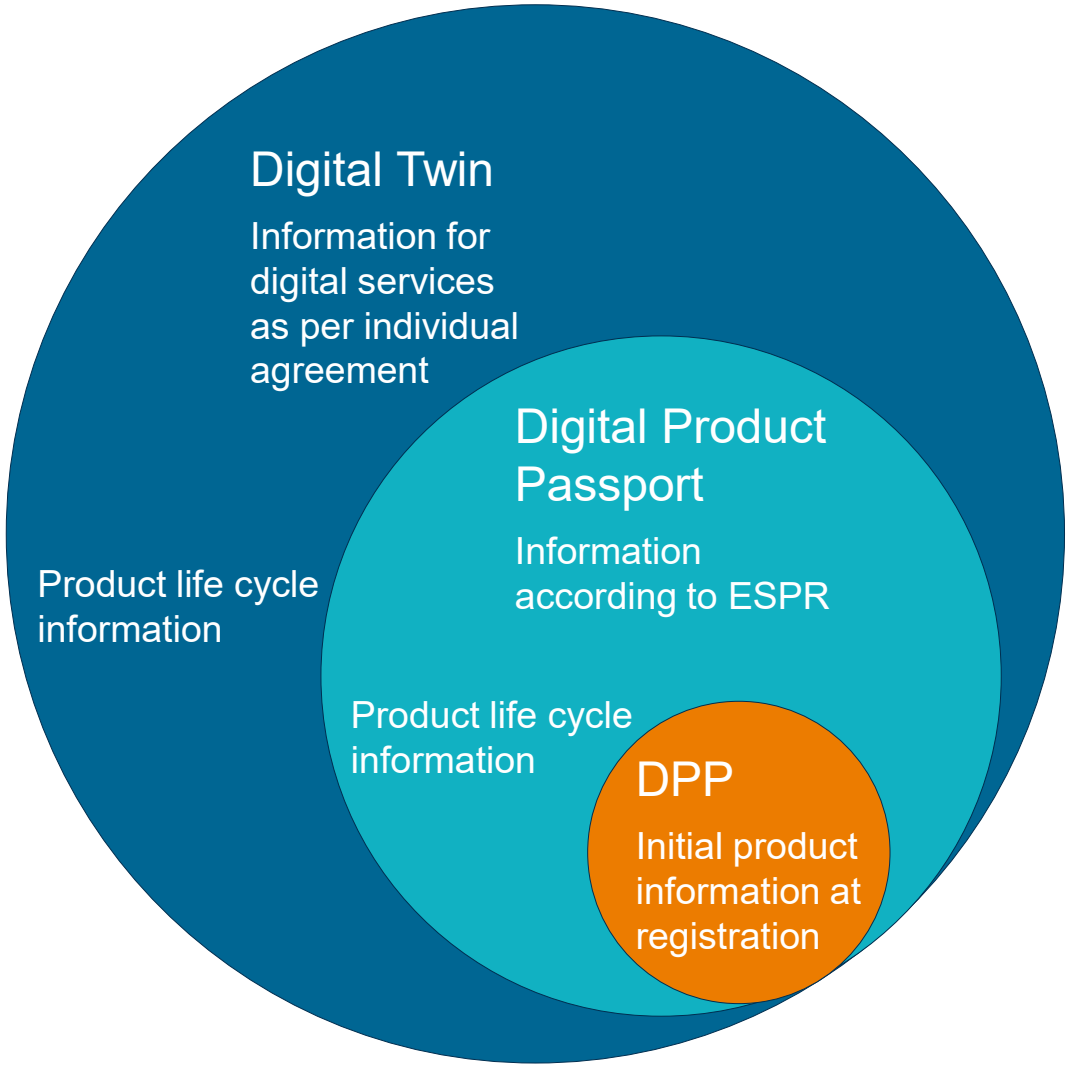
The ontological basis of the AAS is ECLASS!



Digital twins – DPP regulations and business potentials!



Digital twin - a superset of the Digital Product Passport



Variants of the Digital Twin and the DPP: Model vs Instance

Model

Represents the type
version of a produc
Catalog, manufacture
product number, brand

Configuration, Ordering, Production

Adoption of generic properties

01

[..] The manner in which the product passport shall be made accessible to customers **before** they are bound by **a sales contract**

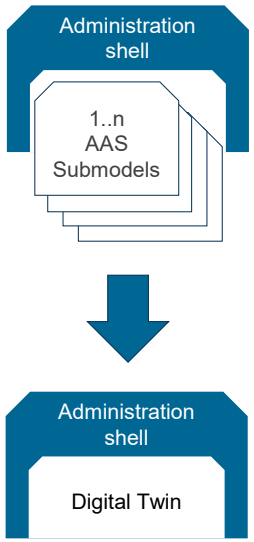
(Art.8 (2e))

Instance

resents a uniquely
ntifiable product:
etID, Serialnr, Batchnr,
Lotnr

Digital twins with the AAS meet the requirements of the furniture industry.

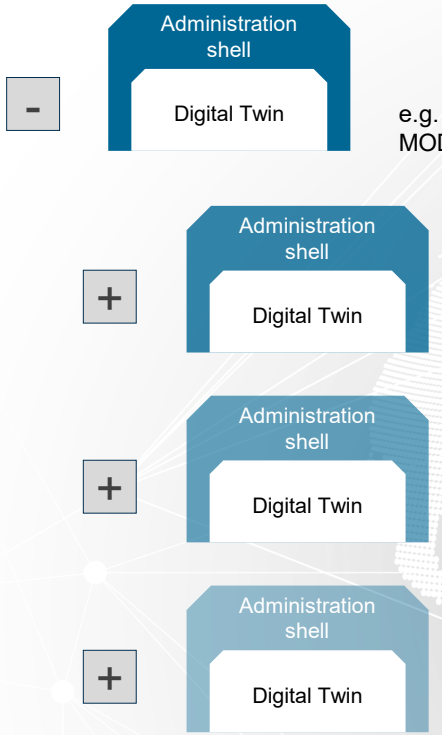
Digital Twin & AAS Submodels



Complex variant articles

Complex variant articles

Composite asset
Based on a configured instance with BOM list of the manufacturer with articles FEATURES and OPTIONS on the versioned e.g. IDM catalog of the manufacturer. These can only be generated at runtime.

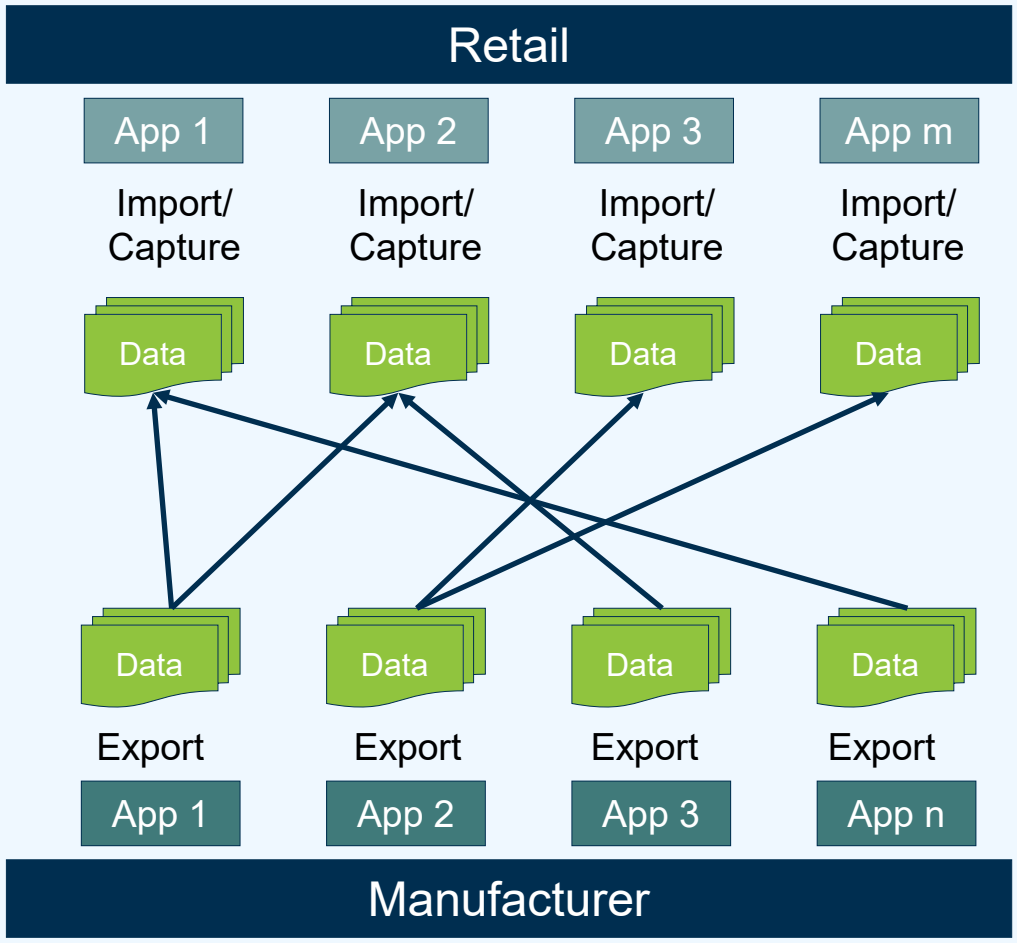


Data spaces and data ecosystems

Standards, security and sovereignty for data exchange

Current situation in the provision and use of data!

