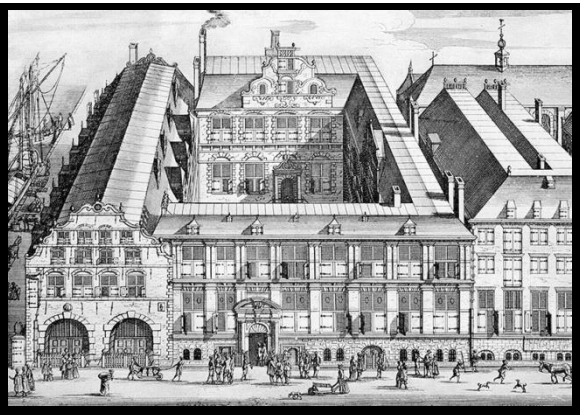
25 Years of AI & Law
ICAIL 1987 - 2013



ICAIL 2013

Radboud Winkels

Leibniz Center for Law

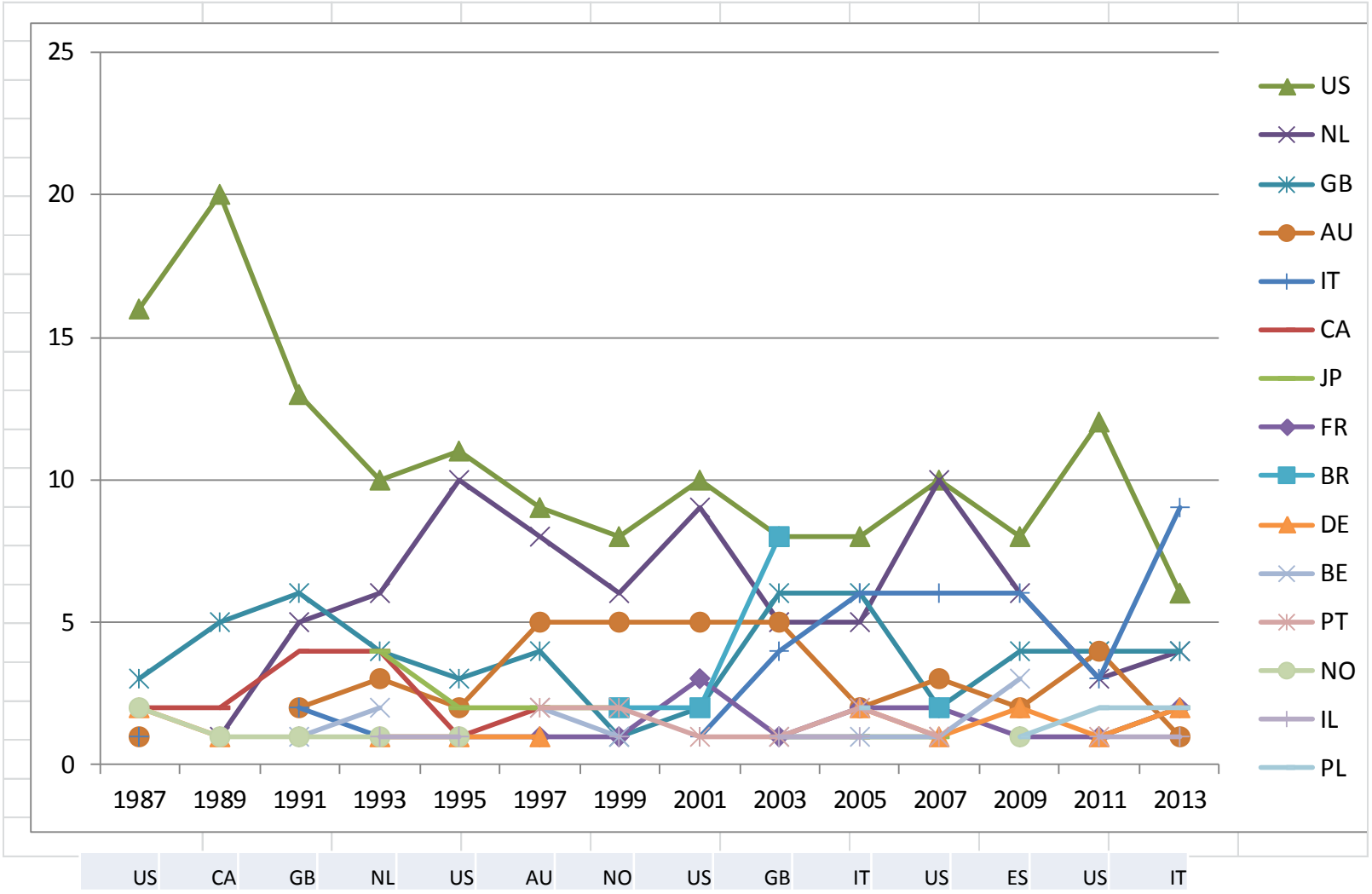
Outline

- Some data and some trends 1987-now
- Our own research 1988-now
- The research-practice paradox
- In search of the AI&Law challenge

The Wisdom of the ICAIL crowd?

Which country 1st author most papers?

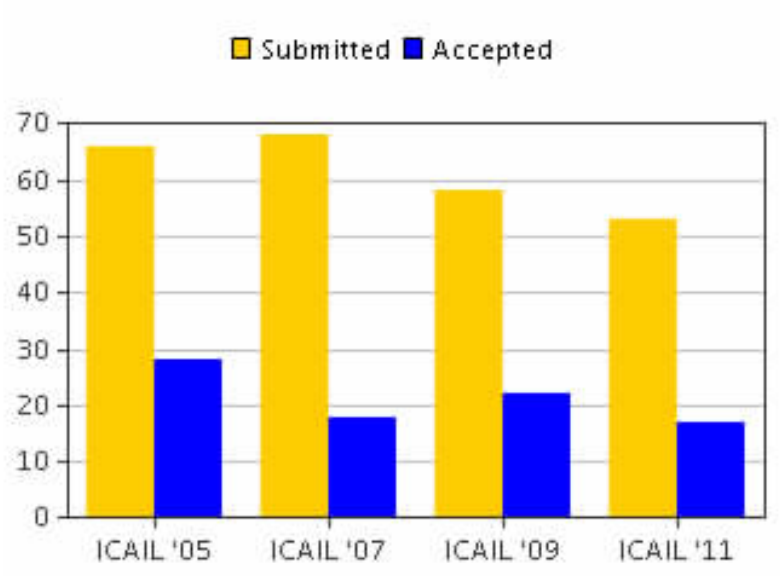
Countries of 1st Authors papers



ICAIL acceptance rates 2005-2013

Paper Acceptance Rate 17 of 53 submissions, 32%

Overall Acceptance Rate 85 of 245 submissions, 35%



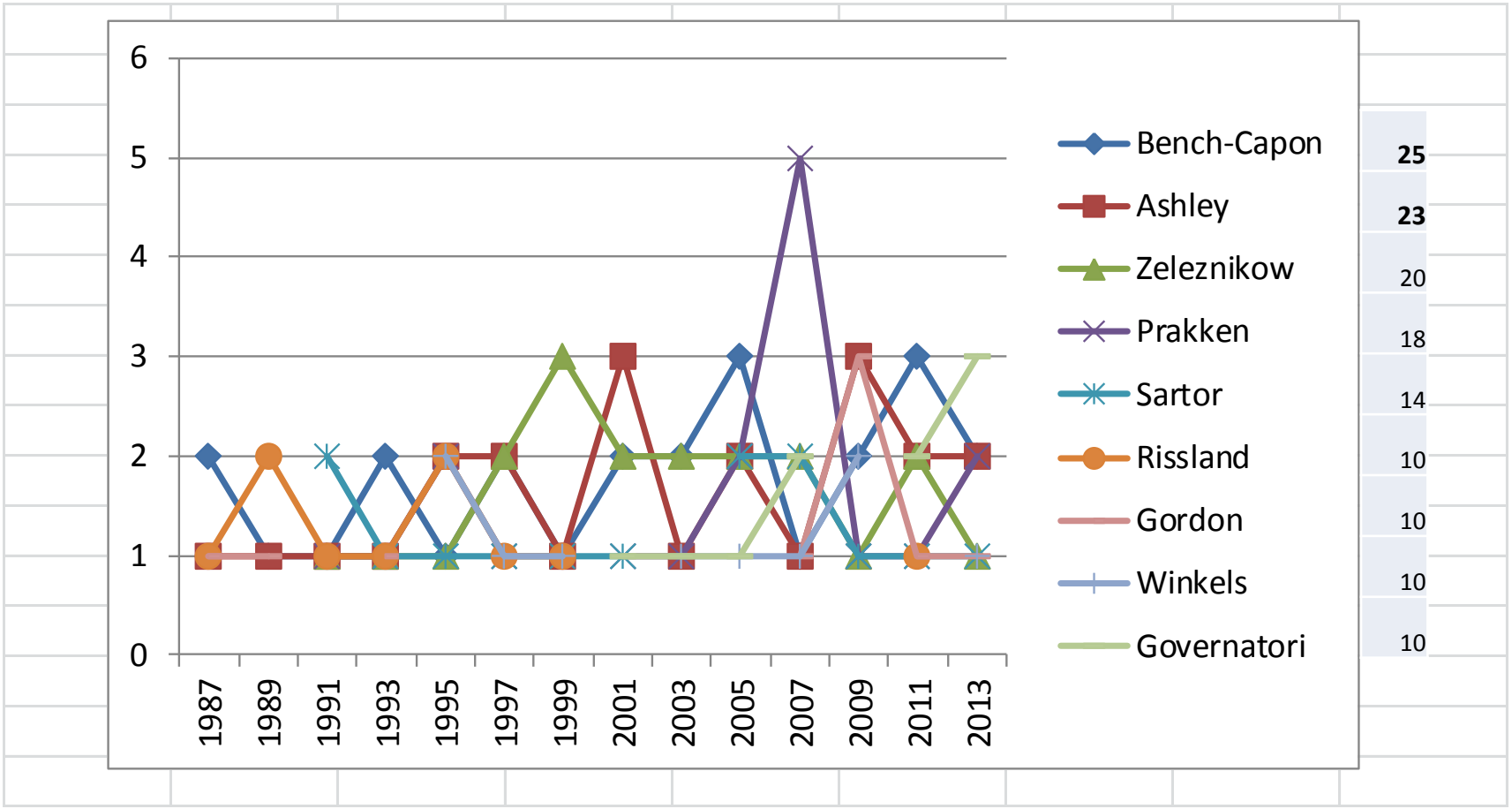
Year	Submitted	Accepted	Rate
ICAIL '05	66	28	42%
ICAIL '07	68	18	26%
ICAIL '09	58	22	38%
ICAIL '11	53	17	32%
Overall	245	85	35%

ICAIL '13 53 17 32%

The Wisdom of the ICAIL crowd?

Which Author most papers?

