Knowledge about Implementation of the Law
Reflections on knowledge representation and the role of the state in making the law work

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Abstract With good reason, legal positivism insists on a division between legal theory, addressing the sphere of law, and a sociology of power, addressing the sphere of power. The alignment between these spheres is a continuing source of friction, and a driver of change in the sphere of law. Because this dynamic aspect of the legal system has developed into a central problem, in the field of law, in public administration, and in legal knowledge representation, we reflect on the role of the state’s contingent implementation of the law, and the scope of the concept of legal knowledge in legal knowledge engineering. Since the subject matter of law is essentially behaviour, a knowledge engineering approach to legal knowledge should focus on systems of agents. Moreover, legal knowledge engineering would benefit from making sharper distinctions between normative/ideological perspectives on law and analytic perspectives on law. One may take these two types of perspective towards the operational, development and policy making sphere’s interactions with the legal system.

Keywords Law · Legal theory · Public administration · Power · Knowledge Representation

1 Introduction

Systemizations of law by legal scholars have considerable influence on our field. The notion of a legal system, or legal systems, with explicit internal structure and external boundaries is attractive to those in Artificial Intelligence & Law who take a knowledge engineering approach to the domain of law. The legal system promises to be the deep model of the knowledge domain that is the subject of our research. As observed by [7], a deep model is what we look for, when we want to apply the methods of model-based reasoning to a domain. It is tempting, if you have a hammer, to look for nails everywhere.

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In Vienna, where we first conceived of this article, Hans Kelsen developed his general theory of law, describing the structure and boundaries of the legal system. This concept, including the arguments against it and later amendments to it by other legal scholars, is perhaps the cornerstone of our work. In this article we reflect on the nature of legal knowledge in legal knowledge engineering, using some of the key features of Kelsen’s concept of a legal system, and some of the objections made against them in law, to structure this presentation.

Hans Kelsen in his Pure Theory of Law [8] described the legal system as a system of norms, where norms derive their bindingness from other norms, eventually culminating in a Grundnorm, requiring that the highest norms in the system should be obeyed. The Grundnorm, as properly understood, is not a legal norm, but a social and/or ethical one. As long as the Grundnorm stands, the legal system exists. Beyond this Grundnorm, Kelsen explicitly tries to avoid idealizations of the law. This claim to an analytic point of view is not in itself a distinguishing feature of the pure theory of law: Legal scholars typically claim that realism is on their side, and accuse others of making idealizations.

Kelsen aimed to understand bindingness in relation to existence in the legal system, without having to include the power that makes norms effective, or the reasons why norms should be binding. In particular he sought to exclude the political system, the institutions that could create law, which he considered a different domain of study outside the theory of law. Kelsen’s boundaries obviously exclude many possible, and active, research topics in the field of law, including our field. Moreover, Kelsen is a monist on the subject of legal systems: there is one such system, not two, not many, and therefore one kind of existence in the legal system, and one concept of bindingness of norms.

Few today accept Kelsen’s rejection of power realism in legal theory without reservations, and monism is an increasingly rare point of view too.

In modern legal practice, the opposite of monism, legal pluralism, the view that there are many, disconnected, legal systems competing for attention of the same addressees in the same areas, is the increasingly dominant point of view. By implication, there is not one Grundnorm in society, but many. If a single legal system makes sense, this system has certainly become increasingly complex in structure in modern times. Besides the nation state, international institutions have accumulated power to create and adjudicate legal norms in all kinds of domains. Europe received supranational institutions with the power to create laws that sometimes contain direct norms, and sometimes are to be implemented through national laws by states. International private law now affects far more people and more transactions than it did in Kelsen’s time. In modern non-western states, different laws often regulate the behaviour of different ethnic or religious groups, and in western states, pluralism issues like the recognition of non-western family law keep scholars busy. It is not obvious that a single Grundnorm unifies the various forms of law that influence our lives, and not obvious that there is an active drive to integration into one, coherent legal system.

