

DPP4.0 – Concept for implementing the DPP as the Digital Twin of a Product

IDTA Tech Days 2025

Prof. Dr. Dieter Wegener | 01.10.2025



Agenda

- 1 Digitalization as lever for “Effizienzwende”
- 2 DPP4.0 as enabler of the “Effizienzwende”
- 3 What we have achieved
- 4 What we plan to do

1. Digitalization as lever for “Effizienzwende”

The framework conditions are becoming more stringent

Challenges 2024

Bureaucracy



Taxes and duties



Environmental and climate
protection conditions



What is holding back companies
today:

Energy costs



Shortage of skilled workers



Supply Chain Due Diligence Act



The “Effizienzwende”: From cost pressure to digital strength

The greatest challenges can be transformed into competitive advantages through networking, standardization and intelligent use of data.



Bureaucracy



Taxes and duties



Energy costs



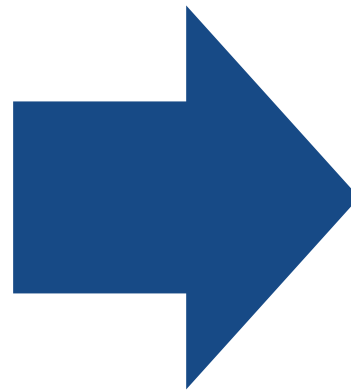
Environmental and climate
protection conditions