Most ICAIL Papers as (Co-) Author



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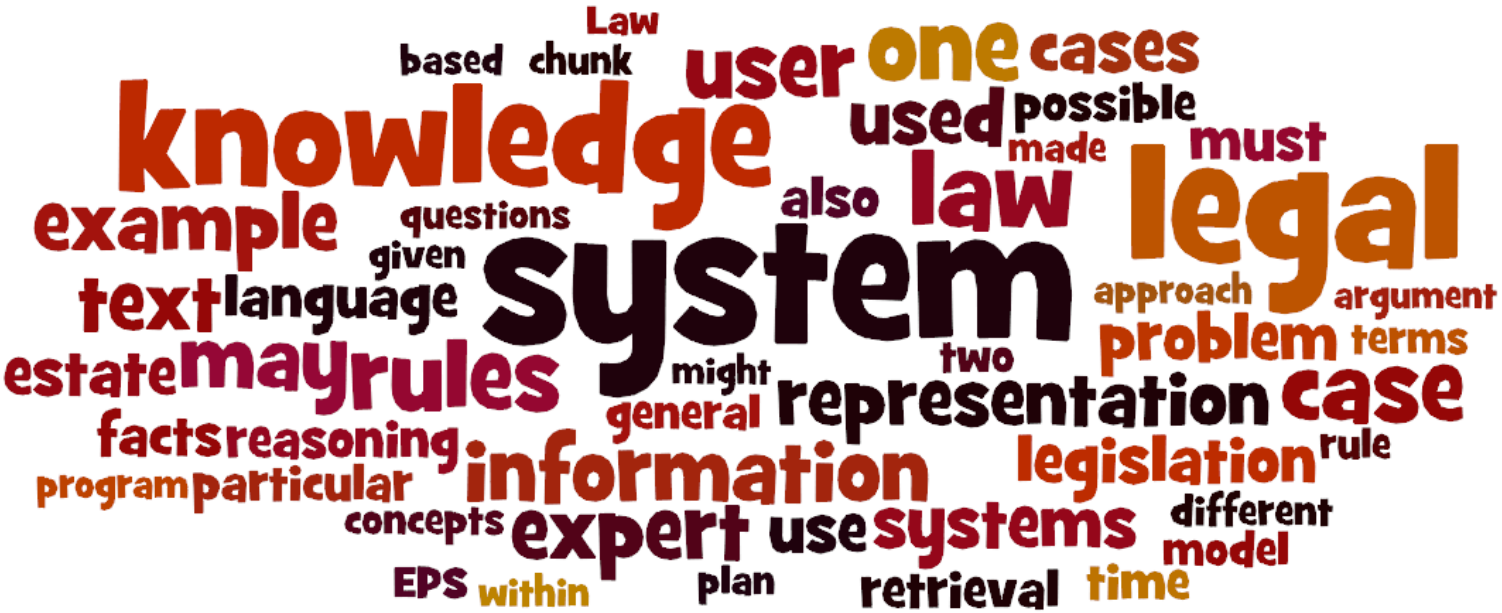
ICAIL 1987



