Data Spaces: Key Findings and Challenges

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Introduction – Data centric ecosystem

Data
From data to actionable knowledge for creating value

Connected Intelligence
From Cloud Native to AI Native
Decentralized intelligence

Fully automated Infrastructure
AI for networks and Networks for AI

Trustworthy DNA Ecosystems
Key findings and challenges – 1

The Ecosystem of ecosystems
Technology ecosystems (e.g., 5G, Clouds, IoT, Big Data & AI, etc.)
Vertical domain specific ecosystems (e.g., industrial, health, energy, etc.)

- Scaling up – large scale virtual continuum (space-time)
Key findings and challenges – 2

From data provisioning to data usage
Usage control

From Connecting Devices to Creating Value

• **Business roles and interactions (Data-centric)**
  - User-driven approach
    - A user-friendly ecosystem
  - Ownership
  - Stakeholder management
Key findings and challenges – 3

Data lifecycle
Data and value flow

Operations (OT)

IDS and EU IoT-A reference model
A **common language** for Data Interoperability and Intelligence

- Metadata as meaning and vocabulary package
- Ontology as the foundation and capability of machine interpretation, inference, and logic
- Semantics for better understanding

Key roles in **knowledge discovery and data federation for shared meaning**

**GOUI: “Global Observatory for Urban Intelligence”**

In June 2021, IEEE and ITU initiated a joint-collaboration to develop GOUI

- Create a NEW Smart Cities **Ontology** as a common language
- Correlations via **semantics**
- **Digital Twins** - model cities to better understand them
Common data models
Domain-agnostic
Represented in formats compatible with the API

(source) https://github.com/smart-data-models (A program led by FIWARE, IUDX, TM Forum, OASC and others)
Key findings and challenges – 6

**Data curation** for maintaining the value of data
Data are organized, described, cleaned, enhanced and preserved for public use

The need for explanations (Human + AI)
Key findings and challenges – 7

Trust in data sharing
- Consent to share
- Control of personal data
- Privacy (GDPR Compliance)
- Transparency
- Accessibility
- Fairness
- Accountability
- Security and data integrity

Risk management
- Federated security management
- Federated privacy management
- Federated assurance management

(Source: Telefónica)
Key findings and challenges – 8

**Governance**
- Rights and Responsibilities
  - What actions can be taken
  - By whom
  - With what data
- Compliance

**Ethics**
- Key performance indicators (KPI)

Blockchain and smart contracts

MultiChain Governance

The blockchain as the "perfect code of law"

DIN SPEC 4997 Privacy by Blockchain Design

DEcentralised Citizens Owned Data Ecosystem
Decentralization

A decentralised architecture agreed upon by all relevant stakeholder groups with Blockchain

Blockchain enabled value creation

Framework of medical records in Europe
**Data Fabric**

An integrated data management platform that enables the full breadth of integrated data management capabilities including discovery, federated governance, curation, and orchestration.
Data-centric approach

Trustworthy Decentralized Data Ecosystems with AI

Linking between Data and AI

Connected Intelligence

AI
Network
Data