Supply Chain Due
Diligence Act



Shortage of skilled workers



Digital transparency

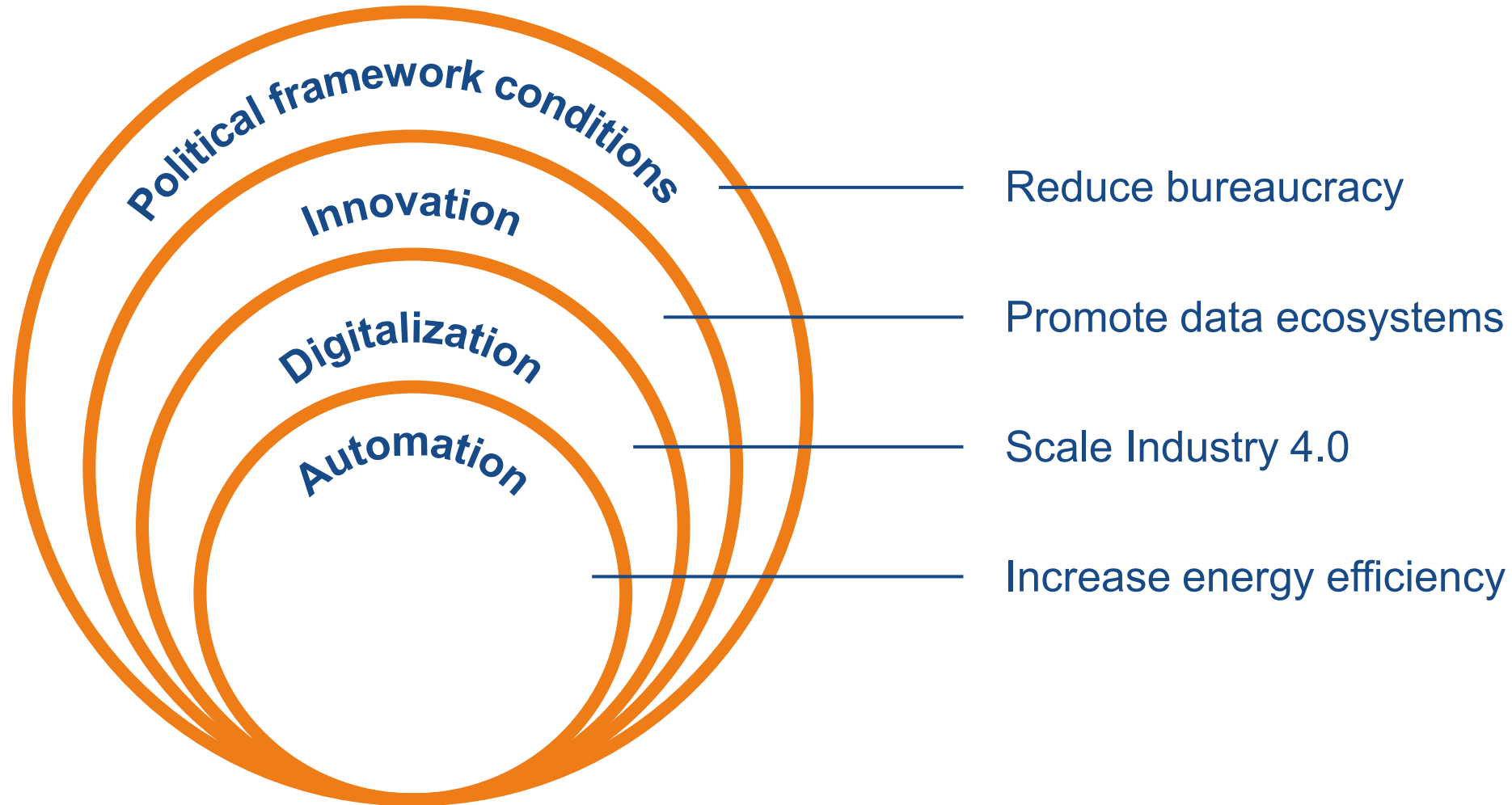


Automated
compliance

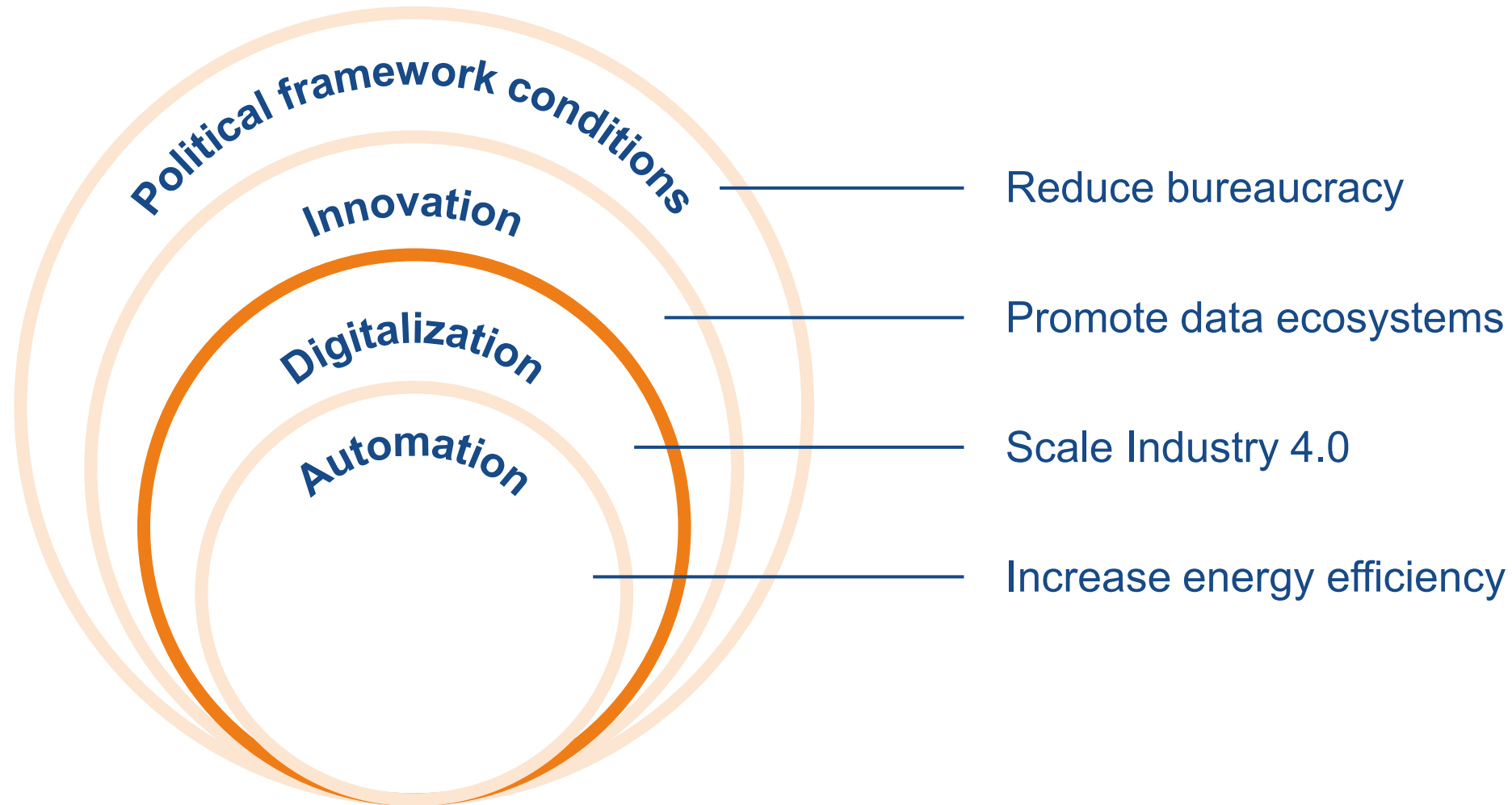


Effective resource
management