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ICAIL 1997

Leibniz Center for Law

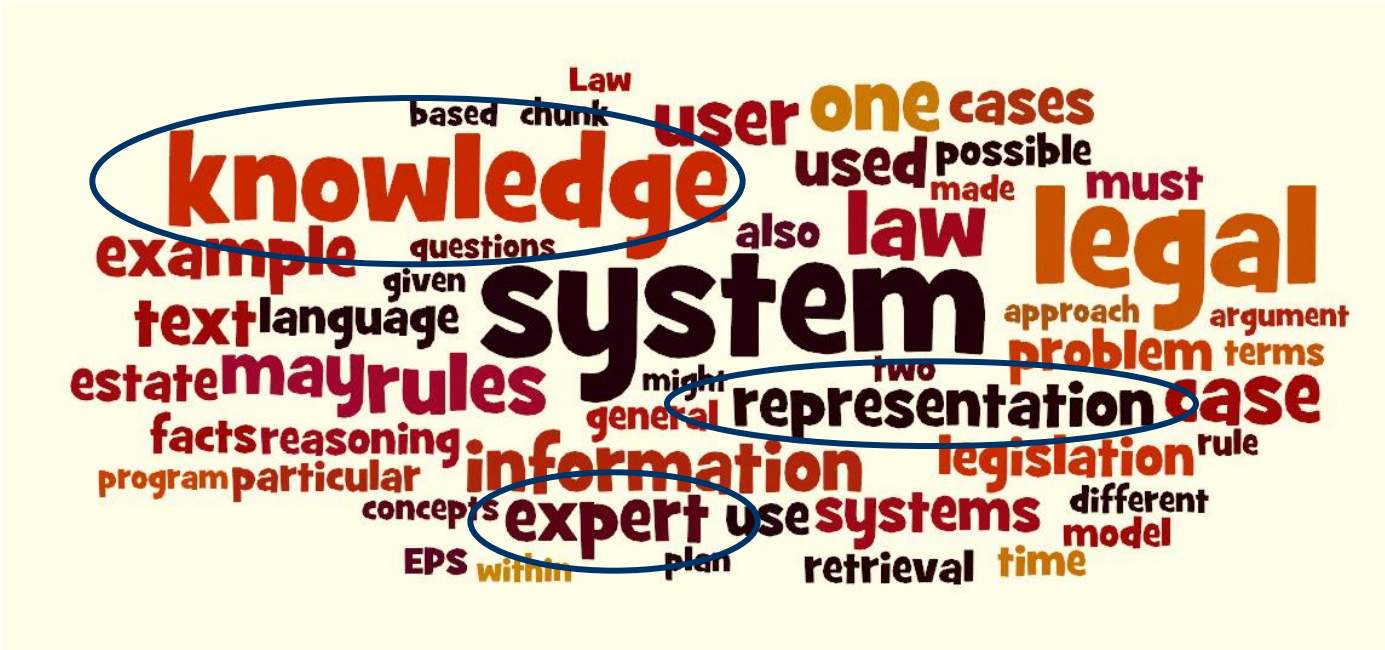
ICAIL 2007

Leibniz Center for Law

ICAIL 2013

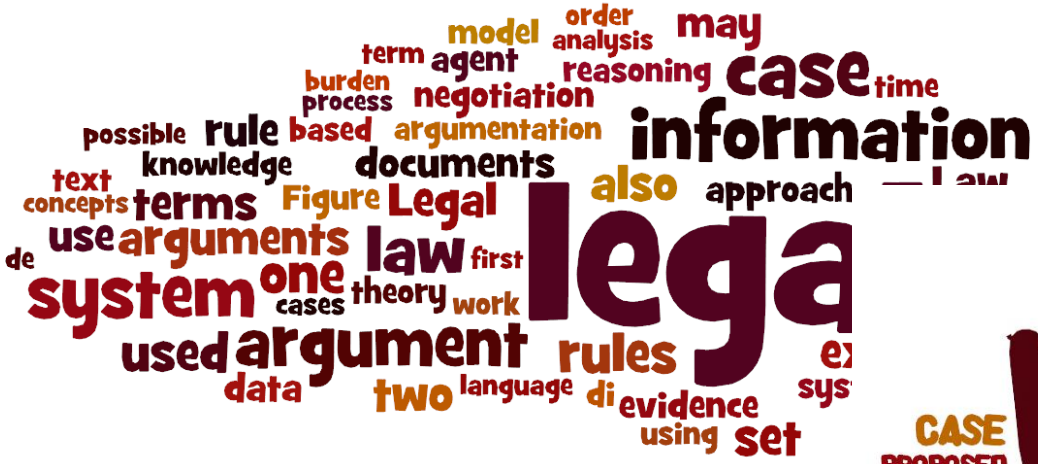
GONE

1987



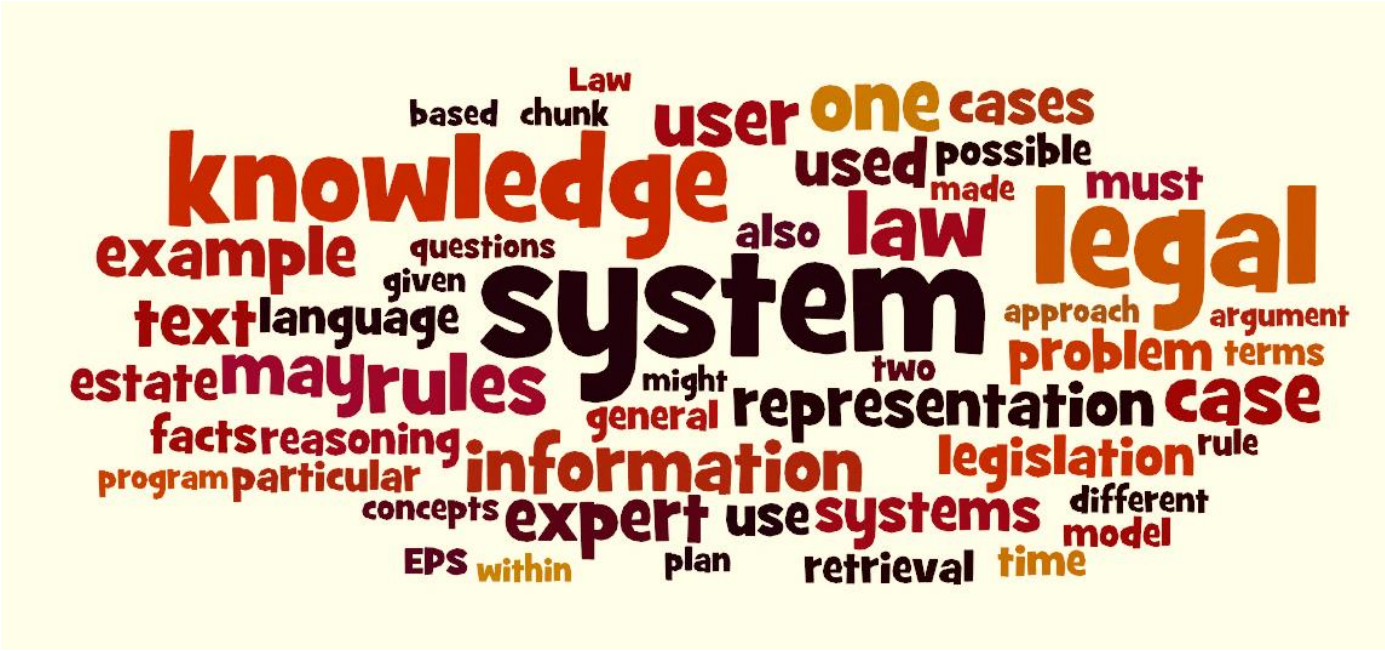
2013

2007



New

1987

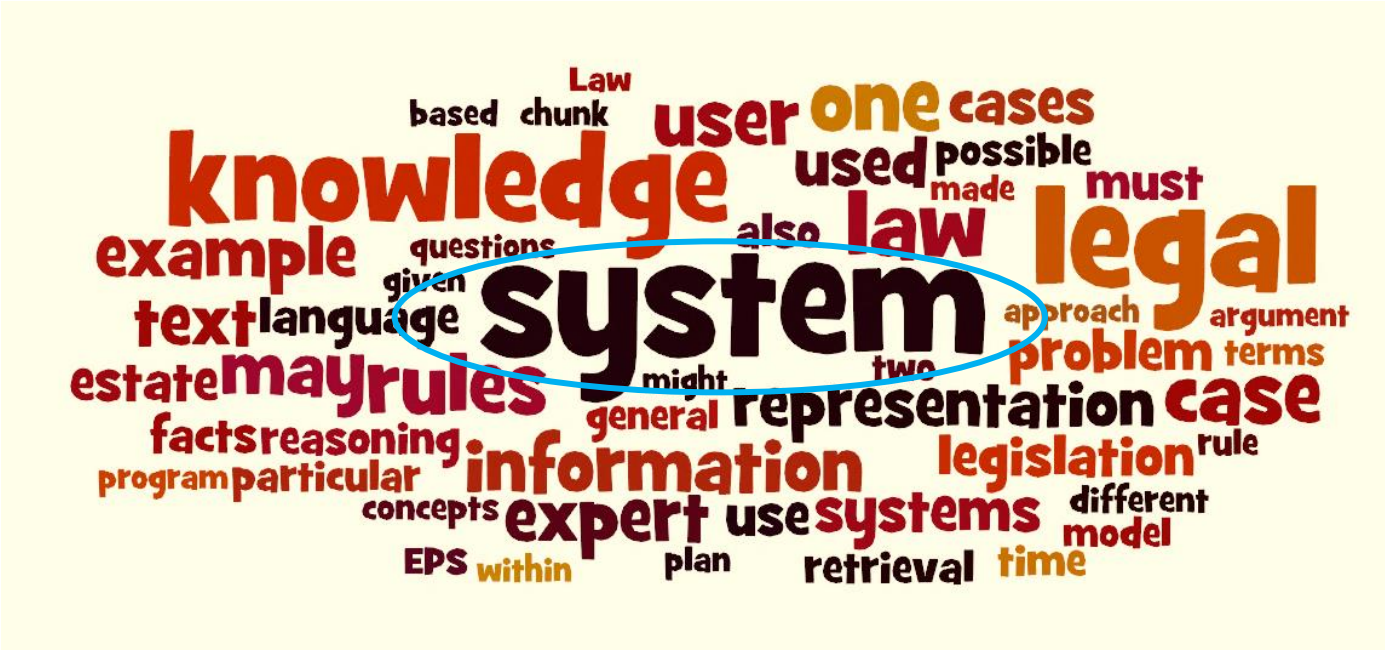


2007

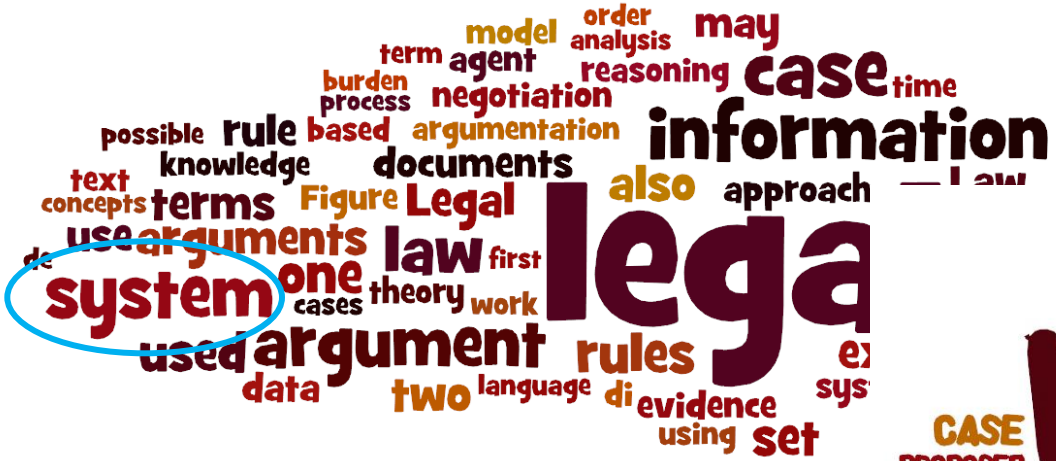
2013

LESS

1987



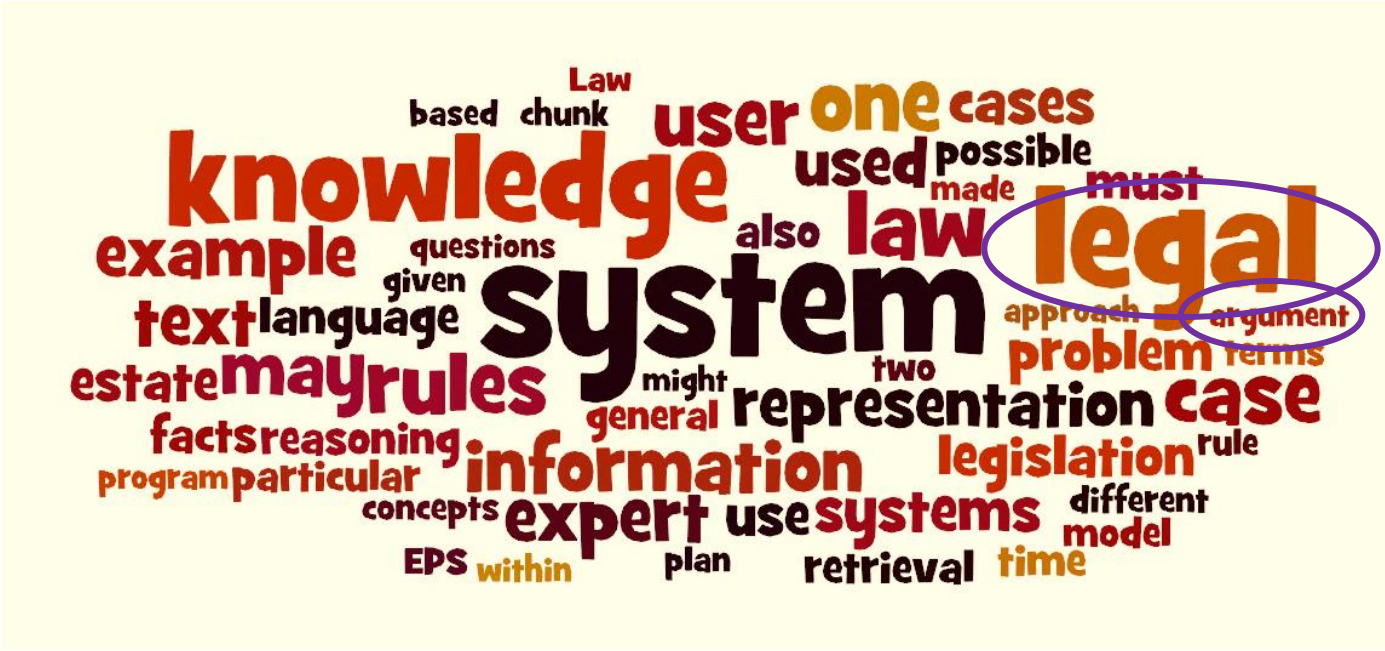
2007



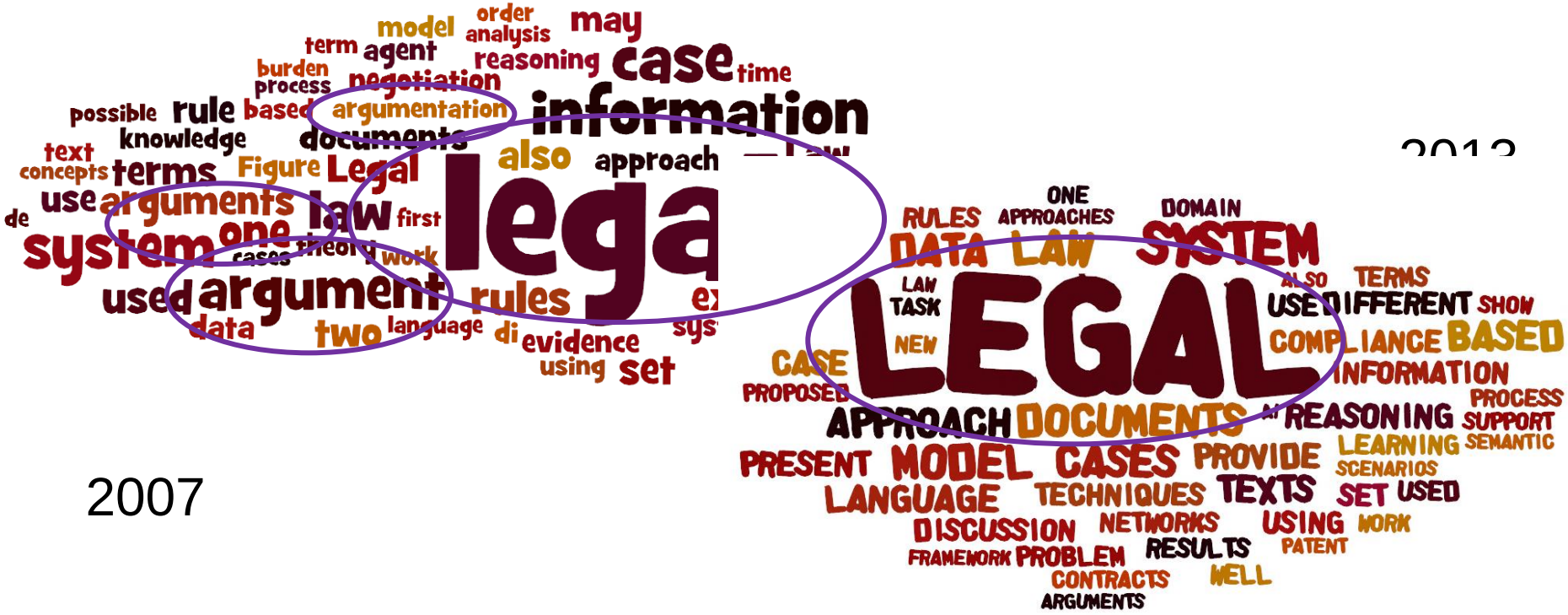
2013

MORE

1987



2007



Observations 1987-2013

- *Knowledge* and *expertise* less important and gone (2013)
- *Documents* and *data* appear (1997)
- Building *Systems* less important
- *Legal Argumention* more important

(similar observations JURIX
except for Agents appearing)

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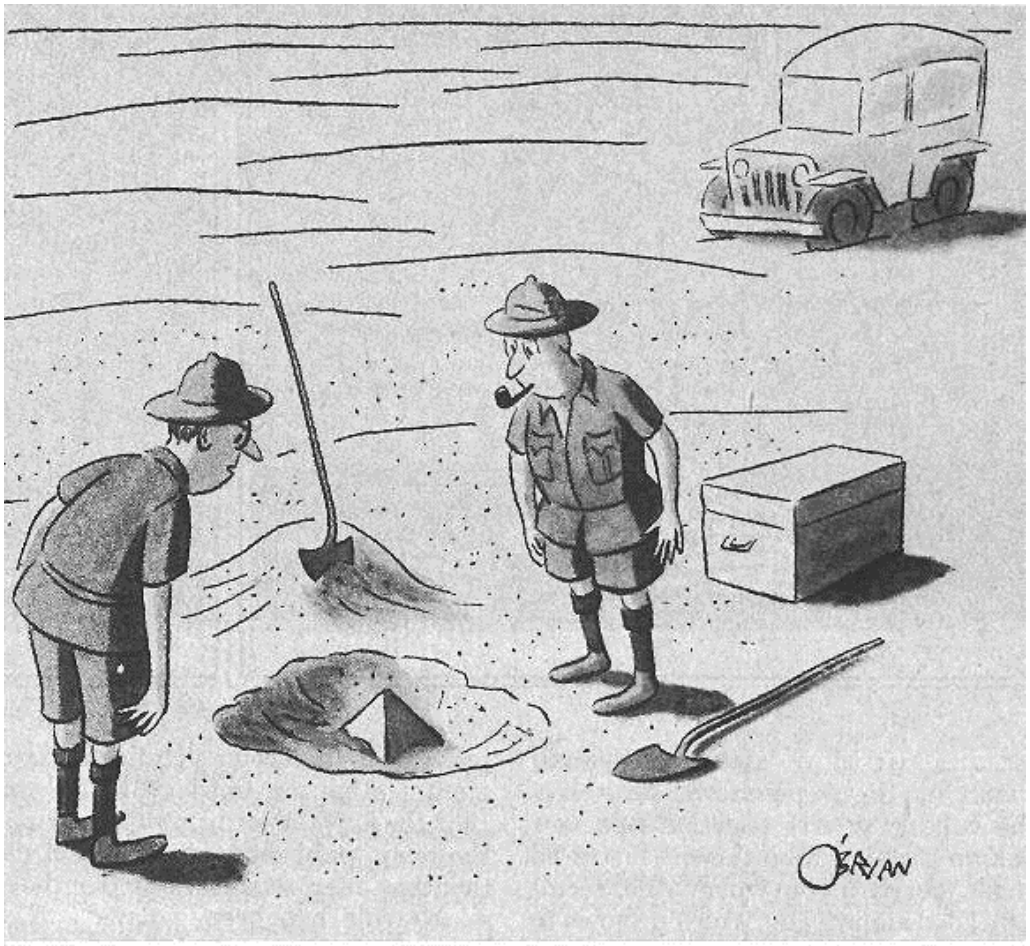
(Some of) Our Research @ Leibniz Center for Law

