MEMBERS IN BUSINESS ECOSYSTEMS
EXAMPLE FROM THE RAILWAY INDUSTRY

Source: Knorr-Bremse (2019).
BENEFITS OF BUSINESS ECOSYSTEM INNOVATION
EXAMPLE FROM THE RAILWAY INDUSTRY

Use Cases

Challenges

- Various proprietary platforms – no standards
- Integration and accumulation of knowledge along the value chain
- Lacking proliferation of platforms and services – no critical mass
- Many use cases – no business models

Source: Knorr-Bremse (2019).
DATA SHARING IN ECOSYSTEMS EMERGES IN VARIOUS DOMAINS

- Material Sciences: Sharing of material information along the entire product life cycle
- Energy: Shared use of process data for predictive asset maintenance
- Manufacturing and Logistics: Shared use of master and event data along the entire supply chain
- Healthcare: Anonymized, shared data pool for better drug development
- "Smart Cities": Shared use of data for end-to-end consumer services

BUSINESS ECOSYSTEMS HAVE TO OVERCOME A SET OF CHALLENGES

ROADMAP TO BUSINESS MODEL INNOVATION

1. Trust
2. Data Sovereignty
3. Shared Governance
4. Interoperability
5. Compliance with Antitrust Legislation
6. Data Economics
DATA SOVEREIGNTY IS A KEY CAPABILITY IN DATA ECOSYSTEMS

DATA SOVEREIGNTY is the capability of a natural person or legal entity for exclusive self-determination with regard to their data goods.
IDSA reference architecture forms the base of

- an open, **distributed** data market place,
- ensuring **data sovereignty** for the creator of the data,
- and **proven data-provenance** for the user of data,
- all above **audit-proof**, if requested
- based on **European values**.
THE IDSA DEFINES...

1 Reference Architecture

2 Interfaces

3 Contractual Framework

4 Sample Code

...FOR OPEN DATA ECOSYSTEMS.
300 people contributing

20 countries

100+ companies in 20 countries
BUSINESS INNOVATION IN HEALTHCARE
MEDICAL DATA SPACE

Usage context
Clinical research

Anonymization
Data record must consist of at least 150 individual anonymized data sets

University Hospital
Patient Management
- Health data
- Medication plan
- Electronic case records

Pharma Company
Smart Drug Development
FLEXIBLE AND DYNAMIC PRODUCTION NETWORKS
INDUSTRIAL DATA SPACE

OEM

Production Planning and Control

Maintenance

• CAD data
• Configuration parameters
• Production volume

Usage context
Machine type
Condition
Delete CAD data after first use

“Production as a Service” Provider

Usage context
Maintenance, no forwarding
Condition
Operator anonymous

• Usage time
• Temperature data
• Certificates

Image source: ingenieur.de (2018)
THE INTERNATIONAL DATA SPACES APPROACH
DATA SOVEREIGNTY ON EDGE, FOG AND CLOUD LEVEL
INTERNATIONAL DATA SPACES APPROACH: SELF DETERMINED CONTROL OF DATA FLOWS

**Extended Interoperability**

Enabled by semantic data descriptions

**Trust** between different security domains

Certified, comprehensive security functions providing a maximum level of trust

**Governance** for the data economy

usage control and enforcement for data flows

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Technical Enforcement

Organizational / Legal Enforcement
THE INTERNATIONAL DATA SPACE CONNECTS VARIOUS CLOUD PLATFORMS

Legend:
IDS Connector; Data usage constraints; Non-IDS communication; NB: Viewgraph w/o broker and clearing house.
IDS REFERENCE ARCHITECTURE
ROLES AND INTERACTIONS

www.industrialdataspace.org
Source: Knorr-Bremse (2019).
IDS CONNECTOR
DEPLOYMENT OPTIONS

Legend: IoT – Internet of Things.
IDS CONNECTOR
INTERNAL ARCHITECTURE

Container Management
- Custom Container
- App Store Container
- Execution Core Container

Operating System

Virtual Machine / Hardware
BUSINESS ECOSYSTEM EVOLUTION
STAGE-WISE DEVELOPMENT

I. 1:1

Bilateral Data Exchange

II. “Few to Few”

Closed Community Data Sharing

III. n:m

Open Dynamic Data Ecosystem

Legend: Circle-shaped Nodes – Ecosystem Member; C – Connector; B – Broker; I – Identity Provider; H – Clearing House; Edges between Nodes – Data Exchange.
GENERAL DATA INFRASTRUCTURE
IDS POSITIONING

www.industrialdataspace.org
SOVEREIGN DIGITAL INFRASTRUCTURE
EDGE TO CLOUD, IDS AND AI
VALUES & FRAMEWORK FOR INNOVATION (EU Law and Regulations)

ENTERPRISE/DIGITAL ECOSYSTEM (using EU standards)

SERVICE PLATFORMS

DATA SHARING INFRASTRUCTURE

CLOUD/EDGE INFRASTRUCTURE

NETWORK

SMART ECONOMY & SOCIETY

SMART SERVICES

SMART DATA

SMART PRODUCTS

SMART NETWORK

Essential Trust Services
- Clearing House
- Certification Body
- Certification Authority

Dynamic Trust Management
- Dynamic Attribute Provisioning

Basic Data Services
- Broker, auditability
- Transaction services
- Quality scoring
- Micro-payment services
- Data Usage Control
- Encryption services
- Inter-operability Services
- Data connector services
- Appstore
- Platform access, antitrust
- Data Governance/Privacy

Design Principles
- European values
- Secure and trusted
- Easy-to-use
- Federated, neutral
- Vendor-agnostic

Urgent demand for a neutral enabler for trusted data sharing and data usage across multiple service platforms across industries.

DATA SOVEREIGNTY AND INTEROPERABILITY IN BUSINESS ECOSYSTEMS

PROF. DR. BORIS OTTO • COLOGNE • 19 SEPTEMBER 2019