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INSTITUT FÜR  
RECHTSINFORMATIK

# The automation of trust in industrial contractual relationships

Conference on Shaping a globally secure Industrie 4.0 Ecosystem  
January 27<sup>th</sup>, 2021

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# Institute of Legal Informatics

- **Research**

- Industry 4.0
- AI / Autonomous Systems
- Legal Informatics / Legal Tech
- Data Protection / IT-Security

- **Education**

- Master studies „IT and Law“ (LL.M.)
- Summer School „IT Law and Legal Informatics“

- **Events**

- **Services for the public**

- Montagspost (Decisions of the German Federal Supreme Court)



# Industry 4.0 Legal Testbed: Legal testing environment and open repository



- Automated contract negotiation & documentation
  - Development of contract agents
  - Smart Contracts for Industry 4.0
  - Blockchain solutions
- Publicly accessible digital testbed
  - Legal testing environment (e.g. contract agents, communication interfaces)
  - Open Repository (e.g. contract clauses for businesses)
- Legal research and simulations of court proceedings



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Gefördert durch:



aufgrund eines Beschlusses  
des Deutschen Bundestages

# Main facts about the project



## Consortium

- Fraunhofer-Gesellschaft:
  - Institute for Material Flow and Logistics (IML),
  - Institute for Software and Systems Engineering (ISST)
- Saarland University: Institute of Legal Informatics (IfR)
- Ruhr-Universität Bochum: Horst Görtz Institute for IT Security (HGI)

## Partners

- Plattform Industrie 4.0
- Industrial Data Space Association



## Funding

Period: 4 years

Launch: June 2019

Budget: approx. 5.5 m euro

Authority:

German Federal Ministry for Economic Affairs and Energy

Execution:

VDI Technologiezentrum

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# The automation of contractual relationships in Industry 4.0

# The automation of contractual relationships in Industry 4.0

- Automation as a driver of progress and prosperity
- Industry 4.0: Automation of contractual relationships
  - Automated supply of goods / provision of services
  - Automated conclusion of contracts
- Goal of The Legal Testbed:
  - Automation of contract negotiations
  - Securing the contractual relationship through smart contracts





**Trust and trustworthiness as part of risk management**



# Trust as a prerequisite for contractual relationships

- Trust in service provision
- Trust in good conduct

→ Contract law: protection of trust, protection of good faith



# Trust and trustworthiness



## Trust

= Manifestation of a positive evaluation of an trust object by the trust subject

- Trust object: the entity which is trusted in
- Trust subject: The entity which is granting trust
- Manifestation → generally decisions about an action

# Trust and trustworthiness



## Trustworthiness

= the property attributed to the trust object by the trust subject

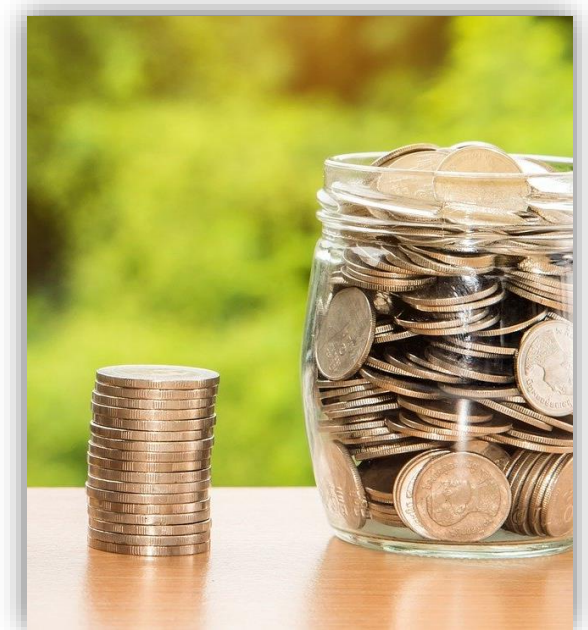
- Trustworthiness is
  - A prerequisite for trust
  - The result of an assessment (of the trust object by the trust subject)
- The assessment is a process consisting of
  - Obtaining relevant information about trust object (trust information)
  - Evaluation of the information