Tip of the Iceberg



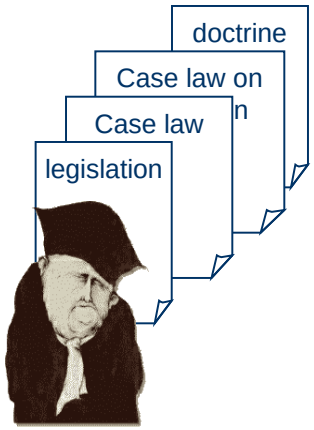
"This could be the discovery of the century. Depending, of course, on how far down it goes."

Or Start at the Bottom?

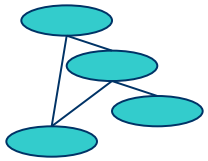
"I hate this hole."

Building Legal Knowledge Systems

Sources



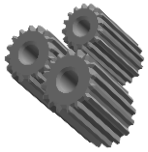
Formal Models



{ p1,p2,… }
{ q1,q2,… }
{ O(α I β) }

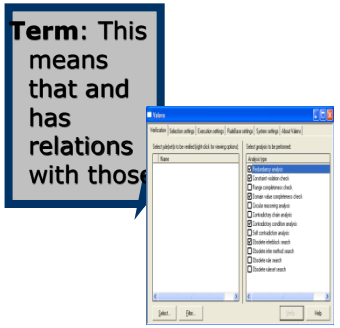
concepts norms

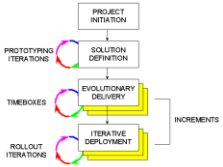
Meta-knowledge

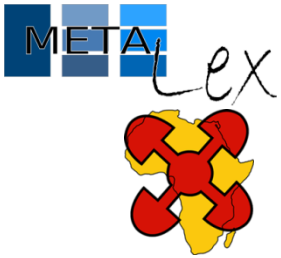


Tasks and reasoning

Applications







LRI-core

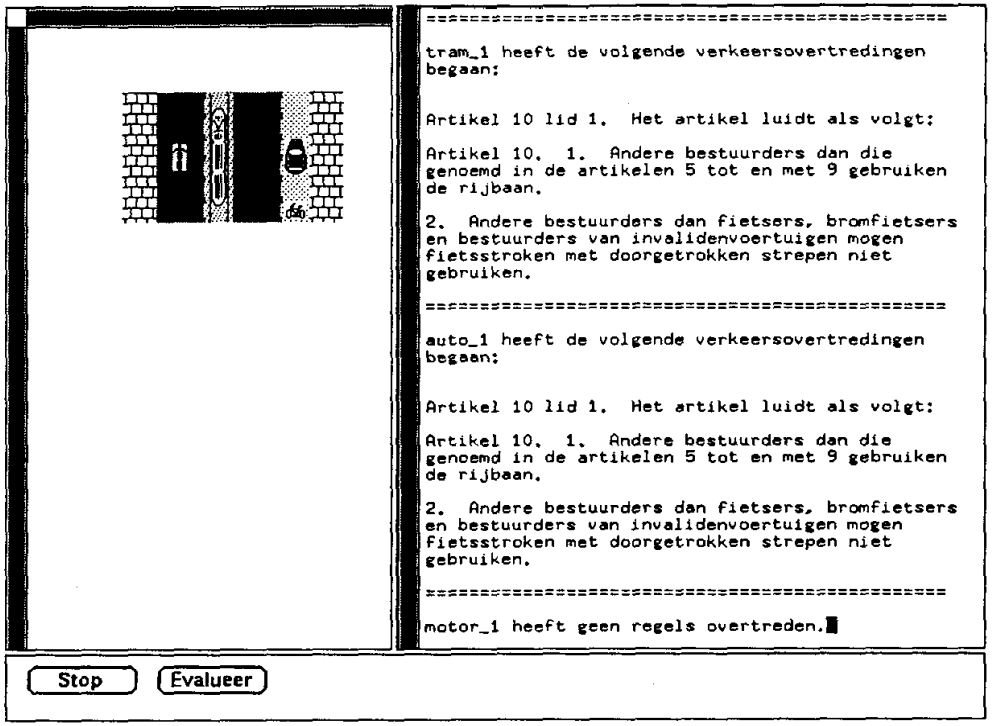
FOLaw
LLD
Sartor
…

CLIME

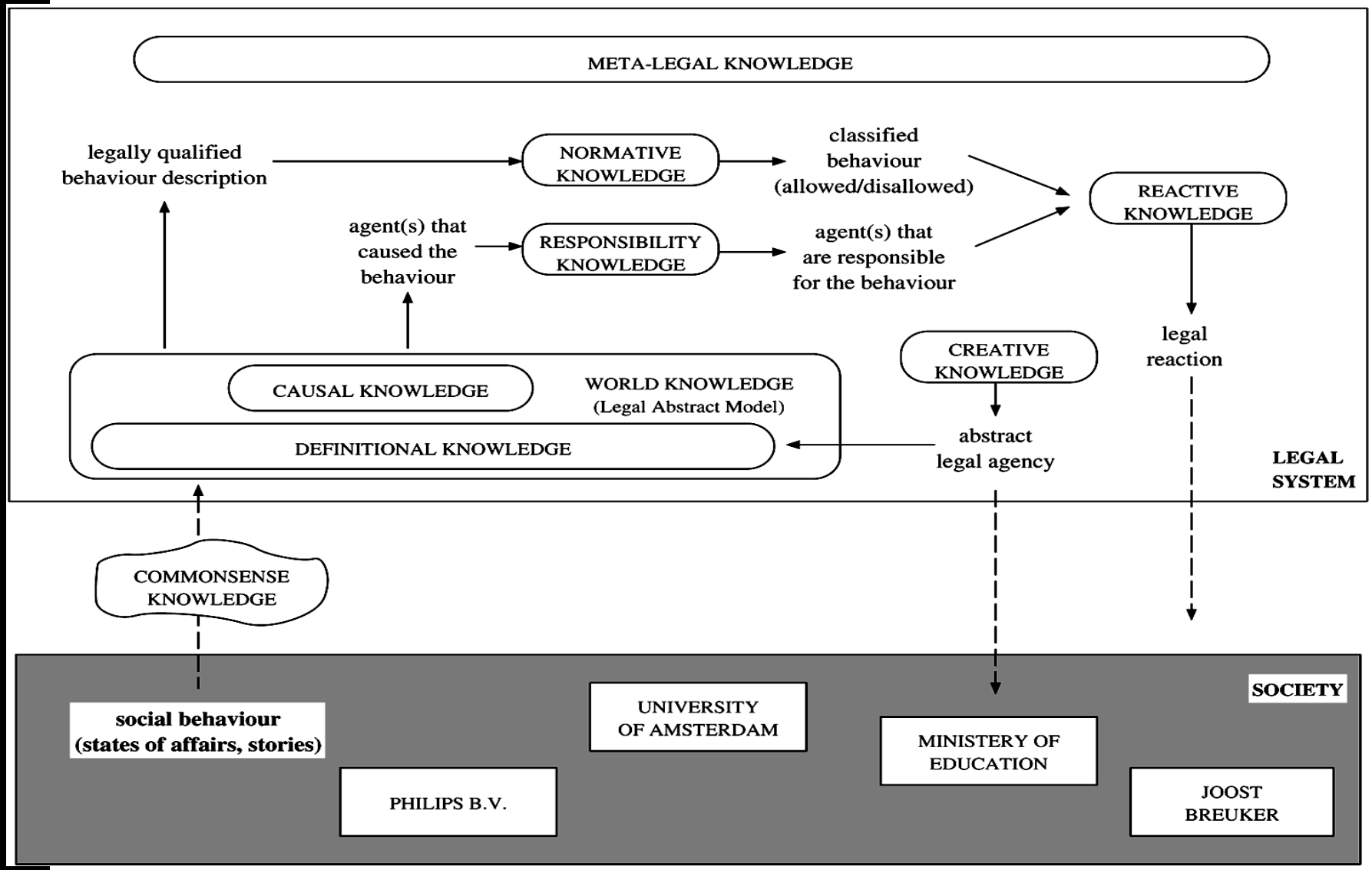
e-Court

A Knowledge Engineering Perspective

- Traffic Regulations (1989->)
- World vs Normative **Knowledge** (ICAIL91)
- TRACS (de Haan e.a.)

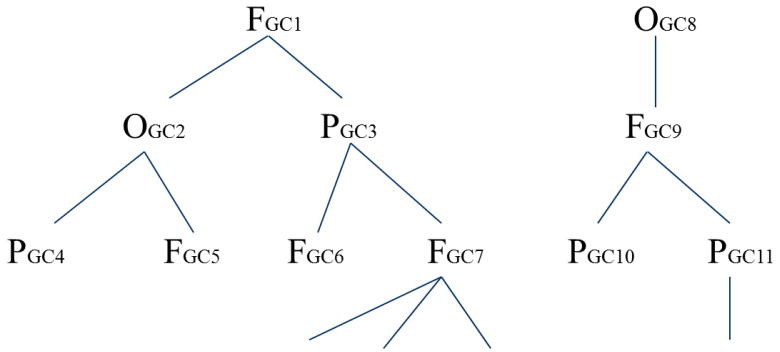


More Kinds of **Knowledge**: ON-LINE (Valente e.a. ICAIL95)



CLIME (1998-2001)

- Very large domain of ship classification
- Incremental Modelling of
  - Domain: Extended Conceptual Retrieval (JURIX2002)
  - Norms: Generating Exception Structures (ICAIL99)
- Legal Information Serving
  - Assess case with possible exceptions!
- cf. HARNESS (2008)



Example

N1: Ships are *not* allowed to have only 1 pump.

N2: A cargo ship *may* have only 1 pump.

Q1: The bulk carrier 'Victoria' has 1 pump. Is that allowed?