The push procedure…

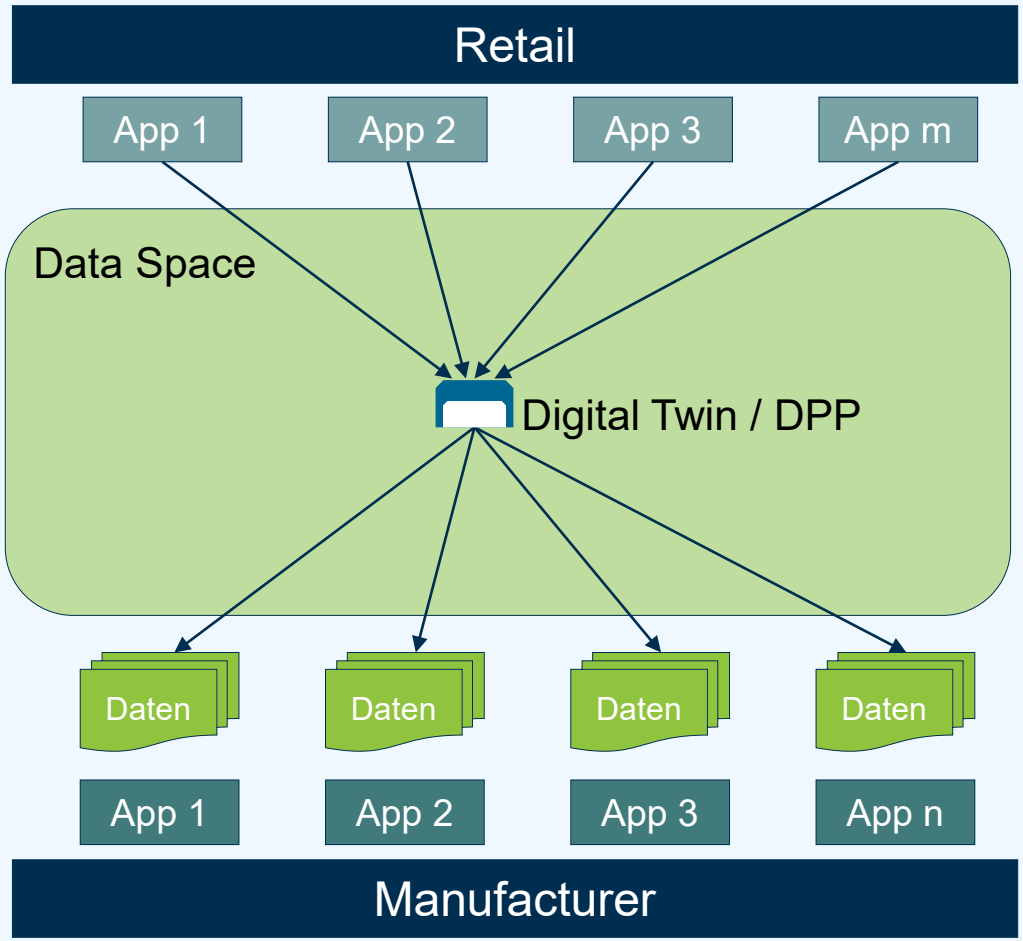


with many problems…

- High maintenance effort on both sides
- Up-to-dateness of the information
- Often proprietary and non-standardized
- Many different partners with different requirements
- Severe restriction due to the delimitation of different subject areas
- Redundancy and lack of synchronization
- Mostly no bidirectionality

The use of digital twins in a data ecosystem is a game changer!

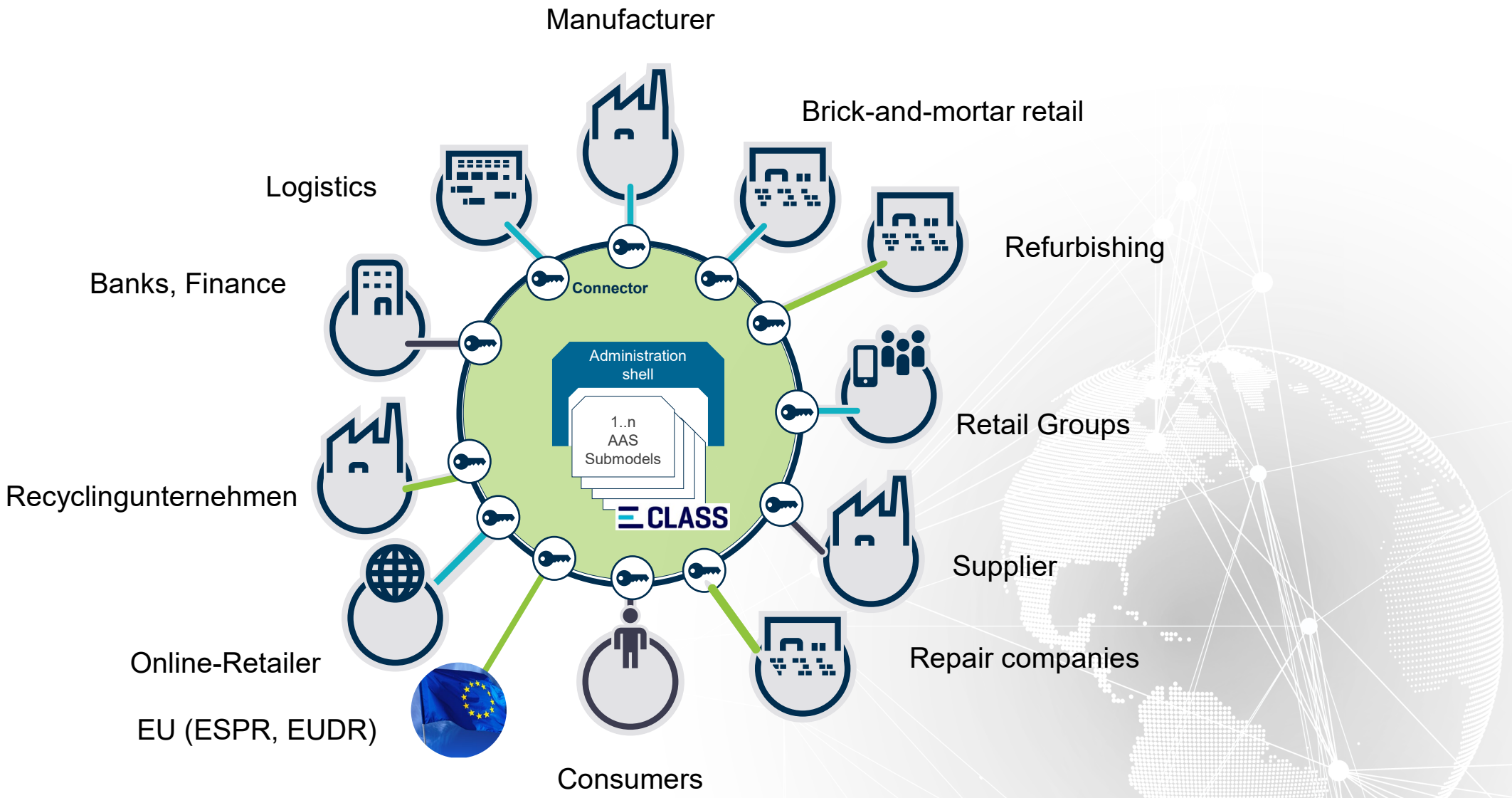
…to the pull process.



with many advantages and solutions to well-known problems…

- Less effort on both sides
- Good up-to-dateness of the information
- Standardized data and procedures
- Many different partners but a **single point of truth**
- Different requirements but consolidated for on-demand access
- Sovereignty and security are guaranteed
- Bidirectional – Basis for the product lifecycle

