

Generative AI for Explicit Regulatory Knowledge Representation

In our LLM4LM lab we will explore how generative AI can revolutionize compliance by extracting knowledge from regulations, contracts, and policies, allowing for automated auditable and explainable reasoning.

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Bridging Academia and Industry Collaboration

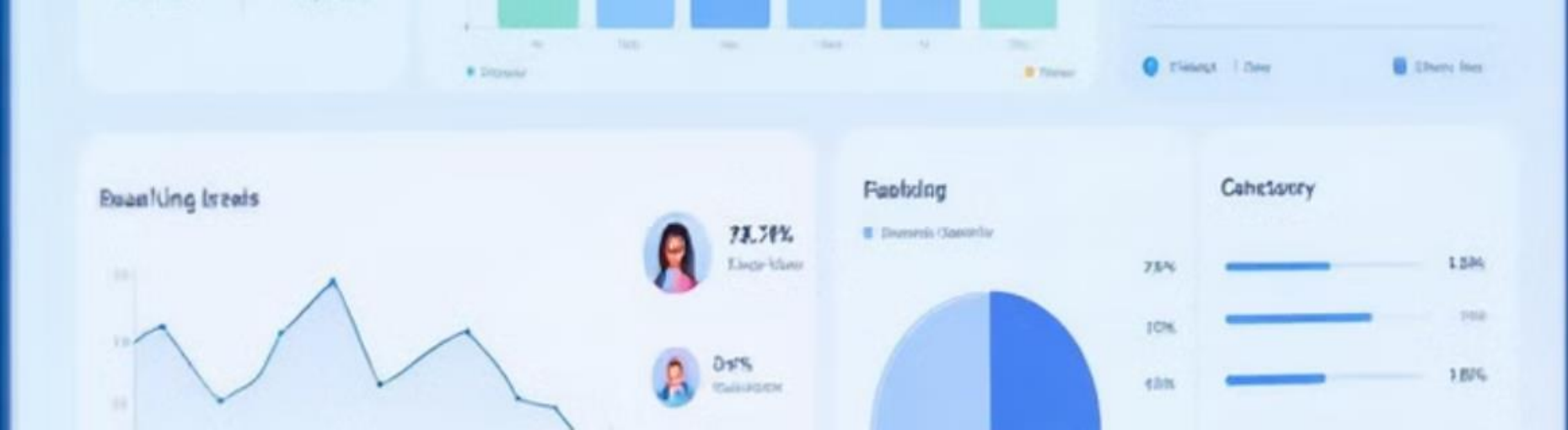
- Real-world challenges in ensuring compliance in international supply chains
- Regulations from many different domains and multiple countries (legal pluralism)
- Cost of ensuring compliance to these regulations on a global scale and an increased focus of the regulator on ensuring compliance in the entire supply chain.
- Data collection costs
- Lack of trust results in doublures in compliance work

Academic Expertise

Deep (fundamental) understanding of AI, knowledge representation, representation, and various forms of automated reasoning.

Industry Insights

Real-world compliance challenges and industrial scale knowledge- as knowledge- as well as data-driven decision-making.



Automated Auditable and Explainable Reasoning

Automated Compliance Checks

AI analyzes data against regulatory requirements, identifying potential potential violations.

1

Explainable Outputs

AI-generated reports offer clear and concise explanations of compliance compliance findings.

3

Auditable Trail

The AI provides a comprehensive record of its reasoning and decision-making process.

2

Automated Compliance Checks

We work on Always Up-to-date Interpretations of Regulations and Automated Compliance Checks

Automated compliance checks require

- Interpretation of regulations
- Policy Decision on how comply with the requirement (control)
- Automated controls

AI can analyze the data against controls

AI can detect anomalies in the data provided

But also assist in:

- 1. interpret regulations
- 2. create effective policies
- 3. to test transactions against controls



Challenges of Manual Compliance and Regulatory Interpretation



1 Time Consuming

Manual review of regulations and policies is often time-consuming and labor-intensive.