Moreover, power, information, and technology today play a more central and visible role in the functioning and disfunctioning of the legal system than they did just a few decades ago. Information technology has increased the potential capacity of organizations to organize change and develop information positions, and more resources are invested in design of organizational structures. This has created new potential for organizational structures that support the legal system,
but the modern state has powerful competitors who may be better at organizing and better informed, better at evasion of law, or better at enforcement. Moreover, investment in information systems and organizational structures creates increasing sunk costs, and when the law is changed faster than anticipated, investments intended to increase efficiency turn out to be a waste of resources. A widely shared perception is therefore that the nation state is losing grip, that the state, and law in general, is increasingly irrelevant to regulating behaviour, and moreover that the services that the state provides are not cost-effective.

Can the notion of a single, almost self-sufficient, legal system be maintained if nation states are no longer by far the most powerful influences around in the background of the system? On the other hand: *If* power backing the system cannot be taken for granted, its alignment with law being contingent, a strategy of separating pure law from the mechanisms that make it effective may be advisable. But as knowledge engineers we must include these mechanisms in our concept of legal knowledge.

Legal knowledge must have a wider scope than Kelsen’s sphere of law. Knowledge engineers mainly deal with knowledge, and the role of knowledge in competent behaviour. Knowledge engineers start with an ontological account of what exists in the domain, but this ontological account is hardly a philosophical stance towards that domain. Idealizations about state, ethics, and economic efficiency can be dispensed with in Kelsen’s problem of marking the boundaries of the sphere of law for purposes of analysis. Knowledge engineers, *qua* engineers, need idealizations as design requirements.

Engineers make things, and those things must be valuable to be worth making. There can be no evaluation without requirements. Our stance towards law is in this sense always a normative one. At the same time, those requirements, based on contingent alignments with conventions, ethics, economic considerations etc., should be clearly separated, to the extent possible, from analysis of the legal structures that are modeled.

In this paper we introduce a concept of law that we have developed over time, not as a philosophical position towards reality, but as a stance towards the subject driving our research agenda in legal knowledge engineering. Since we often work with public administration, we consider the position of the state, and the grip it has on society, in particular.

In our work we distinguish the following four loosely connected knowledge representation domains, distinguishing them ontologically in our work:

- The structure of the sources of law, against the background of the social and legal-institutional structures that produce them;
- The structure of legal institutions, against the background of the sources of law; Implementation and production of law in social structures, against the background of legal institutions; and
- The application of law, to anticipate behaviour, guide behaviour, and assess behaviour, in individual cases, against the background of social structures in which the behaviour occurs.

The first two, and in particular the second, are characteristic of a legal positivist perspective on law. The first knowledge domain addresses the structural organization of the text, and the structural organization of the corpus of texts. It
deals with reference, discourse context, reuse of terminology, the use of model sentences to express institutional design patterns, perhaps even the intentional use of legal principles like lex superior, lex specialis, and lex posterior in design of legislation, etc. Knowledge about this domain plays a role in legislative XML, metadata vocabularies for linked open government data, legal text retrieval, self-organizing concept maps, and text parsing approaches to knowledge representation. This is the core domain of the legal information sciences.

The second knowledge domain addresses the abstract components of the legal system, its institutional structures, and rules, as posited in the sources of law. This domain is understood best, it is the core subject of legal theory, and it is least interesting to dwell on here. In AI & Law a vast literature exists on abstracts design patterns such as institutions and constitutiveness, norms, legal powers, etc.

The third knowledge domain is characteristic of legal realism, with its focus on the sociological aspects of law. It covers the pragmatics of enforcement, legal service delivery, and judicial decision making. It covers the political arena, and policy making processes. It covers processes of organized contextualization of the law to application domains, for instance:

1. Lex specialis as a resolution to the confluence of norms in some context of application (i.e. the discovery of exceptions);
2. law interpreted as requirements and constraints in design processes (i.e. compliance); and
3. theory construction about and measurement of the effectiveness of law in contexts of application.