Data spaces and data ecosystems in the furniture industry

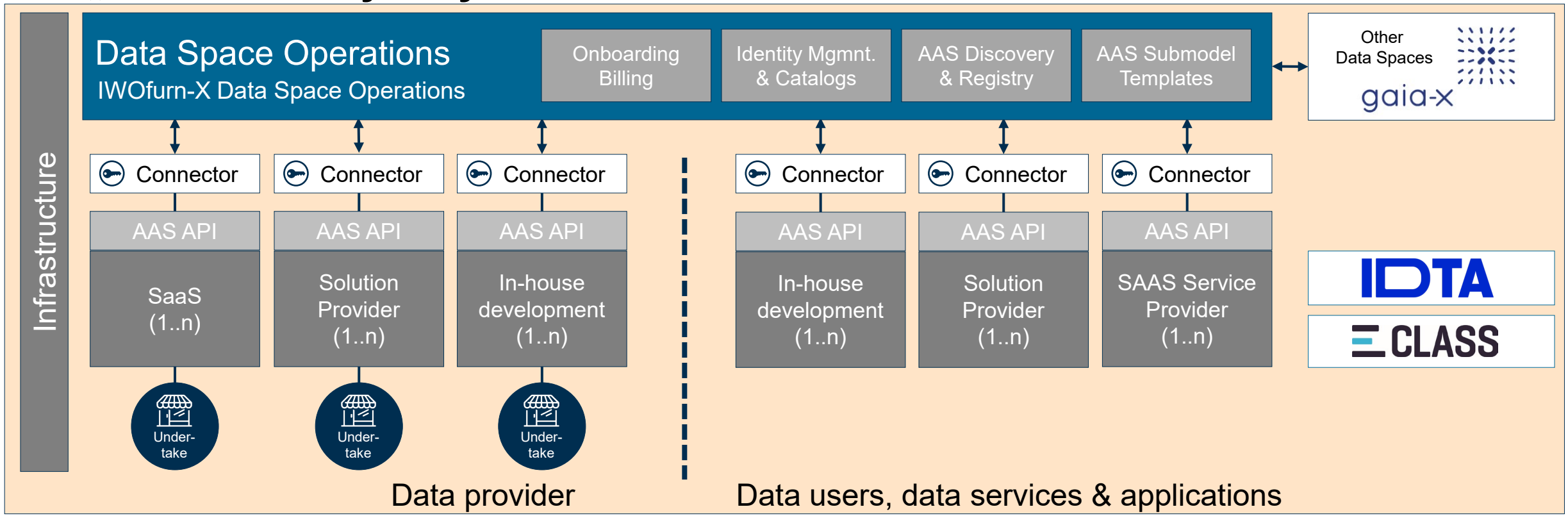


The technical infrastructure of the Data Space

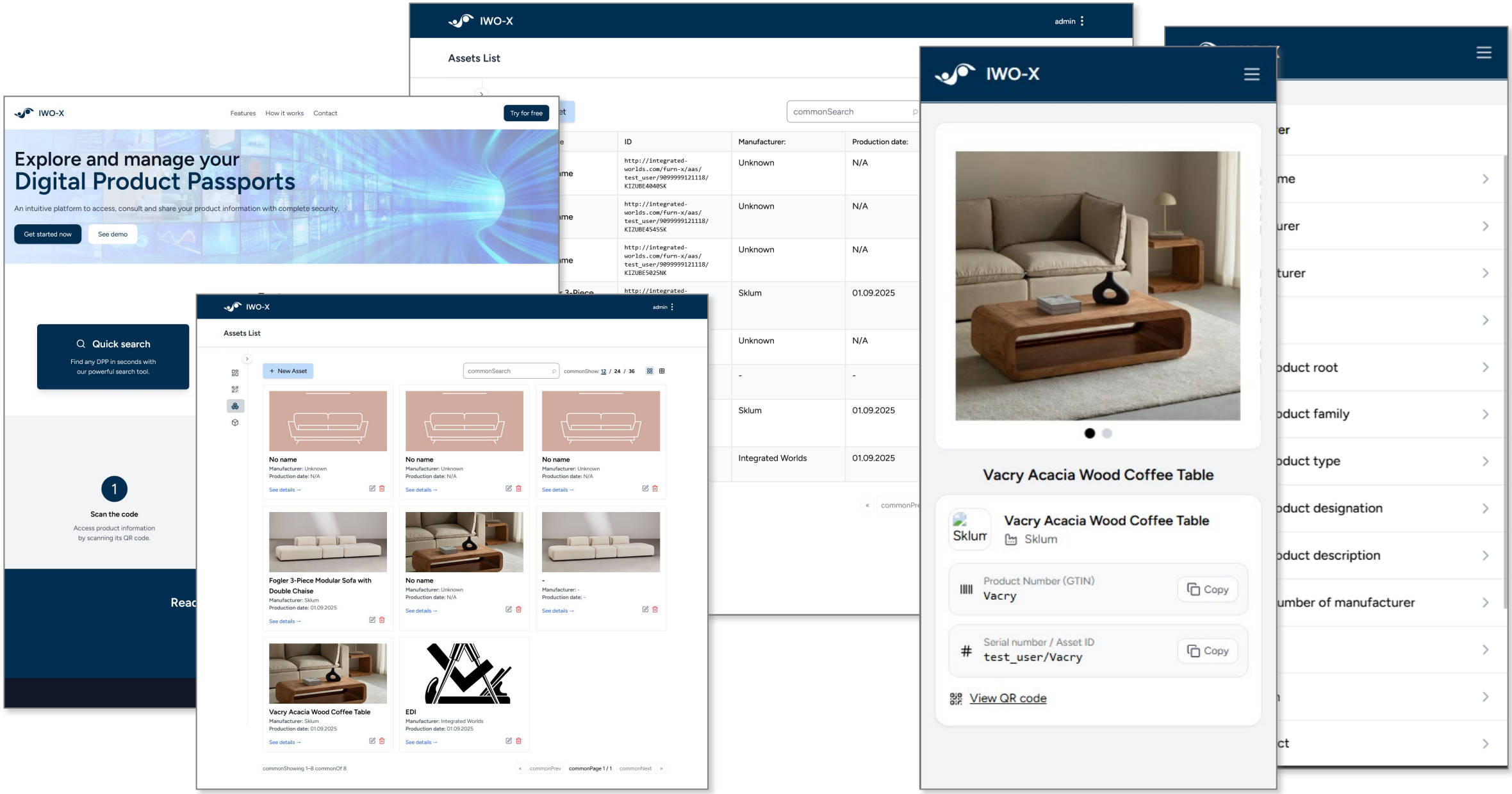
Fraunhofer IESE

Fraunhofer-Institut für Experimentelles Software Engineering IESE

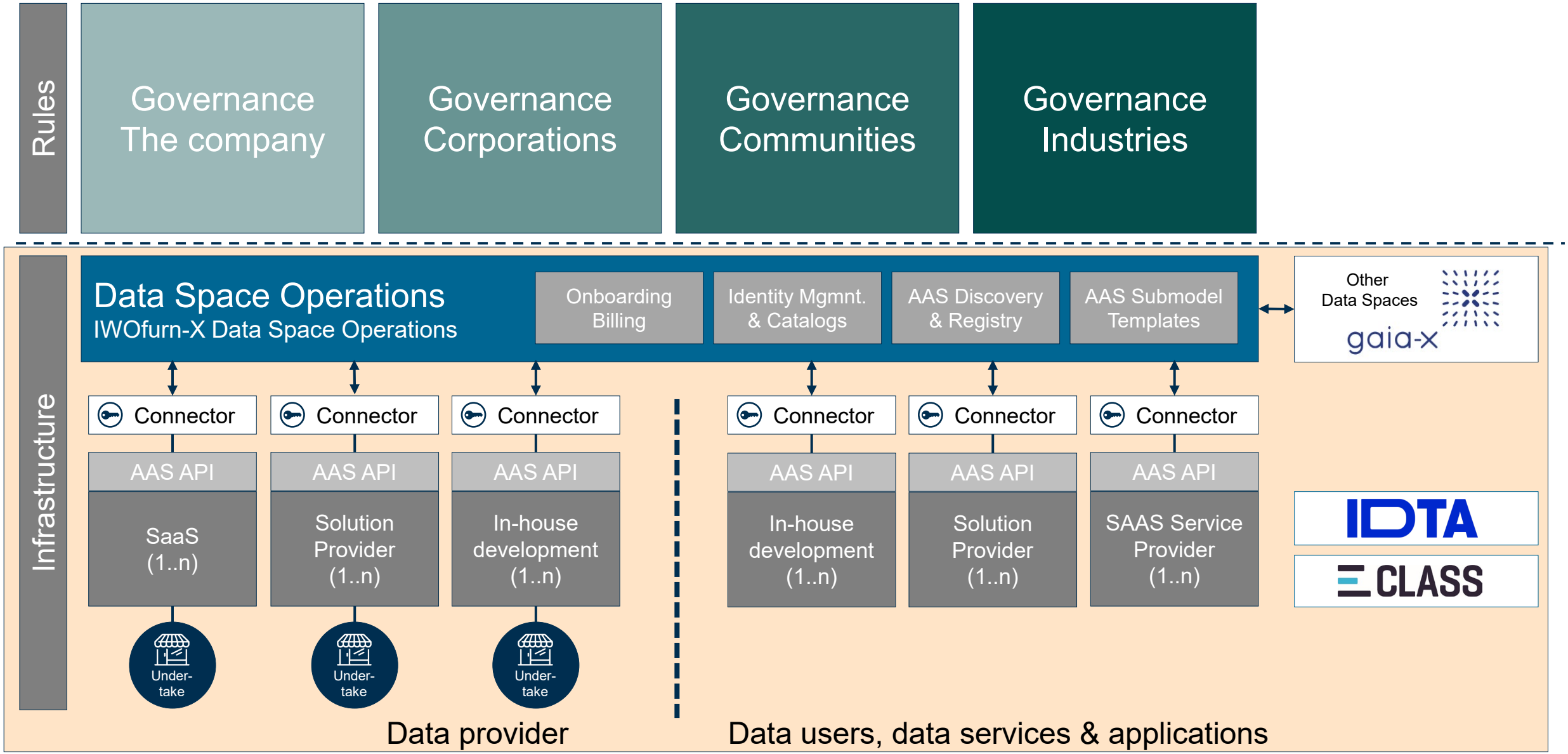
„AAS for Everybody“



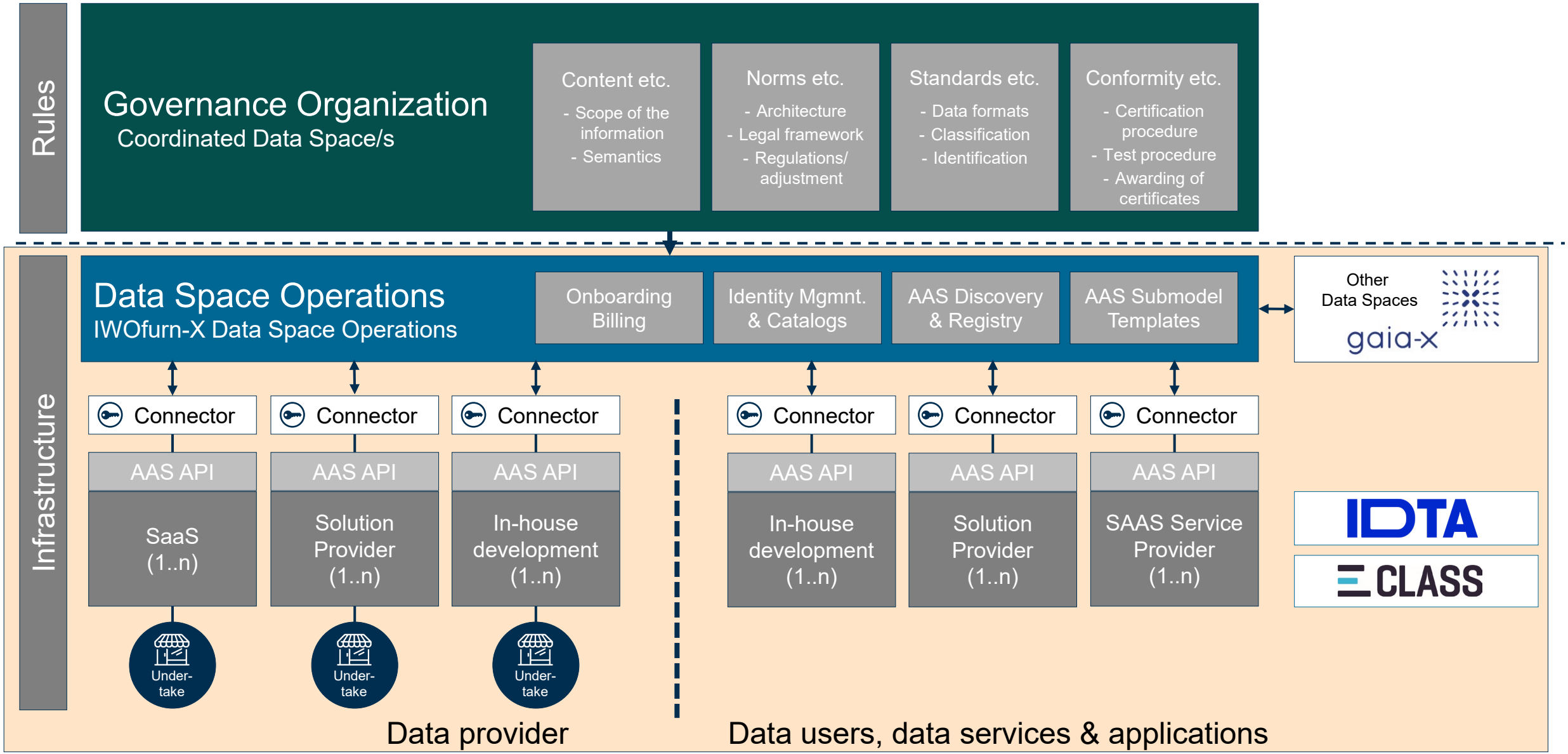
IWOfurn-X Apps – not only infrastructure!