Normative Knowledge

N1: $F\{ship(X) \wedge pumps(X, 1)\}$

N2: $P\{cargo\text{-}ship(X) \wedge pumps(X, 1)\}$

Tw: $cargo\text{-}ship(X) \rightarrow ship(X)$

$bulk\text{-}carrier(X) \rightarrow cargo\text{-}ship(X)$

Q1: {bulk-carrier('Victoria') ∧ pumps('Victori

Meta Knowledge

Q1 matches 'generic case' of N1 → disallowed

Q1 matches 'generic case' of N2 → allowed

N2 is more specific than N1 → *allowed*

Example

N1: Ships are *not* allowed to have only 1 pump.

N2: A cargo ship *may* have only 1 pump.

Q1: The ship 'Victoria' has 1 pump. Is that allowed?

N1: $F\{ship(X) \wedge pumps(X, 1)\}$

N2: $P\{cargo\text{-}ship(X) \wedge pumps(X, 1)\}$

Tw: $cargo\text{-}ship(X) \rightarrow ship(X)$

$bulk\text{-}carrier(X) \rightarrow cargo\text{-}ship(X)$

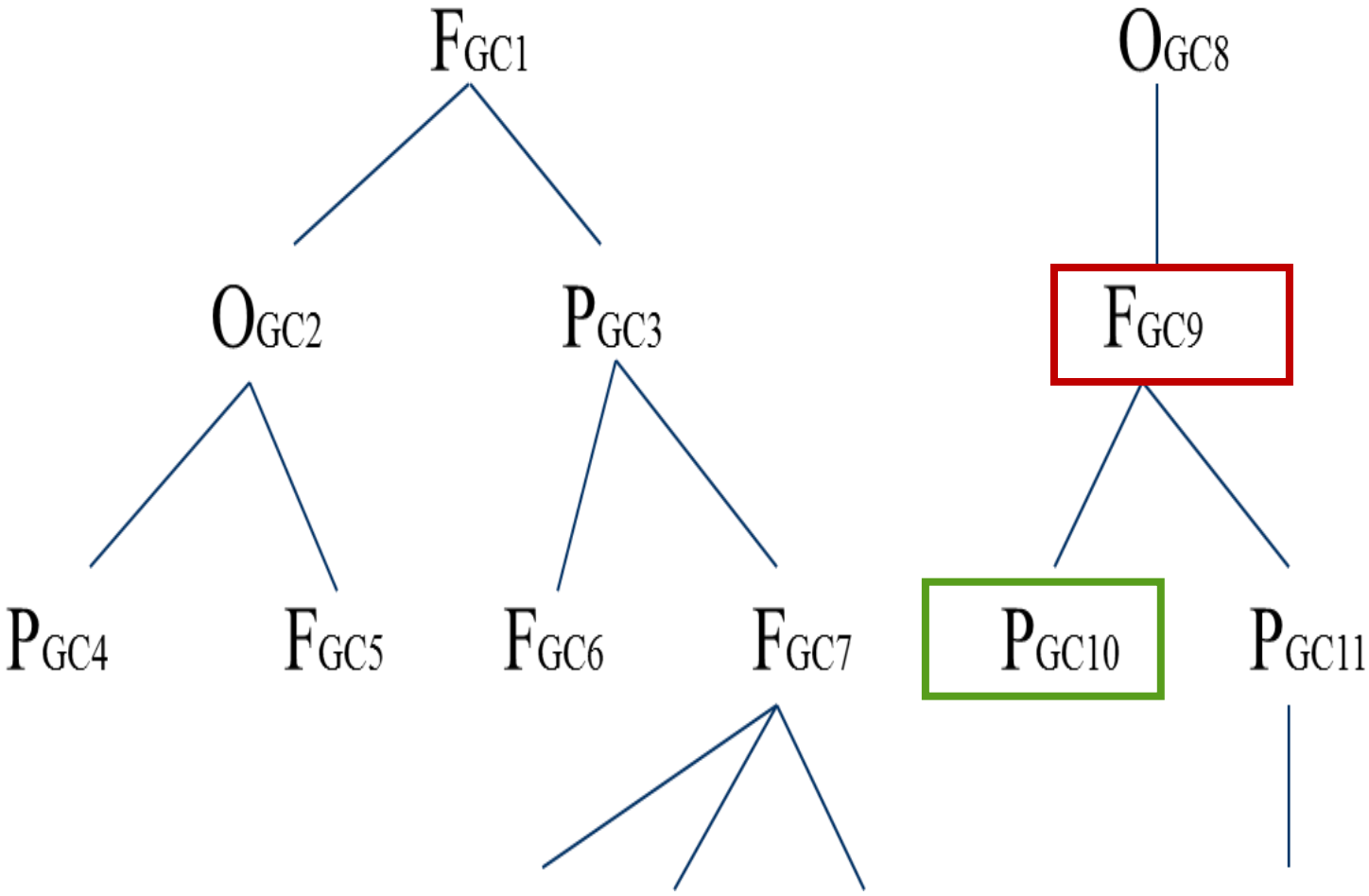
Q1: $\{ship(\text{'Victoria'}) \wedge pumps(\text{'Victoria'}, 1)\}$

Q1 matches 'generic case' of N1 $\rightarrow$ *disallowed*

Correct, but co-operative?

Disallowed, unless your ship is a cargo ship…

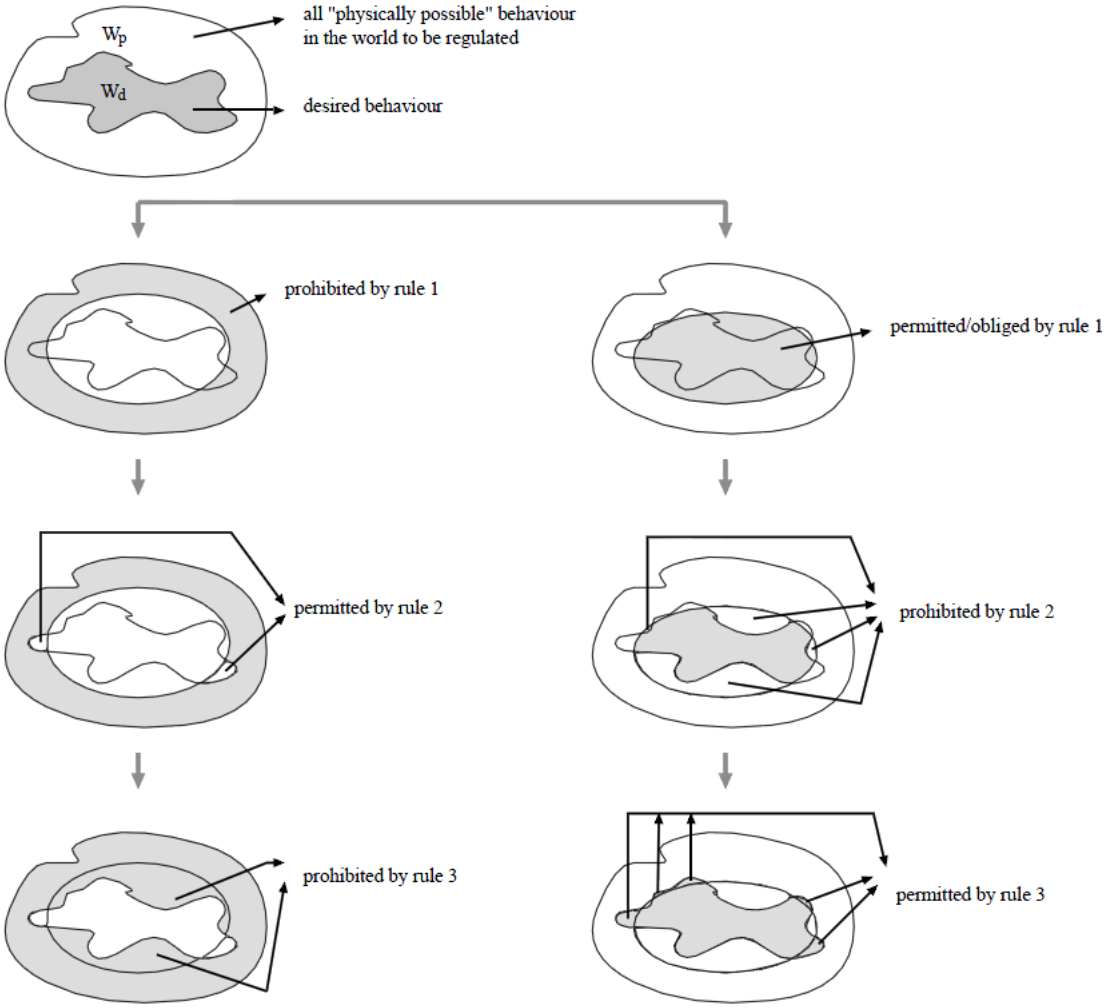
Exception Structures



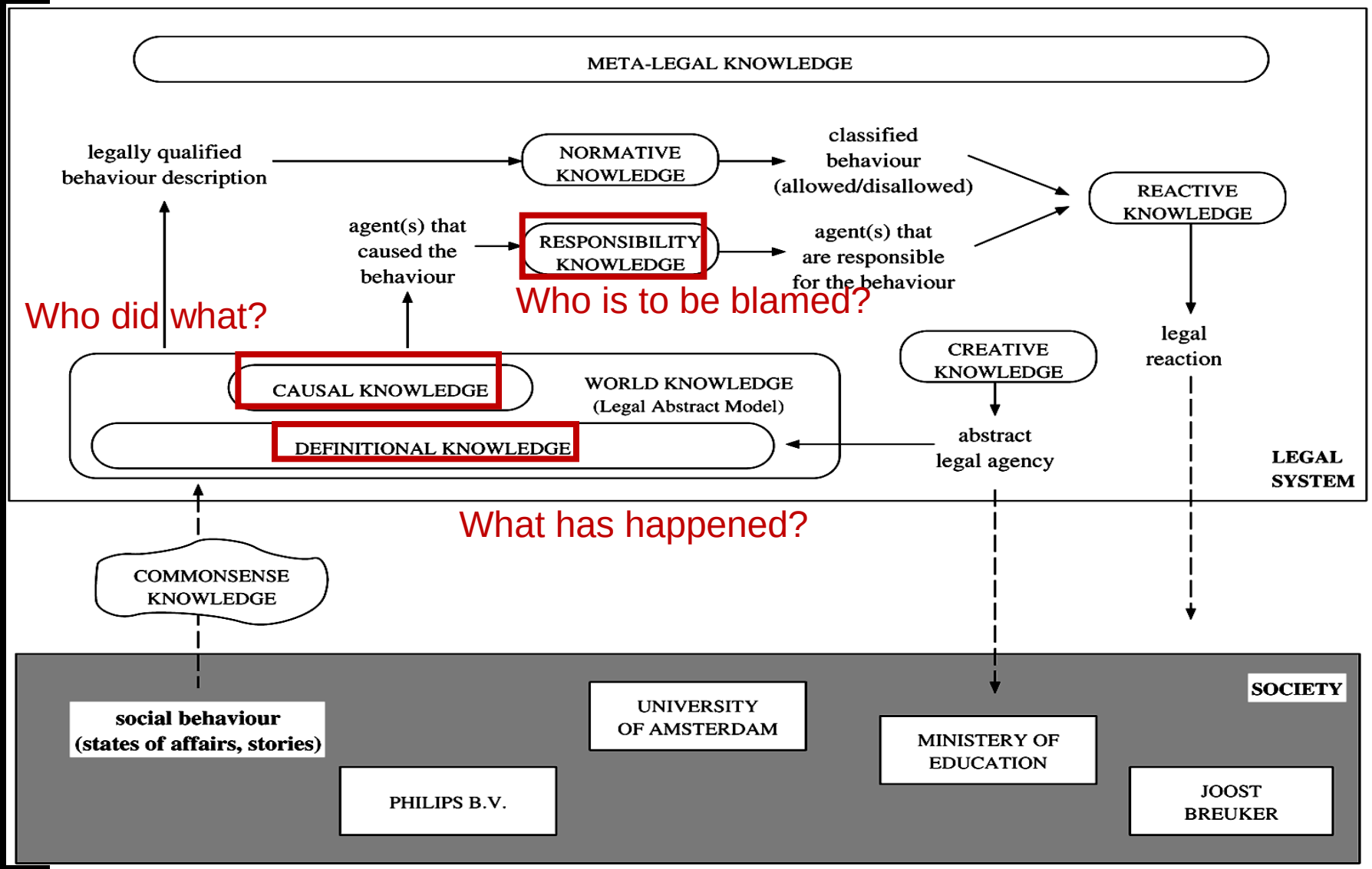
‘Deep Structure’ of Law (1993-1995)