This short list covers the major sources of input to policy argumentation, and has, in our view, potential to explain a major part of the forces that move the legal system forward over time.

The fourth knowledge domain is clearly the one most legal professionals act in most of the time: interpretation of the law in context, from a specific perspective, given certain knowledge, expectations, motives, a concrete problem, a plan.

A legally proficient player has working knowledge of these domains, and uses that knowledge effectively to attain its goals. The legally proficient player is not just a norm subject, but also a stakeholder and investor in the legal system. In this paper we consider what this means for legal knowledge engineering.

1.1 Overview

1. Distinction between the legal system, or the legal sphere, and the scope of legal knowledge, or the knowledge required to act competently in the sphere of law. Legal knowledge must have a wider scope that the sphere of law, and knowledge engineers deal with knowledge. Also with deep models (model-based reasoning), but mainly with the development of competences.
2. The interaction of the sphere of law with the sphere of power, and the characterization of law as a dynamic, complex, adaptive system, subject to reasoning on three levels (operational, development, policy). Deals with enforcement, with resource use, with economic value of legal positions, and competition for legal positions on the operational level.
3. While idealizations can be dispensed with in Kelsen’s problem of marking the boundaries of the sphere of law, knowledge engineers, qua engineers, cannot. Engineers construct things, and those things must be good things to be worth building. No evaluation without requirements. At the same time, those valuable ideas (based on contingent alignments with conventions, ethics, economic considerations etc.) should be clear separated from analysis of the law.

4. When someone says ‘I herewith declare x’s property confiscated’ a self-referential statement is made as to the social consequence of this verbal act. Whether or not the consequence actually follows depends on the validity of the act. Kelsen’s critical attention to the conflict between subjective self-interpretation of an act in the sphere of law and its objective validity in a greater whole, addresses one of the main issues in knowledge engineering in general: reusability of knowledge components. Kelsen gives a system-level answer to a problem addressed by many others as a (defeasible) reasoning problem.

5. Legal knowledge engineering distinguishes itself by the deep models it builds of the legal system.

Monism versus pluralism.

Complex adaptive systems model themselves and their environment, using sets of rules as components, executed in parallel, and in competition with each other, to marshal resources as circumstances demand, and adapting to changing circumstances [?]. If we understand the legal system as a complex adaptive system, it becomes clear that our inability, as an individual component of the system, to make a correct and complete model of it, matters little to its functioning or its existence.

2 State institutions as mediators between the sphere of law and the sphere of power

Hans Kelsen’s legal positivism insists on a radical division between legal theory, addressing the sphere of law, and a sociology of power, addressing the sphere of power [8]. From a legal positivist perspective, power-realist conceptions of law that permit power to be conceptualized as an element of the legal system reduce it to a mere epiphenomenon of a more fundamental struggle among competing power interests. In doing so, it is claimed, the power-realist obscures law’s normative character, the abstract structures of legal institutions, and the rules of legal argumentation.

On the other hand, power can not be ignored in the practice of law. Even if the spheres of power and law should be differentiated in analysis, means of effectively linking the two spheres must exist, for law to have effect, and these links are a continuing source of friction.

Three basic mechanisms exist that explain how law and power get aligned. Sometimes the means arise more or less automatically from an alignment of interests. One could for instance say that the driver of a car has practical, and pretty reliable, power to make other drivers coming from the left hand side yield in traffic. This practical power arises not from the effectiveness of enforcement of a norm that one ought to yield for traffic from the right, but from the mere expectation that traffic from the right will not usually yield, and an interest in avoiding collisions. The norm has a mere coordinating function.
Not all norms are equally inspirational for spontaneous coordination of behaviour. Additional power must be generated. A second way to effectuate law is to rely on the interest of participants in norm violations in law enforcement. This mechanism is most obviously at work in areas of private law, where a victim of norm violation is entitled to go to court, and usually has an interest in doing so, to have the case adjudicated by professional judges. In this case power is generated by private persons and the resources they are willing to invest in enforcement of the law. In principle one can succesfully run a legal system on resources voluntarily made available by victims, as experiences in Europe up to the late 18th century show.

