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CLASSIFICATIONS AND THE LAW: DOCTRINAL
CLASSIFICATIONS VS. COMPUTATIONAL ONTOLOGIES

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Classifications and the Law:
Doctrinal Classifications vs. Computational Ontologies

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Abstract

This paper addresses legal classifications by comparing legal doctrine and computational ontologies. In recent years legal ontologies have attracted a growing interest, not only from knowledge engineers but also from legal scholars. Indeed, several controversial issues arise concerning the elicitation and structuring of domain (legal) knowledge, and legal theory can provide useful insights in this respect. The existing tradition of definition and classification of legal concepts by legal doctrine can provide a source for the extraction and characterisation of concepts to be included in legal ontologies. The question arises as to what extent doctrinal structures can be reused in the construction of legal ontologies, and as to what extent doctrinal analyses can draw inspiration from computational ontologies.

Firstly, different theoretical approaches to legal conceptualisation are presented. Special emphasis is put on the tension existing in the law between the possibility of defining legal concepts in abstract and the need to define them in the context of each norm, which is a specially relevant issue for legal ontology building, since it concerns capturing the semantics of legal concepts.

Secondly, systems of concepts in legal doctrine are analysed and compared, considering both their structure as well as the kind of semantic relationships they include. Through the examination of several examples taken from a broad temporal span in the history of legal thought, it is observed that the systems of legal concepts in doctrine have different levels of abstraction (from very general legal categories encompassing the whole legal domain, to specialised conceptual systems representing particular domains like private law) and different structures (from *is-a* hierarchies to more complex functional networks of concepts). Some conclusions are drawn as to the possible mappings between doctrinal systems of concepts and computational ontologies. Further lines of research are suggested to better exploit the possible cross-fertilisation between legal doctrine and ontological research in the framework of knowledge representation for intelligent legal information management.

Keywords

Legal ontologies, legal discourses, legal doctrine, legal theory

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1. Introduction: Doctrine as a Source for Building Legal Ontologies

If ontologies are understood as the formal description of a domain of discourse (Antoniou and Van Harmelen 2008 [2004]: 11) then legal ontologies can be considered the formal description of the domain of legal discourse. A decision to make is, therefore, what counts as “legal discourse”.

However, we cannot speak of one legal discourse but of different legal discourses. Indeed, it has been highlighted that different levels of legal language exist (Tiscornia 2005), among which we can identify the following:

- the discourse of the legislator (laws and regulations);
- the discourse of the judges (judgements and other judicial decisions);
- the discourse of the doctrine (studies on several legal subdomains, systematising legislator and judges’ discourses);
- the discourse of legal theory (legal works having a general content, not addressing a particular legal system).

Limiting our view on legal discourse to the four previous kinds of discourse, amounts to having a restricted approach to the law, which only considers certain classes of legal documents as relevant sources of the discourse to be considered: the documents representing authoritative sources of the law (legislation and case law), plus the published academic comments on such sources and more abstract reflections (doctrine and theory). This corresponds to explicit legal knowledge, codified in specific and standardised ways by the legal community¹ (bills, laws, articles published in legal journals, judicial decisions, ...).

However, the law can be seen as well as a set of practices (actions, ways of reasoning, language uses ...) by legal professionals and of interactions between citizens (contracts, customs). In particular we can speak of an implicit or unspoken law that we can refer to as the discourse of legal practice. On the one hand, this includes practical legal professional knowledge² that goes beyond codified legal knowledge in the aforementioned forms (legislation, case-law, doctrine, legal theory) and consists in the know-how that tells how to apply codified knowledge in concrete situations³. Very much related to the paradigm of situated cognition⁴, this knowledge is acquired through experience rather than by

¹ A rich literature exists on the definition of *explicit knowledge*, usually to contrast it with *implicit knowledge*. A landmark contribution to the distinction is (Polanyi 1966), where explicit knowledge is defined as codifiable knowledge due to its propositional form. On the contrary, implicit knowledge is usually non propositional and therefore difficult to codify.

² Not necessarily limited to traditional legal professions (lawyers, barristers, judges, ...), but including other professionals having somehow to do with the law, such as mediators, economists, university professors, or the so-called *paralegal* professionals (Casanovas 1998).

³ This corresponds to the notion of *personal knowledge and capability* as defined by Eraut (1997, 1998): “what individual persons bring to situations that enables them to think, interact and perform”, and which includes: “Codified knowledge in the form(s) in which the person uses it; know-how in the form of skills and practices; personal understandings of people and situations; accumulated memories of cases and episodic events (Eraut, 2000a, 2004e); other aspects of personal expertise, practical wisdom and tacit knowledge; self-knowledge, attitudes, values and emotions.” (Eraut 2007). Similarly, in the legal field, “professional knowledge of a legal topic [...] involves a particular knowledge of: (i) statutes, codes, and legal rules; (ii) professional training; (iii) legal procedures; (iv) public policies; (v) everyday routinely cases; (vi) practical situations; (vii) people’s most common reactions to previous decisions on similar subjects. (Casanovas et al. 2006: 266).

⁴ *Situated cognition* is a transdisciplinary notion that applies to a wide range of scientific domains (social sciences, linguistics, animal cognition, evolutionary biology, ...) and that more concretely was manifested in cognitive sciences and AI research as *systems thinking*, which implies studying things in a holistic way, as a dynamic and complex whole located in an environment (Clancey 2008). This approach has been very controversial in psychology and cognitive science as well as in AI (Ibidem), since it seems to question the orthodox physical symbol system hypothesis (for a

formal training, it is unequally distributed among the members of the community and it is difficult to elicit. On the other hand, the discourse of legal practice includes the so-called “mute law”, which has been frequently neglected by legal scholars and has rather been object of study by legal anthropology (Sacco 1995). This consists in common citizens’ interactions beyond legally conceptualised situations and relations, including factual behaviours.

Written form accompanies sometimes as well these types of informal or implicit legal knowledge, but since it is not codified knowledge, its written forms are not archived orderly and in standardised formats (letters to clients and parties, summons, legal discussions over the Internet, etc.), so it is difficult to analyse them systematically. This is probably where the methods of legal doctrine require the contribution of the methodologies and approaches of legal sociology and legal anthropology⁵, for instance ethnographic work on the ways of action and interaction of judges, lawyers in the institutional setting (at the court) and outside it (relationship with clients, ...).

In this paper, we concentrate on the third and the fourth kind of legal discourse, namely, the discourse of doctrine and legal theory⁶. We think that (i) in this kind of legal discourse we find the intellectual roots of the conceptual structures used in legal reasoning; and (ii) that in this kind of legal discourse we can find useful insights in order to build legal ontologies. Indeed, the particularity of legal doctrine and theory is that it tries to identify, define and organise in broader conceptual structures the objects⁷ of the domain. This is the first step in the construction of an ontology, namely, the semantic analysis of the domain. The second step will be to formalise the identified conceptual structures in a formal language. If legal doctrine has already done part of the first task it could maybe help legal ontology builders. Indeed, legal doctrine could be seen as an intellectual capital to be reused in ontology building (broadly understood) in the same way that Ontology as a traditional branch of metaphysics contributes to the conceptual distinctions made in upper or foundational ontologies.

2. Legal Concepts

The possibility and the utility of constructing structures of concepts in the legal domain has always been controversial. One important reason for being sceptical about structuring legal concepts resides in the fact that this idea seems to presuppose that legal concepts have a certain degree of stability (context independence), i.e., that we can identify different occurrences of the same concept in legal texts and in legal practice (usually constituting the meaning of all occurrences of the same words in different legal texts). For instance, embedding the concept of “document” in a structure of legal concepts (while linking this concept to linguistic expressions to be found in legal discourse) seems to presuppose that it is possible to view this concept as the meaning of the different occurrences of the term “document”.

If legal language was so context-dependent that the legislator would ascribe different meanings to each different occurrence of the term “document”, and even different judges would express different meanings whenever using this term in motivating their decisions (concerning the validity of documents or other similar issues), then having the concept “document” in a conceptual structure

(Contd.) _____

theoretical analysis of the opposed views and an attempt to bring them together them see Slezak (1999); for a taste of the discussion see the response of Clancey (1992) to Sandberg and Wielinga’s critical paper with regard to situated cognition (1992)). Situated cognition highlights precisely the non propositional and environmental aspects of knowledge and this is why it can be considered one of the foundations of a theory of practical legal knowledge.

⁵ It is acknowledged that evidence of personal knowledge must come from observations of performance in order to have a holistic rather than a fragmented approach to knowledge, since the knowledge used in particular situations is available in a compiled form ready to be used (Eraut 2007).

⁶ For a focus on the fifth type of legal discourse see Casanovas and Casellas socio-legal approach (Casanovas and Casellas 2010).

⁷ We will be using objects as a synonymous of concepts.

would be of dubious utility: this concept would not provide the meaning of most occurrences of the word “document” in legal language, and similarly, the structural links pertaining to this concept might not apply to the (different) concepts expressed by the various occurrences of the word document.

As we shall see in the following, one may still want to provide a structure of concepts for legal thinking, but then one would abandon the goal of providing directly the meanings of the terms in legal language, and the semantic relationships between such meanings. One would rather provide a conceptual structure relatively independent from the practised legal language, which would have to be mapped to the different words used in legal discourse, and the different ways in which the occurrences of such words are used.

The idea that legal concepts have a stable meaning (which is maintained in the linguistic expressions of different norms, taking place in different contexts) is questioned by three characteristic aspects of the law:

- the dependency of legal concepts on legal norms
- the dependency of legal norms on (the interpretation of) terms in authoritative documents
- the dependency of interpretations of legal norms on the pragmatics of the different situations in which norms have to be applied.

In this section we shall consider how these dependencies impact on legal ontologies and how and within what limits we can save legal ontologies from this challenge.

