

DGZfP Technical Committee NDE4.0

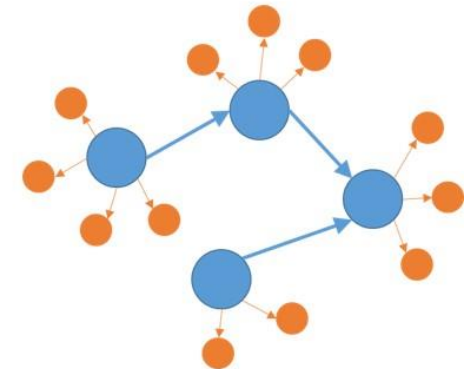
- Profile and Fields of Activities -

Prof. Dr. Bernd Valeske, Vice Director Fraunhofer IZFP, DGZfP Technical Committee NDE4.0



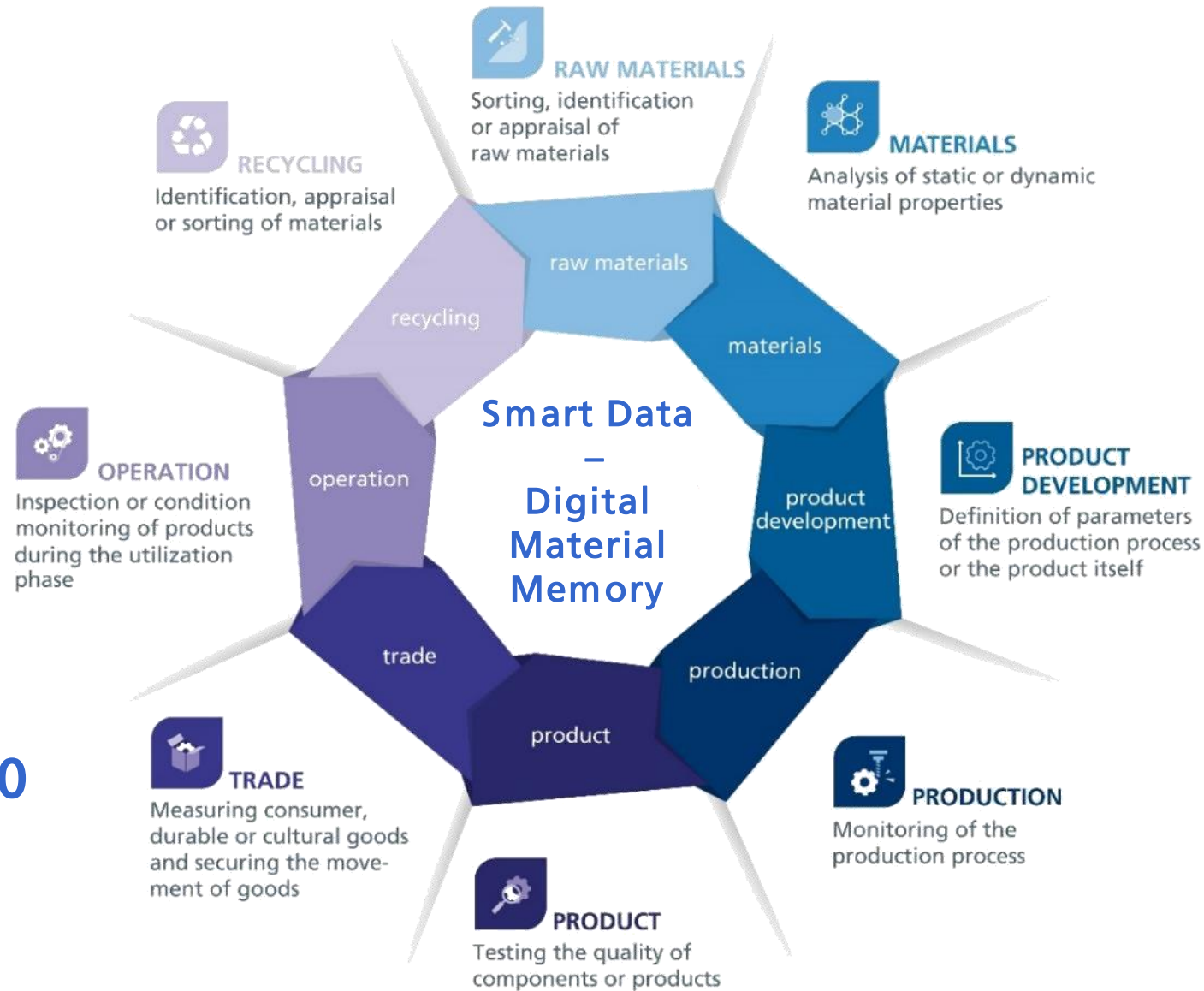