The third and most comprehensive link between the two spheres is in modern society clearly the state. One could in fact argue, following Carl Schmitt [10], an infamous contemporary of Hans Kelsen, that the defining function of the state is to translate the norms of the abstract legal universe into concrete reality. State institutions, including a state-subsidized judiciary, act as reliable and omnipresent transmission belts between the sphere of law and the sphere of power [10]. The state gives the law hands and feet, interprets it, and changes it. While Schmitt considered the state’s power at least potentially as absolute, supplying a theoretical opening for the Führerprinzip (leader principle) in a time when this was opportune, modern observers attribute considerably less power to the modern state. This makes the problem of generating and applying limited power acute.

3 Spheres of law-based action

Our recent work, in the Agile project and before, with a tax and an immigration administration, is primarily about the use of power to effectuate law, rather than about positivist law [5,6,4]. Kelsen would perhaps not have considered it a contribution to legal science proper. In earlier publications we have used variations of Fig. 1 to explain the relationship between three spheres of law-based action in public administration: the legal-political policy making sphere, the design-oriented development sphere, and the work floor operations sphere. In each of these spheres, struggle between competing interests, limited resources, and discretionary, unregulated, use of power play an important role, but it takes on different forms in each sphere. This is in essence our take on the state’s transmission belt between law and power.

In the lower or deeper two spheres, policy making and process and product development, the activities of the state organization are systematized, subjected to generally binding rules, explained in documentation, restricted by business processes, allocated limited resources, described in database management systems, etc. These are design activities. At the top level primary government services are delivered, and decisions on individual cases are taken. These are planning activities. Problems regularly arise on the top level, and a diagnosis gives them a meaning, or possible meanings, on each level. A hard case on the operational level does not only call for a solution on that level, but also means that more resources should be allocated, or that documentation should be changed, or that the database tables should be redesigned, et cetera, or, finally, that the law should be changed to overcome friction with hands-on reality. The diagnosis of a problem in the op-
The operations, development, and policy making problem solving cycles.

In private business, we usually speak of compliance of products and processes with the rules in the development sphere, and of action conform the rules in the operations sphere. Law is perceived in the first place as a constraint on designs and operations in private business. In the state’s organizations, law has a broader significance: the organization enforces, interprets, and it delivers the services implied by the law. The law makes its actions possible and meaningful, determines the identity of the organization by stating its mission, etc.

To understand the dynamics of the legal system, we must understand the friction generated in its implementation by the state. There are always implementation problems, and divergent interpretations of their meaning. The state’s resources are always limited. Clamor for change of the law, and opposed to it, is always there, from within the state, and from parties interacting with it.

From the perspective of the state organization, we are dealing with two mutually dependent design activities: 1) the organization designs itself, using the legal rules as a source of requirements and constraints, and 2) its performance limits, as perceived by itself, are a source of requirements and constraints in the design of legal rules. As a stakeholder in policy making, it represents in the first place sunk costs of the state. This does not mean that the organization narrowly represents its own interests in policy making, but rather that it represents its diagnostic interpretation of the frictions that it observes, internally, in its network, among its clients. Any stakeholder, no matter how objective and beneficent it aims to be, is limited by his perspective on the domain.

Legal theory is clearly not about managing large organizations. There are other, more qualified, social sciences. Specific public administration topics do however demand attention in legal knowledge engineering. One deals with the agility of public administration. To react promptly and rationally to problems, the organization needs to know the extent of its freedom to interpret and implement within the limits of the rules. It, in other words, needs to have traction on:
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1. the alternative interpretations of the law, and of its expected effects, that exist in the organization,
2. the organization’s formal account of the current interpretation and implementation of the law in the organization and the network around it,
3. its perspective on alternative possible implementations within the design space constrained by the current law in the organization and the network around it, and
4. how proposed policy affects the potential performance envelope of the organization and the network around it.