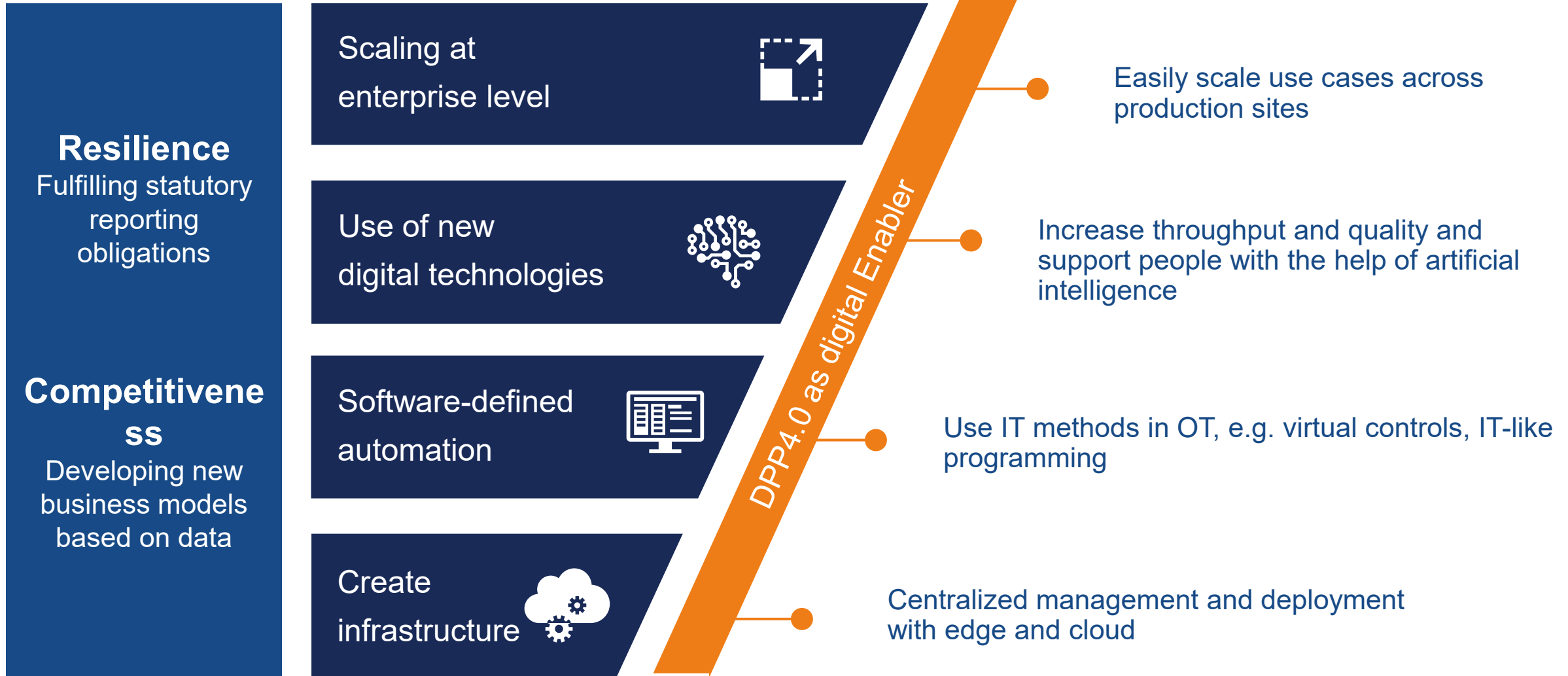
Four building blocks for a successful “Effizienzwende”



Four building blocks for a successful “Effizienzwende”



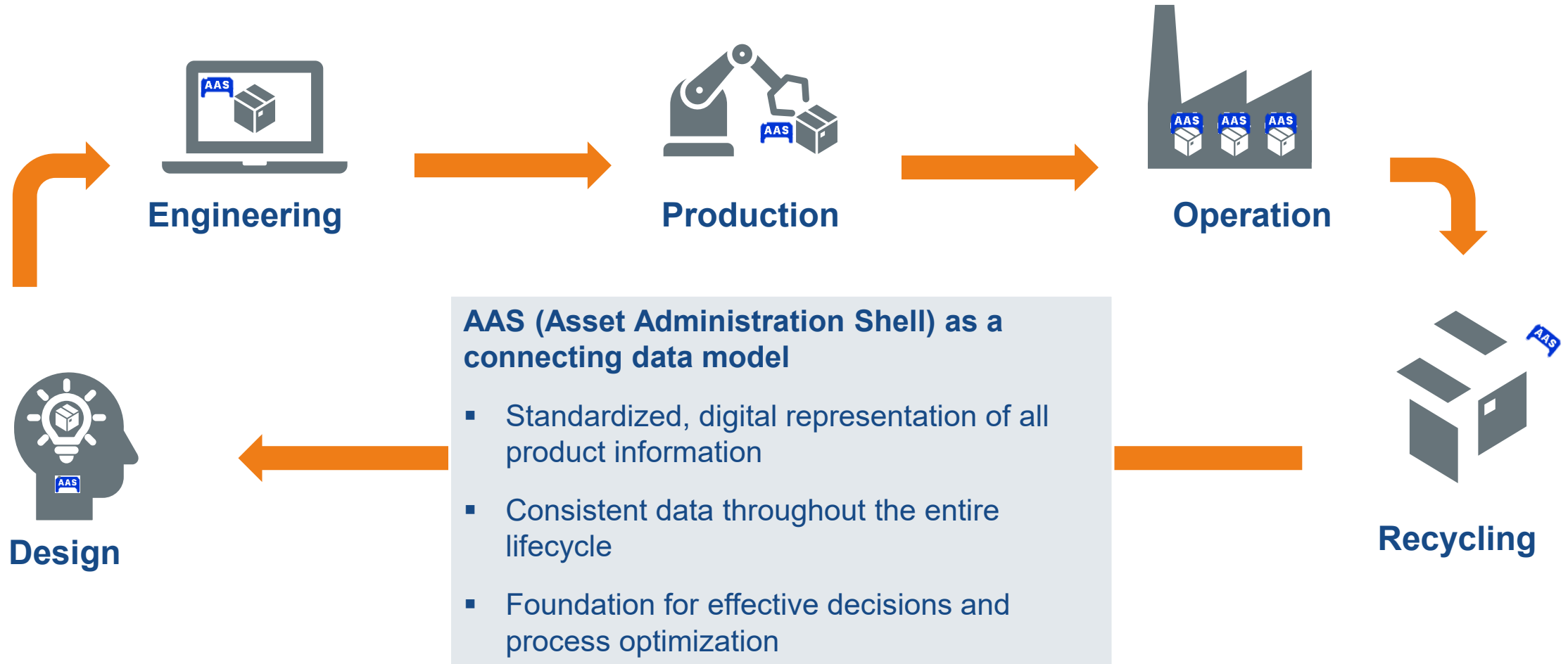
Digitalization – Scaling Industry 4.0 with DPP4.0