2.1. The Mutual Dependence of Legal Concepts on Legal Norms

Legal concepts are dependant on legal norms since they may be expressly defined by legal norms, or since they may be implicitly defined by them. Let us firstly consider explicit definitions. For our purpose we may restrict our analysis of explicit definitions to the most evident forms of them, i.e., to those definitions having a metalinguistic form, i.e., ascribing a particular meaning to a term. Consider for example the following definition, contained in the EU data protection directive (Directive 95/46/EC of the European Parliament and of the Council):

- (a) 'personal data' shall mean any information relating to an identified or identifiable natural person ('data subject'); an identifiable person is one who can be identified, directly or indirectly, in particular by reference to an identification number or to one or more factors specific to his physical, physiological, mental, economic, cultural or social identity;

Here is the definition which can be found instead in the Italian legislation (art. 4a of the data protection code, Legislative Decree no. 196 of 30 June 2003)

- a) "personal data" shall mean any information relating to natural or legal persons, bodies or associations that are or can be identified, even indirectly, by reference to any other information including a personal identification number;

Let us observe the difference of the two definitions: they indeed do not identify the same concepts, the main difference being that “personal data” according to the EU definition only covers data concerning a physical person (a human) while the Italian definition also includes data concerning “legal persons, bodies or associations”. One may also wonder whether the very different wordings of the two documents are meant to indicate conceptual difference or not. These two definitions exemplify two aspects of the typical legislative definition: the definition on the one hand characterises a concept, and on the other hand ties that concept to a term. In fact the usual normative effect of the definition is that all occurrences of the term within the text containing it have to be understood in the defined sense. This normative effect usually also applies to subsequent documents containing that term, unless there are reasons to the contrary, and it may cover as well preceding ones (if this fits with the purposes the new definition is aiming at, according to the assumed intention of the legislator) Thus a legislative definition is a norm that on the one hand establishes a concept (so that the concept is dependant on that

norm) and on the other hand contributes to determine the meaning of other norms (so that these norms are dependant on the concept). This means that not only one needs to interpret the norms containing the defined concepts on the basis of the definition, but also that when interpreting the defining norm one must consider what impacts this will have on the norms where the term occurs. For instance, the Article 29 Data Protection Working Party (a body providing advice on data protection, established according to art. 29 of the Data protection directive, 95/46/EC) describes in this way the task of understanding the definition of the term “personal data”: “Working on a common definition of the notion of personal data is tantamount to defining what falls inside or outside the scope of data protection rule”. On the one hand the legislator, when defining a concept (the meaning of a legislative term) is performing a normative function, i.e., specifying the content of the norms in which the term to be defined appears, on the other hand the interpreter, when determining the meaning of the legislative definition, is participating in the same function.

Note also that the wording of a legislative definition is usually insufficient to enable a full characterisation of the defined concepts. With regard to the concept of “personal data”, for instance the Article 29 Data Protection Working Party provides a 26 pages analysis, where it is discussed how this notion has to be understood, and applied to different cases. It must also be observed that it would be absurd, for the purpose of understanding the legal notion of “personal data”, to rely only on the common-sense understanding of the terms from which the legislative definition results, i.e., “any information”, “relating to”, “an identified or identifiable”. The abstract conceptual meaning of these terms (i.e. the meaning we may assign to them when they are not linked to a particular context) only is the starting point for understanding what they mean in the particular context we are considering (i.e., the context where they are providing the definition of “personal data” for the Data Protection directive). In other contexts – for instance, when the information to be regulated is technological know-how, when it is discussed whether an invention is “relating to” a particular industrial process, when it is required that the origin of a product is “identified or identifiable” for consumer protection – the same terms acquire distinct meanings (related to the different function they are performing), for which considerations developed in the Opinion of the Article 29 Working party have little or no relevance. For instance, in this opinion it is said that even dynamic IP addresses, assigned by Internet provides, are to be considered as pertaining to an identifiable person (even though they are assigned to a connection, rather than to a person, and only for the duration of that connection). Such considerations have little relevance for establishing when the producer of a good is identifiable from the label of that good. Since the purpose of the requirement of “identifiability” with regard to producers it to enable consumers to easily (without effort) identify the producer, a much clearer indication is needed for a producer to be “identifiable” from the good than for a person to be identifiable from his or her data: if a label included the indication “Manufactured by the producer owning the computer to which provider Wind assigned dynamic IP number 72.47.223.123 on 13 February 2009, from 12:00 to 13:00” we would not consider that it makes the producer identifiable for the purpose of consumer protection (though the producer will be identifiable, according to the Opinion of the Article 29 Working party, for the purpose of data protection).

Besides being defined explicitly, the meaning of a legal concept can also be defined implicitly, i.e., through its use within legal discourse (and in particular within legislative discourse). This happens in various ways. Sometimes the legal norm indicates that the concept applies to certain entities under certain conditions (that such entities, under such conditions count as instances of the concept); for instance, it may say that also a three wheeled vehicle is (counts as) a motorcycle, so that it may be driven with a motorcycle licence, or that a frog is a fish, so that the prohibition to take fish also applies to frogs. In other cases the law states what conditions originate the event or state of affairs described by a legal concept and what follows from such a normative state of affairs. Consider for instance the rules stating under what conditions a contract comes into existence, is terminated, and what the legal effects of a contract are, the rules establishing when citizenship is acquired and what is entailed by being a citizen, or the rules establishing when one acquires and loses ownership, and what are the rights and duties of an owner (for a discussion of some views on this issue, see Sartor 2009).

Consequently, legal semantics is determined (among other things) by legal doctrine, to the extent that doctrine determines, identifies or constructs legal norms on the basis of the sources of law. The discussion concerning the meaning of a legal concept in a legal system concerns establishing what norms -leading to, or departing from, the term expressing the concept- hold in that system. Since the inferential links holding in a legal system represent, or are derivable from, norms of such a system, this discussion is inseparable from the doctrinal issues concerning what legal norms belong to a legal system (given the available legal material, such as legislation, precedent, custom, and so on) and consequently constitute correct premises of legal reasoning with regard to that system. On the one hand, when we argue that in a given legal system certain preconditions determine the application of a concept and that certain consequences follow from it, we are arguing that certain norms exist in such a system, according to a certain interpretation. On the other hand, when we consider whether a certain norm exists in a legal system we must take into account the conceptual network in which the norm participates: if the norm links a conceptual qualification to certain preconditions, we must consider what consequences other norms connect to that qualification; if the norm provides consequences of a certain conceptual qualification, we must consider what preconditions entail this qualification.

In fact, by constructing in a certain way (through doctrinal interpretation/construction) the meaning of a certain concept in a legal system we contribute to determining the substantive legal conclusions derivable according to that system. Consequently, we will argue for one or the other interpretative construction of the relevant norms, according to what conclusions, derivable according to such norms, we believe better fit (the values and principles we associate with) the considered legal system.

Consider, for instance, the recent debate about torture, where the absolute prohibition of torture⁸ has been recently questioned with regard to the treatment of suspect terrorists. A lawyer believing that the law permits infliction of pain on detainees for the purpose of extracting useful information has two ways to go about showing that this is the case: the lawyer can take either a restricted view of the conditions for applying the concept of torture (requiring, for instance, that permanent physical damage is caused, so as to exclude that there is torture when pain is inflicted without such an effect) or a restricted view of the consequences of qualifying an act as torture (assuming that only certain kinds of tortures are always forbidden, while other kinds of torture are in certain circumstances permissible). Correspondingly, a lawyer believing, on the contrary, that the law never permits any infliction of pain for the purpose of extracting information will claim that every pain inflicted for this purpose qualifies as torture, and will claim as well that the law prohibits every act of torture regardless of the form it may take. The two lawyers, in offering what they view as justified conditions for qualifying an act as torture or as justified consequences following from this qualification, will characterise in different ways the concept of torture, and this will have relevant deontic implications (the first characterisation of torture permits certain actions on detainees, actions which the second characterisation prohibits). As this example shows, the characterization of legal concepts is no neutral activities: it concerns establishing what norms hold in a legal system and thus what norms have to be applied by judges and imposed upon the party. It is not an activity dealing with mere descriptive linguistics: it is rather a central aspect of legal interpretation.

⁸ As stated in Art. 5 of the Universal Declaration of Human Rights: "No one shall be subjected to torture or to cruel, inhuman or degrading treatment or punishment."

2.2. Why Systems of Legal Concepts May Still Be Useful

We cannot provide here a detailed analysis of the reasons why the endeavour of building structures of legal concepts can be challenged. Let us just mention some of these reasons (for a more detailed account see Sartor 2009):

- Legal change may question the validity of conceptual hierarchies. As the law evolves, new inferential links are introduced -by the legislator, by precedents, by custom- newly associating a legal concept to a certain condition or a certain effect, or dissociating the concept from one of its pre-existing conditions or effects. In introducing such new inferential links, conflicts with existing conceptual structures, as resulting from definition and from taxonomic inheritance, are inevitable, and inevitably legal evolution is to prevail over static conceptual hierarchies.
- Definition cannot fully capture the meaning of legal concepts. In fact to determine what preconditions and effects characterise a certain concept we must also consider what can be obtained through correct interpretation of laws and cases, what emerges from customs and other legally relevant social interactions, etc.
- A definitional approach to legal concepts appears even more unable to fully capture the legal meanings, if we include among the relevant inferential links those emerging from legal practice, such as non-verbalised attitudes of legal reasoners.
- The preconditions for applying a concept make the concept dependent upon the reasons justifying its application, while effects deriving from the application of the concept indicate what conclusions the concept is a reason for. Such reasons can be supported by rationales, and they can be attacked by contrary reasons (reasons why the concept should not be applied or why we should not, given certain situations, derive its conclusions). These underlying dialectics get lost when we take a definitional attitude.
- In order to enable the relevant values and interests to be realised through the application of the law in different contexts and across different subject matters, we need to shape legal inferential links (legal norms) in the ways that best promotes such values and interests. This may lead us to abandon terminological consistency: for instance, we may need to understand causality in different ways in private and criminal law, or to conceive good faith differently with regard to customers and to professionals, to differentiate notions of fault and negligence, and so on.

The considerations we have developed exclude that we can assume that any ontology fully captures the meaning of legal concepts, and the meanings of the words that in legal discourse are used for expressing such concepts. However, this does not make useless the attempt to organize legal meanings into conceptual structures. We need to be able to pack inferential information into legal terms, and to use this information according to terminological relationships. Without terminological information, we would not be able to make sense of the textual formulations of legal norms and of the connections between norms having different levels of abstraction. Without the inheritance across conceptual hierarchies, legal regulations would become a chaos of useless repetitions. And specifying the meaning of legal concepts and their relations helps us in better understanding legal norms and the commitments we undertake when representing legal information and addressing legal issues.

There is indeed a feedback circle involved in constructing legal norms, where the assignment of a meaning to a term and the teleological interpretation of the norms including that term go together: on the one hand we start with a preexisting understanding of the term at issue, then we refine our understanding of the term on the basis of teleological considerations concerning the norms where the term appears, which may lead us to revise the understanding of one or more instances of the occurrences of that term. There is also a complex relationship between common language and legal

language, where the law inherits in principle the terminology of common language (words like “fish”, “wine”, “food”, “harm”, “pain”, “parent”, etc.), but then may redefine these words, either through the legislator’s definitional or qualifying statements, or through legal interpretation.

Thus we need to consider the conflict between legal interpretation and ontology as a dialectical balance and co-evolution, rather than as a merely destructive confrontation. This requires that lawyers (and ontological engineers working with legal knowledge) have the ability to continuously adjust their onto-terminological constructions as the law evolves (taking into account the need to implement legal values), and at the same time to make conceptual analyses bear on the interpretation of legal norms and on the solution of legal cases.

