DATA SOVEREIGNTY IN A MULTI-TENANT, TRUSTED (LOGISTICS) DATA SHARING INFRASTRUCTURE: OPPORTUNITIES AND CHALLENGES FOR APPLYING BLOCKCHAIN TECHNOLOGY

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Inefficiency in road freight transportation (fragmented market)
High percentage of empty kilometers
43% load truck factor
70% of LSPs in Benelux plan to implement horizontal cooperation in the next 5 years
Collaboration is crucial in the supply chain, however it is complex and challenging
Monitoring/steering collaboration is seen as challenging by practitioners.
BENEFITS OF MULTI-TENANT COLLABORATION

• Prakash and Deshmukh (2010) who illustrate that collaboration is mainly optimized within single organizations and that collaboration in supply chains mainly takes the form of vertical collaboration.

• Frisk et al. (2010) demonstrate that better planning systems and processes within companies can result in a saving of 5%.

• And that collaboration with supply chain partners can add another 9%, which accumulates to a total of 14%.

• Similar numbers are reported by Palmer and McKinnon (2011), who derive to a reduction of nearly 18% external cost and 14% CO2 reduction.
THE *IDEAL* INFORMATION NETWORK
THE CURRENT INFORMATION NETWORK
Open infrastructure:

- Generically applicable to multiple use cases / scenarios
- Usability and connectivity not constrained to specific communities
- Based on open (non-prorietary) solutions and technology
- Separation of concerns / functionality (modular)
THE AMBITION
OPEN INFRASTRUCTURE FOR TRUSTED SUPPLY CHAIN DATA EXCHANGE

Key requirements:

• Trust, trust, trust,…

• ‘Open’ infrastructure
Industrial Data Space Approach: SELF DETERMINED CONTROL OF DATA FLOWS

Endless **Connectivity**
standard for data flows between all kinds of data endpoints

**Trust** between different security domains
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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# Functional Architecture of the Industrial Data Space

1. **Trust**
   - Roles
   - Identity management
   - User certification
   - Governance

2. **Security and Data Sovereignty**
   - Authentication & authorization
   - Usage policies & usage enforcement
   - Trustworthy communication & security by design
   - Technical certification

3. **Ecosystem of Data**
   - Data source description
   - Brokering
   - Vocabularies

4. **Standardized Interoperability**
   - Integration of existing vocabularies
   - Handling of different data formats
   - Connection of clouds and platforms

5. **Value Adding Apps**
   - Processing of data
   - Remote execution

6. **Data Markets**
   - Clearing & billing
   - Domain-specific broker and marketplaces
   - Use restrictions and legal aspects (contract templates, etc.)
To design an open, trusted (secure, accountable, …), digital infrastructure to support an ecosystem where companies and stakeholders can share data in a secure and controlled way, as enabler for supply chain collaboration between companies and sectors at a global scale.
ROLES & INTERACTIONS IN THE INDUSTRIAL DATA SPACE
IDENTITY PROVIDER

- **Existence.** Users must have an independent existence.
- **Control.** Users must control their identities.
- **Access.** Users must have access to their own data.
- **Transparency.** Systems and algorithms must be transparent.
- **Persistence.** Identities must be long-lived.
- **Portability.** Information and services about identity must be transportable.
- **Interoperability.** Identities should be as widely usable as possible.
- **Consent.** Users must agree to the use of their identity.
- **Minimalization.** Disclosure of claims must be minimized.
- **Protection.** The rights of users must be protected.

*Christopher (Allen, 2018)*
CLEARING HOUSE

- Clearing / Transaction Logging
- Settlement / Billing
- Conflict Resolution

Blockchain implementation
- Instances of data transaction ‘clearing’ blockchains being initialized by the data provider for logging specific data sharing sessions;
- The receipt of trusted data sharing transactions is acknowledged by means of secured data receipt records, preferably with (reference to) the legal agreements / terms of use under which these data sharing transaction has been done;
- The secured / certified data receipt records are inserted in the data transaction ‘clearing’ blockchain.
ROLES & INTERACTIONS IN THE INDUSTRIAL DATA SPACE
CONCLUSIONS & FUTURE WORK

- Currently there aren’t successful implementations of a heterogenous trusted data sharing infrastructure due to all kind off reasons (trust, IT, cost, competition), however with the speed of the adoption of the blockchain we foresee some progress on some of these factors.
- Instead of having central roles and actors this can help to build trust amongst partners and not having a single point of failure.
- Setting up a business experiment
INDUSTRIAL DATASPACE ASSOCIATION

80+ Companies and Organizations
15+ Countries
25+ Use Cases
1 Ecosystem

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