2. DPP4.0 as enabler of the “Effizienzwende”

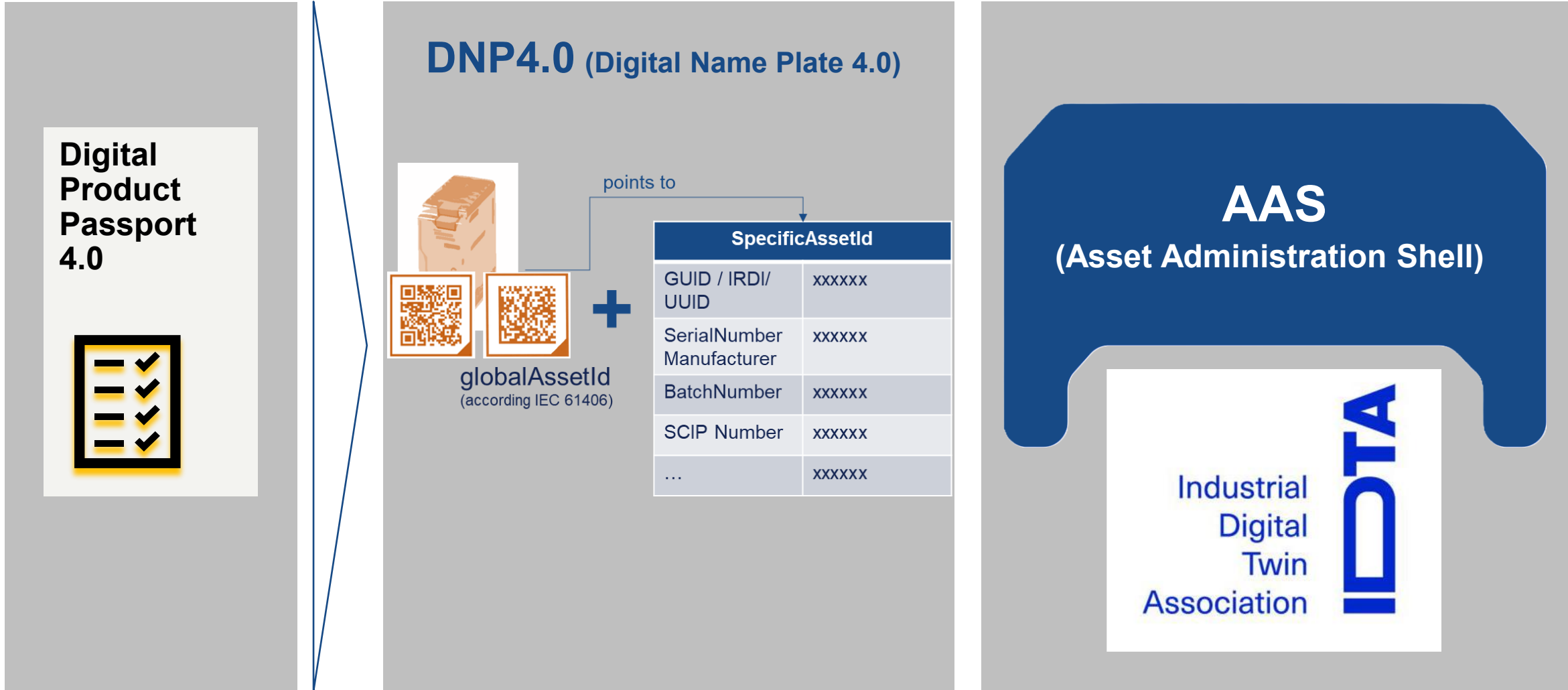
DPP4.0 based on the Digital Twin (AAS)

From idea to recycling: The digital core of your product



The DPP4.0 Concept

Combination of Digital Name Plate (DNP4.0) und AAS



DPP4.0 as Digital Twin based on AAS

Every physical product receives a digital twin in the virtual world



DPP4.0 – An example from SIEMENS

Sustainability Information via Identification Link

The image illustrates the process of accessing sustainability information through a digital product passport (DPP4.0). A hand is shown using a smartphone to scan a QR code located on a Siemens industrial device. The scan leads to an 'ID Link webpage' which provides detailed product information and sustainability data.

ID Link webpage

SIEMENS English

6ES7511-1AL03-0A80
CPU 1511-1PN, 300KB Prog., 1,5MB Data

SIMATIC S7-1500, CPU 1511-1 PN, central processing unit with work memory 300 KB for program and 1.5 MB for data, 1st interface: PROFINET IRT with 2-port switch, 25 ns bit performance, SIMATIC Memory Card required -- approvals and certificates according to entry 109815653 at support.industry.siemens.com to be considered! --