A state organization that appreciates this point of view, will appreciate the distinction between the legal system per se, and its contingent alignment with a system of state exercise of power, as represented by its business process specifications and decision support system knowledge bases. This distinction can be reflected in knowledge representation, and in the long term it is better to make that distinction. An organization that has no grip on the environment it works in, perceives that it lacks control, and is tempted to ask for more legal powers, less legal constraint, more legal constraints on its network partners and clients, etc.

4 The contextual aspect of legal knowledge engineering

To shed light on the concept of legal knowledge, let us consider what is being produced in each of the three spheres (see table 1). It is natural to think of social structures first: the law gives us rules and institutions, the implementation by the state gives us processes and systems, which are operationally used to deliver services, to enforce, to perform public legal acts. Each of these is presented/represented in information structures: the sources of law represent the legal system, while specifications, manuals, websites, program code, knowledge bases, communication protocols, standardized forms, and database schemas represent implementation, and formal decisions and judgments, database entries, filled in forms, and propositions in knowledge bases represent operations. As information scientists and knowledge engineers, we are on the interface between these products. We study the social objects indirectly, by studying information about them, and propose new ways of structuring the information that represents them.

The production of legal information structures belongs to a sphere of action. Knowledge representations, whether they are direct representations of the sources of law, decision support system knowledge bases, standardized decision argument structures, policy field simulations, jurisprudential theories of some domain, or organization-wide legal ontologies, represent knowledge in a context of use. This is even true of representations of legal knowledge in the judiciary. In the judiciary, the development sphere is underdeveloped, and the operational level has a great deal of autonomy, but development of knowledge assets for judicial decision making as
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a problem domain clearly still exists, in the form of theory construction from case law.

When we represent the law, we can make a practical distinction between a legal positivist skeptical mode of reasoning about what the law says, and a credulous mode of reasoning about the expectations we have of behaviour based on that law, based on considerations of power and motive. In law we see a lot of normative expectations that bridge the gap: expectations about the coordinating effect of norms, expectations about the assignment of responsibility for norm violation based on position to know and ascribed abilities and intent, expectations about the feelings of victims of norm violations, expectations of tax evasion behaviour, etc. And the micro-expectations we have on the operational level, are different in form from the macro-expectations we have about the legal system and its implementation. We can argue about the exact dividing line: it is not crystal clear. The real knowledge management problem is however to assign each expectation to its context of use.

Legal knowledge engineering makes itself useful if it can present an integrated, holistic view on the law and its implementation that helps the organization to gain and keep traction on the dynamics of the legal system. A power and value-free legal positivist knowledge representation of the legal system is part of that, but it is not, in itself, useful on the operational level. It acquires value when positioned in a greater, continually changing, system. State organizations only make resources available for it, if they are able to take a step back and see the whole system instead of focusing on operations.

5 Agent role-based research

An open question, and a key theme for future work, is how to practically separate the legal system per se from knowledge about contexts of use, and the expectations that come with that context of use, in a large organization. We believe the context of law is provided by the agent role we are acting in. The role description embodies a self-other prepresentation, pointing both at the social situation to which it is appropriate, the social-legal abilities of the agent in that situation, and the perspective on, and knowledge about, the situation that we ascribe to the agent. Pure law, if anything, is the knowledge shared by the relevant agent role descriptions, of positive law.

An example: Dutch law tells us that a sale involves a buyer and a seller, that it involves an offer and an acceptance, and that it leads to an obligation to pay on the part of the buyer, and an obligation to deliver on the part of the seller. It does not entail that the seller and buyer feel harmed if the counterparty does not meet its obligation, it does not tell what they will do if that happens, it does not tell when an offer will be acceptable, etc. We do have expectations about those things, but these are contextual.