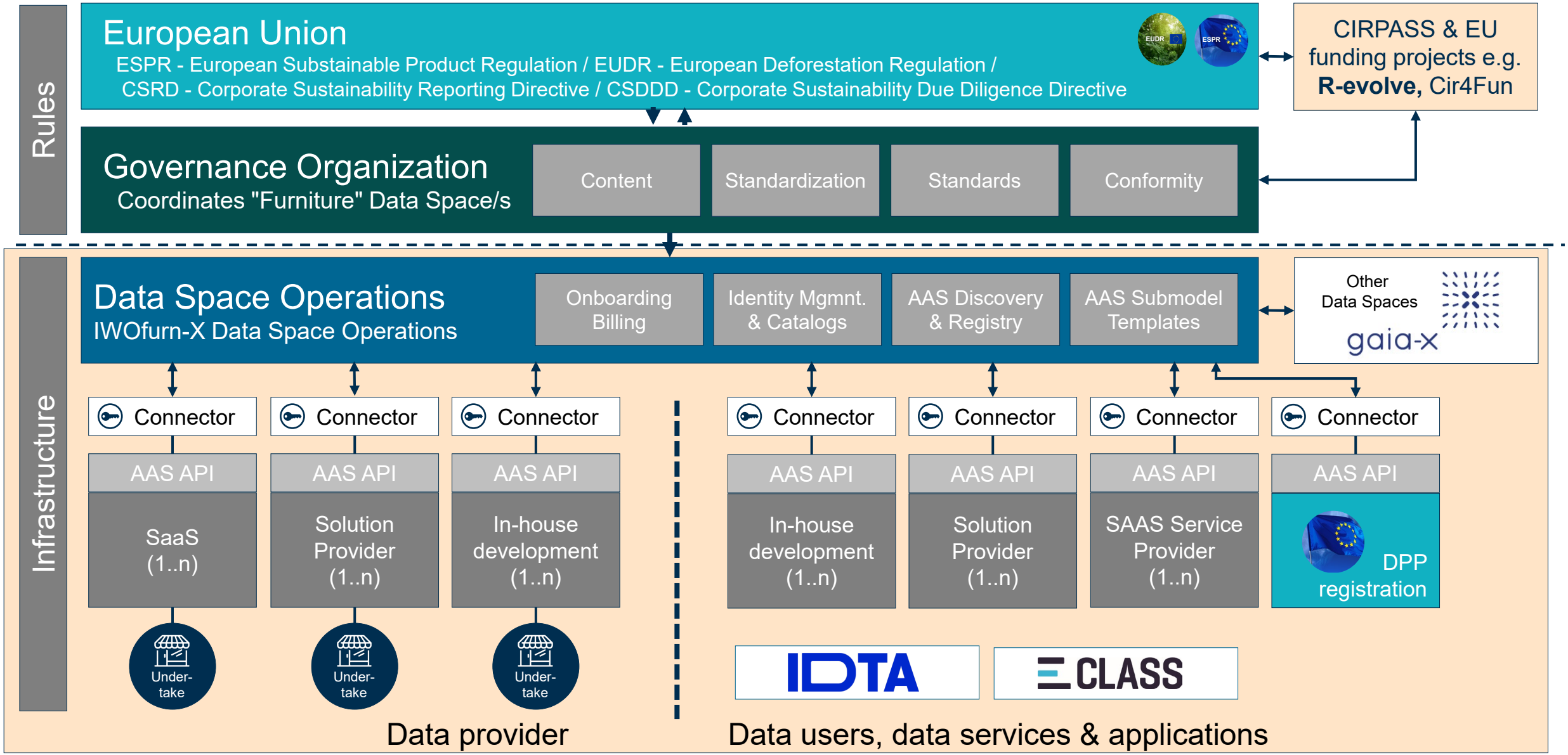
Rules for collaborative working in data spaces



Governance in the environment of data spaces



A data space for a circular furniture economy



A data space for a circular furniture economy

DA, DGA, AIA,…

Legislation aimed at enabling innovation, protecting consumers and safeguarding European values in the digital space.

ESPR

Promotes sustainable product design, circular economy, resource conservation and transparency through digital product passports.

JTC 24

Development of harmonized standards for digital product passports to promote global interoperability and sustainability.

JTC 25

Develop standards for data rooms, cloud, and edge to drive interoperability, scalability, and innovation.

…

Other planned acts… (Data Union Strategy,..)

Final legislation pending

R-evolve

Integrated Worlds

The R-evolve project

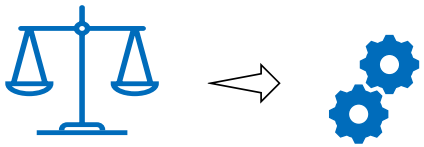
INTERDISCIPLINARY RESEARCH CENTRE for Technology, Work and Culture
ifz
FLA FEDERLEGNOARREDO
alples
Forma 5
LAGO
EHRMANN einfach schöner wohnen
AKT
V/S
European Furniture
mbit SPACES CLUSTER
CLUSTER FVG LEGNO ARREDO CASA
CSM
iba
LIFESTYLE AND DESIGN CLUSTER
Lesarski grozd WOOD INDUSTRY CLUSTER
POLITECNICO MILANO 1863
tecnalia MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE
CERTINALIA tecnalia group
UNIVERSITÀ DEGLI STUDI FIRENZE
Wuppertal Institut
h_da hochschule darmstadt innovations- und transformationsplattform für nachhaltige entwicklung
MOLTENIGROUP
Integrated Worlds

The contribution of Integrated Worlds to the EU project R-evolve

DPP-Governance-Framework

Contributing expertise to the development of DPP governance framework, Feedback on rules/mechanisms, participation in simulation to test different options of the framework

Implementation Governance-Framework



Expansion of the existing technical infrastructure to meet the DPP governance framework, provision of necessary auxiliary materials

Piloting

Carrying out the test phase with various suppliers, determining the need for data (exchange), identifying obstacles/ Potential for improvement in information flows of companies/DPP system

DPP-Lifecycle

Mapping of the complete life cycle of a piece of furniture – from repair to recycling and the "return factory", Collecting and analyzing experiences/opinions from the testing community

Furniture-X

Concrete milestones of
the initiative's work

Furniture-X
Technical POC & Demonstrator (Milestone 1)

Step 1
Building a technical basis

August 2024

Goals:

Technical and content-related evaluation of AAS platforms.

Development and evaluation of initial integration platforms (GAIA-X based on AAS for Everybody) and development of initial identity management solution.

Step 2
AAS Show-Case Template Definition

September 2024

Goals:

Definition, implementation and integration of initial submodel team plates for show cases.

Implementation and demonstration of roles and rights using exemplary AAS submodels.

Step 3
Systematic AAS generation

October 2024

Goals:

Definition and implementation of services for the automatic and systematic generation of AAS based on templates.

Implementation of an AAS repository.

Finalization of demo showcases

Summit November 2024

Goal:

All show cases implemented and validated.

Construction & digital twin
Directory for the targeted distribution of product information is created.

Service & repairs
Service information can be called up at any time; supplements are simple and transparent.

Digital sales information
Optimized sales advice through accurate product data.

Product ordering
Digitally traceable and simple ordering process.

Recovery & recycling
Exact material data for reuse and recycling.

Trends & context information
Current data on product usage for better new developments.