Delivery status
12/19/2022

Digital nameplate

Serial number: C-SOADUK50
MAC: 31-C8-51-49-CB-21

CE Ex UK CA IEC 61800-3 UL 508 cUL 508 TUV TUV SUD IECEx FM APPROVED

Sustainability information

EPD Siemens EcoTech Recycle

Support entries

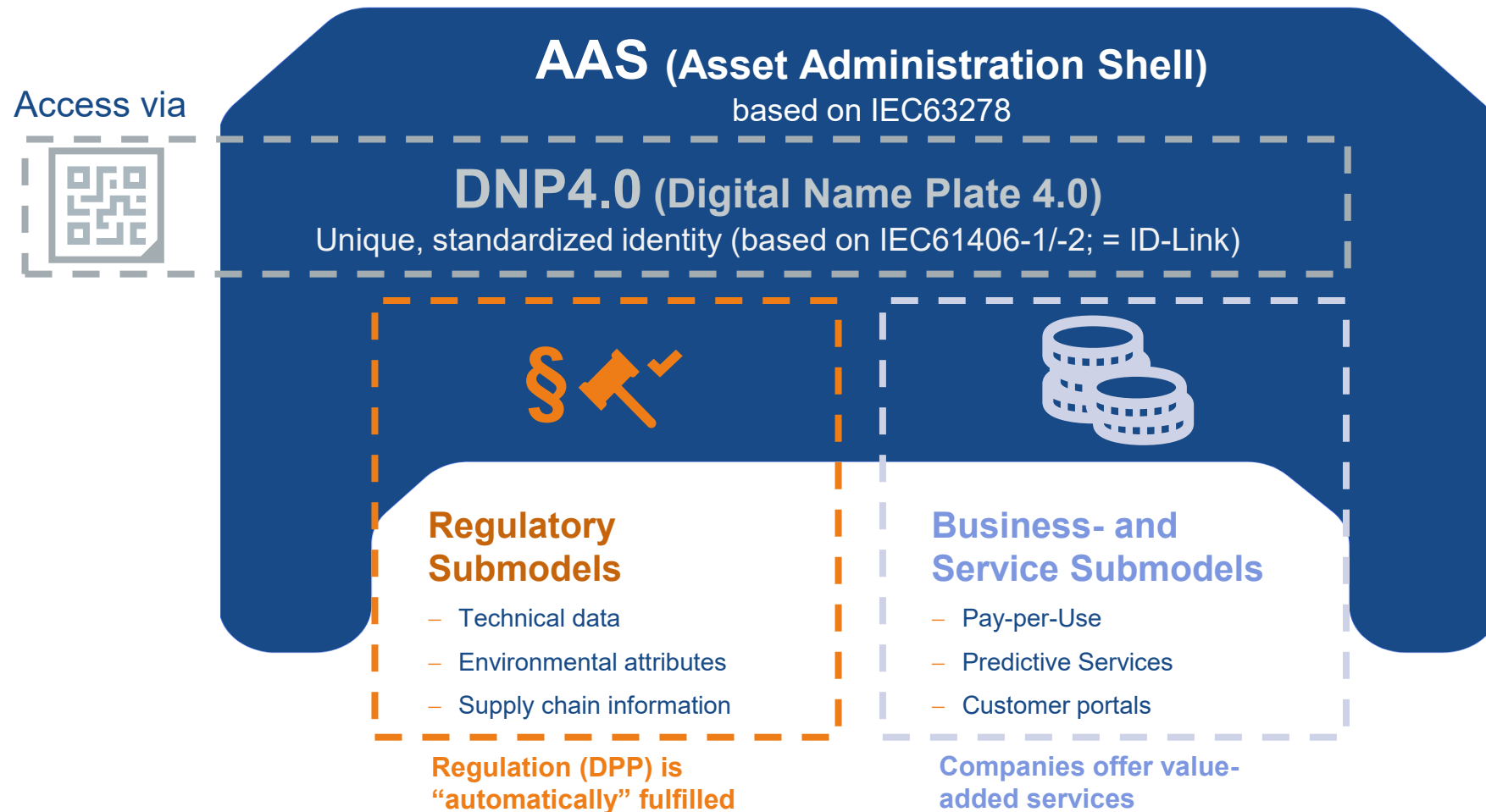
- Manual/Operating instructions 22
- Technical data
- Certificate 38
- Download/Software 4