2 Complex Interpretation

Regulatory language is complex and open to interpretation, leading to inconsistencies.

3 High Costs

Compliance activities consume significant resources, including personnel, personnel, legal fees, and audits.

OECD estimates that the cost of complying with regulations in international trade is equivalent to a tariff of 25% - 75% depending on the industry

High cost: 25% to 75% of value of goods

For the largest part (50%) these costs are attributed to the heterogeneity and complex way regulations are written



Potential for 70% Reduction in Administrative Burden Burden

70%

Efficiency Gains

Automating tasks frees up time for strategic initiatives and value-added activities.

Exploring Generative AI for Knowledge Extraction



Knowledge Base

AI models learn from vast regulatory datasets, extracting key concepts and relationships.



Structured Representation

Generative AI converts unstructured text into explicit and machine-executable knowledge representation.



Explainable Reasoning

The AI provides clear and transparent reasoning behind its compliance decisions.

The screenshot displays a software interface for analyzing regulatory text. The main area shows a document titled "Regulations and rules for opening a salon" with several paragraphs of text. Key phrases are highlighted in red, indicating extracted facts. On the right side, a structured representation of these facts is shown, including a list of requirements and a table of related terms.

Regulations and rules for opening a salon | Modeling

Project overview | Annotate | Modeling | Review

Sources

Last updated August 27, 2024 at 9:56 AM

4709.09 Application for barber shop license - related businesses.

(A) Each applicant who desires to obtain a barber shop license shall apply to the state cosmetology and barber board on forms provided by the board. The board shall issue a barber shop license to an applicant if the board determines that the applicant has paid the license fee and ensured that the barber shop shall meet all of the following requirements:

- Be in the charge and under the immediate supervision of a licensed barber.
- Be equipped to provide running hot and cold water and proper drainage.
- Be in compliance with the infection control standards adopted by the board in rule.
- Pass an initial inspection as described in division (A)(10) of section 4713.07 of the Revised Code.

(B) An applicant issued a barber shop license under division (A) of this section shall display the shop license and a copy of the infection control standards provided by the board under division (A)(5) of section 4709.05 of the Revised Code in a public and conspicuous place in the barber shop.

(C)(1) Any licensed barber who leases space in a licensed barber shop and engages in the practice of barbering independent and free from supervision of the owner or manager of the barber shop shall obtain an independent contractor license by submitting the form provided by the board, paying the applicable fee, and satisfying the conditions for the license established in rules adopted under section 4709.05 of the Revised Code.

(2) Every holder of an independent contractor license shall maintain the board-issued, wallet-sized license or electronically generated license certification and a current government-issued photo identification that can be produced upon inspection or request.

(D) A shop license is not transferable from one owner to another or from one location to another.

(E) Tanning facilities issued a permit under section 4713.48 of the Revised Code may be operated in a barber shop.

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4709.11 License renewal.

Every license issued pursuant to this chapter expires on the thirty-first day of August of each even-numbered year. Each licensee desiring to do so shall, on or before the first day of September of each even-numbered year, renew the licensee's license pursuant to the standard renewal procedure of Chapter 4745. of the Revised Code.

If the state cosmetology and barber board adopts rules under section 4709.051 of the Revised Code to establish a continuing education requirement as a condition of renewal for a barber license, barber instructor license, or assistant

Fact overview | Related | Conversation | History

the barber shop shall meet all of the following requirements:

Properties

Name	the barber shop shall meet all of the following requirements:
State	New
Explanation	
Valid from	
Valid until	

Function

Requires	Be in the charge and under the immediate supervision of a licensed barber;
Requires	Be equipped to provide running hot and cold water and proper drainage;
Requires	Be in compliance with the infection control standards adopted by the board in rule;
Requires	Pass an initial inspection as described in division (A)(10) of section 4713.07 of the Revised Code.