In conclusion, the task of providing an analysis of the meaning of such legal concepts does not pertain uniquely or mainly to legal ontology as a separate discipline. It rather pertains to legal theory, legal doctrine and legal sociology, and such disciplines can use the tools provided by ontological research in order to better specify their proposals and findings. On the other hand work on computational ontology (for purpose such as information retrieval or knowledge representation) should use the inputs provided by legal theory, legal doctrine and legal sociology in order to develop legal conceptual structures appropriate to the purposes the ontologies being developed are meant to serve.

3. Systems of Legal Concepts in Legal Doctrine

The potential connection between modern legal ontologies and legal doctrine is the common concern for the conceptualisation of the law. A further inquiry is to be made, however, before we can assess the extent to which doctrinal legal classifications can be reused in the computational context. Indeed, it cannot be trivially assumed that the formal structure of the conceptual networks found in doctrinal classifications is similar enough to the formal structure of computational ontologies and some kind of analysis is required to see how and to which extent the two structures can be mapped. Therefore, we will analyse in the following sections, first, the structural features of conceptual structures in ontologies, and secondly, the formal structure of classifications in legal doctrine.

3.1. *System of Concepts, their Topological and Semantic Properties and Methodology for Exploring them*

In our analysis of legal concepts will rely on the following notion of *system of concepts* or *conceptual system*:

A conceptual system can be conceived as a network in which each node corresponds to a concept and each line in the network corresponds to a link between concepts (Thagard 1992: 30).

Furthermore, since the links between concepts have a semantic nature, a conceptual system can be regarded as a semantic network. Two issues are thus relevant for the analysis of a conceptual system; on the one hand, the *topological structure* that it gives place to, i.e., the architecture of the links between the concepts (namely, a tree, a rooted tree –the one with a unique beginner or root element–, ...); and on the other hand the *semantic relations* expressed by the lines that unite the nodes in the network⁹ (this relation can be an inclusion relation –is-a-, a meronymic relation –part-of-, ...). In this context, we should be able to answer these two questions:

⁹ The relevance of the explicit understanding of the intended meanings for various types of arcs and links in semantic network structures has been highlighted by (Woods 1975).

- Are the conceptual structures of ontologies and doctrinal legal classifications equivalent with regard to their topological structure?
- Are the conceptual structures of ontologies and doctrinal legal classifications equivalent with regard to the semantic relations expressed by the links between their nodes?

With regard to the analysis of topological structure a methodological precision is required. It is worth noting indeed, that the graph paradigm is broader than ontological modelling. Ontologies and databases are constrained by an external set of rules whereas a graph is not necessarily constrained and can reflect an emergent system itself, with no external control (Bales and Johnson 2006: 453). If we limit ourselves to explicit conceptual systems as presented by legal doctrine, we are accepting the restrictions imposed by external rules of organisation of concepts (for instance, the correct construction of a taxonomy following the Aristotelian method of division by *genus* and *differentia*¹⁰).

Our analysis is limited to the explicit links made by the authors between concepts. The definition of what counts as an explicit link is controversial, but here it will be assumed that two ways exist for expressing it: either textually or graphically. This has effects on the cognition of legal contents. In the first case it will be necessary to do a complete reading of the text in order to extract the elements of the system of concepts and infer their relations; in the second case the graphical representation makes easier the cognition of the classificatory structure. When an explicit verbal description is made of a system of legal concepts, the author usually puts a special emphasis in marking linguistically the conceptual structure by using specific linguistic markers that describe the structure (such as *x are divided in y and z; there are n types of x; ...*), for instance, in Gaius division of persons: “*The principal division of the ius of persons is the following, namely, that all men are either free or slaves*”. When the system of concepts is presented graphically through a schematic representation, the diagrammatic lay-out replaces linguistic markers and the information is transmitted directly through the interpretation of the image. Even if some instances can be found in legal history (see Figure 1), the diagrammatic representation of systems of legal concepts is not very usual in the legal domain unlike in other domains.

¹⁰ The method of division is presented by Aristotle in *Posterior Analytics*: “It is such attributes which we have to select, up to the exact point at which they are severally of wider extent than the subject but collectively coextensive with it; for this synthesis must be the substance of the thing.” Nevertheless, the method of division, consisting in the knowledge of how to divide forms into kinds, was already proposed by Plato in the *Phaedrus* and described in more detail in the *Sophist*.

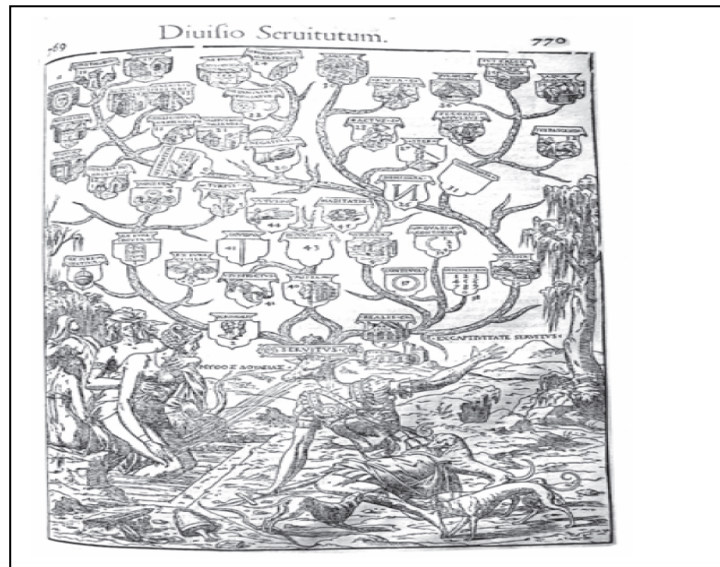


Figure 1. Arbor servitutum. From the 1548-1550 edition of the Corpus Juris Civilis, Digestus Vetus, p. 770. (Source Hayaert 2007: 319)

This is why the conceptual systems that will be presented in this paper have been manually constructed on the basis of explicit linguistic structures whereby the author of the text marks class subsumption, generic semantic relations or other semantic links.

However, it is conceivable that other more complex conceptual graphs can emerge from the statistical analysis of the corpora composed by legal doctrinal texts. Further analysis in this direction using current statistical approaches combined with Natural Language Processing Techniques could reveal implicit conceptual systems emerging from doctrinal texts and propose new analytical approaches of traditional legal theory, as well as put them more accurately in connection with structural features of computational ontologies.

3.2. System of Concepts in Ontologies

A conceptual system, according to the definition provided above, consists of “concepts” and “links” between them. In ontologies the system of concepts follows a pre-established scheme, usually taking the form of a rooted tree, where concepts are organised vertically, from more general to more specific

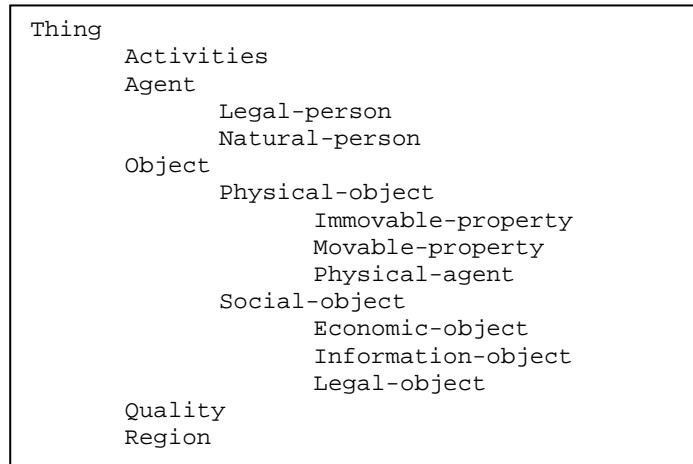


Figure 2. Fragment of DALOS ontology of consumer law.

For instance, let us consider the fragment of the DALOS¹¹ domain ontology shown in Figure 2: the topological structure is that of a rooted tree, with a single initial element (Thing) further divided into the branches of Activities, Agent, Object, Quality and Region. Other nodes span out from these branches, giving place to new branches. For instance, Object is divided into Physical-object and Social-object, from which further branches of the tree fan out.

The semantics of the arches linking the nodes of the tree in Figure 3 is an inclusion or is-a relation, which is the creator of the ontological backbone: the taxonomy of entities. In the case of the DALOS ontology we can observe, for instance, that Social-Object is-a kind of Object, and Object is-a kind of Thing.

¹¹ The EU DALOS project (Drafting Legislation with Ontology-Based Support) is aimed at providing legislators with control over legal concepts and the corresponding vocabulary across several European languages. The DALOS domain ontology represents the consumer law and was manually built with the aid of NLP support (Agnoloni et al. 2007; Francesconi et al. 2007).

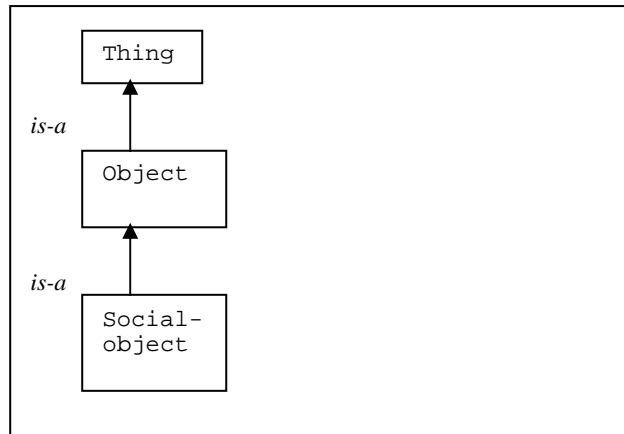


Figure 3. Taxonomic semantic relations (*is-a*) in DALOS ontology.

However, in DALOS ontology semantic cross-references -not directly represented in the tree-like structure of Figure 2- are established through the definition of properties. For instance, the property *provides-information-on* has as its domain *information-object* and as its range has, among other concepts, *agent*. There exists, thus, in fact, a semantic relation linking *agent* and *information-object*, although these concepts are not directly linked through the *is-a* relation represented in the tree-like structure. Due to these further semantic links represented through properties the actual structure of the semantic network is much more complex than the initial taxonomy (although the network follows anyway the organizational schema established by the designer).

3.3. *Systems of Concepts in Legal Doctrines*

If we apply to the legal domain the definition of “systems of concepts” provided above we will obtain that:

A system of legal concepts or legal conceptual system is a network in which each node corresponds to a legal concept and each line in the network corresponds to a link between legal concepts.