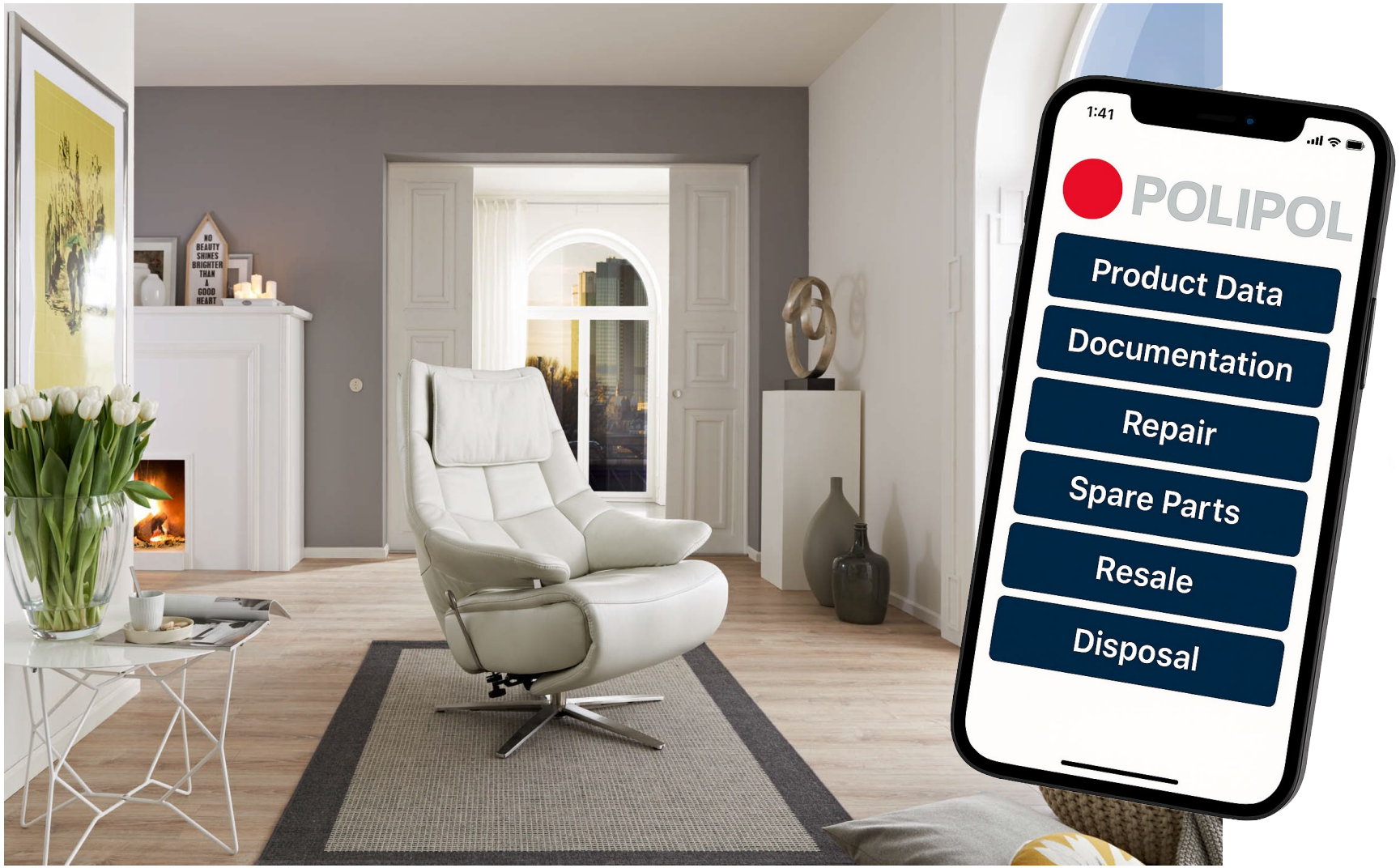
Production
Detailed information for the product passport/EUDR and much more - all stored digitally.

Logistics & assembly
All the information you need for efficient delivery and installation.

Sustainable raw materials
Transparent traceability of sustainable materials.

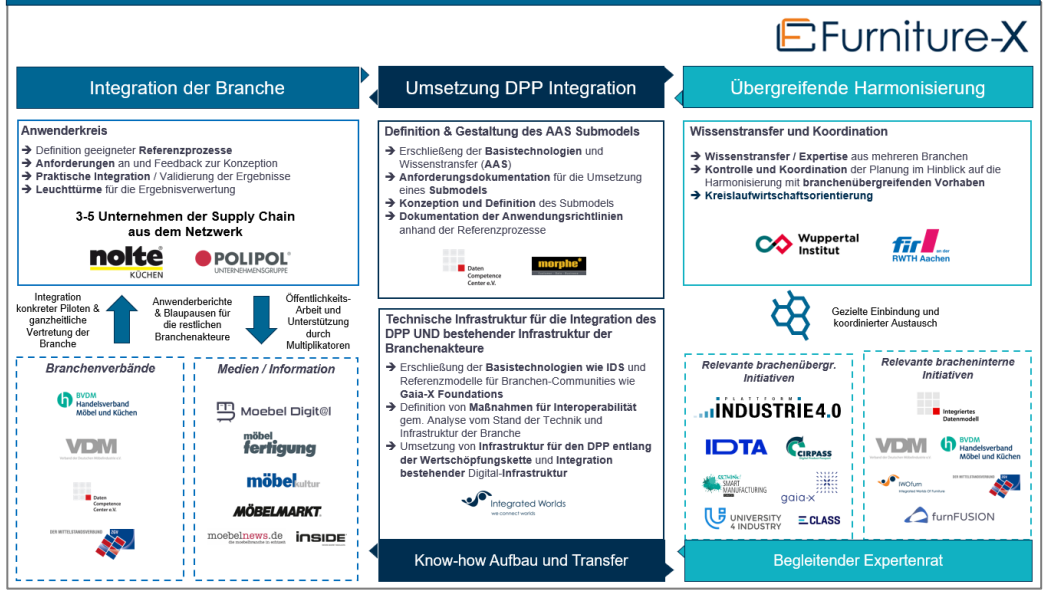
furnFUSION

The demonstrator for a DPP from e.g. Polipol



Successful completion of milestone 1 (November 2024)

1 - Establishment and expansion of the Furniture-X structure



2 - Structure of the Expert Council

IDTA Industrial Digital Twin Association

DER MITTELSTANDSVERBUND ZGV

Fachverband Matratzen Industrie e.V.

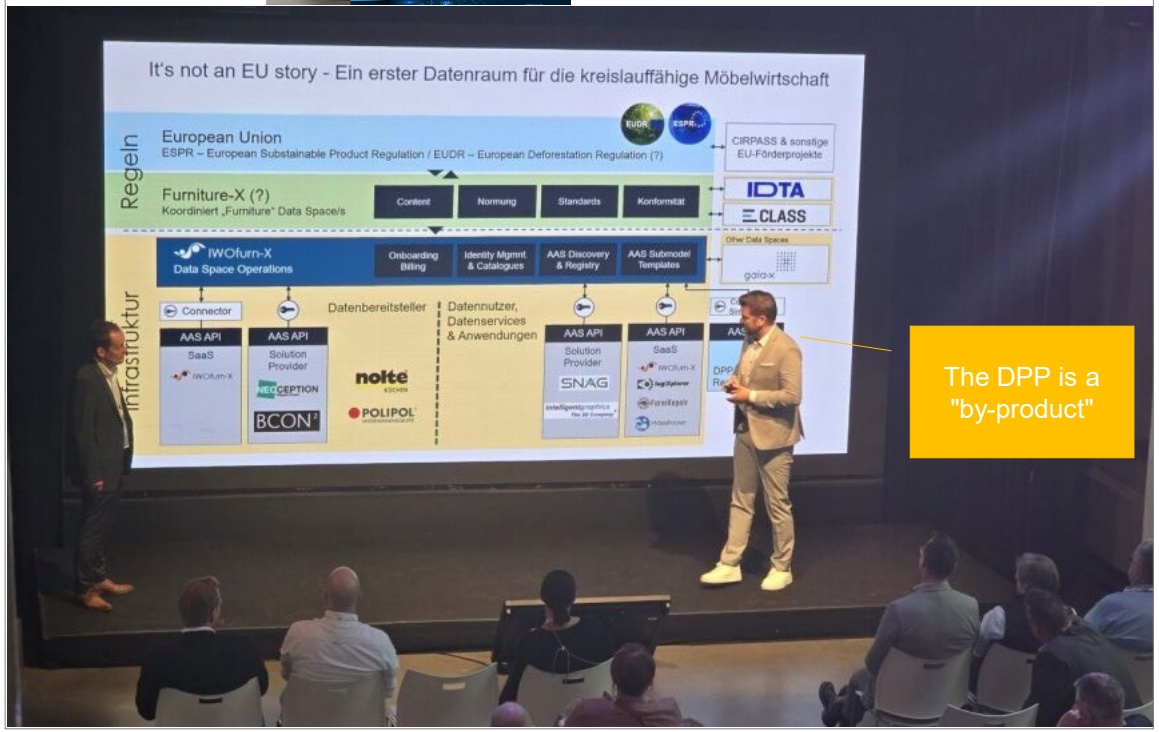
h_da HOCHSCHULE DARMSTADT UNIVERSITY OF APPLIED SCIENCES

die möbelindustrie

CLASS

HOMAG

3 - Premiere at the IWOfurn Summit: The digital twin in the interaction of all players in the data space!



Furniture-X
Roadmap for a rollout (Milestone 2)

Step 4
Further development of the technical basis & services

Step 5
Lighthouse Projekte
- Praxis-Roll Out

Step 6
Lighthouse Projects -
Industry-wide Roll Out

Information event

Since November 2024

January 2025

2. Quarter 2025

6th October 2025

Objectives (among others):

Expansion of the integration platform (based on AAS for Everybody).

Implementation of the concept of "roles and rights".

Services for the automatic and systematic generation of AAS.

Implementation of an AAS repository.