- Normative intent of law
- ***Generate paraphrases*** or alternative codifications
- Exception structures
- Useful for legal comparison and drafting
- Winkels & de Haan (ICAIL95)

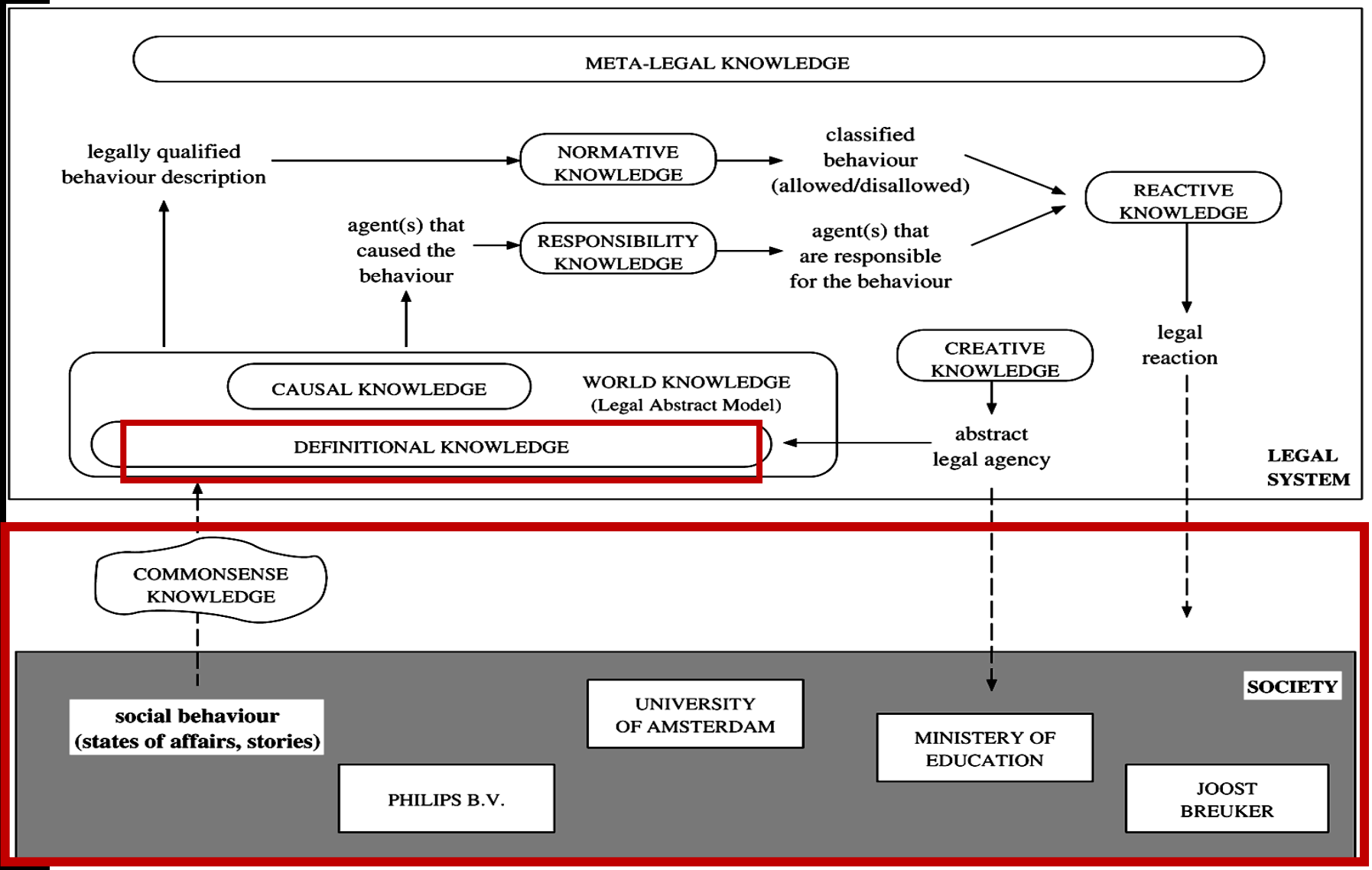
Alternative Codifications



Causal/responsibility **Reasoning** in Law (Lehmann e.a.)