In this sense, legal classification understood as the definition and organisation of legal objects or concepts is the task that gives place to systems of legal concepts. This is precisely one of the ways in which doctrine contributes to the systematisation of the legal system¹². Doctrine builds theories in which each concept has its definition, for the classificatory order relies on the features specified in the definitions. For instance, contract theory will define: *contract* as a legal transaction with certain

¹² It has been highlighted that there exist different levels of legal systematization: (i) systematization of legal concepts; (ii) systematization of legal rules in institutions and branches of the law according to the piece of reality that they regulate; (iii) systematization of legal rules on the basis of the values they pursue and their justification; (iv) systematization of those values themselves, establishing an axiological hierarchy (Renauld 1958). Legal doctrine is not always clear as to the object of systematization or classification, as highlighted by (Pound 1924: 941): “[...]it is not uncommon for analytical jurists, assuming to classify "the law", to move, without apparent consciousness of the transition, from classification of legal precepts to classification of the subject matter of legal precepts, or to classification of the institutions by which that subject matter is made effective by means of legal precepts, and vice versa.”

properties (and therefore as a subclass of *legal transaction*), *parties* as natural or legal persons that participate in a legal transaction (and therefore as a role of the classes *natural person* and *legal person*), and so on. The relevance of the definition and organisation of legal concepts is the design of a conceptual map of the domain, a structured universe of discourse shared by domain experts that enables their communication and mutual comprehension. In other words, it is the creation of a knowledge system¹³. In this sense, when a legal scholar speaks of *contract* any other domain expert should be able to recognise the concept and therefore know what kind of entity the term refers to. Nevertheless, the conceptual map of the domain does obviously not remain always the same, but a certain conceptual dynamics exists, a sort of evolution of legal conceptual systems due to changes in regulation or to judicial interpretation that either modifies the intensional¹⁴ or extensional¹⁵ definition of concepts, or creates new concepts. Sometimes even new subsystems will be created, like labour law, consumer law, ... (Collins 1997: 64). Doctrinal systems of legal concepts can be thus considered dynamic conceptual systems, just like scientific conceptual systems are (Thagard 1992).

The most significant efforts to provide the definition of a basic conceptual language of the law took place during the XIXth century. Indeed, partly influenced by the positivist paradigm, partly driven by the desire to give law a scientific methodology, decades of legal research were committed to this endeavour. Apart from the philosophical underpinnings of the effort, practicalities were as well at issue, for the development of a common terminology for legal reasoning was deemed essential for achieving clarity and correctness in legal thought. In the common law sphere several scholars refer indeed to the need of establishing a clear usage of legal terms that would free legal discourse from obscurity (for instance Bentham, Austin and Wigmore). This is the stream of thought corresponding mainly to analytical jurisprudence, with roots in Bentham's thought and that starting from Austin's *The Province of Jurisprudence determined* (1832) led the quest for the main conceptual components of the law. In continental legal thought a similar line of thought was manifested in the works of the German pandectists. Represented by main legal scholars such as Savigny, Ihering, Puchta and Windscheid, and with origins in Hugo, it developed in the context of a strong debate on the suitability of codification which would eventually culminate in the German Civil Code, which has been considered more similar to a doctrinal treatise than to a legislative piece of work¹⁶. The weakening of this stream of thought can be traced back to the jurisprudence of interests, by Ihering, who had been one of the major figures of the conceptualist school.

The works produced by the main figures of both streams of thought provide useful data for an analysis of legal conceptual systems with a historical perspective. Together with some examples extracted from current legal doctrine they will be the material on which to run our analysis of the structural and semantic characteristics of doctrinal legal conceptual systems.

¹³ On the idea of legal classification as a knowledge system see (Collins 1997: 57).

¹⁴ For instance when a new act changes the definition of a concept like "environmental risk".

¹⁵ Such as when case law establishes that a bicycle will be an instance of the concept of vehicle in the interpretation of a certain act.

¹⁶ The BGB (German Civil Code) has actually been criticised as embodying an abstract system of private law, in accordance to the conceptual apparatus built by the pandectists rather than a system adapted to actual conditions of life in society (Wieacker 1995: 376).

4. Types of Systems of Legal Concepts

In the present section we will compare legal conceptualisations on the basis of the degree of abstraction of their conceptual units and of the kind of semantic relationships connecting them.

4.1. Degree of Abstraction

From the point of view of content, systems of legal concepts can be more or less specific. That is, there exist, on the one hand, certain systems of legal concepts that deal with the concepts specific to a subdomain of the law, like works dealing with civil law or criminal law¹⁷, where the conceptual networks basically contain concepts particular of the domain¹⁸. On the other hand, there exist systems of legal concepts that aim at providing a general picture of the whole legal domain and therefore contain more abstract notions that require a more philosophical reflection and theoretical commitments.

An early example of domain-specific conceptual systems is the tripartite division of the law established by Gaius, a Roman jurist of the 2nd century AD¹⁹. Three are the main branches of the hierarchy as described in *The Institutes* of Gaius: persons, things and actions. Each of them is further divided into more specific classes. Persons are divided into free and slave, dependent and independent, in curatorship and in guardianship. Two subclasses span out from persons: freeborn and freedmen. And the latter are further classified into roman citizens, latins and *dediticii*. The scheme is methodologically followed, giving a systematic exposition of the law that faithfully respects the method of division by *genus* and *differentia*.

¹⁷ On the idea of doctrinal subsystems which aspire to consistence and coherence see (Collins 1997: 60-61).

¹⁸ The same concept can even exist in different subdomains and have different meanings in each of them. Concepts like “wilful misconduct” and “negligence”, for instance, are not the same in criminal theory and in civil responsibility theory) (Vernengo 1986: 235-236).

¹⁹ The use of hierarchies for presenting legal concepts was actually already common before Gaius and there is evidence to believe that it was an influence of Greek philosophical thought on Roman Jurisprudence (Talamanca 1976, Grosso 1976, Gaudemet 1986).

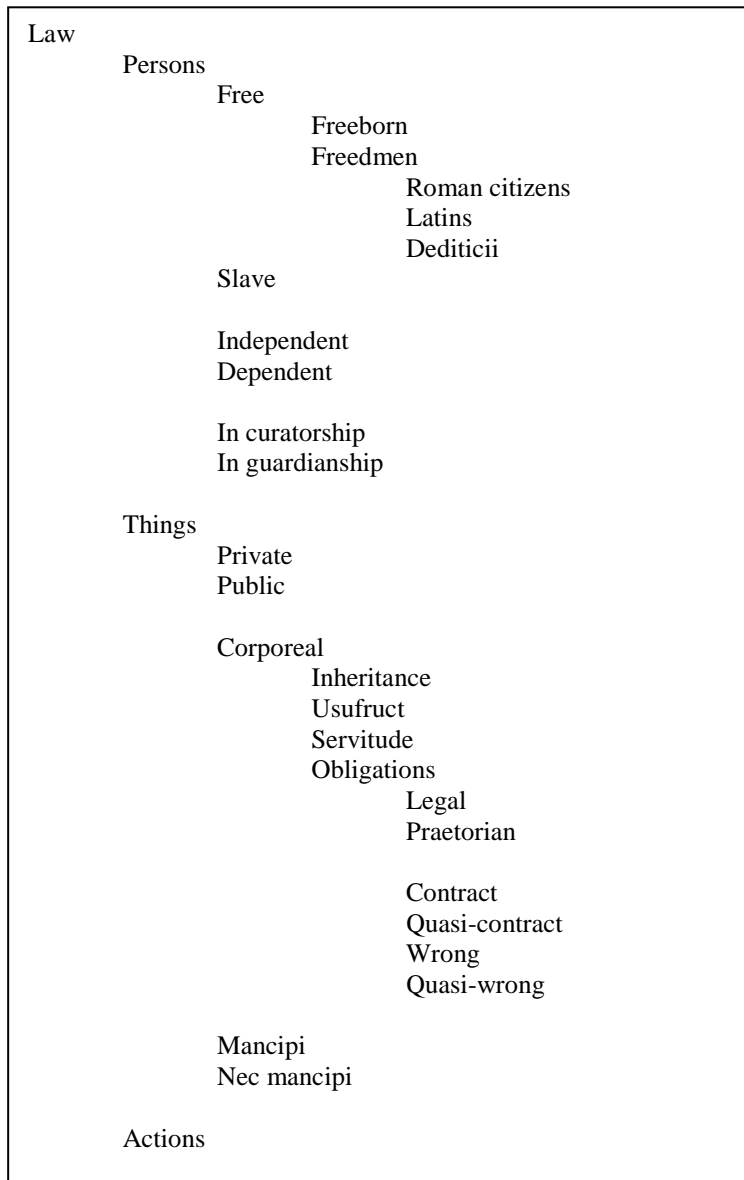


Figure 4. Gaius classification of the law.

Another early example of legal classification in private law is found in the Justinian Code, which inherited Gaius scheme. Figure 5 shows the classification of the sources of obligations according to the Justinian Code, which follows a quadripartition: Contract, Quasi-contract, Delictus and Quasi delictus.

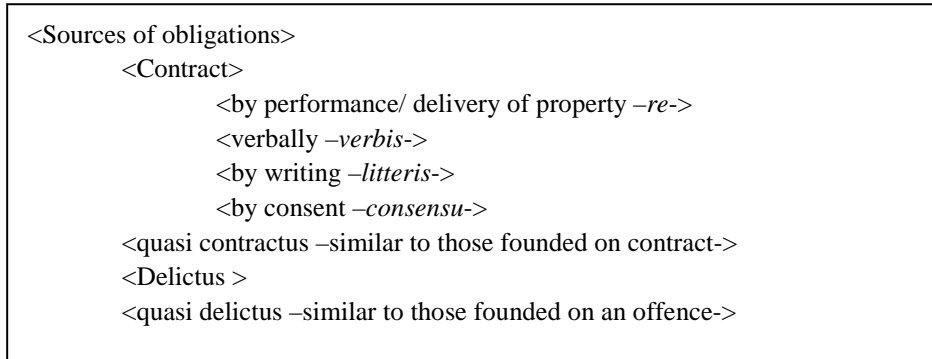


Figure 5. Classification of the sources of obligations according to the scheme of the Justinian Code.

During the XIXth century legal doctrine and legal theory developed both types of systems of legal concepts, namely, domain specific and more general. Figure 6 shows a fragment of Windscheid's classification of real rights according to private law.