Sustainability and circularity data & functions

Source: Siemens

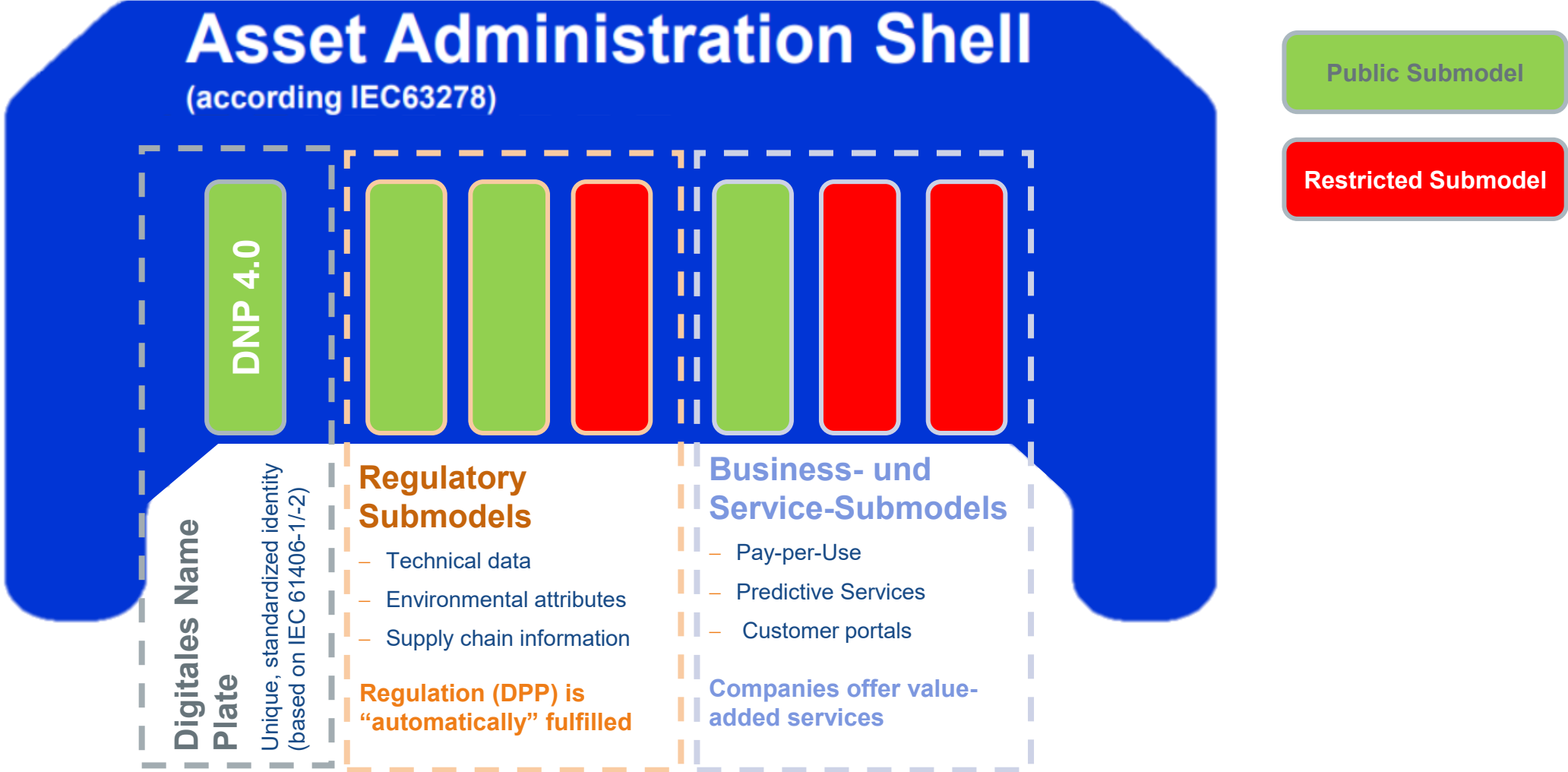
DPP4.0 based on the AAS and DNP4.0

Foundation for product compliance and digital business models



Technical implementation of DPP4.0 based on “IDTA submodels”

Foundation for product compliance and digital business models



DPP4.0 based on the AAS

Integration with data ecosystems and Manufacturing-X

... will lead to "MX-Port Configurations" for different requirement sets

Layer	MX-Port "Hercules"
MX Discovery	Data Space Protocol / Decentral Claims Protocol
MX Access & Usage Ctrl.	
MX Gate	AAS-REST
MX Converter	AAS sub model
MX Adapter	application specific

... Supply Chain oriented

Layer	MX-Port "Leo"
MX Discovery	ID-Link
MX Access & Usage Ctrl.	AAS security
MX Gate	AAS-REST
MX Converter	AAS sub model
MX Adapter	application specific

... Asset oriented

Layer	MX-Port "Orion"
MX Discovery	Data Space Protocol / Decentral Claims Protocol
MX Access & Usage Ctrl.	
MX Gate	UADP OPC UA TCP HTTP(S) NetConf
MX Converter	OPC UA Companion Spec OPC UA Meta Model
MX Adapter	application specific

... Production oriented

Digital Product Passport 4.0

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→ **DPP4.0** is the **data provider**

→ **AAS** is the standard, that ensures **interoperability**

→ **Manufacturing-X** is the **Ecosystem**, in which this data is shared and used in a secure and controlled manner.

DPP4.0 delivers not only data but also competitive advantages



Increase value creation

- Faster time to market through connected development and production data
- Data-based services as a source of revenue



Reduce costs

- Less waste and rework
- Automated compliance checks replace manual processes

**Your tangible
added value**



Minimize risks

- Traceability in supply chains
- Precise CO₂ and material footprints available at all times

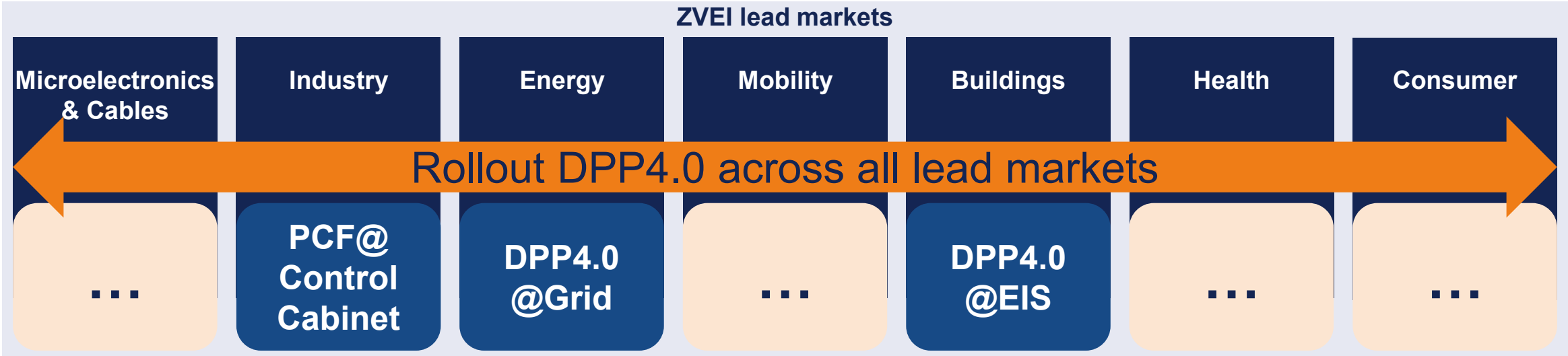


Advance sustainability

- Circular economy through complete material information
- Resource efficiency throughout the entire life cycle