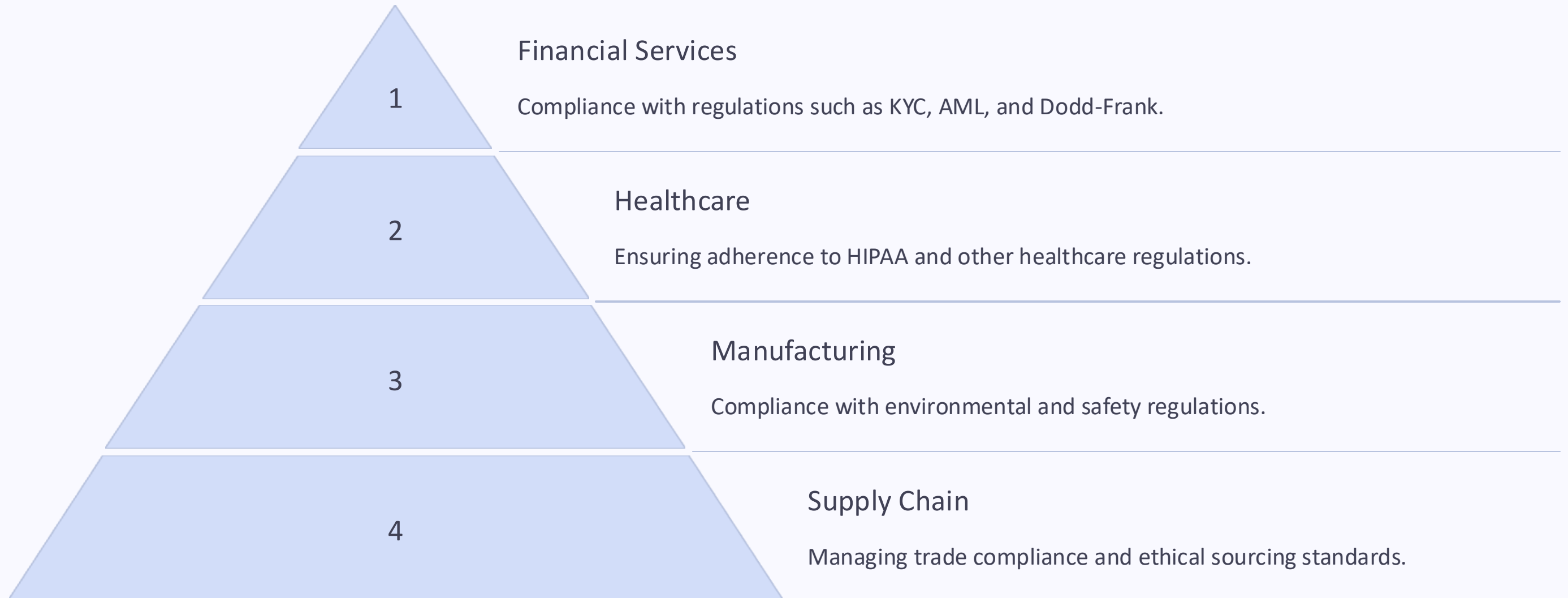
Related term

No related term available

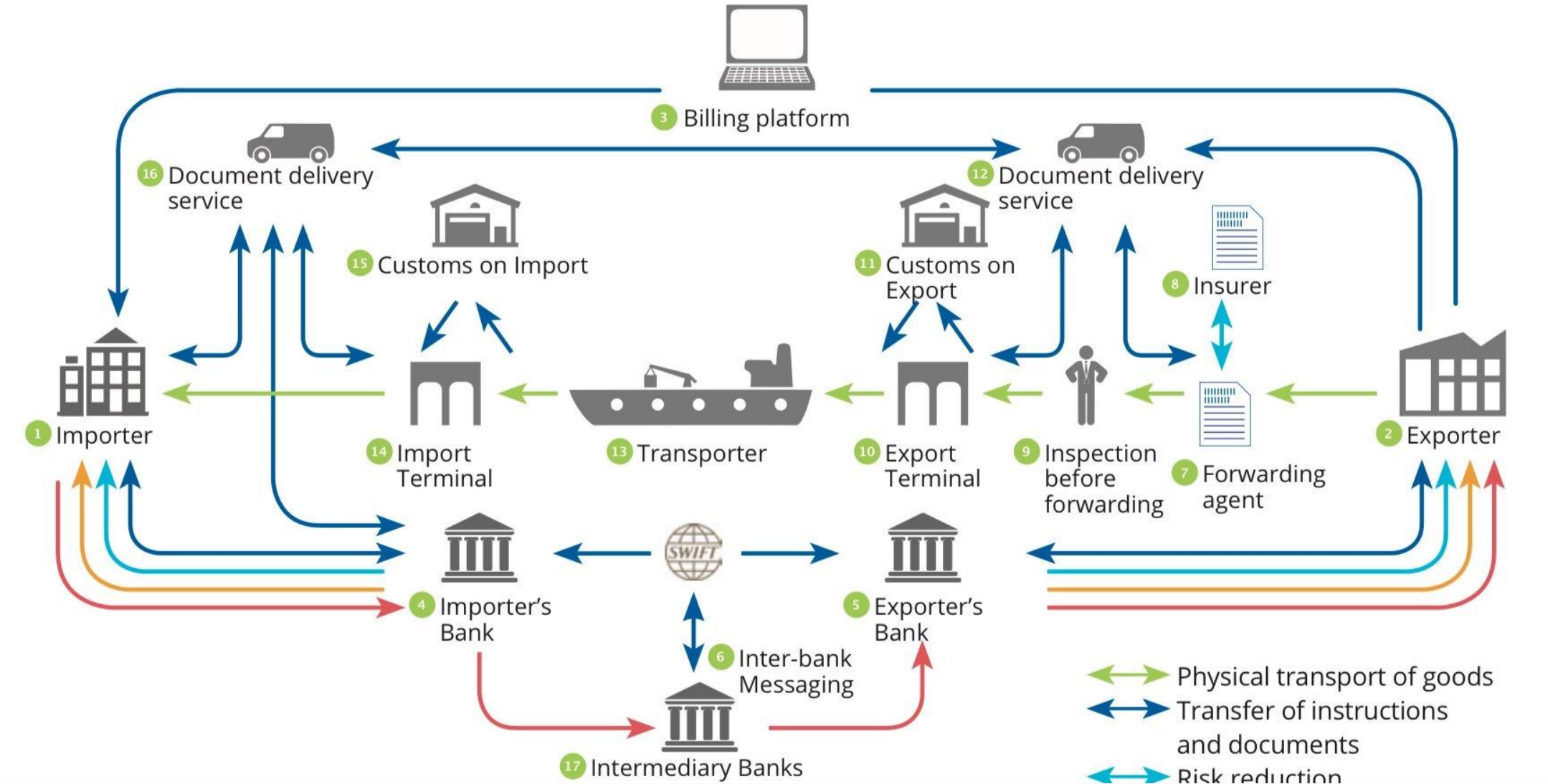
Sources

4709-09	doc4709Applying
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Key Use Cases and Industry Applications



The LM use Cases is exemplary for the full complexity of other actual industrial use cases