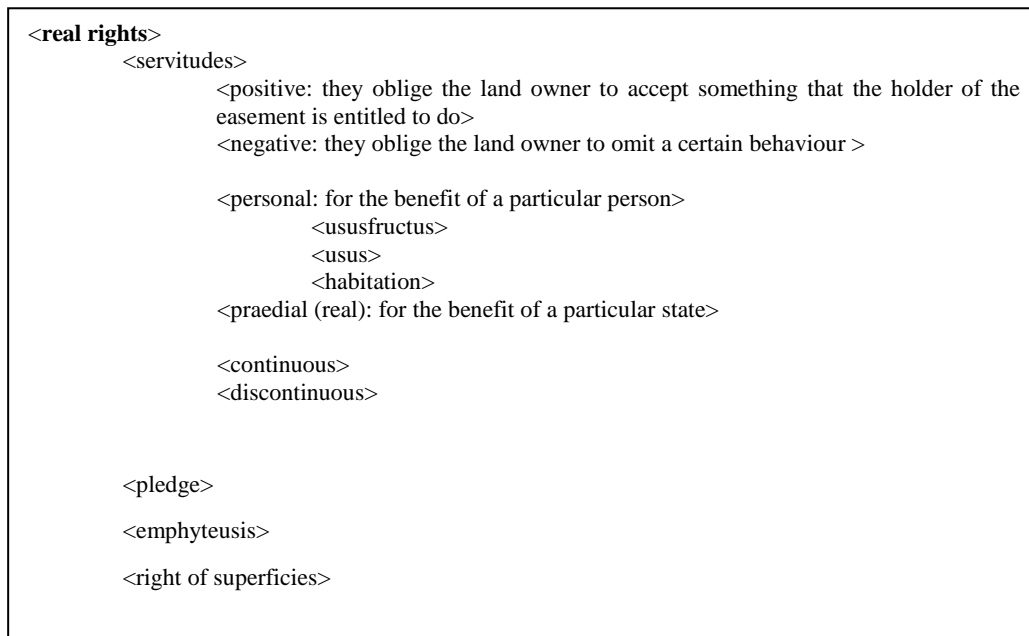


Figure 6. Windscheid's classification of real rights (Windscheid 1930: 477 ff.)

More general systems of legal concepts were developed by several scholars during the XIXth century, which focused on the detailed and *logical*²⁰ analysis of rights and duties trying to provide a formal account of legal discourse and reasoning. The one to provide a complete and detailed framework for such notions and to go down in history for such achievement was Hohfeld (1917), although some other legal scholars had already dealt with those concepts for a while (among which Austin himself (1832), Holmes (1870, 1872 and 1873), Holland (1880), Langdell (1887 and 1900), Salmond (1902), Taylor (1908), Gray (1909)). This trend would die out at the turn of the century due to the shift from the so-called “expository paradigm” (Herget 1990) to the sociological paradigm represented in figures such as Holmes and R. Pound and very well illustrated by Holmes’ momentous phrase: “the life of the law has not been logic: it has been experience” (Holmes 1881).

However, not only legal theory is concerned with the construction of abstract systems of legal concepts. Also scholars working in particular areas of the law often build networks of their concepts and ground them on general theories of the law. For instance frequently civil law works try to link the domain of private law to a general theory of the law and this way provide connections between domain specific concepts and more abstract concepts (for instance between contract and legal act; or between parties and legal person).

²⁰ It has to be noted that that the sense in which the term logical was used in that period differs from its current formal understanding. In late XIXth century legal discourse the adjective ‘logic’ was used to characterise something analytical, clear, ordered, not contradictory, but by no means included a precise reference to the properties of modern symbolic logic as derived from the works of George Boole (1854 *Laws of Thought*) and Gottlob Frege (1879 *Begriffsschrift*- usually translated as *concept writing* or *concept notation*), among others.

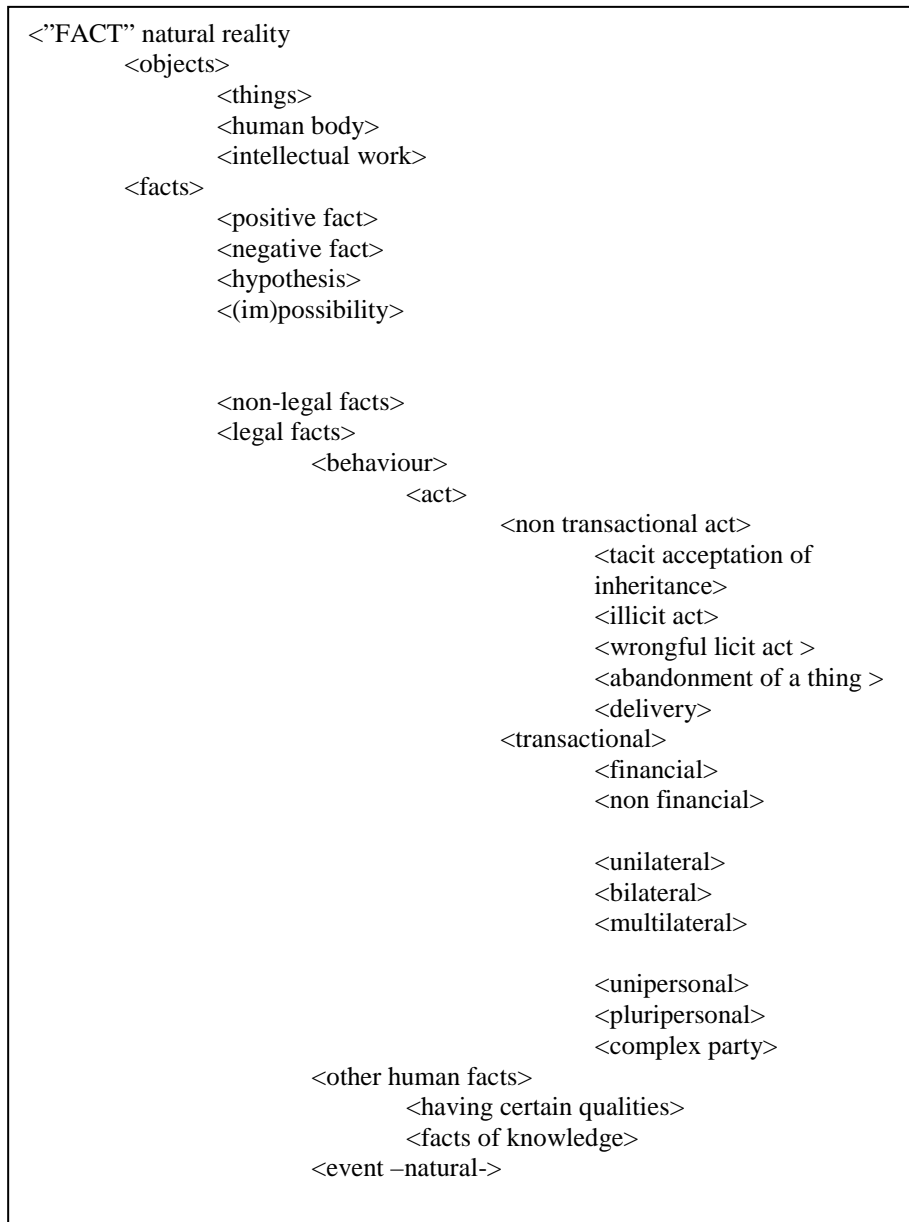


Figure 7. Classification of legal reality. From (Sacco 2005)

The particularity of this scheme is that it provides a comprehensive overview of the categories on which the law operates, reaching therefore a high level of abstraction (for instance the categories of facts or objects), but at the same time a connection remains to concrete categories of very specific domains of the law. The category of financial transactional act, for instance, is directly connected to the concept of contract, which is much more familiar to the practicing lawyer²¹.

4.2. Types of Semantic Relations

A further distinction of systems of legal concepts built by legal doctrine can be made on the basis of the semantic relations linking the concepts of the system. In this sense we can speak of:

- i. Systems of concepts that organise concepts in terms of generality giving place to a vertical ordering from more general to more specific concepts, known as well as classification by *genus* and *differentia*. In these systems the relation linking concepts is the inclusion or *is-a* relation, and
- ii. Systems of concepts that gather together the elements connected to a particular event regulated by the law, like contract. This last kind of organisation can be called “operational family”, in the sense that the nodes of the conceptual system have a functional role in the particular frame of an event regulated by the law. For instance, in the case of contract, relevant members of the system would be: the requirements (form, agreement, capacity), the effects, the parties, ...

Both kinds of conceptual systems are highlighted by Cornu (1990: 195 ff). Firstly, an example of conceptual systems organising concepts on the basis of the genus and differentia method of division is the following one:

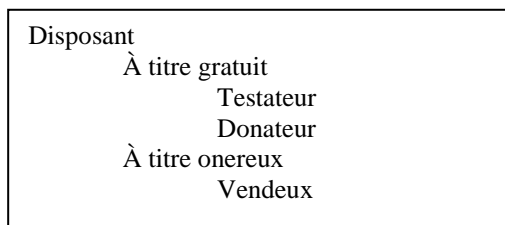


Figure 8. Typology of “disposant”. Source: (Cornu 1990: 201)

As to the semantic relations linking the concepts of the structure, they are *is-a* relations. In this sense, thus, Donateur *is-a* Disposant-à-titre-gratuit, and Disposant-à-titre-gratuit *is-a* Disposant.

This kind of semantic links is commonly found in the aforementioned works of conceptual analysis developed during the XIXth century, as the following examples show. Figure 9 reports the concept of legal fact as conceptualised by Windscheid and the set of its subtypes, which are linked to it through the inclusion relation so that: private declaration is-a legal fact; passing of time is-a legal fact, and so on.

²¹ The concept of legal transaction is actually more common in the analysis of legal doctrine than in the domain of practicing law, for it is not regarded as a legal category in various legal orders. On the historical origins and the presence of this category in the various legal systems see (Sacco 2005: 278 ff.).

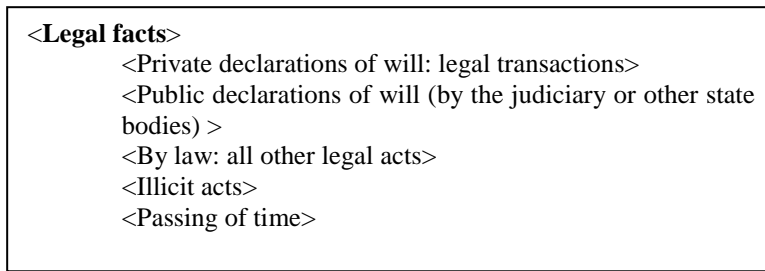


Figure 9. Windscheid’s classification of legal facts. (Windscheid 1930: 200-201)

Similarly, Figure 10 shows the conceptualisation of person as presented by Puchta. In this case concepts are structured in various degrees of depth forming hierarchical chains based on the inclusion relation: charitable foundations is-a universitas bonorum; universitas bonorum is-a legal person; legal person is-a person..