Goals:

First **pilot partner Polipol** – approach to other partners **(data owners)**

Pragmatic approach of **Praxis-Use cases**

Concrete added value through **Services/ Applications** (e.g. WWS in retail, POS solutions, service)

Early involvement of **partners**, e.g. from the retail sector or "cycle" **(data user)**

Goals:

Further integration for regulatory requirements **(DPP, EUDR)**

Involvement of other **active and interested stakeholders** (Trade, Industry, Digital Economy)

Derivation of **blueprints** from pilots' experiences

Networking with other Industry projects (e.g. furnFUSION, R-evolve, Cir4Fun) and cross-industry initiatives (e.g. SCALE-MX)

Goal:

Informing the industry about the state of development

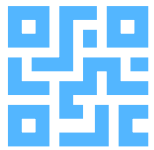
Lighthouse projects

From quick wins to complex solution modules

“Think big – start small”

Overview of current Lighthouse Projects

1 Nameplate & Product-information

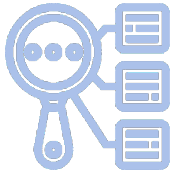


2 Bill of materials (BOM)

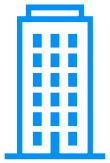
3 Complex orders

4 Integration of Recycler

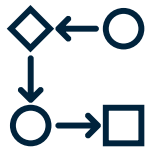
5 Classification of data



6 Company data

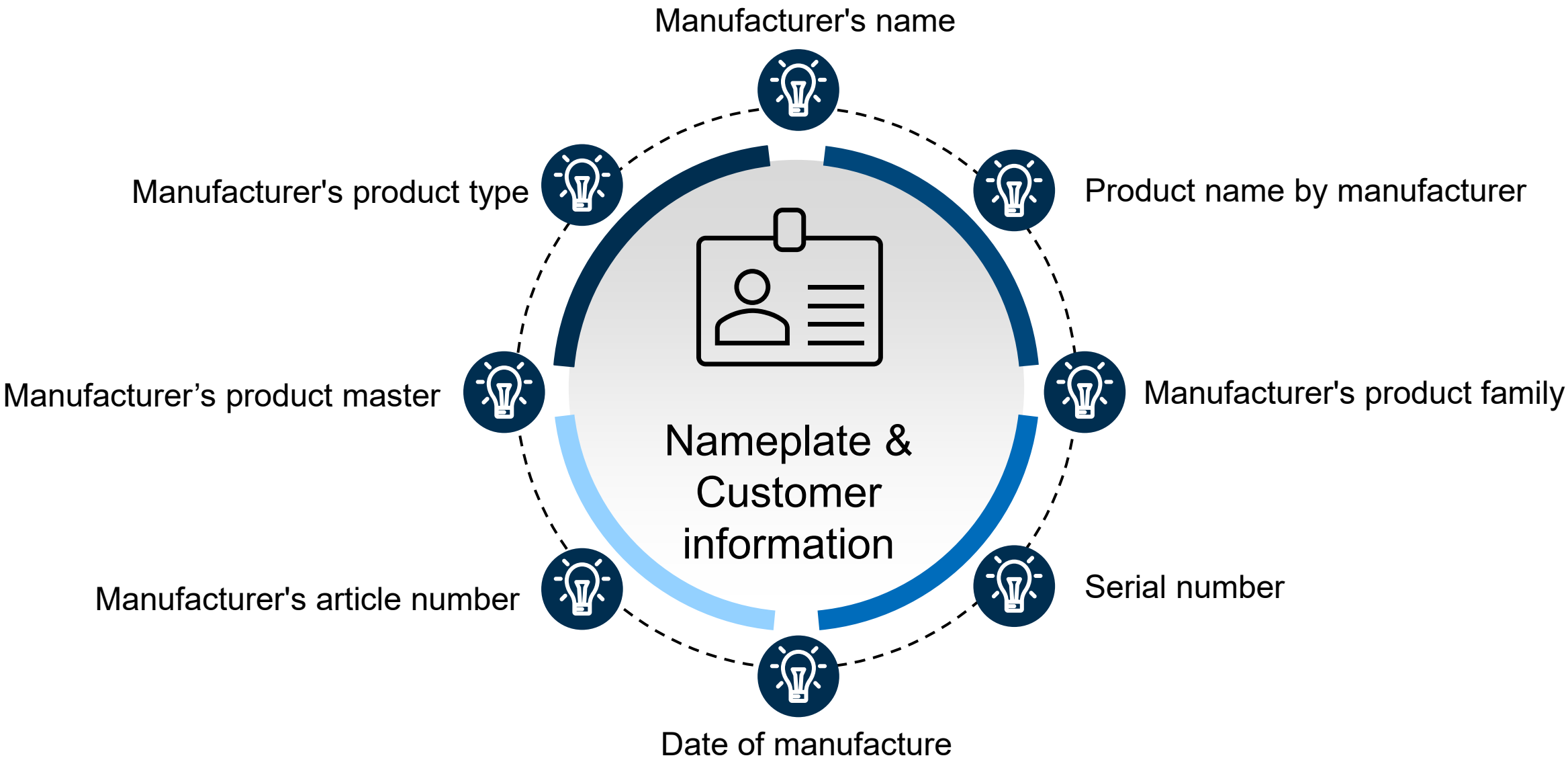


7 EDI-Integration

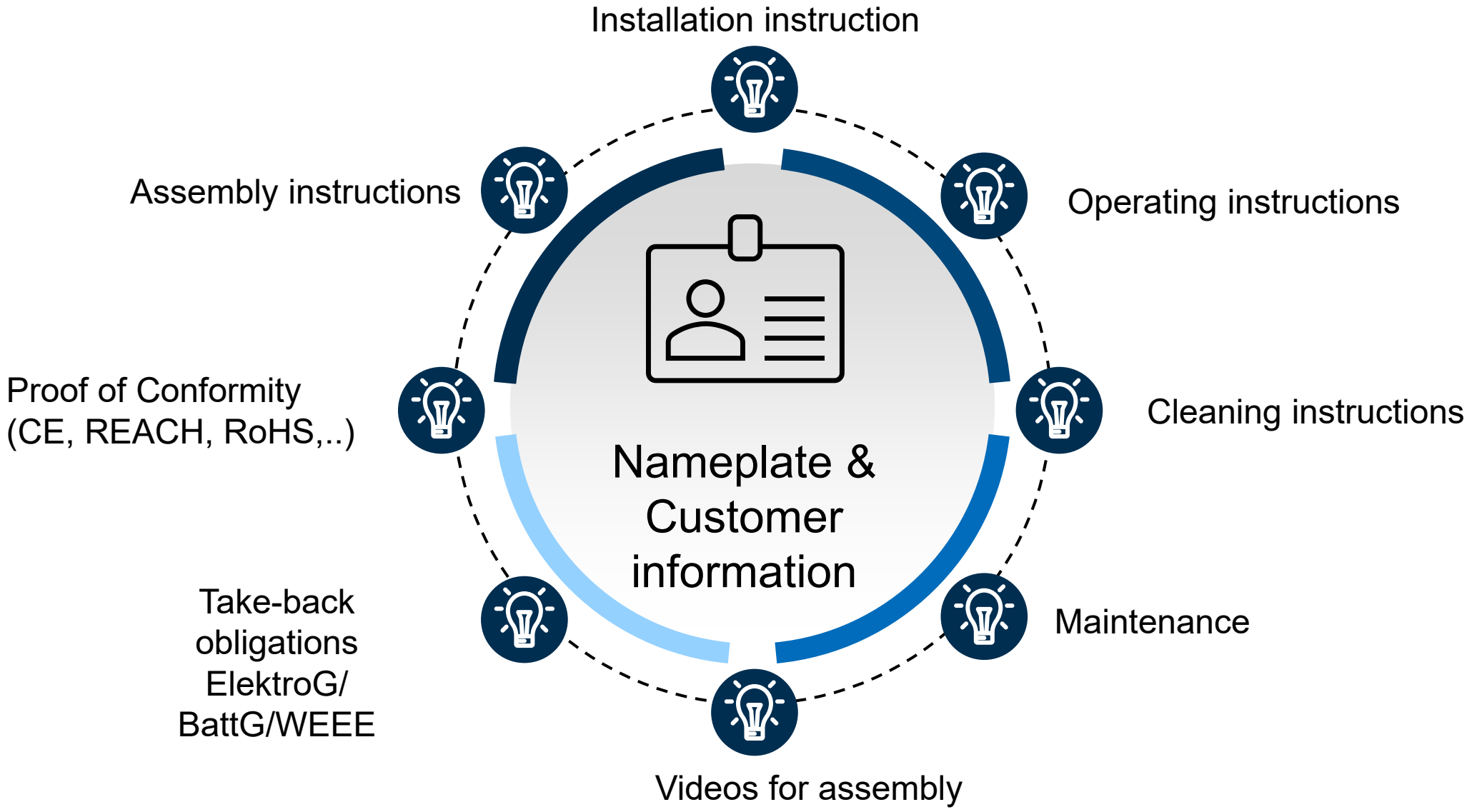


8 Enrichment from catalog data

Objective and added value of the Lighthouse Project 1: "Nameplate & Product Information"



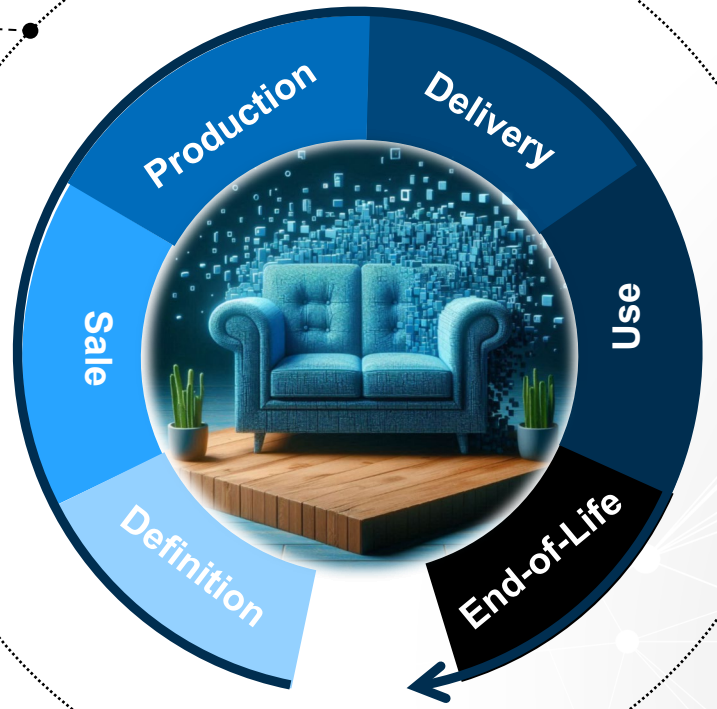
Lighthouse Project 1:
Decided content – focus on quick wins



Furniture-X

Long Term - potentials, goals and expected results beyond Circular Economy

Added values of the digital twin in the respective phase of life.



Production status and access to EUDR, carbon footprint, etc

Status of completion and delivery of my ordered product.

Minimization of inquiries about the production status. Central documentation of all product-related information

Less effort in the provision of product information. Upsell accessories and services.

Easy access to structured information about the product and support in the purchase decision

The marketing and product information of all manufacturers is structured in the same way and integrated into the sales application.

