

# Encoding Competition Norms

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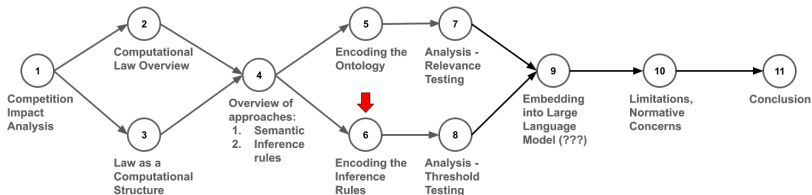
# Background/Problem

- Legal and normative reasoning for digital systems
- Connectionist vs. symbolic approaches
- Goal: Knowledge Base for Automated Legal Reasoning (About Competition Norms)

# Project Components

- Ontology of Concepts Related to Competition Norms
- Encoding the Competition Norms
- Reasoning About the Norms

# Chapter Plan (Previous)



# Layers of Encoding

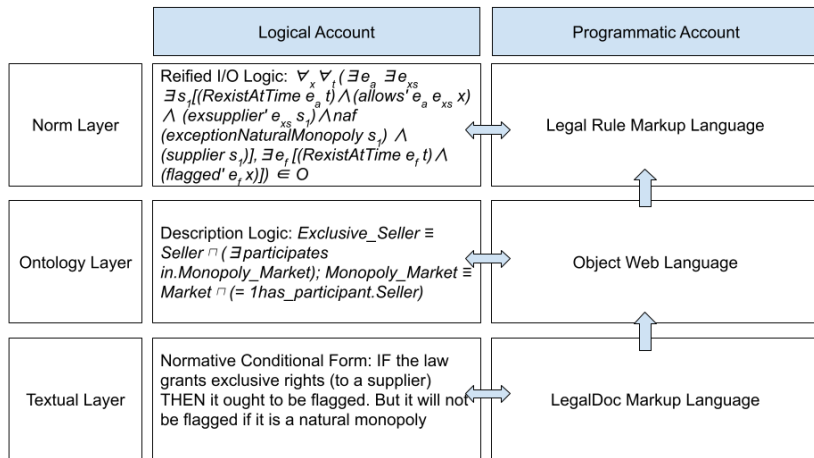


Figure: Layered Encodings (Robaldo, 2020)

# Description Logic

## Theorem (A1, Ontology, Exclusive Seller)

$$\textit{Exclusive\_Seller} \equiv \textit{Seller} \sqcap (\exists \textit{participates\_in}.\textit{Monopoly\_Market})$$

## Theorem (A1, Ontology, Monopoly Market)

$$\textit{Monopoly\_Market} \equiv \textit{Market} \sqcap (= 1 \textit{has\_participant}.\textit{Seller})$$

# Reified I/O Logic

## Theorem (A1, General Norm)

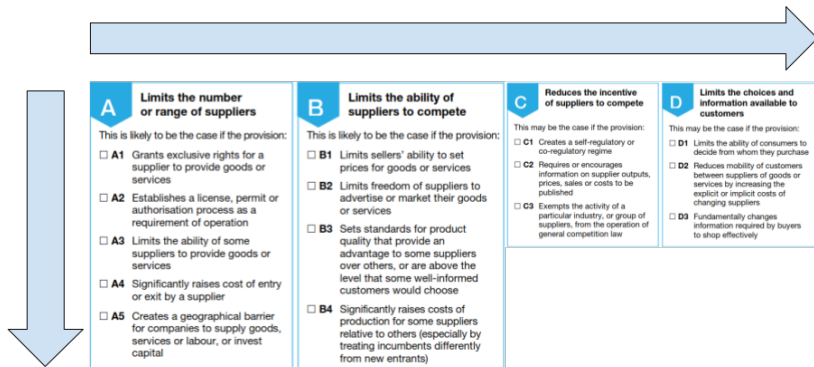
$$\begin{aligned} \forall_x \forall_t (\exists_{e_a} \exists_{e_{xs}} \exists_{s_1} [ & (RexistAtTime\ e_a\ t) \wedge (allows'\ e_a\ e_{xs}\ x) \wedge \\ & (exsupplier'\ e_{xs}\ s_1) \wedge (supplier\ s_1)], \\ \exists_{e_f} [ & (RexistAtTime\ e_f\ t) \wedge (flagged'\ e_f\ x)]) \in O \end{aligned}$$

# Exclusivity

- Very unrealistic - no exclusivity clauses
- The test only captures exclusivity as an end-state
- BUT: Acknowledged as “coarse, naive”, open to further elaboration
- ALSO: OECD Guidelines just for “first pass”



# Breadth or Depth



# Norms Defining and Evaluating Exclusivity

- Market Power, Structural Features?
- Additional dimensions:
  - Elements of time and causation
  - Strategic behavior (games) among rational agents

# Next Steps

- One (or several) operational norms to be evaluated against the model norm
- Evaluate cases instead of statutes?
- Shapes Constraint Language (SHACL)- Data Validation to Compliance Testing

# New Chapter Plan

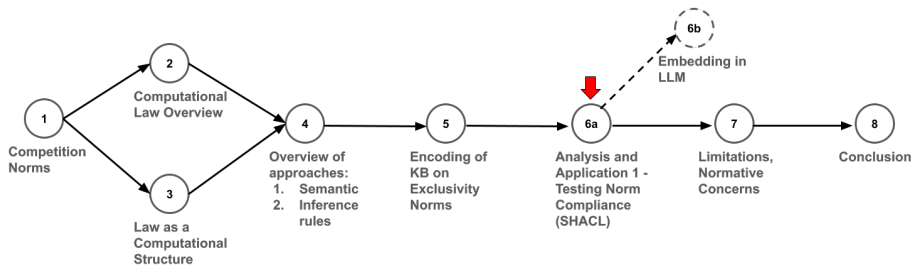


Figure: Chapter Plan, July 2025

# End

*Thank you!*



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