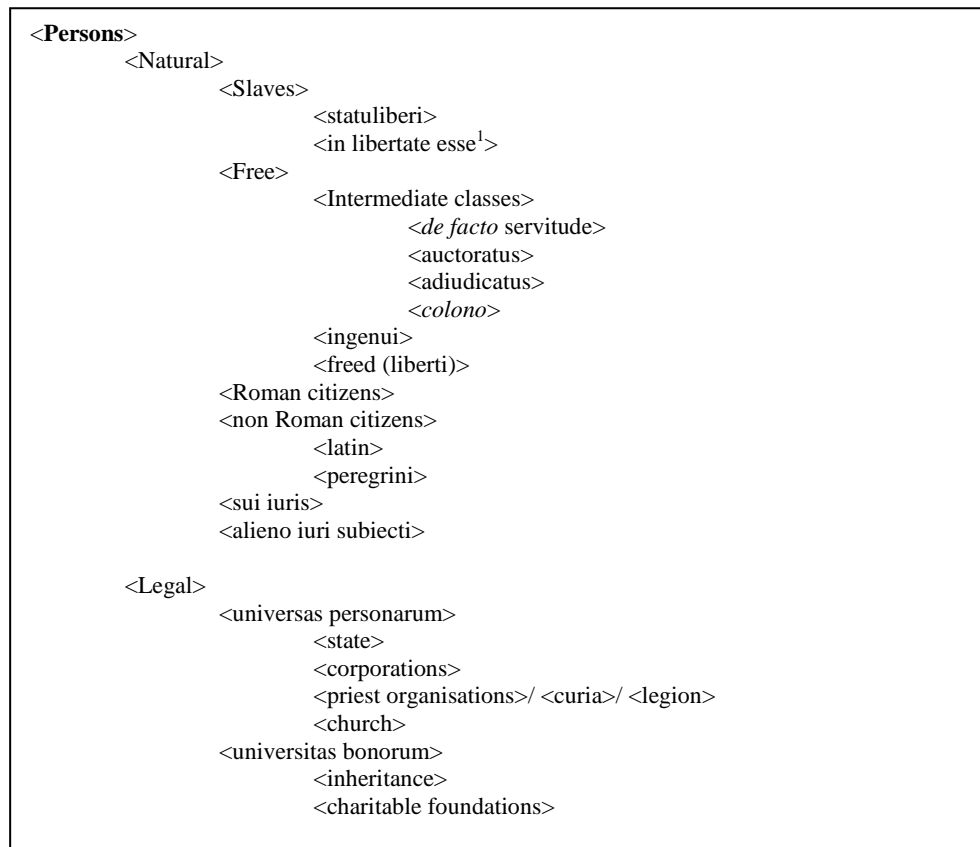


Figure 10. Puchta’s classification of persons (Puchta 54 ff.; 6-9)

Secondly, operational families of legal concepts gather together concepts which are semantically related and form a functional set.

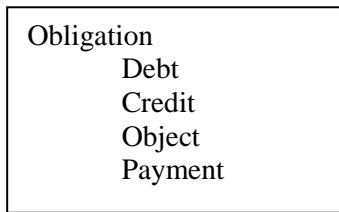


Figure 11. Operational family of the concept Obligation. Source: (Cornu 1990: 207)

The example presented in Figure 11 includes the central concept of obligation and related concepts like debt, object of the obligation or payment.

In this case the semantic link is not anymore an inclusion relation, but a more complex connection. Payment is not a kind of obligation, but a way of extinguishing the obligation. Neither is the object a kind-of obligation, which can be rather considered the content of the obligation. In general terms, thus, we could say that the concepts belonging to the group are semantically related, and the specific relations holding between them will vary.

As to the topological structure of the different kinds of conceptual systems according to the semantic relations that unite their concepts, some differences can be highlighted. On the one hand, systems structured around the is-a relation will correspond to a rooted-tree, ideally with a single beginner and with new nodes fanning out from each node.

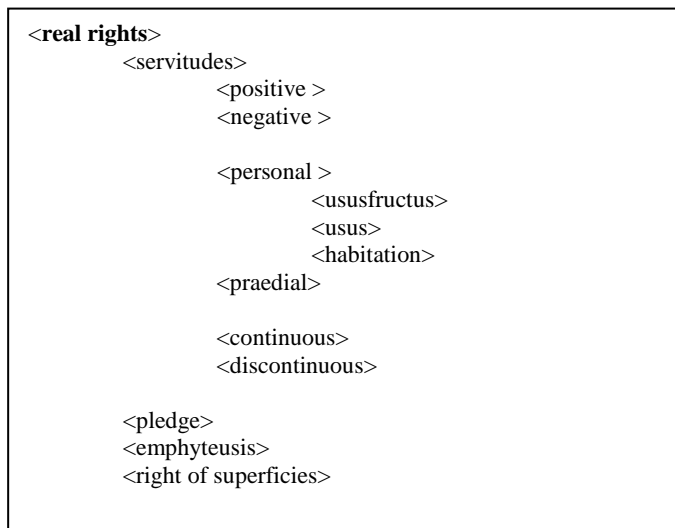


Figure 12. Windscheid's classification of real rights (Windscheid 1930: 477 ff.)

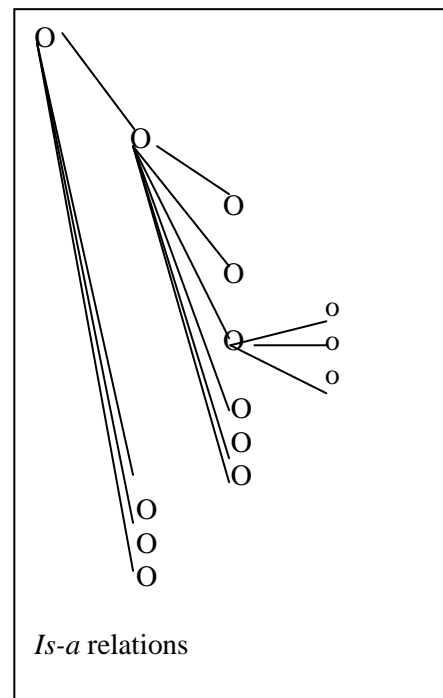


Figure 13. Structure of is-a hierarchies.

On the other hand, operational families of concepts, will not necessarily follow the model of a rooted tree, and will acquire more diverse structures. This is due to the fact that concepts in an operational family are not necessarily related to a single beginner, but can form looped structures. Indeed, we could say that in the operational family of Obligation, obligation is semantically related to debt; debt is semantically related to credit, and so on.

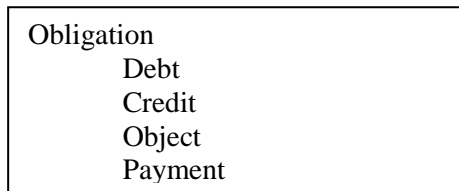


Figure 14. Operational family of the concept Obligation. Source: (Cornu 1990: 207)

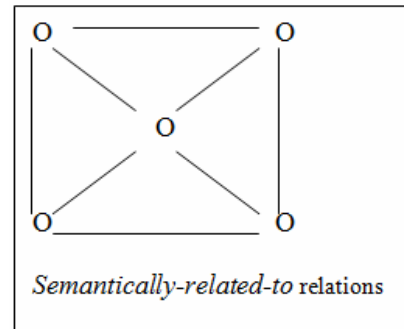


Figure 15. Structure of an operational family of concepts.

Sometimes both types of systems of concepts, namely, is-a systems of concepts and operational systems of concepts will be mixed. In this case a variety of conceptual structures and semantic relations will be intermingled. In the following figure, for instance, we can see the operational family of Contract (contract and its requirements, which are not linked by an inclusion or is-a relation) connected to an is-a hierarchy of the types of form (both form ad substantiam –form required for the validity and the effectiveness of the contract- and form ad probationem –form required to proof the existence of the contract- are types of form):

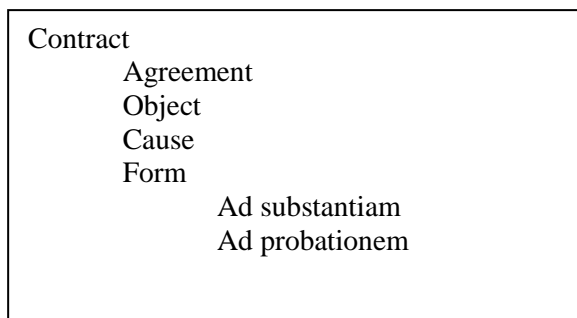


Figure 16. Taxonomical and operational family of concepts.

4.3. Other Forms of Conceptual Organisation in Legal Doctrine

It is possible to think, however, of a global organisation of legal contents in which a broader perspective is taken: this would be the case of the branches of law and legal institutions. At this layer, it is legal norms that are being assembled under a common category because of the subject matter that they regulate, their goals and their underlying values (Renauld 1958: 171-172).

Within the division of the law into different branches, it is necessary to distinguish two issues: on the one hand, the different areas in which the subject matter is divided; on the other hand, the order in which those areas are presented in legal discourse (be it scholarly works or legislative texts). It is natural to think that these two aspects will usually be connected, since from the moment that one starts to think of the different main areas of which the law is composed, it becomes relevant to imagine an ideal order in which those areas are to be presented.

As to the order in which legal materials are organised, there are two possible options: either following the order established by the legislator or introducing a new order that follows some kind of rational organisation. The former is typical of doctrinal works extremely committed to the structure of the original text, whereas the latter is characteristic of systematic expositions of the law, like those of XIXth century German legal scholars.

Among the latter, both Savigny and Windscheid show special concern about the division of the different branches of (private) law and their order of exposition. In the case of Savigny private law is considered to be composed of “family law” (pure and applied), “real rights”, “obligations” and “inheritance law”. Once he has identified these different parts Savigny suggests the order that he considers more suitable for their presentation and he states the need of developing a general part where the common elements to other parts of the law (like legal capacity, modification and extinction of legal relationships, ...) are assembled:

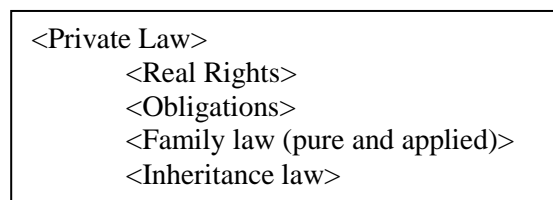


Figure 17. Branches of private law (Savigny 1886: 385 ff.)

Windscheid, at his turn, divides private law into: a general part, composed of “of law in general”, “of rights in general”; and a special part containing “law of property” and “family law”. The first part deals with legal principles applicable to legal norms and to all types of rights, whereas the second part presents firstly, “law of property”, which is successively divided into “legal relationships over things”; “legal relationships between persons (obligations), and “inheritance”; and, secondly “family law”.