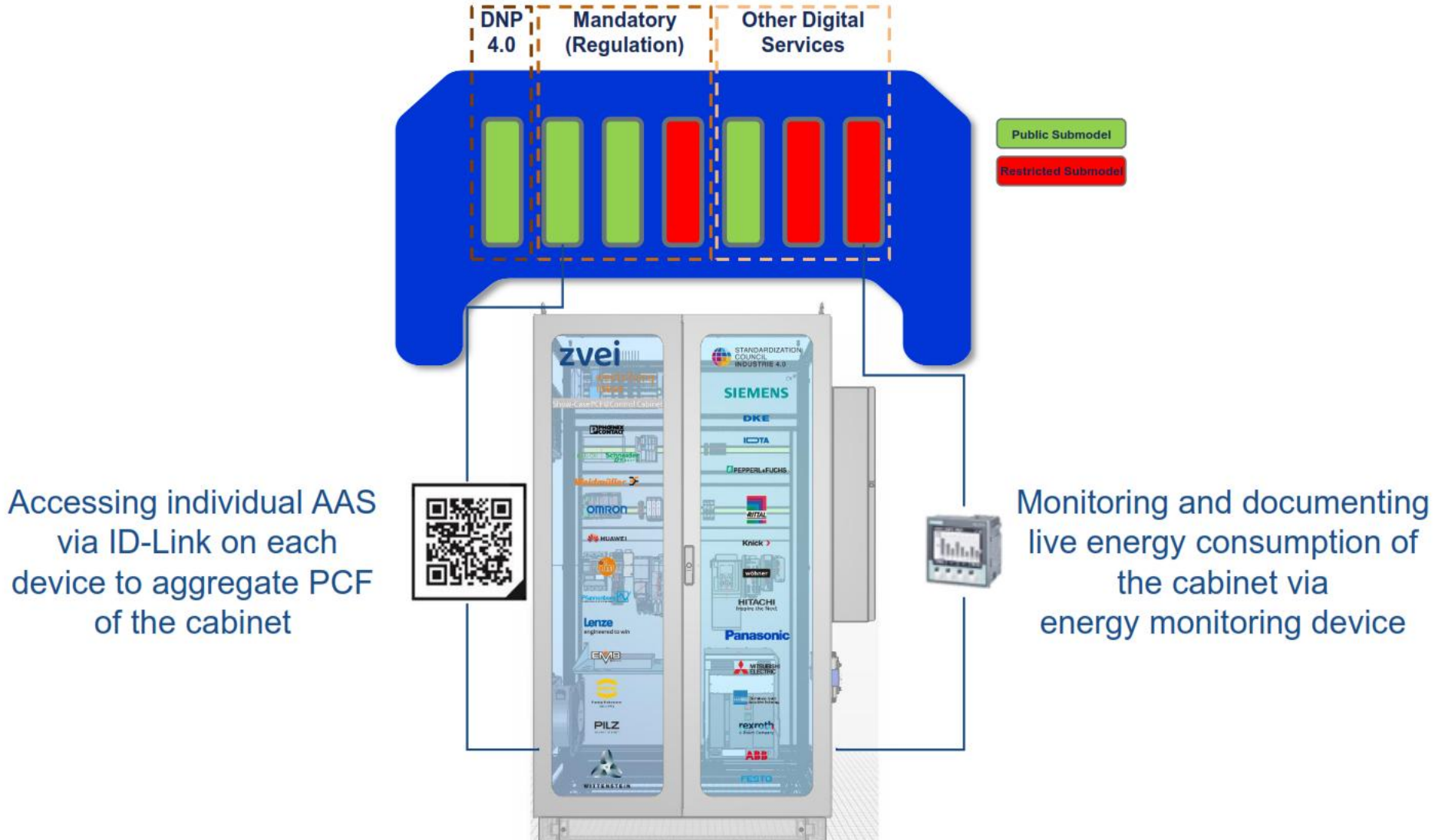
3. What we have achieved

Rollout of DPP4.0 at ZVEI: Cross-lead market approach



DPP4.0 demonstrator at Hannover Messe and SPS 2024

Use Case Control Cabinet for Energy Monitoring





Goal: Implementation of the DPP4.0 concept in the ZVEI lead markets



Scope

Central information platform at ZVEI

Collection and provision of information to enable efficient collaboration within ZVEI

Stakeholder networking

Building a network with relevant stakeholders within and outside of ZVEI to create synergies and promote information exchange

Recommendations for technical implementation

Provision of clear recommendations, particularly for the "group of those affected," regarding the technical implementation of DPP

Ensuring operationalization

Implementation of measures for the safe and effective implementation of DPP4.0 activities

Identification of submodels

Identification and definition of missing metamodels, which can then be developed in the IDTA

Additional use cases and services

Consideration and analysis of additional use cases of DPP4.0, particularly in the area of services, to fully grasp the versatility and potential of the technology

4. What we plan to do

Digital Product Passport (DPP) regulatory roadmap until 2030

2024

Official publication of the EcoDesign for Sustainable Products Regulation (ESPR) to improve the environmental sustainability of products with a focus on availability of digital product information (Digital Product Passport)

Founding of CEN/CENELEC JTC24 to standardize the technical aspects of the DPP-system
Presentation of the DPP4.0 concept based on existing standards

2026

Expanding DPP requirements to include additional product categories, including **construction** products and **consumer products**
Implementation of training and information **campaigns** for companies

2028-2029

Extension of DPP requirements to other product categories (ESPR, steel)
Further development of the **digital infrastructure for DPP implementation**

2025

Start of EcoDesign-Forum to propose requirements for certain product categories

Finalization of the

First mandatory DPPs for certain product categories, such as textiles and energy related products

2027

Entry into force of the **Battery Passport DPP Regulation**
Putting in place monitoring and enforcement mechanisms to ensure compliance