# The potential of automated trust management

# Trust management and transaction costs

- Trustworthiness → result of a trust assessment
- Multiple business relationships requiring trust assessments  
→ necessity of a trust management
  
- Costs of the trust assessment = transaction costs of the respective contractual relationship
- General goal: Minimization of transaction costs
  - Reduction of costs of trust management
  - Alternative models
    - Contractual relationship without trust (smart contracts)
    - Limitation of contractual partners (“supplier lists”)



# Concept: Automation of trust management

- Reduction of transaction costs
- Waiver of limitation of contractual partners
  - larger number of suppliers / customers
  - more contractual relationships





**Towards an automated trust management**

# Steps to automate trust management

- Goal: automation of trust management
- Concept: automation by three elements





# Standardization of trust-relevant information

- State of the art: individual requests / checklists
- **Problem:** prohibitive transaction costs in some cases
- **Solution:** Reduction of transaction costs through standardization of trust information
  - Concept of the Trust Worthiness Profile (TWP)
    - Format for structuring the transmission of information
    - Standardization of information
    - Individual information possible → will decrease



# Automation of information acquisition and evaluation



Automation of **sending** and **filling**  
information requests



Automated use of  
**additional information sources**



Automated **verification**  
of information



Automated **evaluation**  
of information

# Automation of information acquisition and evaluation

## (1) Automation of sending and filling information requests

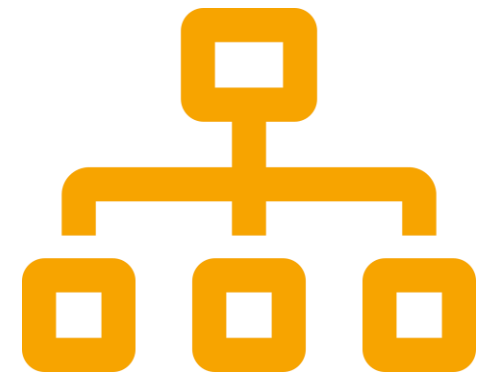
- TWP → can also be sent manually by email/telefax/mail
- Automated request to trust object (contractor)
  - State of the art: Automated sending of the TWP by e-mail
  - Goal: Automated (contract-adapted) creation of the request
- Automated answering of the request
  - State of the art: manual filling of the TWP
  - Goal: Automated answering of standardized questions



# Automation of information acquisition and evaluation

## (2) Automated use of additional information sources

- Trust assessment → use of further information
  - Public registers (commercial register, etc.)
  - certifiers
- State of the art: manual collection / waiver of further information sources
- Goal: Automated verification (e.g. retrieval from registers, certificates)



# Automation of information acquisition and evaluation

## (3) Automated verification of information

- TWP = self-disclosure of information by the trust object  
→ Verification of information required / desirable
- State of the art: manual verification / waiver of verification
- Goal: Automated verification  
(e.g., information matching, certificate verification)



# Automation of information acquisition and evaluation

## (4) Automated evaluation of information

- Trustworthiness = evaluation of information
- 3 elements
  - Determination of the relevant information (in advance of the request)
  - Determination of the trust requirement (in relation to the respective contractual relationship)
  - Evaluation of the information in relation to the trust requirement
- State of the art: standardized or individual, manual evaluation
- **Goal:** automation of the evaluation



# Automated monitoring of trustworthiness

- Requirement: dynamization of trust management
  - Ongoing updating of the decision on (level of) trust
  - Ongoing review of trustworthiness = monitoring
- State of the art: Waiver of monitoring / periodic query of trust information
  - Goal: automation of the query → higher frequency
  - more up-to-date information
- State of the art: manual evaluation of changes in information
  - Goal: Automated evaluation





**Thank you very much!**

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