NDE 4.0

- Start of Technical Committee: 2017
- ~ 60 active working members
- Conferences and Seminars
- 3 Sub-Committees, 5 Work Groups



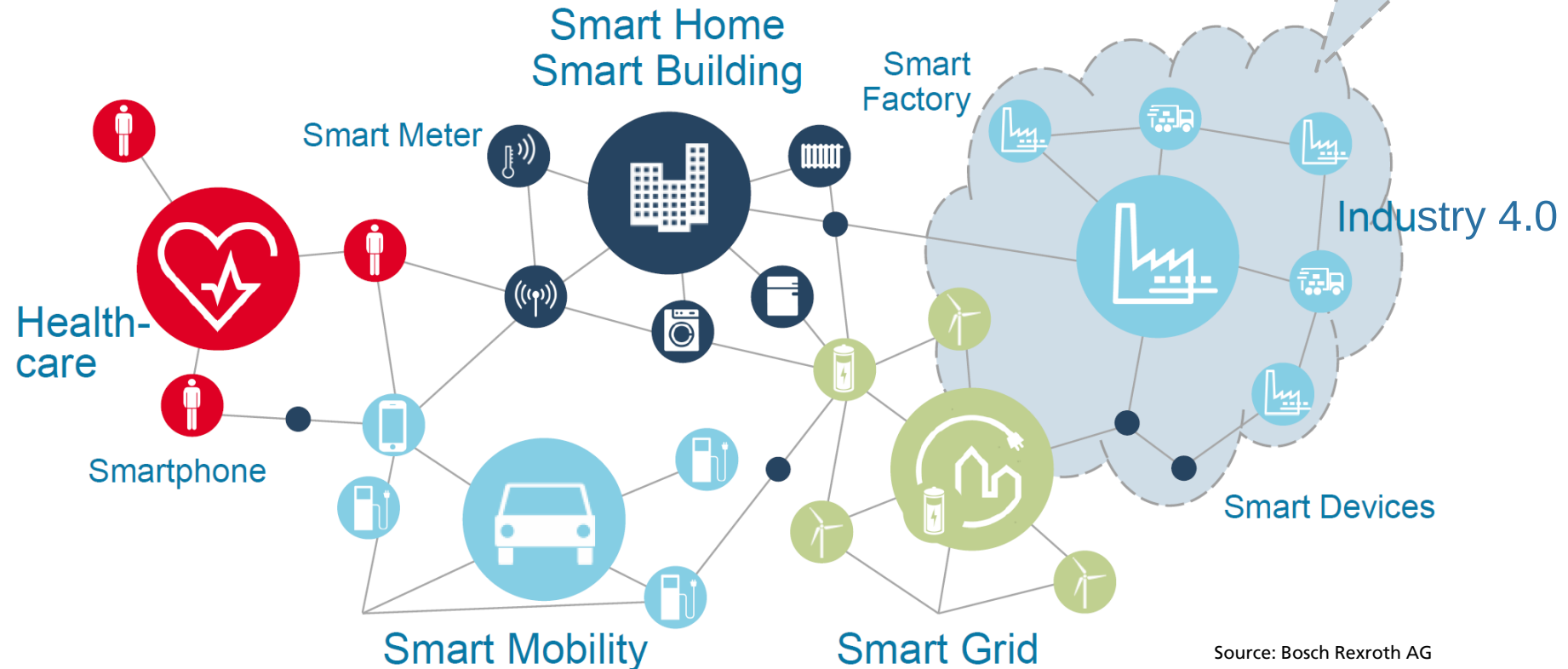
NDE4.0 : Smart Data in all phases of Product Life Cycle