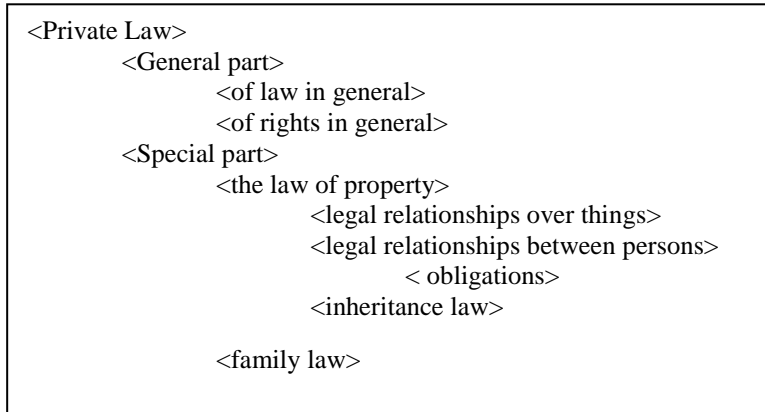


Figure 18. Branches of private law (Windscheid)

Aside from the noteworthy similarities between the two plans of organisation of the law (they clearly share some categories: <Family law>, <inheritance law>, <obligations> and the prevision of a general part) it is important to highlight the differences between these structures and the models of legal concepts presented in the previous sections. Whereas in the former categories refer to subject matters or broad topics (for instance, <family law>), in the latter, categories refer to legal objects with regard to which normative assertions can be made (Ex: <natural person>, “a natural person shall be liable for negligence”).

This leads us to an interesting observation with regard to the idea of “legal classification”, namely, that it is an ambiguous notion for it is used to refer either to the classification of legal objects (concepts), or of thematic areas of the law. This ambivalence of the concept of classification was already noticed by (Pound 1924: 940-941), who pointed to the existing confusion in some doctrinal works, where authors move in their classifications, from one level to another.

A mixture of classification of concepts and subject matter can be observed for instance in Holmes’ classification of duties²², where some branches of the law are attached as subclasses to some of the types of duties, for instance, the “law of prize”, or “criminal law” as subclasses of -duties of all the world- to the sovereign-, even if, clearly, “criminal law” is not a kind of duty, but a subject matter in which duties will be established by the legislator.

²² One of the peculiarities of Holmes classification is the shift of perspective, for he tried to solve the problems in Austin’s taxonomy by suggesting a classification of the law on the basis of duties instead of rights (Kellogg 1984: 6; Kellogg 2007: 67).

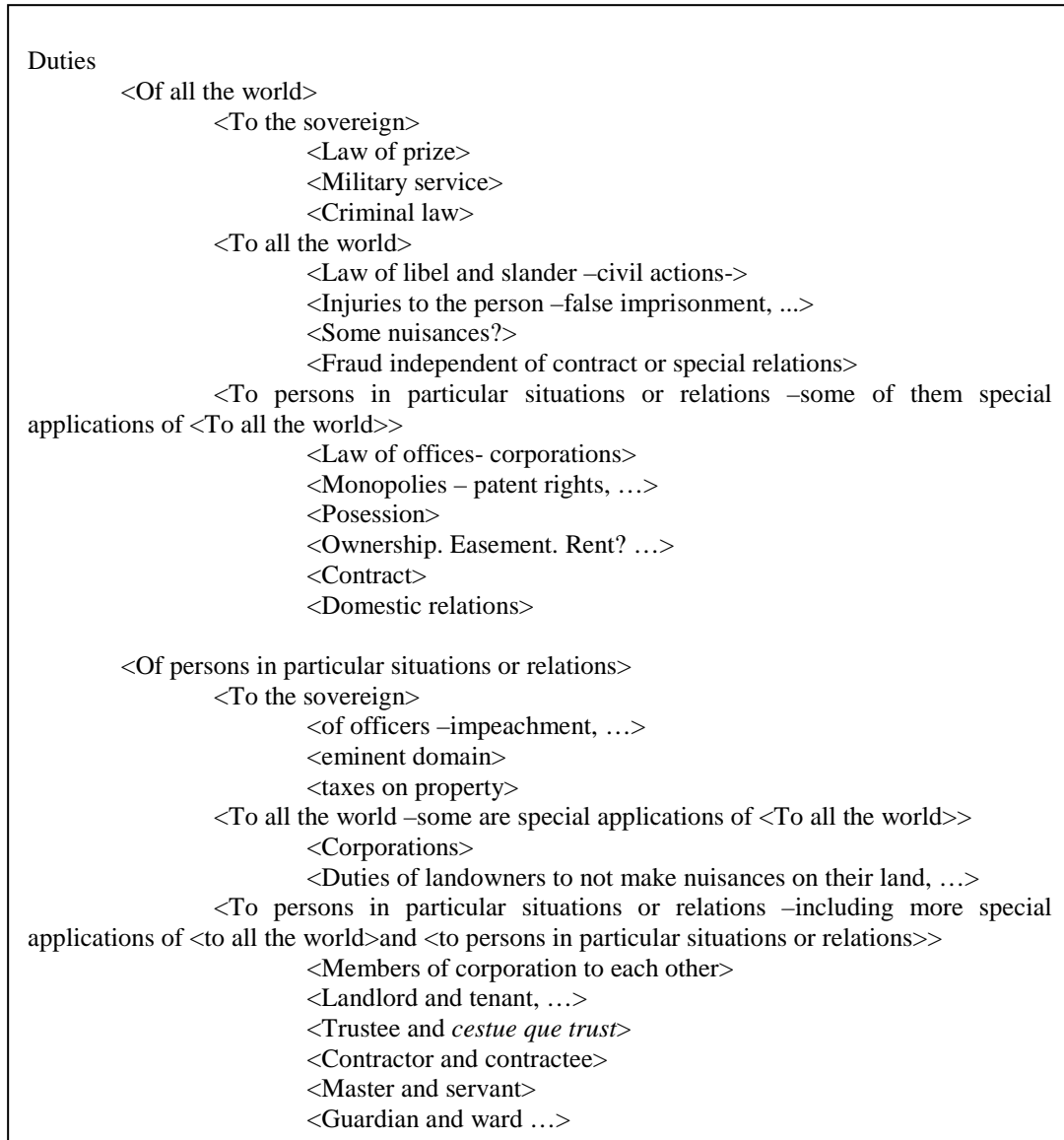


Figure 19. Holmes’ classification 1872. (Source: Herget 1990)

As to the topological structure of this kind of conceptual system it corresponds to a rooted-tree, ideally with a single beginner and with new nodes fanning out from each node. In this sense, thus, it is quite similar to the informational structure of taxonomical is-a systems of concepts. Nevertheless, an important difference exists, since in this case the topological structure does not represent a completely consistent semantic architecture. In other words, the structural links do not stand in all cases for the same semantic relation (since, for instance, even if they are structurally placed in a similar way, “criminal law” and “contract” are not linked though the same semantic relation to the superclass *Duties*).

5. A Mapping between Doctrinal Conceptual Structures and Computational Ontologies

On the basis of the considerations made in previous sections, some conclusions may be drawn:

Firstly, there is a general topological correspondence between doctrinal conceptual structures and computational ontologies. Both are based on a taxonomic or is-a structure with further semantic cross-references that create more complex networks of concepts.

Secondly, in terms of reusability, special attention has to be paid to peculiar structures found in legal doctrine. On the one hand, sometimes legal classification refers to topics or thematic areas (the so-called “branches of the law”) instead of referring to legal objects. On the other hand, sometimes legal classification mixes both “branches of the law” and legal objects. When translated into computational ontologies a clear distinction should be made between both, either creating different ontologies (one for topics and the other for entities) or creating a superclass `Topic` or `Legal_Topic` for the branches of the law, and another one for `Concept` / `Legal_Concept`.

Thirdly, with regard to semantic types of relations, conceptual models of legal theory foresee not only is-a or inclusion semantic relations, but as well functional groups of concepts where semantic links can be of different types.

Fourthly, if we now make a comparison of (i) the systems of legal concepts based on the semantic relation is-a and (ii) operational systems of legal concepts in terms of their suitability for being translated into a formal ontology, several observations can be made:

- the *is-a* are easy to transform, the operational systems of legal concepts are not;
- the reason is that the is-a can be directly represented in the languages for the formal representation of concepts (such as OWL, the main standard for the semantic web), as an inclusion relation linking a class and its sub-class. Nevertheless it is important to note that not all the subclasses identified in a doctrinal classification will be formalised as subclasses in an ontology; some of them might, for instance, be roles instead of entities²³, such as in the case of *citizen* or *free* with regard to the class *person*.
- in the case of operational systems of legal concepts it is not clear how to represent logically the relations linking concepts: what is the logical relation between `contract` and `parties`? Or between `contract` and `form`? It is clearly not an inclusion relation since, for instance, the parties are not a kind of contract, neither are the requirements for the contract to be valid. However, could the relation linking the requirements of a contract with the contract itself be considered a meronymic or part-of relation? Certainly not if we consider the meronymic relation as referring to a material or physical part, but in a wider sense of the notion of part such a conceptualisation might be possible. Indeed, if one understands the parthood relation as one in which a simpler event is part of a more complex event (see Varzi 2003), one could see the event of manifesting one’s agreement through a specific form as an event that *is part of* the more general event of making a contract.

The ontological formalisation of an operational family of legal concepts requires indeed a much more elaborated analysis as it will be shown in the following example, where various classes of a foundational ontology (DOLCE²⁴) are involved in the conceptualisation of a set of legal concepts. Let

²³ The semantics of the is-a link has been an early topic of concern (Brachman 1983). See Guarino and Welty (2000; 2001) on the need of ontologically well-founded is-a links, based on philosophical tools such as the notions of identity, unity, essence and dependence.

²⁴ Descriptive Ontology for Linguistic and Cognitive Engineering (Masolo et al. 2003).

us imagine the operational family corresponding to the concept *Contract*. This set of concepts would include, besides *Contract*, other concepts that are traditionally regarded by doctrine as its requirements: agreement of the parties, object, cause and form.

There is a basic distinction in DOLCE that is useful for our purpose, namely, the distinction between *endurants* and *perdurants*. *Endurants* are entities that are wholly present at any time of their existence, that *are* in time, whereas *perdurants* are entities that *happen* in time, that is, that extend in time by accumulating different temporal parts (Masolo et al. 2003). On the one hand, the only possible relation between endurants and perdurants foreseen by DOLCE is the participation relation: endurants participate in perdurants. On the other hand, perdurants can be related to each other by the *parthood* relation, that is, a perdurant can be part of another perdurant.

From the perspective of legal doctrine, *contract* can be understood either as a legal act performed by the parties with the intention of producing certain effects, or as a set of normative specifications (*lex contractus*) that the parties accept²⁵. For instance a sale contract may be viewed either as an event involving the parties (the event consisting in one party making an offer and the other accepting it) or as the normative regulation the parties state and intend to achieve (good *g* is transferred from party *a* to party *b*, party *b* has the obligation to pay the price *p*, etc.). There is also a third meaning in which the term “contract” is used to denote the document (the sheet of paper or the electronic file) which reports the statements of the parties.

If we follow the first option and we consider that *contract* is a legal act, we could define it ontologically as follows:

Contract: It is a perdurant. It can be seen as an event that has a certain extension in time.

Agreement: It is a perdurant as well. It consists of the action performed by the parties of declaring their will, so we have two declarations of will, understood as speech acts (Declaration 1 + Declaration 2), the contents of which are compatible.