2030

Full integration of the DPP into the European **circular economy**
Assessment of the impact and achievements of the DPP initiative and planning further steps for **optimisation**

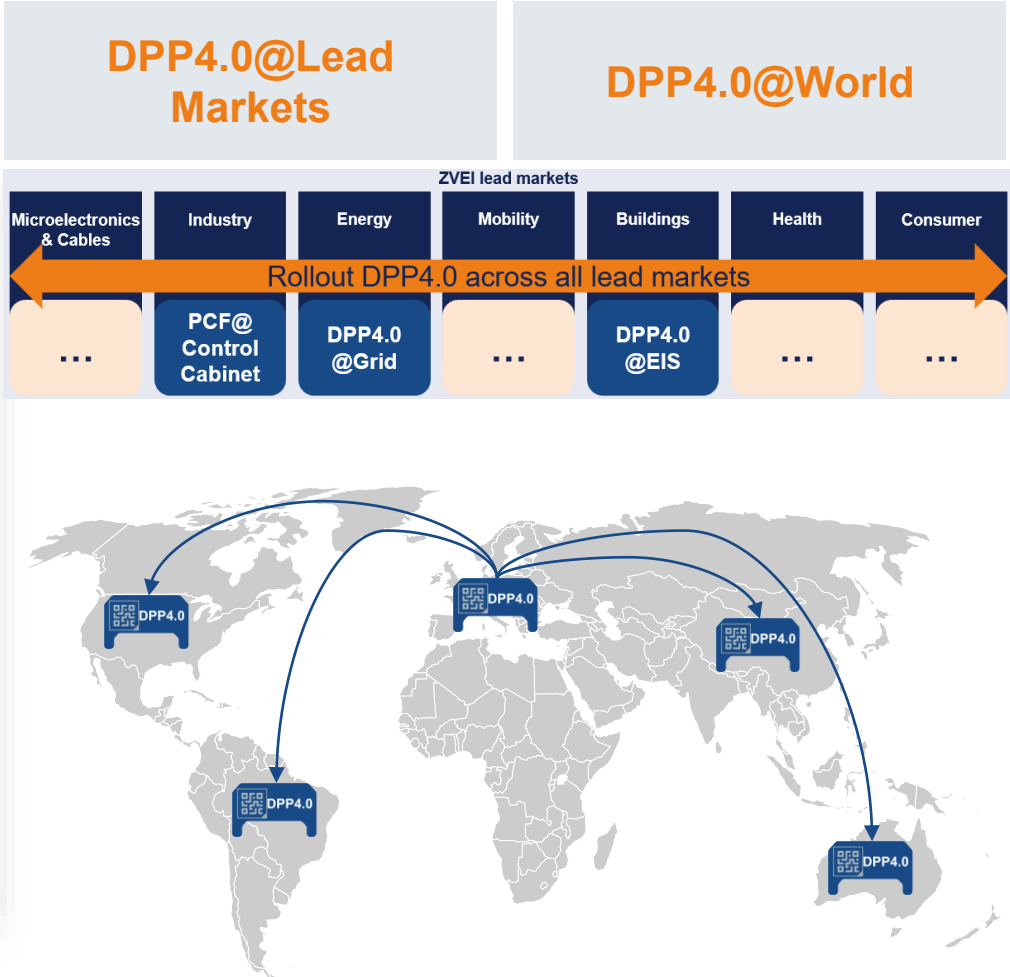
ZVEI 3i-Strategy++ 2026-2030

3i-Strategie++ (2026 – 2030) Rollout of „DPP4.0“ and „DPP4.0 System“

**„3i-Strategie+“
des ZVEI-Führungskreises Industrie 4.0 für 2021-2025**



- i1.** Implementierung **Technik**
- i2.** Internationalisierung via **Standardisierung**
- i3.** Innovationspolitische Ziele „Digitale Wirtschaft“ via **Regulatorik**



Q&A

Contact

Prof. Dr. Dieter Wegener

Head of External Cooperation, Siemens Foundational Technology
Otto-Hahn-Ring 6, 81739 Munich
Mobile: +49 (173) 2512980, E-mail: dieter.wegener@siemens.com

Other external activities:

- (1) since 2014 Chair of ZVEI Management Circle “Industrie 4.0”, Frankfurt
(ZVEI = Electro and Digital Industry Association)
- (2) since 2015 Vice-President DKE, Frankfurt
(DKE = German Commission for Electrical, Electronic & Information Technologies of DIN and VDE)
- (3) since 2016 Chair of Advisory Board SCI4.0 (Co-Founder), Frankfurt
(SCI4.0 = “Standardization Council Industrie 4.0”)
- (4) since 2019 Vice-Chair of DMEC (Co-Founder), Digital Europe, Brussels
(DMEC = Digital Manufacturing Executive Council)
- (5) since 2019 Chair of DIN/DKE Strategic Advisory Board FOCUS.digital, DIN/Berlin and DKE/Frankfurt
(former DIN Presidential Committee FOCUS.ICT for “German ICT- Standardization”, DIN, Berlin)
- (6) since 2020 Honorary Professor, RWTH Aachen University, TIME-Institute
- (7) since 2023 Member of “German Strategy Forum for Standardization at BMWK”, Berlin
(BMWK = Federal Ministry for Economics and Climate Action)
- (8) since 2023 Chair of BDI-Taskforce DPP, Berlin
(BDI = Federation of German Industries)
- (9) since 2024 Chair of ZVEI-Forum DPP4.0, Frankfurt



zvei

electrifying
ideas