Generally, we agree that the obligation of a seller to deliver a good is correlative to a claim of the buyer; We expect that the buyer has an operational motive to monitor whether delivery takes place; We expect, on a deeper level, that the actions taken by at least some buyers against sellers who do not deliver, will make the legal obligation effective. On the operational level, action makes sense if it is profitable. On the development level, however, it makes sense to take action occasionally to
set an example, even if it costs in that case, to influence other trading partners. These expectations structure most sales that take place.

In certain prototypical money laundering scenarios, however, a tax administration has reason to expect that the buyer and seller share an interest in non-delivery of the good, and the tax administration is the one with an operational motive to check whether goods were actually delivered.

Generally, a trade is acceptable if it is at market value. Whether a trade is acceptable is normally not on the radar of the legal system, but a trade that is not representative of market value may be an evasion of taxes or a money laundering operation. This inference assumes a certain rationality of the offender, who pays tribute to the legal system in his own way by dressing up his offense in a legally appropriate dress, and of a tax administration, that assumes that the “real” market value that would be paid by a “normal” buyer and seller acting at arm’s length, and foregone taxes, can be reliably estimated [6].

In our recent work we give this separation between pure legal inference and law-in-context-based expectations hands and feet by focusing on the following ideas:

network arrangements: The organization should not only model its own behaviour, reflecting on its own objectives, resources, plan operators, and information flows. It should give almost equal attention to the behaviour of its network clients and partners, even if it can only guess at the objectives, resources, plan operators, and information flows involved [4].

agent role descriptions: The ascription of objectives, resources, plan operators, and information flows is based on attribution of agent roles. If we know we are dealing with a seller, we know not only the legal qualifications of certain behaviours (offering, accepting, delivering, etc.), but we also have expectations about the rationality behind those actions, including for instance the price a seller should find acceptable [5].

health and fault models: Expectations do not only exist of healthy, normal agents, but also of faulty agents who violate normative expectations. A tax administration implicitly manages knowledge of typical tax evaders, and experts have some ability to forecast how these adapt to changing law, given the rationality behind their behaviour. By assigning a number of health and fault models per normative agent role, the problem of assigning the right model to the right participant in a multi-agent system becomes a model-based diagnosis problem [6]. Because fault models also lead to expectations about abnormal information flows, they also point towards the potentially available evidence.

policy argumentation as model-based diagnosis: The quality of policy input from state organizations is largely a product of how accurate its policy field and policy effect theories are. The methods we propose encourage an organization to model as wide a network around it as possible, to consider information flows that are inaccessible to itself, but accessible to others, and to reflect on the statistical biases in its information collections, and the macro-economic expectations that it formulates based on those. It also encourages organizations to see alternative interpretations of the policy field and policy effects.

agility in implementation: The organization can use multi-agent simulations [1] based on agent role descriptions to test alternative ways of delivering services
and enforcing compliance without first committing to the upfront costs of modeling the field to be simulated from scratch.

6 Conclusions

The ability to collect and process huge amounts of information, and the ability to simulate, were absent when the pure theory of law was developed. In this context, it makes sense that the dynamic aspects of the legal system attracted less attention: they were less tractable, less objective.

In a more dynamic and information-rich environment, it makes sense to reconsider organizations that are big enough to deal with design-level compliance, with a position as recognized stakeholder in law making, or with the power to make law itself, as agents acting rationally in the domain of law and law making. Knowledge of the law is however strongly perspective-bound: the law addresses almost all areas of human activity, and by necessity does so only fragmentarily and in the abstract.

We introduced agent-roles as descriptive elements, allowing us to take perspective in modeling, and model the internal structure of the state and the structures of its networks with (other) norm addressees from various points of view. Legal qualifications of cases, and the willingness to act on them, often depend on motives attributed to the agents involved. The beliefs, desires and intentions, plans and acts in our multi-agent-system models provide us with the means to express expectations about behaviour in scenarios. An important feature of our approach is that we use a similar mechanism and recurrent patterns for describing the three spheres introduced in section 3. Obviously the agent roles in the policy making sphere have a policy-level perspective on the world, and we attribute intentions, plans, and abilities in terms of that perspective, but the abstract mechanisms are the same.