For the LM ecosystem We'll deliver

1 Regulatory encoding and reasoning

Multi regulatory domains

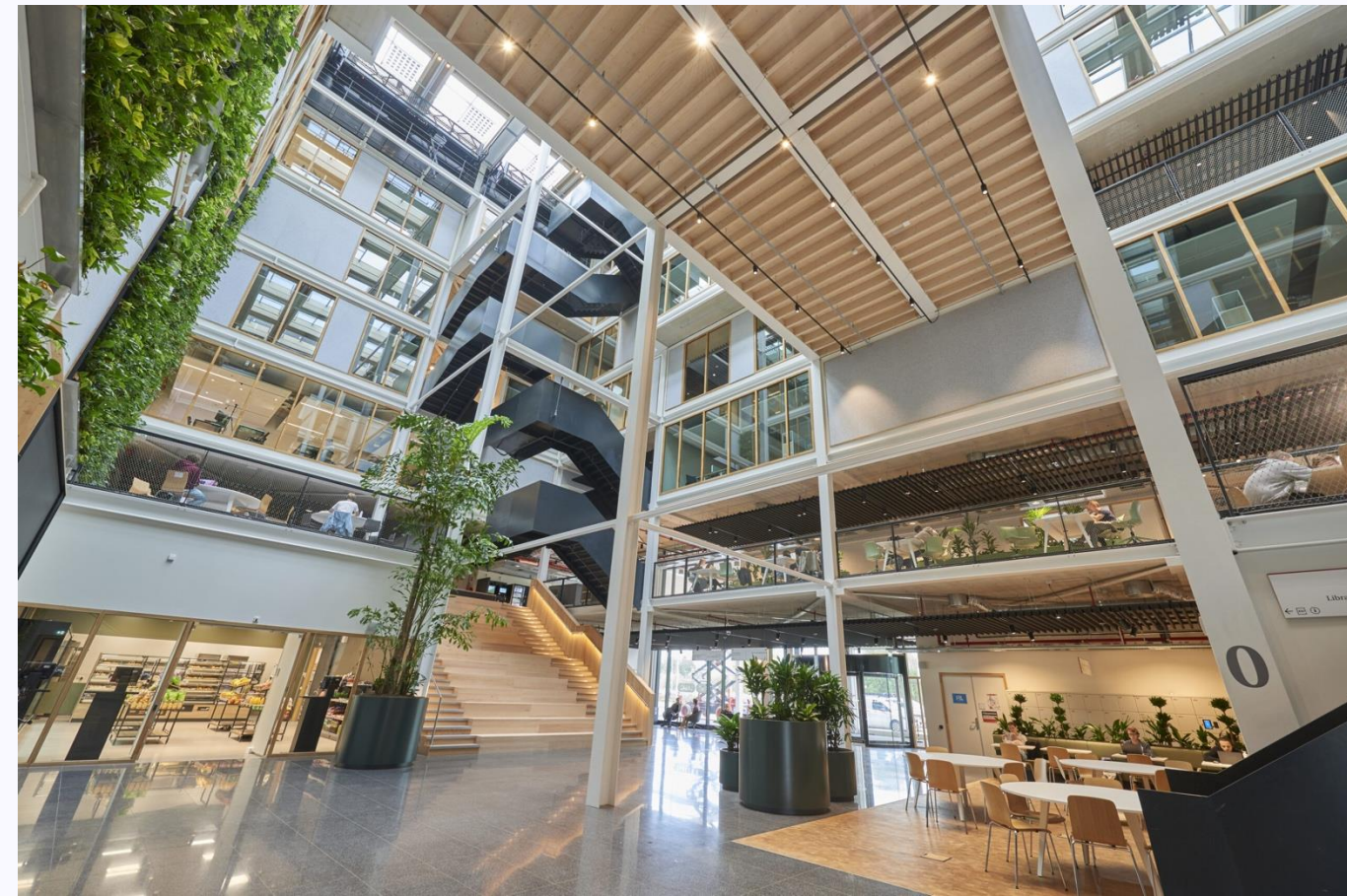
Multiple geographies

3 Automated Compliance Checking

Case Assessment and Anomaly checking

3 Optimizing Supply Chains