Customer loyalty through registration. Offering additional services, such as assembly, relocation, repair, re-selling, upselling

Easy access to all product documents such as instructions, materials, spare parts, care items

Customer loyalty through registration. Offering additional services/upsell Access to usage data such as repairs and parts

Information for resale, professional recycling, disposal or return of problematic substances

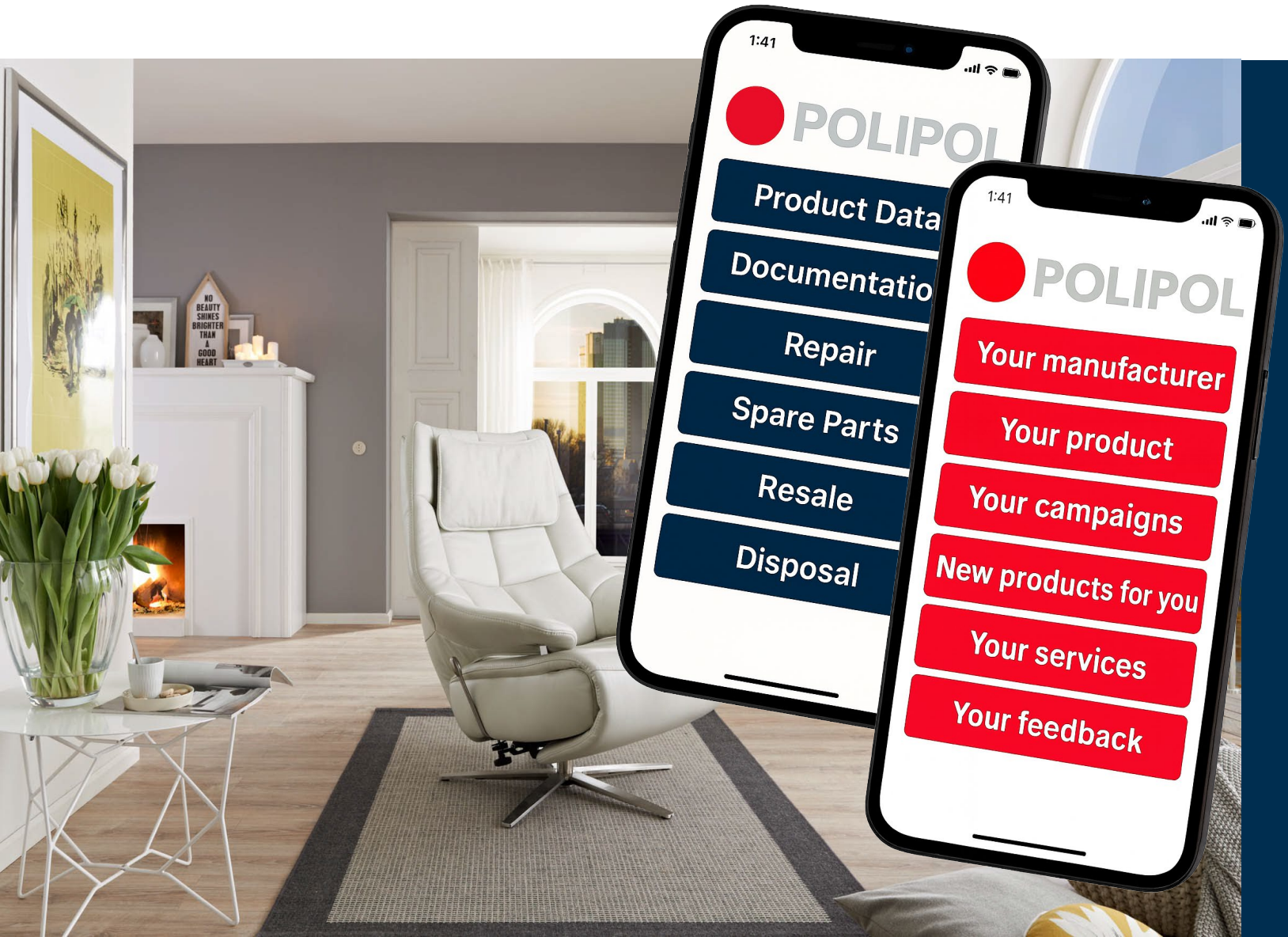
Information on the service life of the product. Take-back, reuse of raw materials and product parts.

Customer,Service

Retail

Manufacturer

A completely new communication channel between manufacturers, retailers and customers.

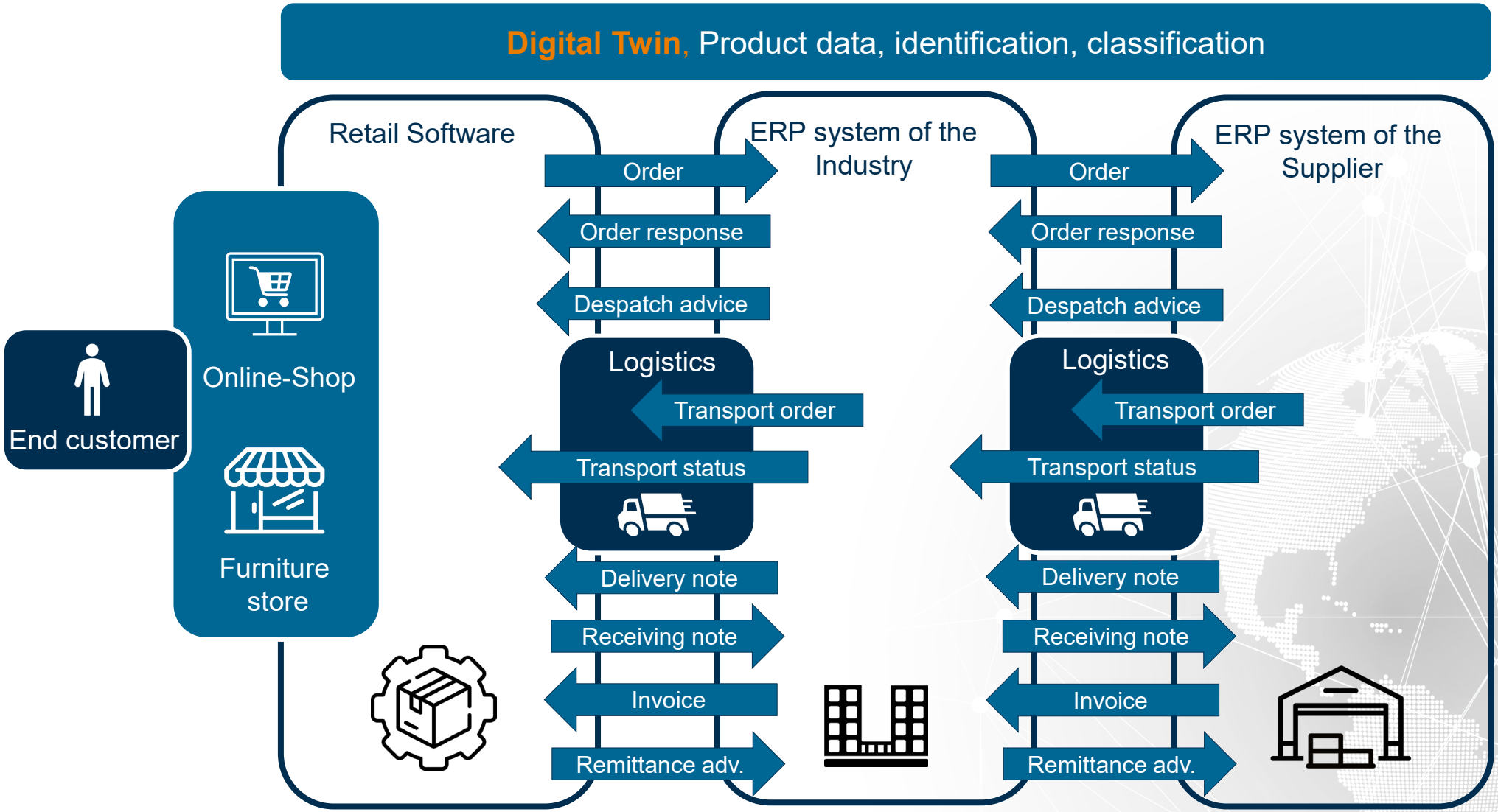


With the Digital Product Passport (DPP), products are upgraded to sales and service platforms.