A legally proficient player uses legal knowledge effectively to attain its goals with the legal system. It understands the network it operates in, and the effects the law has in that network, intelligently influences legal effects in that network, and intelligently argues what it would like the law to be. Legal knowledge is the knowledge that we attribute to this player acting in its legally relevant agent roles. This is a wider concept of legal knowledge than is typical in legal theory. As a sweeping knowledge level generalization in Artificial Intelligence, in the style of Newell in [9], it is an appropriate domain characterization: legal knowledge is the knowledge that we attribute to a agent, such that its behaviour in the legal domain can be predicted in accordance with the principle of rationality. It is, in our view, the concept of legal knowledge that the modern state should adopt.

Legal positivism makes us aware that the alignment of law and power should be analyzed separately from law per se, but the problem of organizing this alignment is best addressed armed with practical legal knowledge.
7 Legal analysis takes a diagnostic and operational point of view

7.1 The rhetorical hierarchy and formalization of legal knowledge

From a legal professional’s point of view, knowledge engineers may appear to take on the law from the wrong end, focusing on abstract metatheories of law instead of supporting legal practice.

Is a model of the legal system relevant at all? Schlag explains in [11] that “the games of law can be played, and won, even if one doesn’t know what the ball (the law) one plays with looks like: no one engaged in doing law will raise the question”. His deconstruction of law may suggest that ontology, as a formal account of existence in the legal system is, in practice, relatively unimportant.

Schlag proposes in [11] that the following rhetorical hierarchy is what actually guides legal practice:

1. Do not confront an ontological question if it can be handled as an epistemic question.
2. Do not confront an epistemic question if it can be handled as a normative question.
3. Do not confront a normative question if it can be handled as a technical question.

Ontological questions question the existence of rules, and of concepts as defined by the opposing side. Based on the examples given in [11], epistemic questions question (the reliability of) an inference made, from evidence that is not itself questioned, to arrive at a conclusion. Normative questions address whether some action is allowed or disallowed, good or bad, reasonable or unreasonable, etc. In each of these cases the inference is based on a proposed legal rule, and it is either the existence of a legal rule, the accuracy of the description of the rule, or the applicability of the rule to the case under scrutiny or in the specific decision making process, that is questioned.

Technical questions are “relating to the (truth of the) facts of the case” [11]. It concerns questioning those claims, not supported by a proposed legal rule, whose truth is left to reasoning from common sense knowledge about the domain.

The relative rarity of arguments about ontology in games of law may, however, be interpreted in favour of the central importance of ontology and epistemology in legal knowledge engineering [2,3]. The rhetorical hierarchy is interesting to legal knowledge engineers because because it forwards a theory about epistemic entrenchment that normally remains implicit.

It is a strategy that tells us which propositions to put forward and which (parts) of the opponent’s propositions to attack. It tells us that explicitly attacking ontology is the weakest move one could make, in court and, we would propose, outside it too. Questioning ontology and the quality of epistemic processes directly attacks the very notion that a shared discourse context exists and that we can perform logical entailment on it. The advice to avoid questioning the existence of a shared discourse context does not answer the question whether it exists – this is a question for philosophers – but it certainly supports the point of view that the idea that it is deeply entrenched, and therefore hard to change, is valued in legal practice.
In knowledge engineering, resistance to change is highly valued because it promises reusability. The four levels mentioned by Schlag order argumentation schemes by decreasing reusability over time in law, and therefore by decreasing usefulness as a reusable and generic knowledge component:

1. Ontology
2. Epistemology
3. Normativity
4. Technique

Ontology is highly resistant to change, and is assumed to be not falsifiable at all in typical knowledge-based systems. Once an organization commits to a formalization of a legal concept in a development project, it commits to it until that commitment becomes untenable in court. The rhetorical hierarchy corroborates that design choice. Even ontology is in the end subject to questioning, at least in its sense of being a shared understanding between discourse participants, but certainly not in a routine decision making context. Falsification of an ontological axiom is a reason for knowledge engineers to review the decision problem solved by a knowledge-based system. Commitment to an ontology of law is a pragmatic design stance.