Agreement is part of *Contract*.

Parties (Party 1 + Party 2): They are endurants.

Content of the declaration of will on which the agreement is based, that is, the norms accepted by the parties: It is an endurant. A non-agentive social object.

Form: The requirement of the form has to be understood as a requirement that the declaration of will takes a certain form. It might be a requirement of written form, or may consist, for instance, in the fact that the act is performed in front of a notary. Form could thus be understood as a property of the perdurant agreement.

Object: The object is an endurant to which the declaration of will refers. It can be a non-agentive physical object (such as a house in a contract of sale) or a non-agentive social object (like a right in a contract whereby the right of publication is sold).

²⁵ The distinction between contract as an act and contract as a norm was introduced by Kelsen (Díez- Picazo, Gullón 2001: 29).

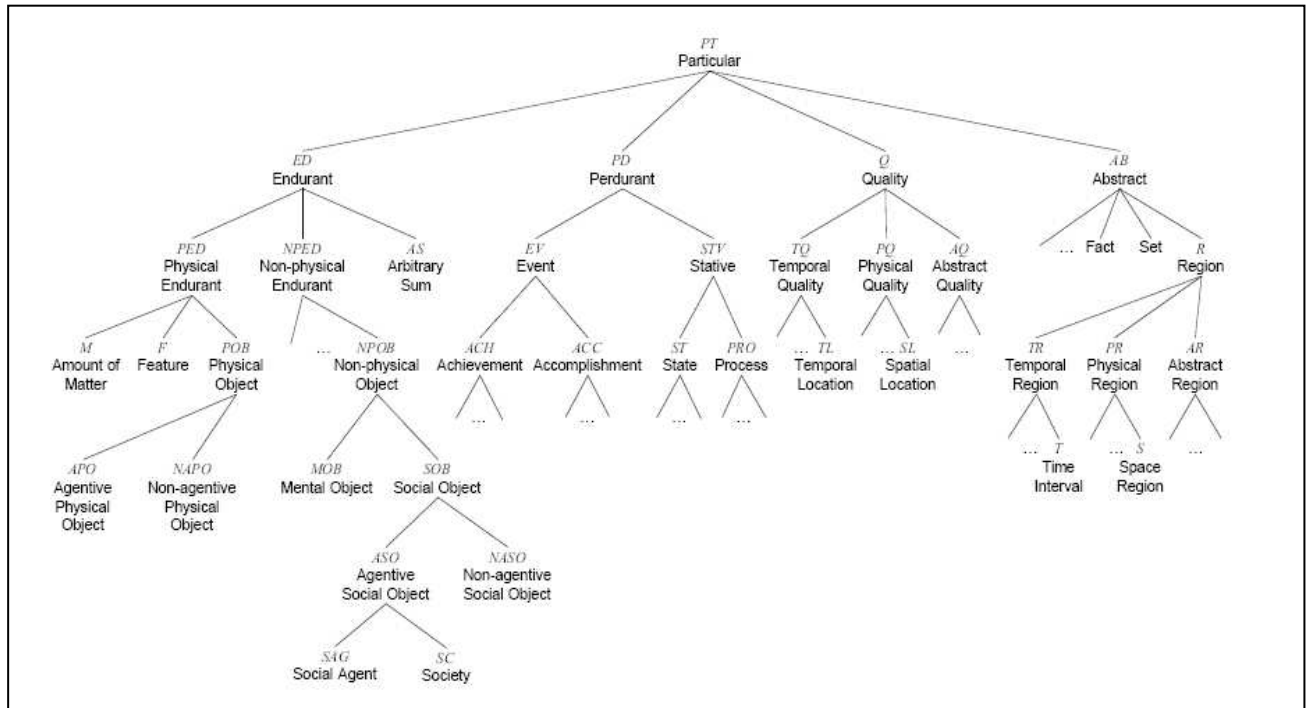


Figure 20. Taxonomy of DOLCE top classes (Masolo et al. 2003: 14), showing the classes endurant and perdurant used to conceptualise the operational family of Contract.

Finally, in order to have effects it is required that the obligation arising from the contract has a Cause. This is a controversial concept, but let us consider the doctrinal approach according to which the cause of a contract consists in the shared goals that motivate the parties into performing the contract. This could be therefore characterised as a perdurant, more specifically a State of the party by which she has certain goals. These goals have to be licit and moral. Since it is difficult for the judge to know what are the internal goals of the parties, sometimes for each kind of contract a generic goal will be assumed. For instance, in the case of sale, the goal will be “acquiring/transferring the property over the thing”, in the tenancy agreement the goal will be “having/giving the legal right to the use of the thing”.

The Cause can then be formalised as a perdurant (of the type cognitive-State) previous or at least simultaneous to the agreement.

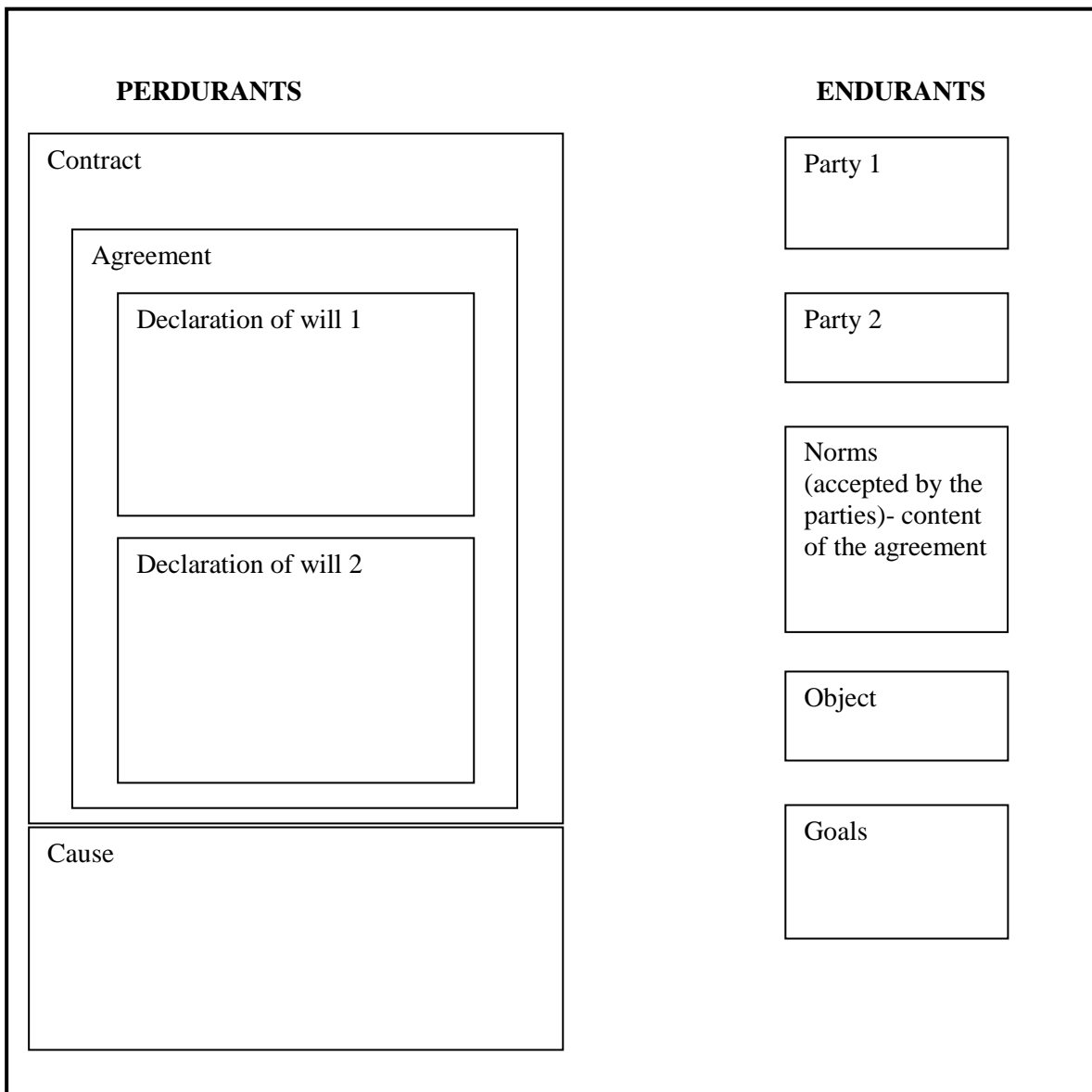


Figure 21. The contract. Endurants and perdurants.

6. Conclusions and Further Work

The main conclusion to draw on the basis of the previous observations is that legal theory and legal doctrine represent a precious intellectual capital with considerable potentialities in the development of computable legal ontologies.

The analysis of the topological and semantic characteristics of systems of legal concepts developed throughout the history of legal thought provides evidence for tracing some intellectual roots of legal ontology-building back to the history of legal thought. Indeed, similarities in the task of conceptual analysis performed by legal scholars and the type of conceptual modelling required by ontology engineering indicate that the former can provide fruitful insights to the latter. Nevertheless, as certain particularities of legal classifications previously shown indicate, reuse of doctrinal constructions is feasible only provided that their underlying formal structure is carefully analysed in order to translate it into appropriate logical-ontological forms, avoiding thus confusion between levels (concept vs. topic areas) and semantic relations (taxonomic vs. other types of semantic relations).

A hypothesis to be studied in further work is that systems of concepts provided by legal doctrine might be specially helpful for the construction of core legal ontologies, namely, ontologies providing general legal concepts, being used in different areas of the law. In fact, there are relatively few general legal concepts, which are often precisely characterised, so that their content can be expressed through the formal languages of computational ontologies. Furthermore, linking the concepts of a core legal ontology to doctrinal constructions would clarify the legal presuppositions determining certain choices in ontological modelling (ontological commitments). Finally, a core legal ontology would gain a high degree of justification, legitimacy and appeal, if it could be shown that it corresponds to systems of concepts used in legal doctrine, by leading authors.

In domain ontologies, concerned with the concepts peculiar to particular areas of the law, the reuse of doctrinal constructions might have disadvantages if compared to semi-automatic building approaches based on NLP techniques applied to big corpora of legal texts. Firstly, because the number of concepts required by domain ontologies is usually higher than in core legal ontologies and, secondly, because usually systems of domain legal concepts built by doctrine are not very well specified and consequently their translation into formal languages becomes more difficult. Nevertheless, domain ontologies can draw inspiration from doctrinal constructions in order to structure and disambiguate lexical units extracted in a bottom-up fashion from big corpora.

Further inquiries will deal with the conceptual networks emerging from doctrinal works by applying the graph theoretic modelling paradigm, in order to see to which extent new conceptual graphs not subject to any hermeneutic external control arise. This could promote new analytical approaches to the traditional readings of legal doctrine and further enrich legal ontological models.

7. References

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