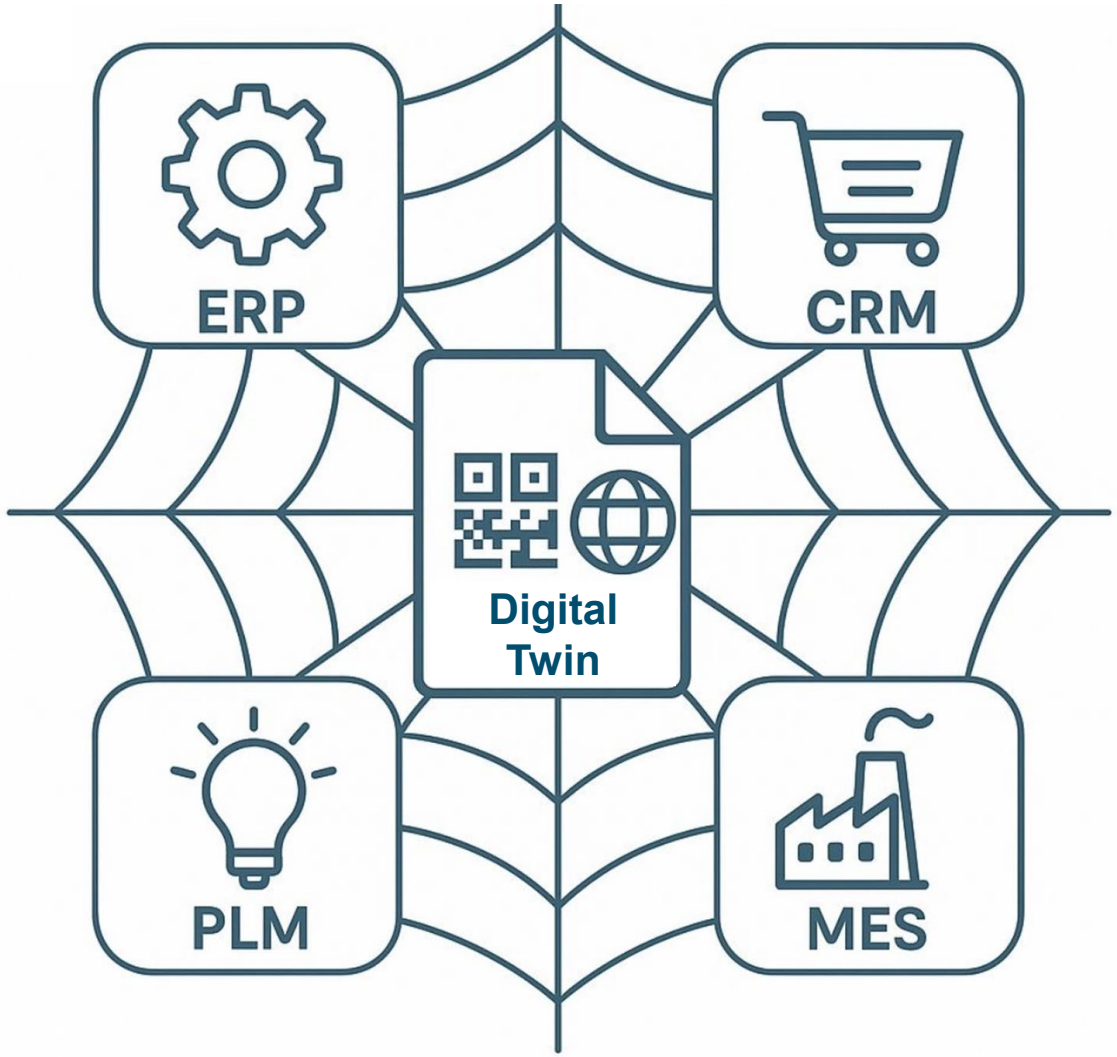
By scanning a QR code, customers gain access to product data, documentation and a 24/7 service hotline.

A new channel for direct customer contact will be available.

The close interaction with the digitization of processes

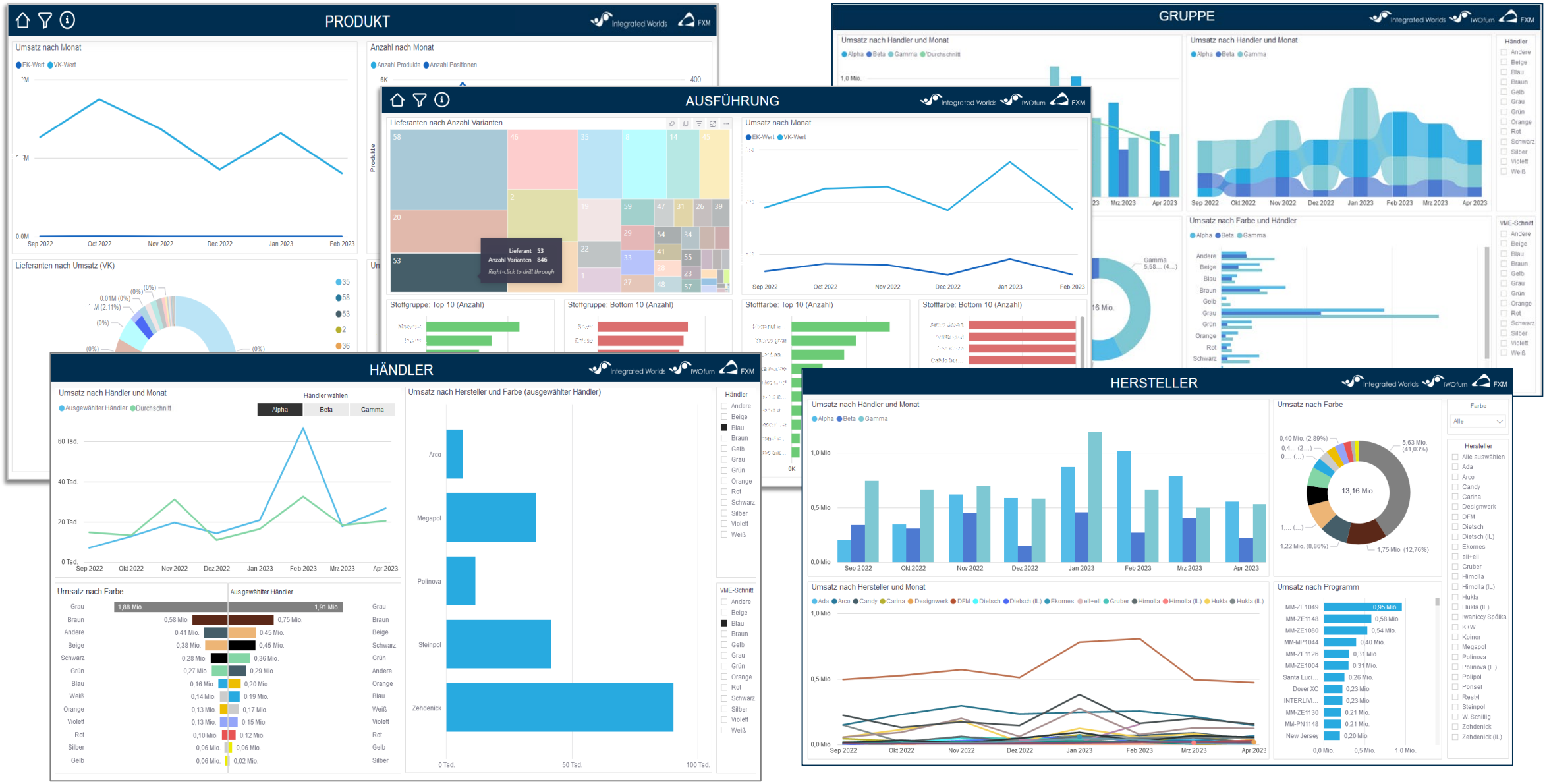


The interaction of the application worlds

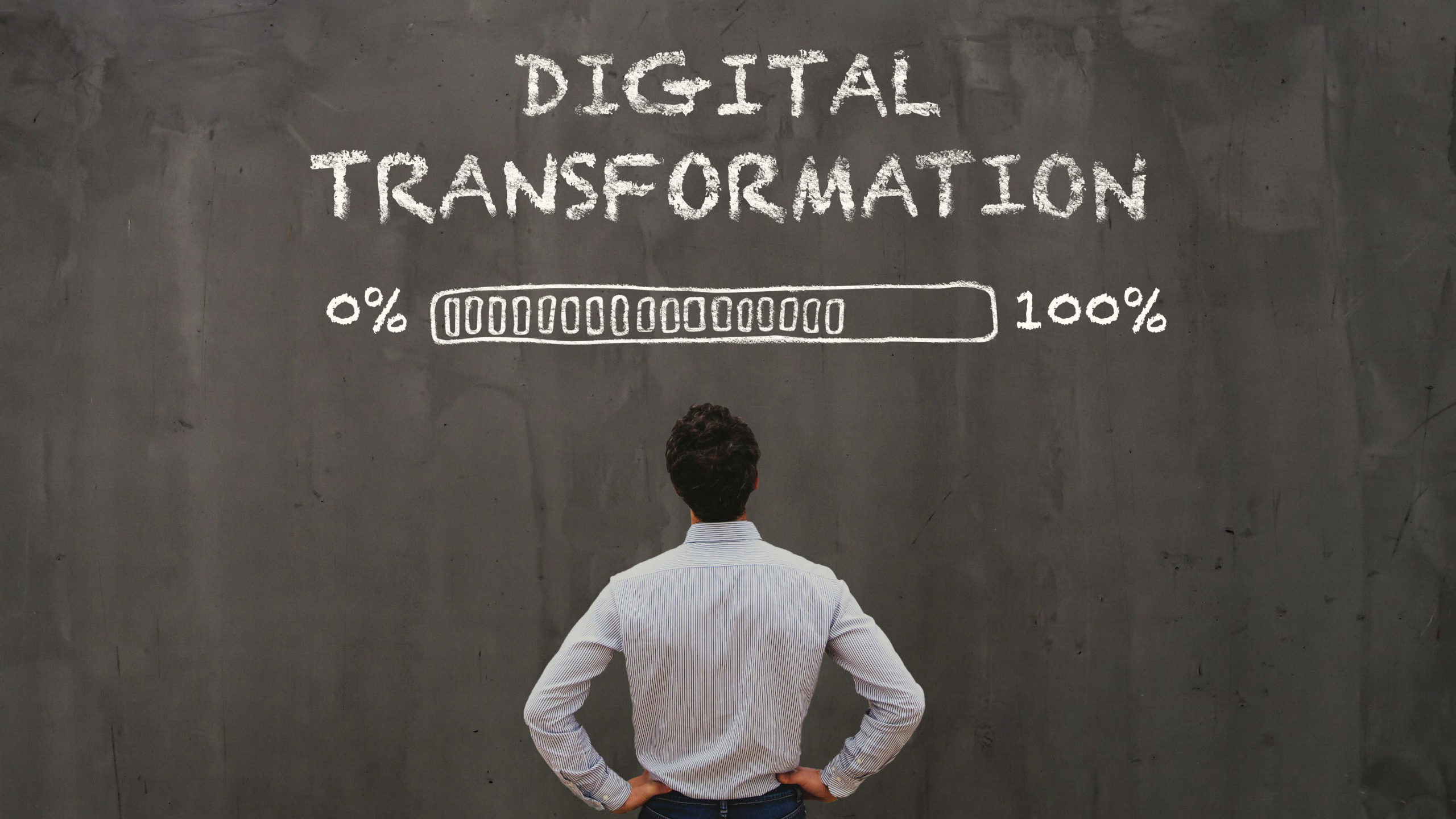


Single source of truth!
From push to pull!

The impact on data-driven work



Comparing apples with oranges?


DIGITAL
TRANSFORMATION
0%
100%

Data ecosystems for a circular furniture industry

Furniture-X

Thank you very much!