Simulation supported by legal/normative reasoning



Research and Innovation Topics

1 GenAI Factory for code generation

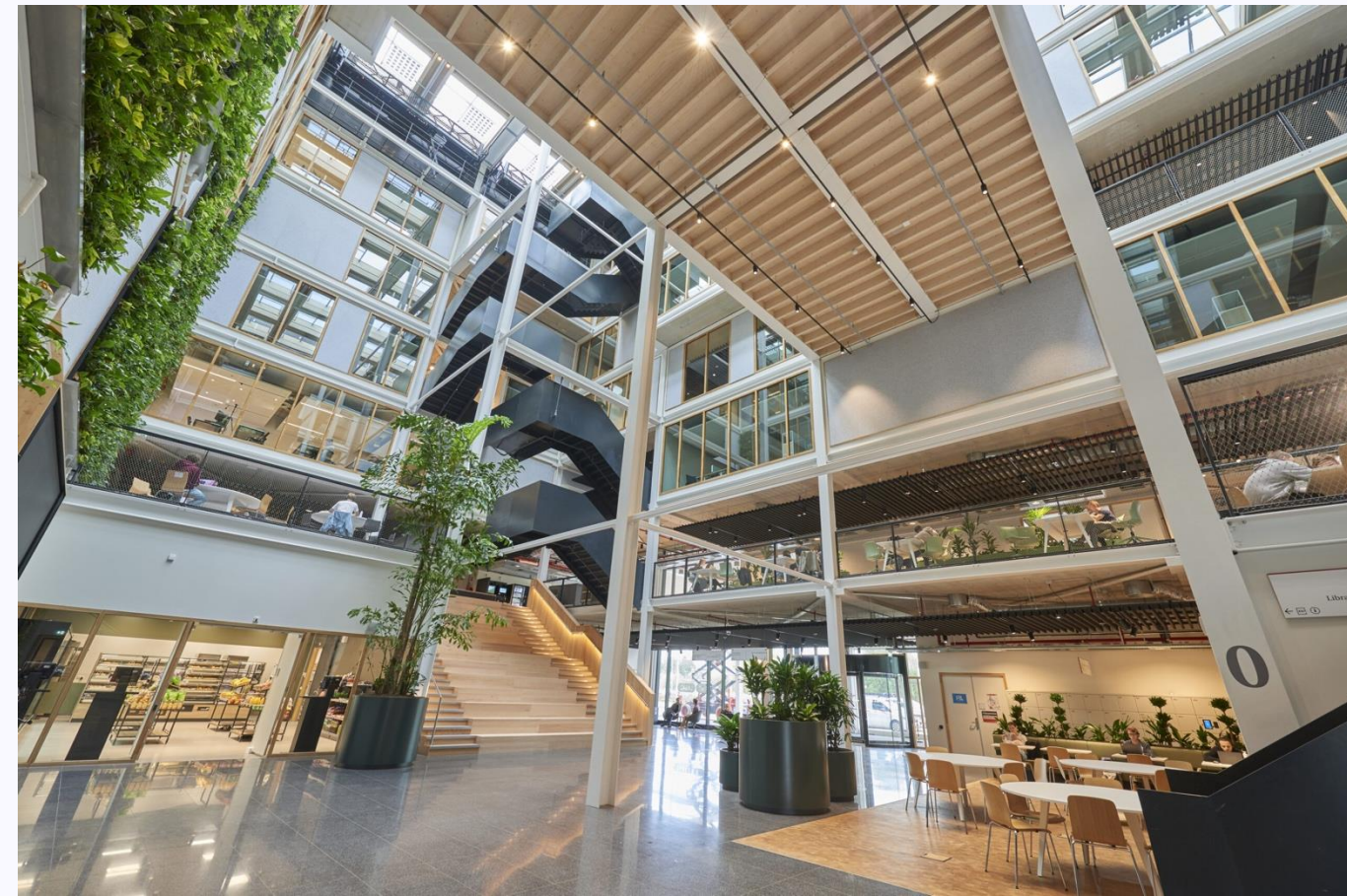
Compliance solution pipeline

3 Policy evaluation facilities

Simulation of potential effects of (intended) policies on stakeholders
stakeholders