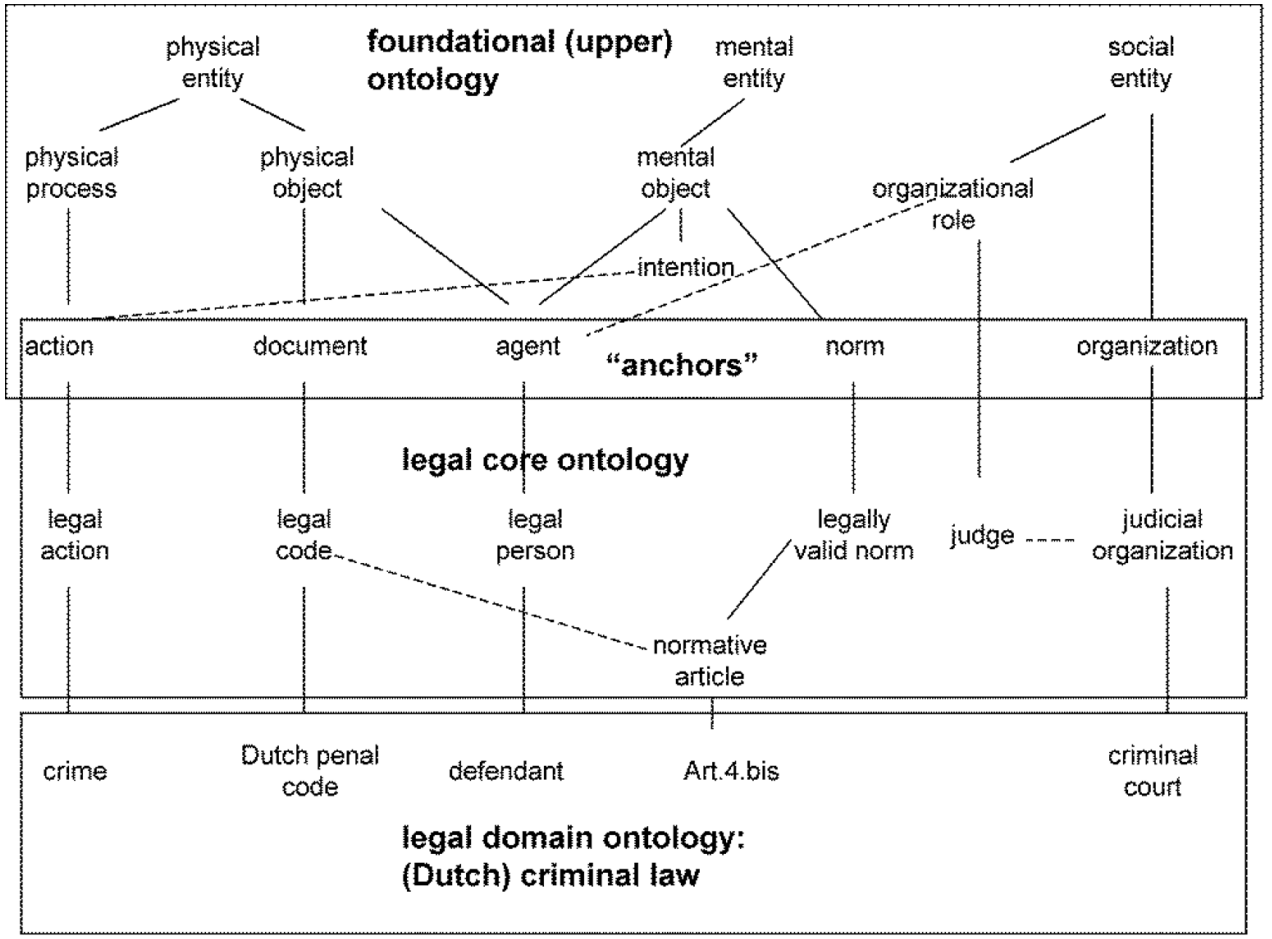


Lots of Problems and Much Effort in World **Knowledge**



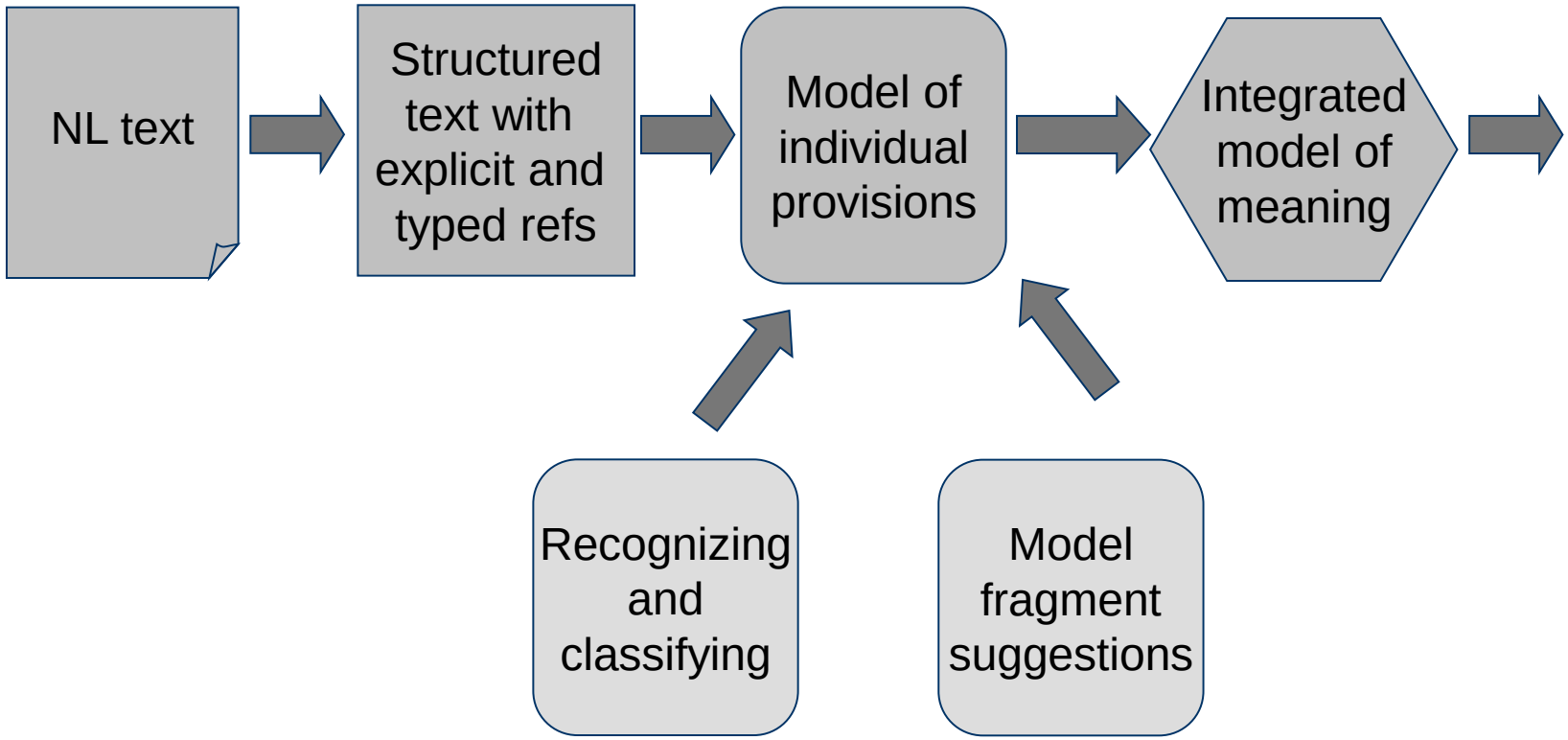
Legal (Core) **Ontologies**

- LRI- and LKIF Core Ontology (Hoekstra e.a.)



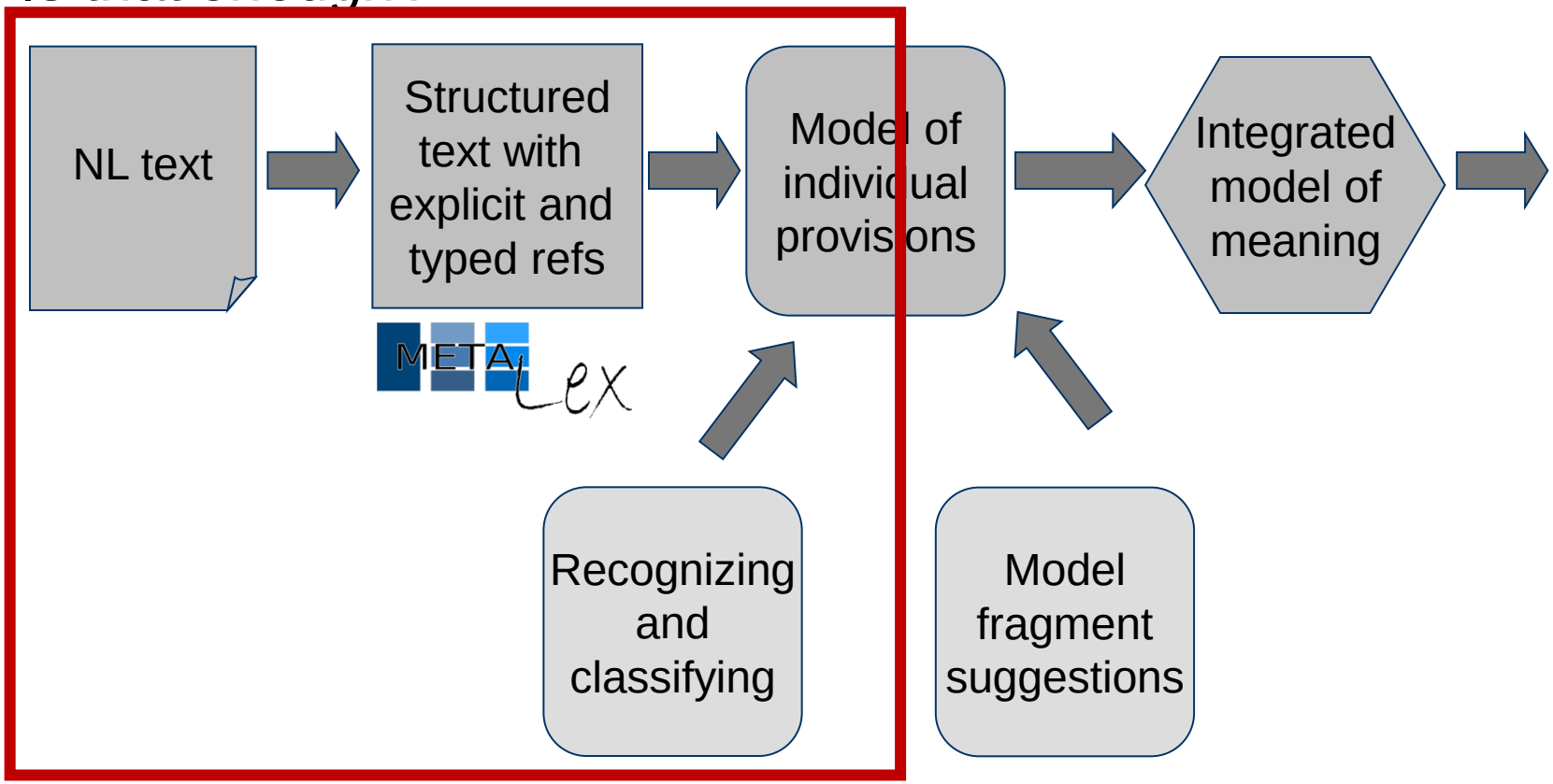
From Sources of Law to Formal Models (de Maat e.a.)

- Automatic support :
  - Increase quality models and efficiency process
  - Increase inter-coder reliability



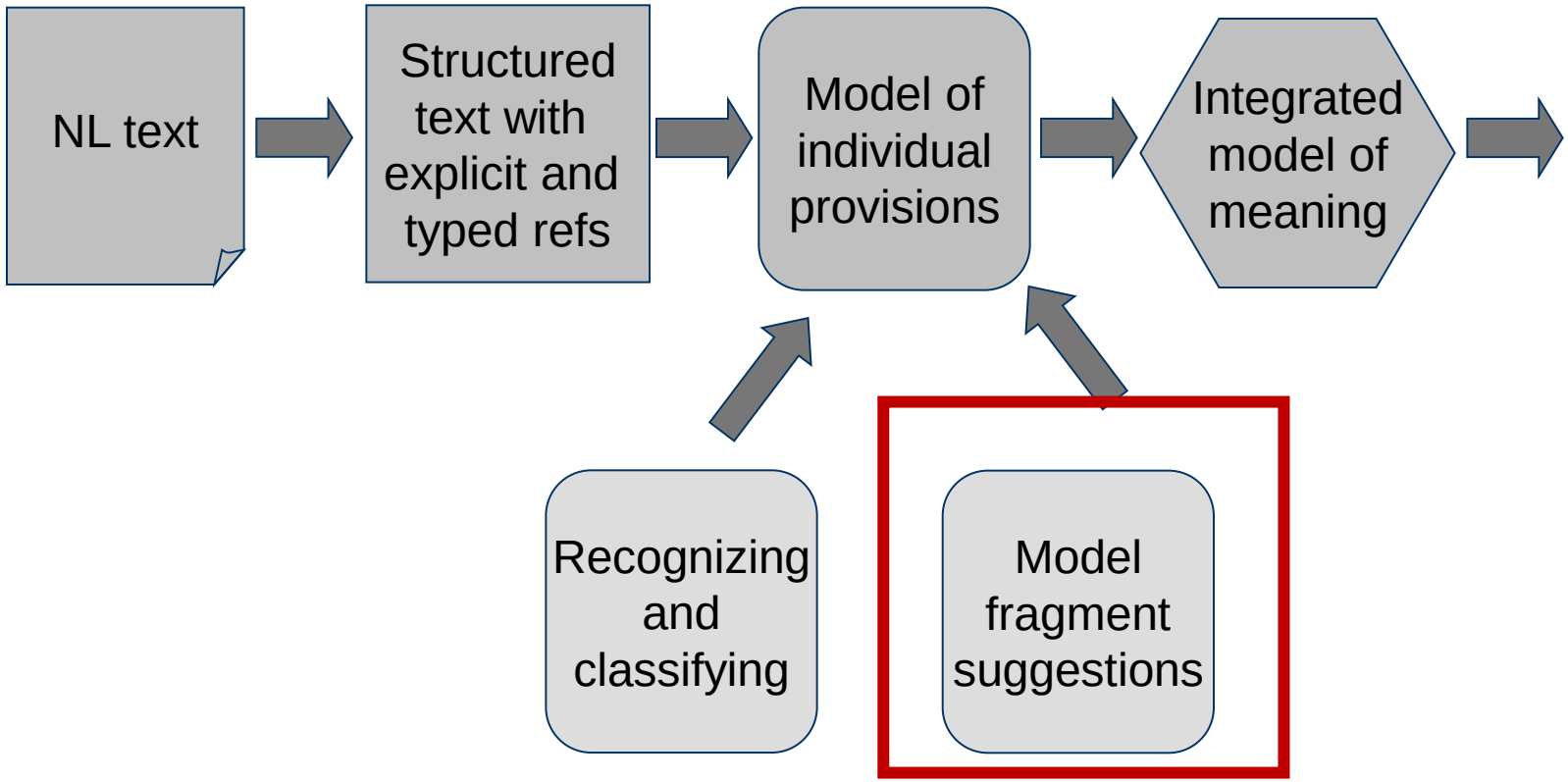
From Sources of Law to Formal Models (de Maat e.a.)

- Doable with patterns and CFG
- 80-99% accuracy for Dutch laws
- Is that *enough*?