Smart Data Eco System for NDE4.0



NDE4.0 → Connected Data & Digital Eco-Systems

IIoT / I4.0 & NDE4.0: Data and Service Eco-Systems



Data Acquisition, Transport & Processing of Smart Materials Data

→ NDE4.0 = Element of IIoT / Industry 4.0 & Circular Economy



Source: VDMA

NDE4.0: Terms, Definition, Strategies and Perspectives

- **Digital Transformation of NDT towards elements of IIoT and smart sensor systems → NDE4.0 Ecosystem**
 - **Compatibility of Interfaces and Data Formats for I4.0: OPC-UA, DICONDE, ...**
 - **Smart HMI and digitalized workflows in NDE4.0**
 - **New Business Models and Data Eco Systems:**
Safe Data Exchange, Block Chain Technologies for NDE4.0,
→ **International Data Space Association IDSA** (managed by Fraunhofer)
 - **Relevant Data instead of Big Data:**
Compressed Sensing, Advanced Signal Processing
 - **Embedded AI in sensor system**
 - **Disruptive Hardware and Micro-Electronics: Neuromorphic Hardware designed for AI**
 - **New Procedures and Validation / Certification Processes:**
Trusted AI, explainable AI, Reliability/ POD, Reference Data Sets, Acceptance / Legal Compliance
 - **New Training & Education Programs for/with NDE4.0 (classic NDT <> information/data sci.)**
- **NDE4.0 = Digitalization and Complete Paradigm Change of future NDE Methodology**

Technology Disruption for NDE4.0 → More AI inside & Revolution in HMI

Video-Link:
<https://www.youtube.com/watch?v=74Kn4LDwkE0&t=1s>



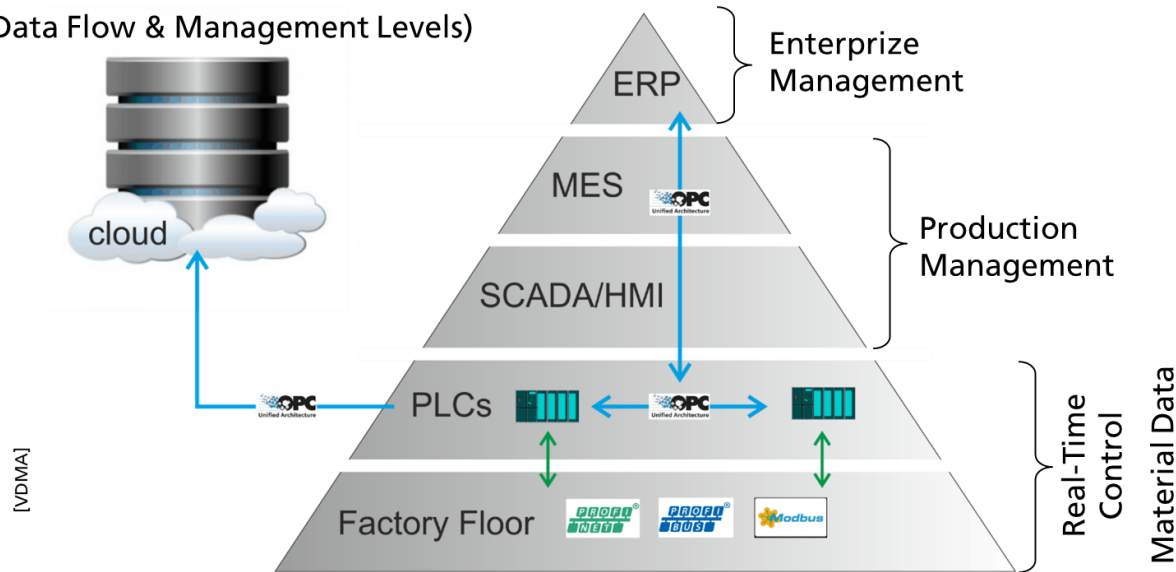
Next Generation Sensor Systems → Link
<https://www.tandfonline.com/doi/full/10.1080/09349847.2020.1841862>