Epistemology and normativity can be interpreted as relating to what to think (epistemology) and what to do (normativity). Schlag makes a clear choice here, by making rules guiding interpretation of a situation more resistant to being questioned than rules guiding decision making. This too is in line with practical theories of reasoning in knowledge engineering: interpretation of a situation is indeed typically functionally and logically prior to taking action in it. A simple planning algorithm will first choose the best explanation of the situation before it will choose the best plan to deal with it. Developing both search spaces together is computationally costly, and often prohibitive. Problem decomposition is a matter of strategy: it cuts down the search space for solutions to manageable proportions. We all understand that this problem decomposition may sometimes lead to suboptimal solutions, but it is a valuable design concept nevertheless.

Practical knowledge-based systems usually reflect one single unambiguous interpretation of ontology, epistemics, and normativity in the knowledge domain relative to a specific decision problem, only permitting variation in the “technical” facts of the case. In AI & Law theory one however also finds proposals that consider all legal reasoning falsifiable, and the expected intermediate forms also exist. Argumentation-theoretical approaches to AI & Law treat all argumentation schemes even-handedly, not committing to category-based prioritizations. [] distinguishes entrenched ontological inference, but does not prioritize among the rest. In the legal knowledge engineering framework of [12] the possibility of falsification of normative qualifications is taken into account to some extent, but situation interpretation is assumed to be a mere matter of translating the case into the terms of the ontology.

One does not easily find proposed methodologies for designing knowledge-based systems that are actual counter-examples to the hierarchy proposed by Schlag, just a variation in methodological rigidity depending on the purpose of systems.
7.2 Law’s operational point of view

Legal solutions are primarily solutions for the specific case. Operational solutions may not work as development-level or policy-level solutions, and vice versa. In private law, for instance, the small claim, and conceptually incoherent policy solutions to the small claim problem, like class action punitive damages and limitation of the amount in controversy in court, have been an issue in law for centuries. It is generally quite easy to get away legally with harming a large group of individuals, if one deals only minimal harm to each individually, since few individual members in the group will have reason to search a legal remedy if the restitution is as small as the damage. The judiciary is also not thrilled about investing its limited resources in small claims, and may not even hear the case: *De minimis non curat praetor*.

Politically, however, the harmed group may represent a large group of disgruntled voters, who may invest their vote, for most people a small investment, in any perceived solution to the problem. The idea of punitive damages, as practiced in the USA, is an example of a such a political solution. The class action, where one or several named plaintiffs act on behalf of a proposed class of plaintiffs with a common issue, is another one. The creation of new agencies supervising compliance is yet another one. When one looks at specific cases, these concepts are hard to justify. When one looks at the functioning of social systems, they make sense.

Vice versa, the state’s implementation of supervision and enforcement of compliance with the law may deal disproportional damage to individuals that is justifiable on the development level, but problematic on an operational level. When a tax administration for instance decides to investigate a suspect transaction, it may have to investigate the administration of innocent involved parties. The damage dealt to those parties in terms of administrative burden imposed is often unreasonable from an operational point of view: It is disproportional relative to the amount of damage dealt to the public cause by a tax evader, and, even worse, it is mainly dealt to innocent bystanders. From a developer’s point of view, when one takes the functioning of a social system as an object of analysis, it is justifiable as a deterrence to maintain tax discipline.

Policy makers, and those representing the development-level views of executive bodies of the state, are often at odds with legal professionals on such matters because they assume different perspectives.

References