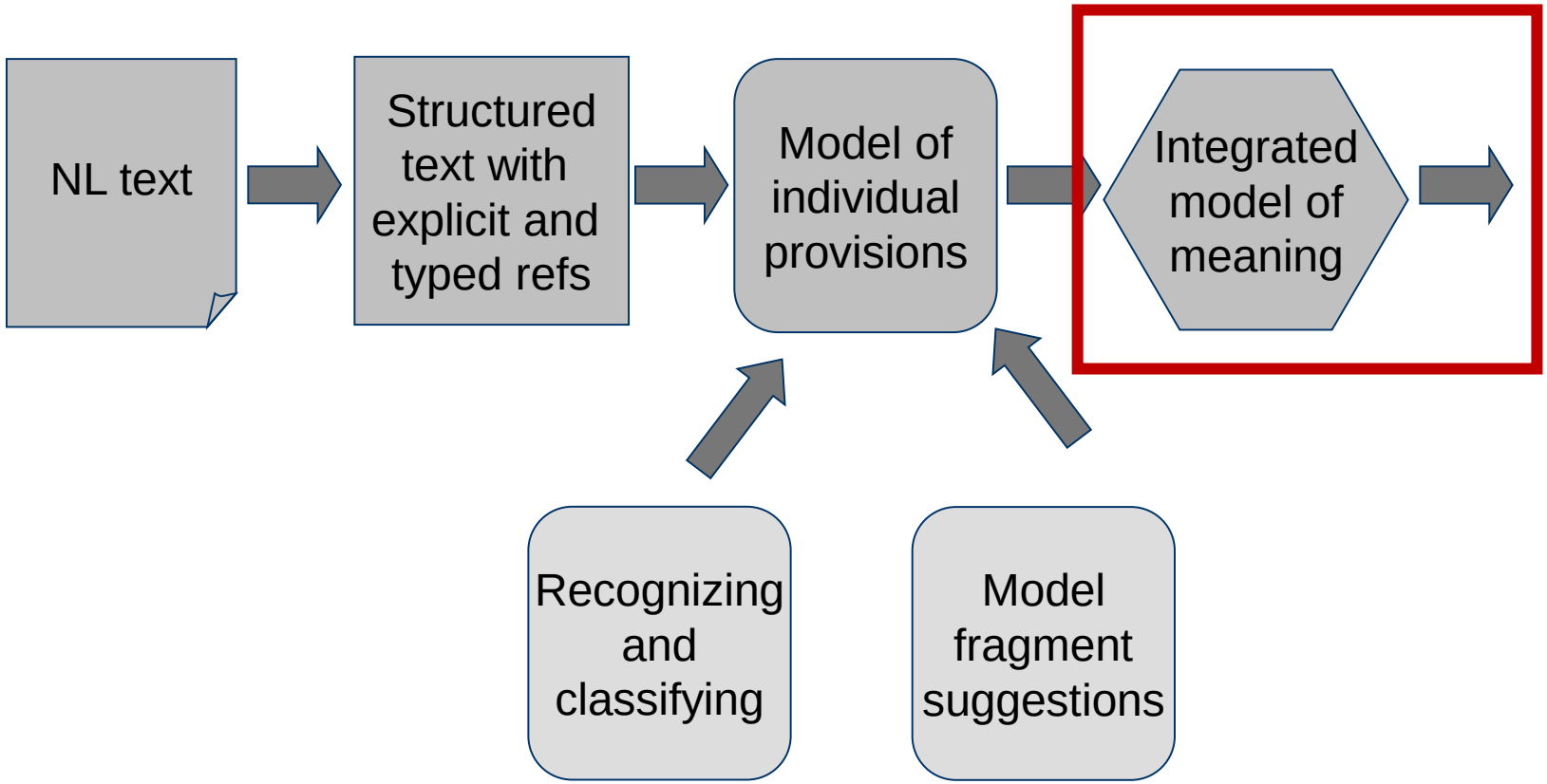
From Sources of Law to Formal Models (de Maat e.a.)

- Doable with patterns plus full *dependency parser* plus *manual* selection of parse tree
- *Worthwhile*?



From Sources of Law to Formal Models (AGILE)

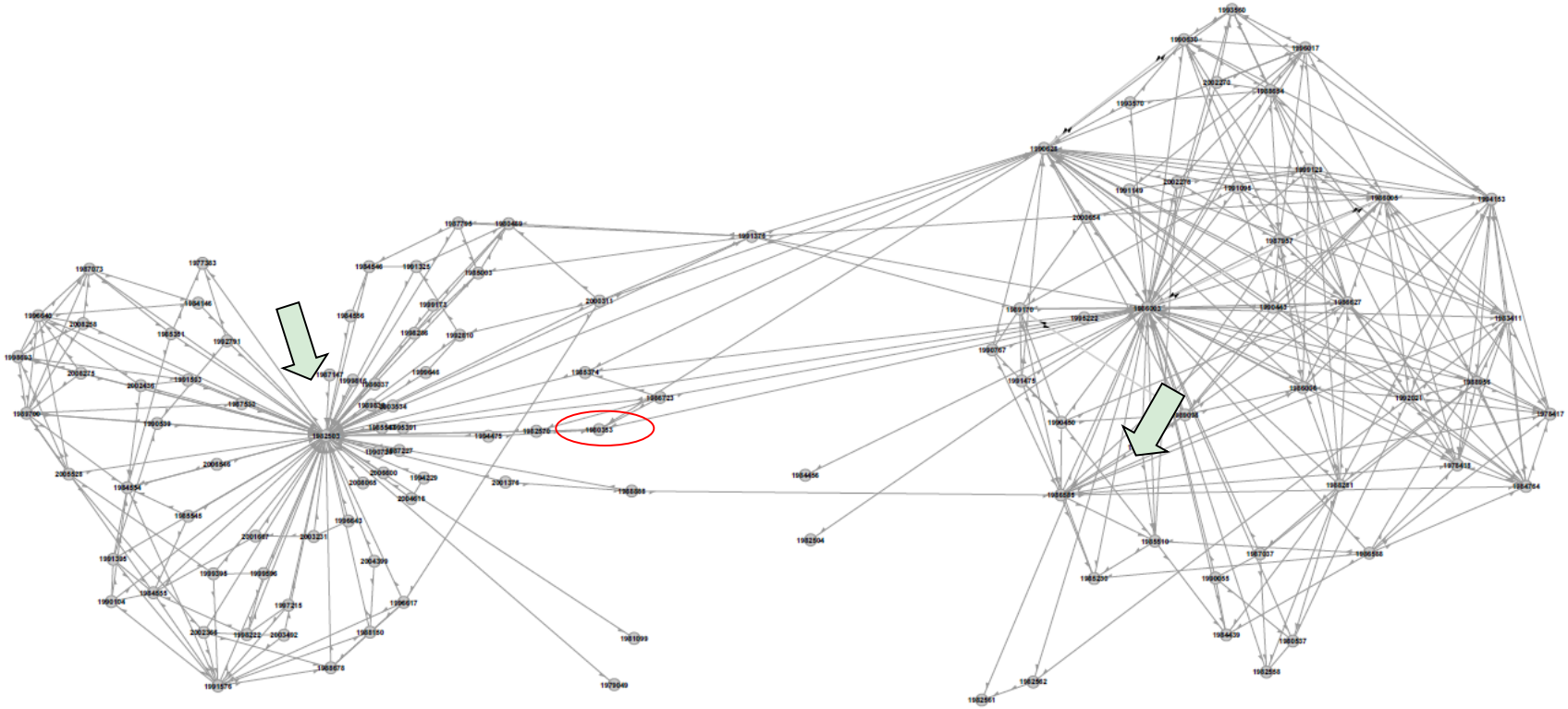
- The *bigger* problem
- Context of Task (Agent perspective)
- Tools *plus methodology!*



From Knowledge to (Linked) Data

- Interesting results and progress but
  - Still very costly
  - Validation and maintenance issues
- Hard to find business cases for LKBS
  - Much (***money***) at stake in specific domain
  - Huge case load in short time
- 'Simpler', prerequisite needs
  - Information management
    - Relevant sources of law in context
    - Concepts and definitions (Winkels & Hoekstra, 2012)
    - Impact analysis of change

Network Analysis of Dutch Case law (Winkels e.a. 2011)



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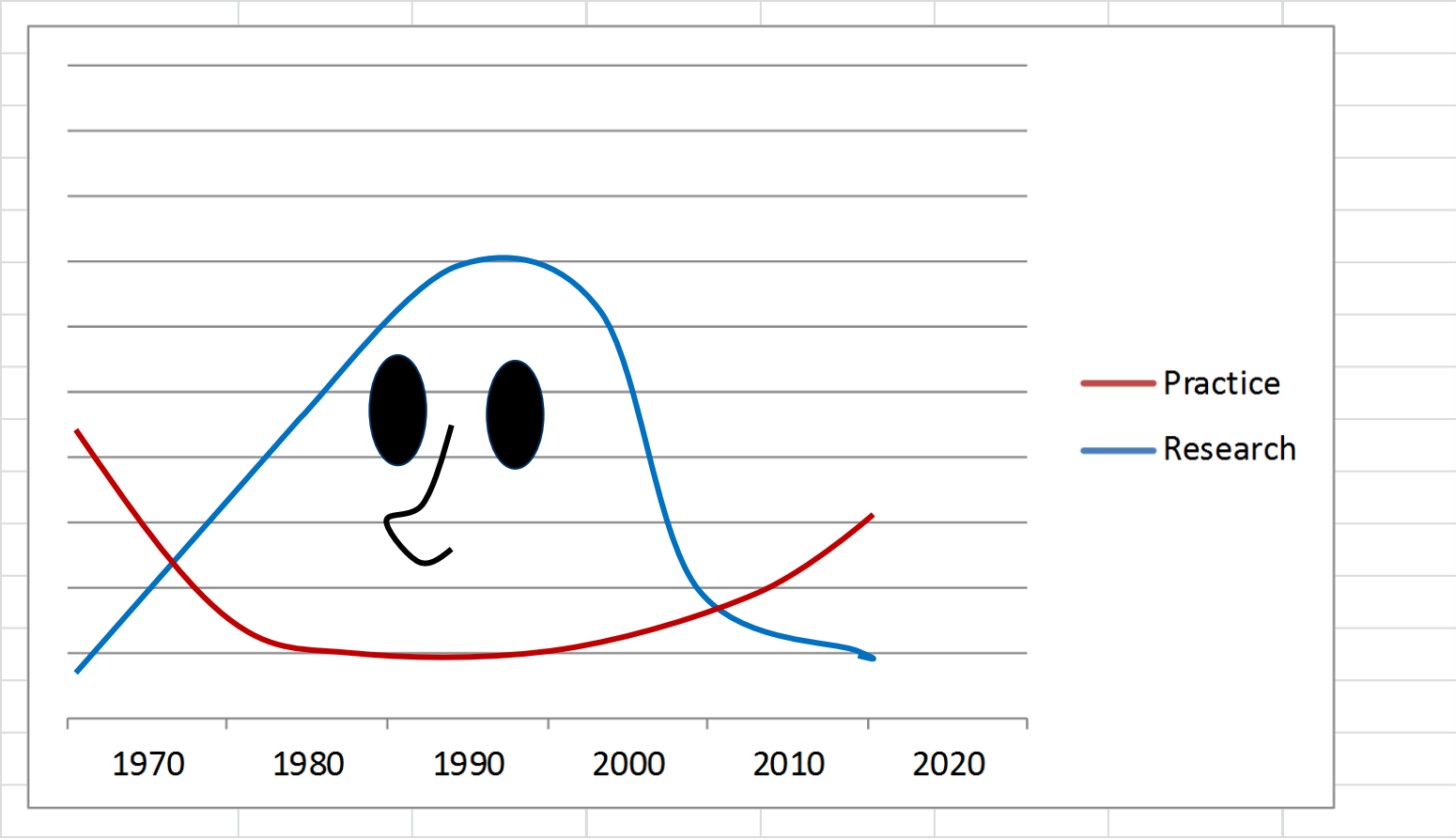
Research – Practice Paradox



Research – Practice Paradox

- Focus on legally interesting in stead of practically interesting problems
- Lack of proof (in realistic settings)
  - Not much evaluation
    (cf. Conrad & Zeleznikow, ICAIL 2013)
- Problem of **Golden Standard**
  especially in legally interesting cases

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In Search of the AI&Law Challenge

What would be a/the AI&Law Challenge?

- Beat the Judge? (cf. vd Herik)
- Predict future developments?

(cf. Surdeanu e.a. ICAIL2011;
Whalen, NaiL2013?)

- Argumentation Game against humans?
- Story interpretation challenge?
- ...

YOUR IDEAS?