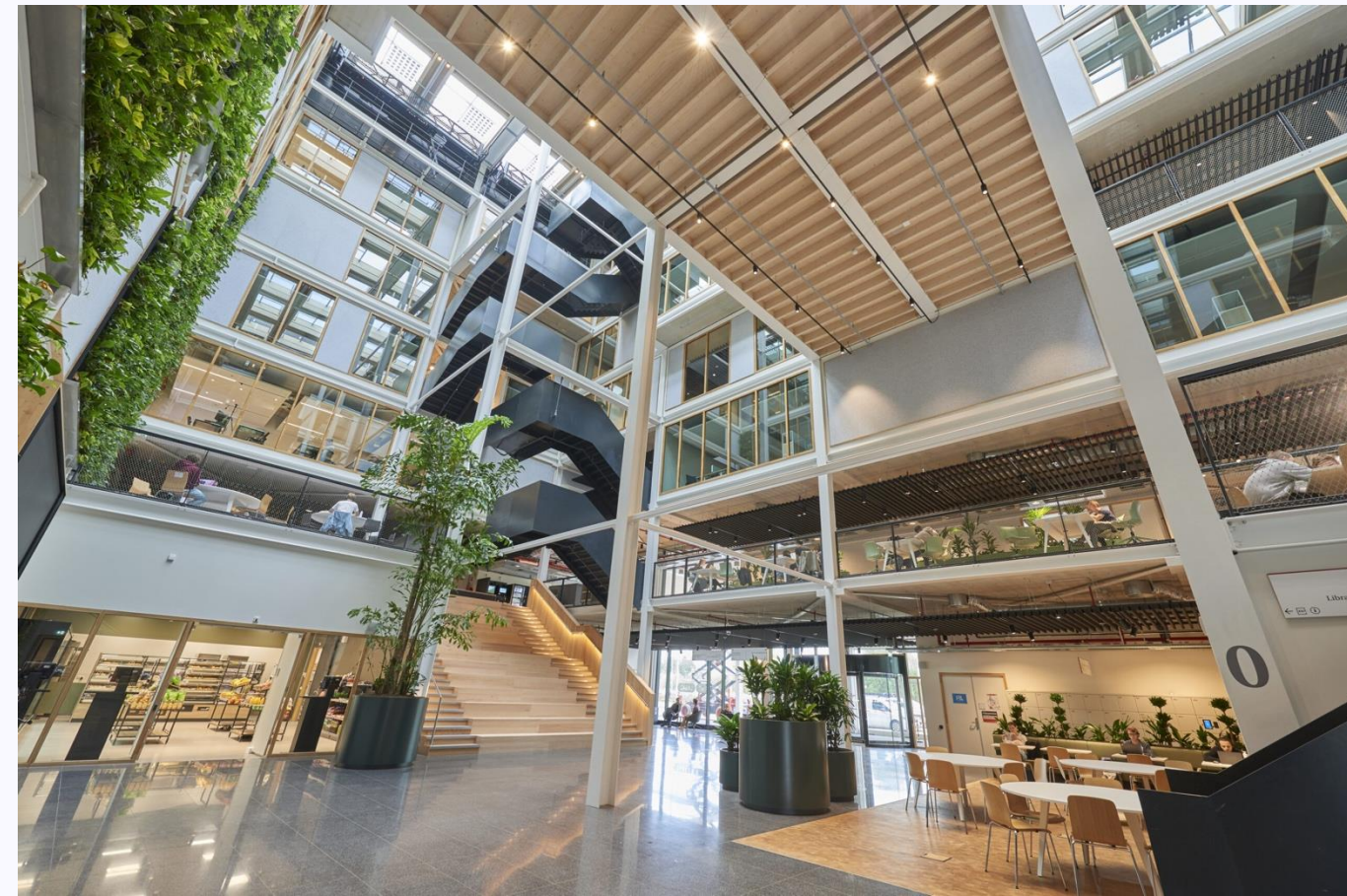
3 Regulatory optimization

Regulatory optimization and
Regulative and administrative burden reduction and (federated)
governance framework development



Adjacent projects

- 1** Norm Engineering BZK
Alignment of legal interpretations and improved legal services services supporting citizens
- 2** AMDEX, DMI, SSC
Normative control over infrastructures
- 3** TRUST RPA
Policy evaluation through ABM and value-based reasoning
- 4** Regulatory optimization
Regulative and administrative burden reduction and (federated) governance framework development



Join the Lab

Generative AI has the potential to transform compliance by automating knowledge extraction and reasoning. This collaboration between academia, the private and public sector and address issues at industrial scale is crucial for realizing its potential and driving innovation.