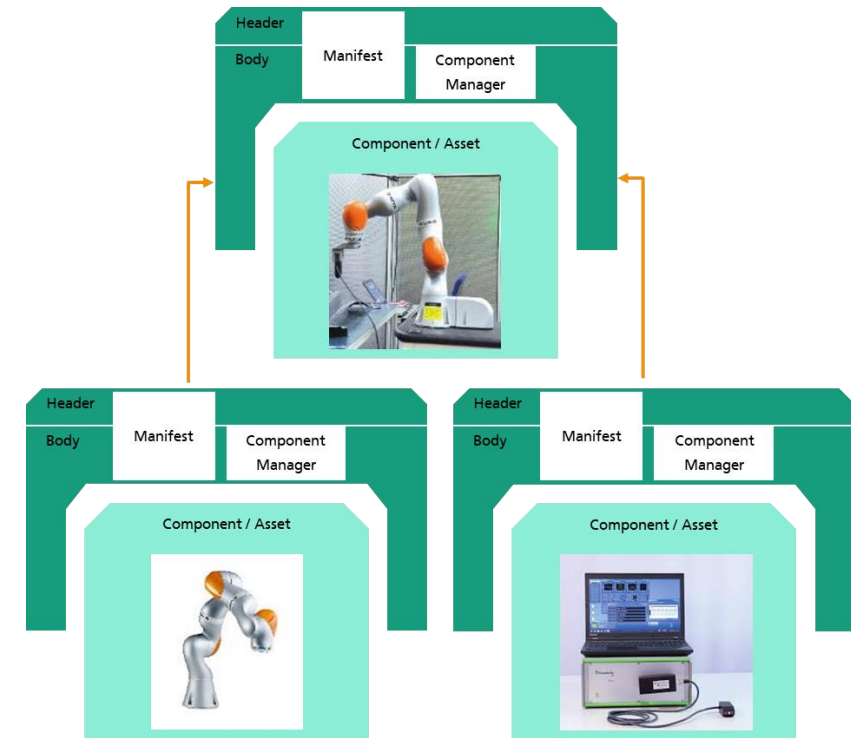
Revolution in Data Ecosystems & Digital Integration for NDE4.0

→ RAMI4.0 & OPC UA Interfaces

Sensor Network and Data Cloud
(Data Flow & Management Levels)



- Plug & Play Architecture
- Data & Communication Standards
- Machine-to-Machine **Interaction (MMI)**
- Production and Process **Integration of Smart Sensor Systems**



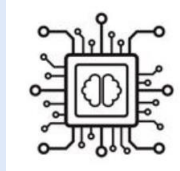
Fields of Activity of the German DGZfP Expert Group **NDE4.0**

Interfaces & Data Exchange

IIoT Integration,
Digital Workflows,
Data Ecosystems



Applied & Embedded AI



DICONDE
OPC UA (RAMI4.0)



Human-Machine-Interaction (HMI)

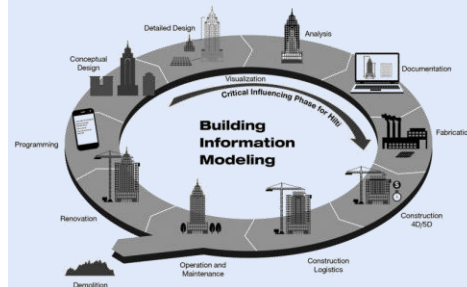
Acceptance & Reliability



Additive Manufacturing



Building & Civil Engineering



New Qualification & Training



New Procedures for Validation & Certification





- The future of NDE - DGZfP Technical Committee NDE 4.0